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CONTENTS

VEGETABLE GROWING

ORNAMENTAL PLANT & LANDSCAPE ARCHITECTURE

FRUIT GROWING & TECHNOLOGY

VITICULTURE & OENOLOGY

BOTANY & PHYSIOLOGY

OTHER FIELDS

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VEGETABLE GROWING

STUDIES CONCERNING THE FEATURES OF THE MAIN QUANTITATIVE CHARACTERS OF THE MELON VARIETY "BRILIANT"

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ABSTRACT

The variety BRILIANT belongs to the group of middle-early varieties, with a vegetation period of 80-90 days (60 days from planting). The medium weight of the fruits is almost 0,8-1,8 kg. The shape of the fruit is round, slightly oval. The colour of the fruit's skin is green (during its development) and yellow with greenish variegation (at physiological maturity stage). The colour of the flash is green-whitish, the flash is juicy, perfumed, tasty, delicious, representing almost 80% from the entire weight of the fruit.

The fruits are well attached to the plant. Are resistant to transport and storage.

The seeds seem like the cucumber seeds, they can be distinguished one from each other by the fact that the melon seeds have the basis is more plane, the colour is uniform white –yellowish. In one gram are 30-36 seeds. The number of the seeds from a fruit is almost 410-550, with a total weigh of 20-24 g seeds/fruit.

INTRODUCTION

The seed's quality represents one of the main parameters that can positively or negatively influence the accomplishment of the objective of obtaining higher productions at vegetable crops. As a result of the practical importance of seed values, it is absolutely necessary to get thoroughly into the nature of bonds that exists between the seed quality, as synthetic feature and the main factors capable to interact with it.

The utilisation of the statistic-mathematics methods in the experimental research, along with its importance in the development and perfecting of breeding and selection activity, offers also the possibility of a more detailed understanding of the biologic material characters. In the same time these methods allows obtaining of many theoretical information that are essential for the perfecting of the practical activity.

Even if through detailed observations, the elements of production were established according with the anatomo-morphologic particularities of each species, the practical experience proved that in many cases the same element of production contributes differently to their quality, due to the intervention of a feature that is strictly depending on the variety of hybrid.

In order to support this statement, a viable example is the correlation between the seed size and specific weight, expressed through germinative energy and strength.

For a better leading of the selection process, necessary for the maintenance of characters and features variability of BRILIANT variety in the limits of specificity and authenticity, the selection was made in the limits $x \pm s$ established for each character.

The experiments were accomplished at Vegetable Research and Development Station Bacau, in the background of selection for the maintenance of the melon variety BRILIANT.

The main purpose of the researches was the exact determination of quantitative characters variability in the descendents field, in order to maintain the genetic integrity of the variety.

OBJECTIVES

The conservative selection process must start from a detailed understanding of the certification characteristics of the variety.

The BRILIANT variety belongs to middle-early varieties group, with a vegetation period of 80 – 90 days. The medium weight of the fruits is almost 0,8-1,8 kg. The shape of the fruit is round, slightly oval. The colour of the fruit's skin is green (during its development) and yellow with greenish variegation (at physiological maturity stage). The colour of the flash is green-whitish, the flash is juicy, perfumed, tasty, delicious, representing almost 90% from the entire weight of the fruit.

The fruits are well attached to the plant. Are resistant to transport and storage.

The seeds seem like the cucumber seeds, they can be distinguished one from each other by the fact that the melon seeds have the basis is more plane, the colour is uniform white – yellowish. In one gram are 30-36 seeds. The number of the seeds from a fruit is almost 410-550, with a total weigh of 20-24 g seeds/fruit.

MATERIAL AND METHOD

The biologic material is represented through the melon variety BRILIANT.

During the vegetation period, different observations were made concerning the development of the main phenophases (sowing – rising; rising – the appearance of the first fruits; the appearance of the first fruits – physiologic maturity).

The determinations were made at the physiologic maturity, at 100 families targeting the following characters:

- the fruit's height (cm)
- the fruit's diameter (cm)
- the fruit's shape indices;
- the fruit's weight (kg);
- the fruit's pulp thickness (cm);
- the fruit's skin thickness (mm);
- seeds number per gram;
- the number of seeds per fruit;
- the weight of the seeds from a fruit.

For each studied character statistical indices were calculated:

- arithmetic media (x);
- variance amplitude (a);
- variance (s^2);
- standard deviation(s);
- variability coefficient (s%);
- dispersion (k - x ± s).

RESULTS AND DISCUSSIONS

The variability of the main studied characters at melon variety BRILIANT, is presented in table 1.

Table 1

The variability of the main characters - variety BRILIANT

No. crt.	Analysed character	Media (x)	Standard deviation (s)	Variability coefficient (s%)	Variability limits (k)
1.	fruit's height (cm)	15,05	1,43	9,5	12,4-18,7
2.	fruit's diameter (cm)	14,08	1,5	10,0	12,5-18,8
3.	fruit's shape indices (h/d)	1,02	0,04	4,01	0,95-1,13
4.	fruit's weight (kg)	1,27	0,22	17,6	0,9-1,85
5.	fruit's pulp thickness (cm)	4,5	0,3	6,6	3-6
6.	fruit's skin thickness (mm)	3,0	0,28	9,3	2-4
7.	seeds number per gram	33,0	1,75	5,3	30-36
8.	number of seeds per fruit	480	51,0	10,6	410-550
9.	weight of the seeds from a fruit (g)	22	3,5	15,9	20-24

1. The fruit's height (cm)

In the analysed period, this character had variation limits between 12,4-18,7 cm, with a media of 15,05 cm. The variability coefficient values were under (s = 9,5%), which demonstrate the fact that for this character the fruits were uniforms, presenting a small variability.

2. The fruit's variability (cm)

The statistic population analysed had variation limits between 12,5-18,8 cm. The value of arithmetic media, calculated for a 3 year experimental period was 14,8, and the variability coefficient s% = 10. So, for this character also the fruits had a low variability.

3. The fruit's shape indices

Calculated through the relation height/diameter, had values between 0,95-1,13, with an arithmetic media of 1,02 and a variability coefficient = 4,01%, which underline the fact that the fruits of this variety are uniforms.

4. The fruit's weight

The variation limits were situated between 0,9-1,85 kg, with a media calculated for three years of 1,27 kg. The variability coefficient was 10-20% (s = 17,6%), presenting a middle variability.

5. The fruit's pulp thickness

The melon population analysed for this character had the variability limits between 3-6 cm, with a variability coefficient of 6,6%, the character variability being small.

6. The fruit's skin thickness

This character was determined in the fruits post-maturation stage. The variability limits were between 2-4 mm, with a media of 3 mm.

7. The number of seeds per gram

The variability limits were between 30-36, the media of the three experimental years being of 33, the variability coefficient under 10% (s = 5,3%), proving a middle variability.

8. The number of seeds per fruit

At this character, the values were between 410-550, with a media of 480 seeds/fruit. The calculated variability coefficient had a value of 10,6%, indicating a middling variability.

9. The weight of the seeds from a fruit

The variability limits were between 20-24 g, with a media per three years of 22 g/fruit. The variability coefficient was 15,9%, which a middling variability.

CONCLUSIONS

Keeping in mind the fact that the researched features are quantitative, so polygenic controlled, it is absolutely necessary to accomplish a rigorous selection, with a large number of elite plants, chosen in order not to ”deviate” the population in a certain direction through the restriction of the gene number, narrowing the hereditary basis and changing the initial genetic structure.

Starting from this demand, a strong attention must be paid for the biotypes that exists in the variety and the maintenance of their proportion.

The uniformity of this variety fruits is proven by the form indices which have a small variability (s = 4,01%).

The dates previously presented underline the fact that, through a correct leading of the selection process, the BRILIANT variety was maintained in normal variability limits.

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THE EFFECT OF SOME MODERN MATERIALS UPON THE TOMATOES PRODUCTION CULTIVATED ON ORGANIC SUBSTRATUM IN NO HEATED GLASSHOUSE

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Keywords: tomatoes, organic substratum, no heated glass house

Abstract

Experiments made regarding the tomatoes culture on the mixture of organic materials in no heated glass house shows the real technical difficulties regarding the obtaining and homogeneous fertilization of these substrata.

The transplants were made in alveolar peat pots Jiffy-7 with 42 mm diameter. Those pots were made from dehidratated peat, sterilized with water steam, with a full content of nutritive elements and with a pH good for substrata recommended for transplants.

The substratum (peat), made by Finn Society BIOLAN with the indicators B3L, fertilized PG-Mix, which was used as substratum for the culture. The watering was made with complex chemical fertilizers, soluble ones from Holand with the Scotts`brand.

The fertilization watering was realized with Queen Gill installation, where the drops were at the terminals of tubs tip spaghetti.

Hybrids F-Abellus, Alboran, Cibelia, Birdie, 73-430RZ made in Rijk-Zwaan-Olanda where used in experiments and as control was used Arletta F.

Materials used to transplant production and also as a culture substrata have performing qualities which determined to obtain some parameters of production which could be appreciated as very good comparison with others obtained in our country;

] Between these materials it can be put out peat Bidan B32, soluble complex fertilizers tip Unisol and Jiffy-7 pots use for transplants.

Between hybrids from the experiment Cibella F1 and Birdie F1 from Rijk-Zwaan-Holand are the best.

INTRODUCTION

Experiments made in early years at University of Agronomical Sciences and Veterinary Medicine Bucharest regarding the tomatoes culture on the mixture of organic materials in no heated glass house shows the real technical difficulties regarding the obtaining and homogeneous fertilization of these substrata (Ruxandra Ciofu şi colab., 2003, Atanasiu N. Popescu V., Chira A., 1997).

The absence of appropriate necessary materials determine the use of some improper substrata from the point of view of pH, air and water capacity retained of mineral elements in necessary quantities and sometime also from the phitosanitary state.

Similarly problems were also in producing of transplants (Atanasiu N.,2002, Atanasiu N., Luchian V., Popescu V., 2001).

Also, the evolution of tomato cultivar assortments represented a strong motivation to test their behaviour in the cultivated conditions made for that culture system.

MATERIALS AND METHODS

To produce transplants and for tomato culture were used materials supported by SC Holland Farming Romania

The transplants were made in alveolar peat pots Jiffy-7 with 42 mm diameter. Those pots were made from dehidratated peat, sterilized with water steam, with a full content of nutritive elements and with a pH good for substrata recommended for transplants.

The substratum (peat), made by Finn Society BIOLAN with the indicators B3L, fertilized PG-Mix, which was used as substratum for the culture have the next parameters:

- composition: 80% red peat + 20% black peat;
- density 1,3 kg nutritive elements/ m3 peat;
- nutritive elements are: N-12%; P- 15%; K-27%; B- 0,53%; Cu – 0,15%; Zn-0,04%, Mn- 0,16%; Fe -0,09% ;
- pH=6
- granulation – 95% 0-2,5 mm dimension

The watering was made with complex chemical fertilizers, soluble ones from Holand with the Scotts`brand. The complex fertilizers were:

-Universol Blue (18 – 11- 18-2 MgO with microelements)

-Universol Violet(9 – 9 – 27- 2 MgO with microelements)

To assure a quickly dissolved and a total absorption in plants, Universol fertilizers have in their composition citric acid and the microelements are EDTA-compounds.

To assure the optimum rate N/K and the Ca necessary at the prepared of fertilization solutions were used another two classical fertilizers, respectively: ammonium nitrate and calcium nitrate.

The culture was planted in individual sacks with a 10l volume, placed in a vertical position on a place technically prepared with the distance between the rows of 80 cm and between the plants a distance of 40cm on the row (3,12 plants/m^2).

The fertilization watering was realized with Queen Gill installation, where the drops were at the terminals of tubs tip spaghetti.

Hybrids F- Abellus, Alboran, Cibelia, Birdie, 73-430RZ made in Rijk-Zwaan-Olanda where used in experiments and as control was used Arletta F.

Plants were radically tailored and mumped at 6 flowers.

RESULTS AND DISCUSSIONS

In table 1 are presented some dates about the number of flowers and the percent of forth buds at the first four inflorescences from the total number in the plant.

It could be seen a better percent of forth buds at the first and second blossoms. Diminish values are for the third and fourth inflorescences because the temperature from the interior of glasshouse couldn’t be maintained in the acceptance limits for tomato plants in the period of blossom and put forth buts of the inflorescences.

The percent of put forth buds assure the perspective of an efficient technological intervention (the temperature control and the pollination with humble bee) and the consistent provision of growing the productivity of farmers which these ones working on organic substrata in unheated glasshouse.

The main elements regarding the production and tomato quality (from the point of view of medium weight) are presented in table 2.

To establish of production there are cumulated the harvested from the 6 blossoms.

The new assortment was put out because of fruits with a medium weight superior to the control Arletta.

From this point of view it could be remarked the hybrids Birdie F1 and Cibellia F1. These hybrids show high productions on the plant respectively 5kg and 4.48kg which assure a level of production of 15,97kg/m2 at Cibellia F1 and 13.98kg/m2 at Birdie F1.

It can be mentioned that there were any deficiencies on the vegetative part of plants and also on the fruits.

CONCLUSIONS

- Materials used to transplant production and also as a culture substrata have performing qualities which determined to obtain some parameters of production which could be appreciated as very good comparison with others obtained in our country;
- Between these materials it can be put out peat Bidan B32, soluble complex fertilizers tip Unisol and Jiffy-7 pots use for transplants;
- Between hybrids from the experiment Cibella F1 and Birdie F1 from Rijk-Zwaan-Holand are the best;
- It could be recommended to extend in tomato farms in glasshouse without heat materials and hybrids mentioned in these conclusions.

ACKNOLEDGEMENTS

All materials use in experiment were from SC Holland Farming Romania.

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Tables

Table 1: The number of flowers, fruits and the percent of put forth bud at the first inflorescences Tomato on organic substratum, USAMV Bucharest, 2005

No of inflorescences	Sortiment	Hybrids F1					
		Abellus	Alboran	Cibellia	Birdie	73-430 RZ	Arletta
1	Flowers	7.5	7.1	7.1	6.0	5.6	5.3
	Fruits	7.5	7.0	7.1	6.0	5.6	5.1
	% put forth buds	100.0	98.5	100.0	100.0	100.0	96.2
2	Flowers	7.2	6.0	9.0	6.0	6.5	5.6
	Fruits	5.2	5.0	8.0	3.0	6.5	4.9
	% put forth buds	72.0	83.0	88.8	50.0	100.0	87.5
3	Flowers	5.0	6.0	7.0	6.0	9.4	6.0
	Fruits	3.0	2.0	4.0	3.0	4.0	4.2
	% put forth buds	60.0	33.3	57.1	50.0	42.5	70.0
4	Flowers	6.0	6.5	7.6	6.0	7.2	5.8
	Fruits	2.6	3.0	3.5	2.0	3.6	2.1
	% put forth buds	43.0	46.1	46.1	33.3	50.0	36.2
Total 1-4	Flowers	25.7	25.6	30.7	24.0	27.7	33.6
	Fruits	18.3	19.0	23.6	14.0	17.1	16.2
	% put forth buds	71.2	74.2	73.6	58.3	68.6	71.8

Table 2: The principal qualitative and quantitative elements of the production (6 inflorescences) Tomato on organic substratum, USAMV Bucharest, 2005

Variant	Hybrid	Fruits/plant	Medium weight, g/fruit	Production		Difference between production	
				Kg/plant	Kg/m^2	Kg/m^2	%
1	Arletta	29.3	118	3.46	10.79	-	-
2	Abellus	31.4	134	4.20	13.10	2.31	21.4
3	Alboran	32.2	131	4.22	13.16	2.37	21.9
4	Cibellia	36.1	142	5.12	15.97	5.18	48.0
5	Birdie	30.7	146	4.48	13.98	3.18	29.5
6	73-430 RZ	32.6	127	4.14	12.91	2.12	19.6

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EFFECT OF MULCHING WITH VARIOUS MATERIALS ON CERTAIN TECHNOLOGICAL FACTORS AND EARLY POTATO PRODUCTION

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Keywords: early potato, mulch

ABSTRACT

Soil mulching in potato early crop has positive effect on some yield characteristics. Also, the mulching has a great influence on number of weeds.

This paper reflect the mulching effect using different materials on production level and the degree of weeds in early potato crops**.**

INTRODUCTION

By cultivating early potato can be performed many technological interventions whose effects must accentuate the harvesting earliness and positively influence production level and quality. Among possible technological interventions is numbered the field mulching.

By mulching the field temperature and humidity soil conditions are improved, water loss through evaporation on soil surface is reduced and weeds keep down. The research regarding the effects of various mulch materials on early potato production is based currently on occurrence in Romania of a reach offering materials especially made for this work.

This paper presents the mulching effect of early potato culture on soil temperature, production and its quality.

MATERIALS AND METHOD

The experience was performed within the experimental field of vegetable crops, inside USAMV Bucharest, put on reddish-brown soil, with high weed level, including perennial weeds.

Within the experience the variants listed in Table 1 were studied.

By carrying out the experience following materials were used:

- **tubers** (seed material) from early cultivar Agatha
- **Agryl** – porous material made of propylene fibres, recommended for protecting the early cultures and for soil mulching, with following properties and uses:
- is permeable to water and air, enabling at the same time rain water to penetrate the protected surface, excessive humidity to be eliminated under foil and exchange of gases between the soil and air;
- favours increasing the temperatures within the spaces and on protected fields, with positive consequences on earliness production;
- is not penetrated by certain insects harmful to the protected cultures;
- due to UV additives can be used for 3-5 culture during 2-3 years;
- it is produced in different variants of thickness, consistency and colour (white or black);
- depending on its properties can be used for protecting the cultures under low tunnel, early cultures with low size in open field or for mulching.

Polyethylene foil made especially for mulching, coloured in white, dun or black, UV additive, with very high mechanical resistance. This foil can be installed as mulch either manually, or mechanized, being perforated before cultivating or in the same time with this operation. Within the experience the mulch has been performed by means of covering the field after planting of early potato tubers.

OBSERVATIONS AND DETERMINATIONS

During the experiments were performed observations and determinations regarding:

- calendar dates of occurrence and running of main fenophases;
- dynamics of soil temperature;
- weed level;
- production and its quality;

RESULTS AND DISCUSSIONS

Among the results obtained after performing the observations and determinations listed above we present selectively the most important and unprecedented ones:

The dynamics of soil temperature was obtained by means of daily recording of the values daily measured, at 8 AM and 13 PM, at a depth of 5 and 10 cm. Synthetic data obtained after processing these observations are listed in Table 2.

The data listed in this table mark out following aspects:

The highest temperature has been recorded for Agryl mulched field, due to the fine porosity of this material that reduces very much the heat loss from soil.

White plastic mulch has a similar effect to Agryl cover. The temperature differences between the two variants are with 1-2 degrees higher for the white plastic mulch for the both depths at what the observations had been performed.

Black plastic mulch maintains the soil temperatures parameters at values lower or equal with the ones recorded for Agryl cover or white plastic mulch.

Moderate temperatures and temperatures with small fluctuations from the black plastic mulched soil correlate very well with the soil temperature requirements for potato.

Black plastic mulch had a particular effect on weed control by destroying the weed. For this variant the weed level was zero, while for the other variants the weed level was the same as for the variants without breeding regarding the weed number and much higher regarding its mass.

The data regarding nest production (Table 3) set off following important aspects:

- the tuber number per nest and especially their average weight for the black plastic mulched variant are much different from the similar parameters of the other experimental variants. The black plastic mulched variant is characterized by a small tuber number with high average weight. The small tuber number is due to the reduced height of the billon, which was not remade in order not to affect the plastic.

We consider necessary to study thoroughly certain aspects regarding the possibility to plant the tuber deeper in order to influence the tuber number per nest.

CONCLUSIONS

- The plastic mulch of the field contributes to the improvement of soil temperature, with positive consequences on total production, its quality and decreasing weed levels.
- Contrary to certain points of view which affirm the thesis of increasing the temperature of black plastic mulched soil, the black plastic created and maintained a soil temperature below the one of white plastic or Agryl mulched soil.
- The black plastic mulch had a total effect on weed control.
- The black plastic mulch influenced positively the early potato tubers quality by increasing their average weight subject to a satisfactory level of total production.

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Tables

Table 1

Experimental variants

Early potato, USAMV Bucharest 2005

Var. no.	SPECIFICATION
1	No soil works
2	Two hoeing and earthing
3	Agryl mulching
4	Black plastic mulch
5	White polyethylene foil

Table 2

Temperature in mulched soil with different foil types

Early potato, USAMV Bucharest 2005

Temperature interval	VARIOUS MULCHING MATERIALS					
	AGRYL		BLACK FOIL		WHITHE FOIL	
	5 cm	10 cm	5 cm	10 cm	5 cm	10 cm
12-15/04	16	14	14	12	15	14
15-20/04	18	15,5	16	15	19	17
20-25/04	24	18	17	14	25	19
1-5/05	17	16	16	15	21	17
5-10/05	22,5	21	22	19	23	21
10-15/05	21,5	20	21	20	22	21
15-20/05	21	19,5	22	20	24	22

Table 3

Tubers number, average weight and yield per nest

Early potato, USAMV

Var. no.	Specification	Tubers/nest average	Tuber weight Variation limits (g)	Tubers weight average (g)	Yield per nest (g)
1	No hoeing and earthing	9.4	4.4-51.3	22.8	215
2	Two hoeing and earthing	12.0	11.6-54.4	35.4	425
3	Agryl mulching	7.9	4.5-28.2	25.0	200
4	Black foil mulching	6.1	8.9-99.6	46.1	277
5	White foil	9.0	5.1-48.0	24.4	220

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LOTUS TETRAGONOLOBUS L. – A NEW SPECIES OF PERSPECTIVE FOR VEGETABLE ASSORTMENT DIVERSIFICATION IN ROMANIA

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Keywords: Asparagus pea, Winged pea

ABSTRACT

Lotus tetragonolobus – a herbaceous annuale legume was observed and there are data regarding the main parametres of vegetative development and fructification; also, there are presented the fruit anatomy.

INTRODUCTION

Great opportunities of Romania's international relationships in the last years determined the circulation of scientific and technical information and the specific biological material for Vegetable crops.

From the large volume of information in this field one vegetable species of great class cultivated and consumed both by West European and North American countries catch us the attention and interest for vegetables assortment diversification – *Lotus tetragonolobus* L. (asparagus pea, winged pea).

The main characteristics, features and parameters of the species previously mentioned are presented in national premiere for Romania in this paper.

MATERIAL AND METHOD

The scientific name of the plant we present is: *Lotus tetragonolobus* L. (Leguminosae Family), synonym: *Tetragonolobus purpureus*. Its common name in various languages: English - asparagus pea, winged pea; French – pois asperge; Romanian – mazare asparagus, mazare aripata. The asparagus pea is indigenous to the Mediterranean region of Europe and the Near East.

Brief history: *Lotus tetragonolobus* was mentioned in written sources as cultural species since the beginning of XVI Century in South Italy. It was introduced in Great Britain at the end of the same century, first as ornamental plant and later than as culinary plant. In North America was revealed as culinary plant in the first half of XVII Century. In Romania was mentioned for the first time in 2000 with the common name from English language – "Asparagus pea" (Cornelia Atanasiu, N. Atanasiu – O monografie a mazarii – Ed. Verus, Bucuresti, 2000).

Lotus tetragonolobus (L) – (asparagus pea or winged pea) – is neither related with the pea (*Pisum sativum* L.) nor asparagus (*Asparagus officinalis* L.). The species common name describes the aspect of the edible part (pod) similar in features with the pod of mangetout pea and also the asparagus shoots like flavour of the pods.

Lotus tetragonolobus is an herbaceous annual legume and its roots create nodulation accomplished by the soil bacterium Rhizobium. The above ground part of the plant is formed by numerous shoots (10-15/plant) which develop parallel with the soil; their peaks grow erect

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or semi-erect. The plant has small trifoliate leaves and beautiful ornamental brick-red flowers, which are born in pairs and they are hermaphrodite, with self-pollination.

The pods develop after 65-70 days starting from germination and they have a tetrahedral transversal section. On each of the four edges the pod has longitudinal wings, with ruffled edges, which give them a pleasant and attractive look. The whole pods can be consumed when they reach a size of 2,5-4 cm. Some of their biochemical compounds revealed a similar nutritive value with the green bean pods.

The pods may be steamed or boiled and then served as simple garniture or among other vegetables in complex dishes. The special specific flavor of *Lotus tetragonolobus* pods do not recommend them to be mixed with sauce that could change their taste or aroma.

The flowers are suitable for eating too and they can be used as ingredients for salads and garniture. The mature peas have been employed as a coffee substitute.

Lotus tetragonolobus L. – is sensitive to temperature. The seeds are middle in size with the 1000 seed weight of about 40g and they rise in 2-3 weeks at 10-12 ^{o}C. In order to reduce the time for seed germination these can be soaking before sow.

RESULTS

The results regarding the main parameters of vegetative development and fructification of *Lotus tetragonolobus* L plants at the USAMV Bucharest on July 2005 are presented in the following part.

The plants presented a number of 9-13 of principal shoots with a length of 25,6-50,4 cm. The number of secondary shoots developed on the tested plants was about 19-37 with a length between 3 cm and 47 cm (Table 1). The fructification of asparagus pea plants revealed a mean number of pods per plant of 17,8 with a variation between 14 and 23 pods harvested per plant.

The analysis of the main biochemical components of the pods showed that for 100g of fresh product correspond 3,56g of crude proteins, 2,29 g of total carbohydrates and 1,43 g of reduced carbohydrates (Table 2).

Cultures can be established by direct sowing in the field or by planting the seedlings after 3-4 weeks from the last frost. The asparagus pea plants require light soils, full sun and irrigation to succeed. They can be sowed or planted as edges for ornamental reasons (30/20 cm, in zigzag).

The pods can be harvested during the entire the warm season. First harvest will be after 70-75 days from germination. In 2005, the first harvest was made on 20 July from a culture which was started by planting seedlings in field on May 5.

Lotus tetragonolobus fruit arise from a monocarpelar gynoecia with a superior ovary and it is a legume with four wings. In the internal structure of the young legume the pericarp is differentiated into three parts, distinct morphologically: the epicarp, the mesocarp and the endocarp.

The epicarp consist of an epidermal and subepidermal layer with thick celluloses walls (fig.1); the mesocarp has 3-4 layers of parenchymatic cells; the endocarp is a sclerenchymatic one and present a different orientation of the microfibrils in two wall layers; that facilitate the dehiscence of the fruit.

The fruit wings are foliaceus structures and they consist of 2 epidermis (upper and lower one) and a chlorenchyma between this two.

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Table 1. Pods characteristics for *Lotus tetragonolobus L.*

Class	Diameter (mm)	Pods weight (g/pod)	Wings width (mm)	Seeds number	Observations
20-25 mm	2.3-2.5	0.8-0.9	1-1.2	4	Optimal phase for consume
30-40 mm	3-4	0.9-1.6	1.2-1.5	5-6	Optimal phase for consume
40-50 mm	3.5-4.2	1.2-1.8	1.5-2	6-7	Maximal limit of size for consume
50-55 mm	4-4.5	2.1-2.3	1.6-2	7-9	Maximal limit of size for consume
55-60 mm	5-6	2.4-2.9	2-2.2	9-10	Physiological maturity
60-70 mm	6-7	2.9-3	2.2-2.5	10-11	Physiological maturity
Over 70 mm	6-7	3.1-3.2	3-3.5	12-13	Physiological maturity

Table 2. Main biochemical components (g for 100 g of fresh product)

Pea species	Total carbohrydrates	Reduced carbohrydrates	Crude proteins
Asparagus pea (Whole pods)	2.290	1.430	3.560
Mangetout pea (Whole pods)	3.058	3.446	3.269
Sugar pea (Whole pods)	2.595	3.296	3.681
Green pea (Green seeds berries)	-	5.184	4.217

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PRELIMINARY STUDIES IN THE POSSIBILITY OF USING FOR DECORATIVE PURPOSES SOME VARIETIES OF PEPPER

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Keywords: *Capsicum annuum,* varieties, decorative pepper.

INTRODUCTION

Of all the Solanaceae plants, pepper can be used the most for ornamental purposes.

Genus *Capsicum* includes 5 species: *annuum*, *frutescens, chinense*, *pubescens* and *pendulum*. The plants belonging to *annuum* subspecies *fasciculatum are* recommended mainly for decorative species purposes.

The multitude of varieties, varieties and hybrids, and the characteristics of this species, allow a successful use of the pepper for ornamental purposes. As a decorative plant characterized by rich bushes, variety of forms and colours of fruit, the pepper may be used in the garden, on terraces or balconies, in flowerpots or in flats during wintertime.

The preservation of the decorative aspect for a long time is another reason for using the pepper for ornamental purposes. Decorative pepper plants may be used as multi-annual indoor species. A plant decorating the balcony in summertime, when it reaches fructification, may be transplanted in different flowerpots and it continues its vegetation during wintertime in the flat. In these conditions, fructification is almost permanent, with flowers and fruit simultaneously at different maturity phases (different colours).

The pepper can be used for ornamental purposes also as a dry fruit, in various flower arrangements.

ORGANIZATION OF EXPERIMENTS, MATERIAL AND METHOD

The experiments conducted in 2005 had in view the characteristics of different varieties of pepper and their behaviour in during vegetation in garden conditions to the end of obtaining some plants haring decorative fruits for a period as long as possible.

The objectives of the researches included the following general aspects:

- establishing the duration of the main phenological phases and the vegetation period characteristic to each cultivar;
- valuating the ornamental quality of a different cultivars under the conditions of field cultivation.

Plants of decorative pepper belonging to subspecies *annum var.microcarpum* were used as biologic material. These are characterized by: a shorter stem than all the other subspecies, strong ramification of bushes, smaller, lancet-shaped, dark green leaves, white or white-violet flowers, small fruit, with different forms (spherical, conical, long, oval), various colours (yellow, green, orange, dark violet, red), which can have a pendulated or erected position.

Most of the seeds from the pepper plants used in the biological, technological and decorative study were bought from the market, part from the Vegetables Department of the Horticulture School of Bucharest (*Chilli de Cayenne*), and from the local variety of Banat –

Serbia region (*green pepper of Banat*). The varieties *Peperoncino, Ukrasne papricice, Ametist* were bought from the Guerresi Sementi SRL and Hortus Sementi companies.

The cultures were created using seedlings obtained in warmhouse, by sowing in cases on the 4th of March and replanting the young plants at real leaves phase. The nutritive soil for sowing and re-planting in flowerpots was made up of: garden soil, fertilizers and sand (3:1:0.5).

Planting in the field was done on 26 May, when the seedlings were of 12-15 cm high, in rows at 70/30 cm.

The works cultivation technology consisted of: watering 2-3 times per week; fertilizing at 10 days by using nutritive solutions, complex mineral fertilizers of N P K (1.5:1:0.75) and microelements in concentration of 0.5 %; phytosanitary treatments with fungicides and insecticides (Rubigan 0.03 %, Previcur 0.2 %, Baileton 0.05 %, Fastac 0.03%).

During the culture period, observations and determinations on phenology, plant growth and their decorative potential were made. Measurements were done on 10 plants for each cultivar.

OBTAINED RESULTS

1. The results on producing decorative pepper seedlings

The studied varieties differ in terms of number of days necessary for going through all the characteristic phases of producing seedlings (table 1).

In general, the plants emerged over 23-26 March, in an interval of 9-12 days since sowing (table 1). The first to emerge were the seeds of variaty *Ametist* and *Bolivian rainbow* (9 days) and the last – the variaty *Peperoncino* and *Ukrasne papricice* (12 days).

Small plants growth after emerging was different, and thus the number of days since emerging to planting ranged between 61 – 64, being shorter for the variety that emerged later and longer for those with early emerging.

The age of the seedling at planting (26 May) was 83 days for all cultivars.

2. Results on phenology of blooming and fructification of plants

The time duration of the phenofases of blooming and fructification of the decorative pepper has a high mare importance in the manifestation of the decorative aspect of each variety. The results of the determinations are presented in table 2.

In most variants under study, the start of blooming mas in June, the earliest being variety *Ametist* and *Cherry peper* (6 – 10.06) and the late ones *Bolivian rainbow* and *Scotch bonnet* (25-28.06). One exception was type *Green pepper of Banat* which started to bloom as late as larly-July.

The same differences between varieties are noticed also regarding the start of fructification. The varietys *Ametist* and *Cherry peper* bore the first fruit in late-June and the 2nd of July, respectively, while the variety *Green pepper of Banat* started to bear fruit a month later (8 August).

The maximum fructification period may be a criterion for then in the studied peper for their decorative use. Thus, this phenophase takes place in early July in the case of varietys *Ametist* and *Cherry peper*, in the mid-July in the case of varietys *Scotch bonnet* and *Bolivian rainbow,* and in the late Julyin the case of the other varieties.

The harvesting was scheduled from mid-August (*Ametist, Peperoncino*) and end-August (*Ukrasne papricice, Cherry peper*) until end-September (*Bolivian rainbow, Scotch bonnet*).

The observed varieties differ in terms of number of fructification days, which may vary between: 35-45 for *Peperoncino, Ukrasne papricice,* G*reen pepper of Banat;* 50-60 for *Ametist, Chilly De Cayenne, Cherry peper;* 60-70 for *Scotch bonnet, Bolivian rainbow.*

According the vegetation period caussiderea as the number of days from the emergence to the beginning of the fructification, the decorative pepper varieties may be grouped in: early – 94-105 days - *Ametist, Cherry peper, Green pepper of Banat;* semi-early – 111-116 days - *Peperoncino, Ukrasne papricice, Chilly De Cayenne;* late – 122-128 days - *Bolivian rainbow Scotch bonnet.*

Plants bloom in two weeks after plantation in the case of *Ametist* (11 days) and *Cherry pepper* (15 days); 3-4 weeks in the case of most types and over a month - *Scotch bonnet* (33 days), *Bolivian rainbow* (30 days), and *Green pepper of Banat* (40 days). In the case of most types, 22-30 days are required since blooming until start of fructification, except for *Ametist*, whose phenophase lasts only 19 days, and the types *Scotch bonnet* and *Green pepper of Banat,* which require over 30 days.

The varieties differ in terms of number of days in which they have a decorative aspect, especially in the period from the start of blooming until the end of fructification, when have plants flowers and fruit simultaneously in different maturity phases is the one of and showing different colours. The longest period decotative the varieties *Scotch bonnet*, *Bolivian rainbow* (94-95 days) followed by *Chilly De Cayenne* and *Cherry peper* (79-81 days), and the shortest one is for the *Green pepper of Banat* varieties (58 days).

The decorative aspect of the plants is given both by dimension and form of the bushes, number of fruit, form and colour.

The varieties *Peperoncino, Chilli De Cayenne* and *Bolivian rainbow* stand out through bushes of low dimensions of Spherical and compact size. By way of comparison, the varieties *Scotch bonnet* and *Green pepper of Banat* have much bigger, vigorous and lax bushes.

The number of main shoots vary a great deal (4-19/plant), the bushes being much ramified at varieties *Peperoncino* and *Ukrasne papricice* (18-19 arms), medium ramified at *Ametist, Scotch bonnet* and *Bolivian ranbow* (9-12 arms) and little ramified at the other varieties (4-8 arms).

Very big differences appear in terms of number of fruit formed simultaneously in the period of maximal fructification. A weak simultaneous fructification characterizes the varieties C*herry peper* and *Green pepper of Banat* and *Scotch bonnet* which form simultaneously below 35 fruits on plant, while the varieties *Bolivian rainbow* and *Ukrasne papricice* formed 56 and 102 fruits per bush.

Each cultivars is characterized by a large variety of fruits colours and forms, grate foliage thickness different forms and dimensions of the bushes, and, the presence of a big number of flowers and fruits formed simultaneously.

CONCLUSIONS

- Numerous varieties of *Capsicum annuum, sp. fasciculatum, var. microcarpum* can be used for decorative purposes.
- For obtaining the necessary plants for creating the field cultures, sowing can be done in greenhouse in mid-March. 9-12 days are necessary for emerging and 61-64 days are necessary from emerging to planting. Thus, the age of the seedling is 83 days.
- The 8 varieties of decorative pepper plants have different unfolding phenophases. They required: 11-40 days of planting at the beginning of blooming, 19-34 days since blooming to the beginning of fructification, and duration of fructification of 36-67 days.
- The vegetation period ranged between 94-128 days (the earliest were the varieties *Ametist* and *Cherry peper*), and the manifestation of the decorative aspect lasted 58–95 days, with the varieties *Bolivian rainbow* and *Scotch bonnet* standing out.
- The varieties differentiated in terms of height of bushes (22.5-51.5 cm), form (spherical, elongated), branching degree (4-19 branches on plant) and (close or lax) compactness of

bushes, and number of fruits formed simultaneously on the plant (25-102), forma (short conical, long conical, spherical, campanuliform) and their colour (green, red, orange and violet).

- Knowing the decorative characteristics of the peper cultivars enables the recommendation of these varieties for using them for decorative purposes on kerbs or other types of arrangements as individualized plant in flower pots, flower containers etc.

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Table 1. Results on producing pepper seedlings

Variant - variety	Date of emerging	No. of days sowing-emerging	No. of days emerging-planting	Age of seedling *
V1- Peperoncino	26 March	12	61	83
V2- Ukrasne papricice	26 March	12	61	83
V3- Chilli De Cayenne	25 March	11	62	83
V4- Ametist	23 March	9	64	83
V5- Cherry pepper	24 March	10	63	83
V6- Scotch bonnet	24 March	10	63	83
V7- Bolivian rainbow	23 March	9	64	83
V8- Green pepper of Banat	25 March	11	62	83

Date of sowing: 14 March.
Date of planting: 26 May
* Age of seedling = number of days from sowing to planting

Table 2. Unfolding of phenophases of the decorative pepper cultivars

Variant - variety	Debut of bloom (date)	Period of fructification (date)			Duration of fructification (days)	Period of vegetation (days)
		start	max.	end		
V1- Peperoncino	21.06	15.07	25.07	20.08	36	111
V2- Ukrasne papricice	22.06	17.07	28.07	30.08	44	113
V3- Chilli De Cayenne	20.06	19.07	27.07	7.09	50	116
V4- Ametist	6.06	25.06	5.07	12.08	48	94
V5- Cherry pepper	10.06	2.07	10.07	30.08	59	100
V6- Scotch bonnet	28.06	30.07	15.08	30.09	62	128
V7- Bolivian rainbow	25.06	23.07	17.08	28.09	67	122
V8- Green pepper of Banat	5.07	8.08	28.08	21.09	44	105

Table 3. Results on decorative consideration of cultivars with pepper

Variant – variety	Height of bush (cm)	Diameter of bush (cm)	Level of branching (no. of main braches)	No. fruits formed simultaneously	Characteristics of leaves and fruit
V1 – Peperoncino	20.5	24.5	19	42	Rich foliage, very small, lanced-shaped. Conical, sharp, 1-2 cm long fruit.
V2 - Ukrasne Papricice	36.0	48.5	18	102	Thick foliage, small, oval and sharp leaves. Erect, short conical, red fruits
V3- Chilli De Cayenne	35.5	30.0	8	28	Big, rare, dark red, 3-4 cm long, conical leaves.
V4- Ametiste	34.5	35.5	10	40	Rare foliage. Big, oval, sharp green leaves with violet nuances. Short conical fruits of dark-green violet colour.
V5- Cherry peper	31.5	19.5	8	25	Poor foliage, Big and oval leaves. Spherical fruits, with diameter of 0,5 – 1cm, pendule, red-carmine
V6- Scotch bonnet	41.5	65.5	12	34	Poor foliage, very big leaves. Big campanuliform, pendulated, red-orange fruits
V7- Bolivian rainbow	31.5	32.5	9	56	Very rich foliage, small, lancelet-shaped, short conical, erect, multicolour, 0,5-1 cm long leaves.
V8- Green pepper of Banat	51.5	41.0	4	16	Poor foliage, big leaves. Pendulated, conical, 3-3.5 cm-long, green fruits.

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GENOTYPE INFLUENCE ON RESPIRATION PROCESS, ENDOGENOUS ETHYLENE PRODUCTION AND ELECTRICAL CONDUCTIVITY OF FLASH TISSUE OF SIX MELON CULTIVARS

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Keywords: melons, climacteric, postharvest, shelf ripening

ABSTRACT

The fresh melon fruits are eaten as deserts being praised for their flavour, sweetness and high content in ascorbic acid. Respiration intensity, ethylene synthesis and electrical conductivity of flesh tissue seem to have a strong influence in maintaining a good quality for a long time. This research shows the genotype influence on some physiological parameters (respiration, ethylene and conductivity). We chose these parameters because of their importance during transport and storage conditions.

INTRODUCTION

Melons show an enormous diversity of fruit types varying in flash colour (from green pink to orange); skin colour (green, white, yellow, orange and grey); skin texture (smooth, with ribs or net suber), size (little lemon like or several kilos melons). The most popular groups of melons are *reticulatus* (with thin reticulated rind and sweet green flash fruits), *cantalupensis* (a muskmelon variety having fruits with tan rind and orange flash) and *inodorus* (with smooth skin and unlike the cantaloupe, not aromatic). These varieties vary also from the physiological point of view.

The aim of this paper is to show the differences existing between the three *Cucumis melo* groups, differences regarding the respiration process intensity, ethylene production and electrical conductivity. These parameters are involved in maintaining a proper quality for a long period of time. They are also important for choosing the right moment to harvest and the right storage period for each melon group.

MATERIALS AND METHODS

The experiments were conducted for three years: 2002-2004 at the Vegetable Research Station Bacau. The melon plants were grown under greenhouse natural conditions. Our investigations were performed during the ripening process. We studied three different melon groups and two varieties for each group: *reticulatus* (Galia, Halle Best Jumbo), *cantalupensis* (Ogen, Magico) and *inodorus* (Nabucco, Amarillo oro). All melons were grown in greenhouse conditions using the same technology.

We used detached fruits and RIKEN analyser in order to determinate the respiration intensity, expressed in mg CO_2/kg/hour.

The endogenous ethylene content was determined by GS 9000 series. We analysed 10 ml of gas from seminal cavity using plot fused silica 10m x 0.53 mm coated with carboplot P7, DF=25.0 and express the content in ethylene in ppm.

In our research we detected the electrical conductivity in tissues using the conductometer with special tissue detector. We tested the conductivity in four different fruit areas (peduncle, apical, near skin, near seminal cavity). The tissue conductivity is expressed in μS/cm.

RESULTS AND DISCUSSIONS

There is wide variation in ripening behaviour among melons. *Cantalupensis* and *reticulatus* group tend to have rapid climacteric and high respiration rate. In *inodorus* group the climacteric may extend over several days or may be absent. The first two groups (*cantalupensis* and *reticulatus*) reach the climacteric peak before the *inodorus* group.

The major respiration intensity was registered at Ogen (64.07 mg/kg/hour) and Magico (44.94 mg/kg/hour). The average for this group was 54.50 mg/kg/hour. Comparing the two first groups we can detect a minor respiration intensity for the *reticulatus* group (33.22 mg/kg/hour for Galia and 34.95 mg/kg/hour for Halle Best Jumbo). In this case the respiration was lower 1.64 times compared to *cantalupensis* group.

At *inodorus* group the respiration intensity was inferior to the other groups. The average was 16.68 mg CO_2/kg/hour which signifies a lower rate, 3.27 times, comparing to *cantalupensis* and 1.99 times comparing with *reticulatus*.

The rate of ethylene production remains below the critical level until the fruit is mature for all three varieties.

Ethylene production accompanies ripening for the first two groups. Ogen, Magico, Galia and Halle's Best Jumbo fruits produced appreciable contents of ethylene near or at harvest, but the *inodorus* type may not produce ethylene until after 20 days since harvesting.

The average ethylene production for Ogen and Magico was 23.04 ppm, definitely the biggest values in all cases. Regarding *reticulatus* group, we achieved no important ethylene content. The common value for this group was 8.63 ppm (2.67 times lower than *cantalupensis* group). At harvest moment the ethylene content for *inodorus* group was insignificant.

Electrical conductivity was analysed in four different fruit areas: peduncles zone, apical zone, and equatorial zone (near seminal cavity, and near skin). One of the most popular indexes for the right harvesting moment is the circular incisions occurring in peduncles zone. As we can see in table 2, for this area we obtained the biggest electrical conductivity for all analysed cultivars (1300 μS/cm at *cantalupensis*, 1150 μS/cm at *reticulatus* and 1100 μS/cm at *inodorus*). This means that the cell wall is destroyed, the conductivity level is high and the fruit is fully ripened. No important differences were reported between cultivars. Anyway, we obtained the prevalent values for conductivity for all cultivars in the peduncle area (100-1300 μS/cm), near seed cavity (1025-1050 μS/cm), next in apical zone (825-1125 μS/cm). Near skin region inferior values of conductivity (775-925 μS/cm) were obtained.

CONCLUSIONS

1. The melons from *cantalupensis* and *reticulatus* groups have a shorter storage life than *inodorus* group because the first two groups have higher respiration rates than *inodorus* group.
2. The fruits with high respiration rate reach the maturity before those with a low respiration rate.
3. *Cantalupensis* and *reticulatus* groups produce more content of ethylene during ripening process than *inodorus* group.
4. Presence of ethylene (maturation hormone) indicates the maturity stage.
5. At all varieties electrical conductivity has major values in peduncle zone, reason for what in this area at harvest moment incisions occurred.

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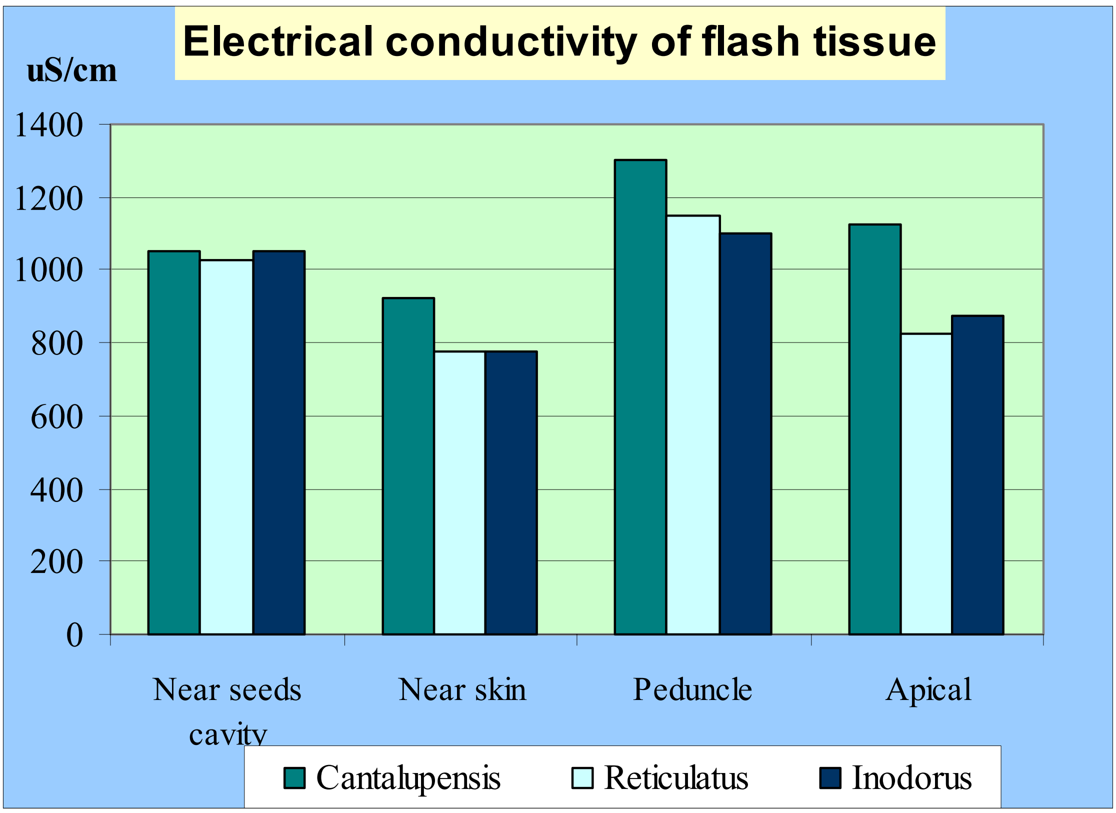
Tables

Table 1. Respiration rate and endogenous ethylene of some melon cultivars

Group	Varieties	Respiration intensity (mg CO2/kg/ora)	Endogenuos ethylene (ppm)
Cantalupensis	Ogen	64.07	24.74
	Magico	44.94	21.39
	Average	54.50	23.06
Reticulatus	Galia	31.49	9.11
	Halle Best Jumbo	34.95	8.15
	Average	33.22	8.63
Inodorus	Nabucco	11.52	-
	Amarillo oro	21.85	-
	Average	16.68	-

Table 2. Electrical conductivity in four different points in flesh tissue

Group	Varieties	Electrical conductivity (µS/cm)				
		Near seeds cavity	Near skin	Peduncle	Apical	Average
Cantalupensis	Ogen	1100	1000	1400	1150	1162.5
	Magico	1000	850	1200	1100	1037.5
	Average	**1050**	**925**	**1300**	**1125**	**1100.0**
Reticulatus	Galia	950	850	1000	900	925
	Halle Best Jumbo	1100	700	1300	750	962.5
	Average	**1025**	**775**	**1150**	**825**	**943.75**
Inodorus	Nabucco	1200	900	1250	950	1075
	Amarillo oro	900	650	950	800	825
	Average	**1050**	**775**	**1100**	**875**	**950**



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RESEARCH METHOD FOR BORON DEFICIENCY IN PLANTS

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Keywords: boron deficiency, soil, plants, cauliflower, magnesium hydroxide

ABSTRACT

The paper presents an original method for releasing B deficiency in plants, in order to offer the possibility to study this nutrient disorder. The researches have been carried out in the greenhouse in a monofactorial experiment; as test plant has been used the cauliflower, a species sensible to B deficiency. The *in situ* blocking of the soil hydrosoluble boron has been done using magnesium hydroxide. The immobilization of boron was based on the fact that the boric acid is strongly adsorbed on the magnesium hydroxide. The experimental results confirmed the premise. So, even if the initial soil chemical properties were not favourable for B deficiency, specific B deficiency symptoms have been observed in cauliflower.

INTRODUCTION

Descriptions of the visual symptoms of the nutrient disorders have been published by many authors (Bergman, 1992; Borlan et al, 1992; Budoi, 2000, 2001, 2004; Budoi et al, 2004, 2005; Marschner, 1993; Mengel, 1987, Scaife et al, 1995; Wallace, 1961). However, the descriptions of the nutrient deficiencies are missing or insufficient for many plant species.

The elaboration of some methods, which allow the in situ (in soil) blocking of the researched nutrient, by precipitation reactions, or by other mechanisms, in compounds unavailable for plants, and studying by this way the nutrient deficiencies, represents an indisputable scientific priority. Such methods eliminate the serious limitations of the classical methods (Budoi et al, 2004, 2005). Once released the nutrient disorder, fundamental researches concerning plant agrochemistry, biochemistry, physiology etc. can be done, in conditions of known nutritional stress. This paper is focused on B deficiency.

MATERIALS AND METHODS

The experiment, of monofactorial type, has been set up in 2005 in the greenhouse of USAMV Bucharest.

The test plant was cauliflower and the planting date was 7.06.2005.

A Moara-Domneasca mollic reddish-brown soil, moderately leached, has been used; the soil was formed on loess, it is middle-fine textured, silty-clay toward clayey-silty. The agrochemical soil properties are presented in table 1.

The agrochemical properties of this soil type have been studied and presented in some other papers (Tiganas et al., 1991; Budoi et al., 1993, 2004, 2005, Budoi, 1997).

The experiment had 3 variants, with 3 levels of magnesium hydroxide applied: 0 (control); 0.5 % from soil mass (5 times the neutralizing rate); 1 % from soil mass (10 times the neutralizing rate). The magnesium hydroxide has been incorporated in soil before cauliflower planting.

$Mg(OH)_2$ was obtained from 424.12 g $MgSO_4 \cdot 7H_2O$ and 137.93 g NaOH, by precipitation and successive leaching with distilled water in order to remove the formed Na_2SO_4 (until the negative reaction for SO_4^{2-} ions appeared); theoretically results 100 g

$Mg(OH)_2$. The resulted magnesium hydroxide has been dried in a drying stove at 105 ºC, and than grinded in fine particles.

As soil background fertilization, at planting, the equivalent of 100 kg N/ha, 100 kg P_2O_5/ha, 100 kg K_2O/ha and 50 kg MgO/ha have been applied.

As supplementary fertilization, in vegetation, on 20.06.2005 and 06.08.2005 the equivalent of 100 kg N/ha has been applied each time.

RESULTS AND DISCUSSIONS

The cauliflower is known as being sensible at B deficiency and it shows specific visual symptoms.

The reddish brown soil on which was set up the experiment had 0.75 ppm hydrosoluble B, so a good supply (tab. 1).

The slightly acid pH (pH = 6) is favorable to a maximum B mobility in soil and to a maximum availability for plant. Thus, the soil properties are not favorable to the appearance of B deficiency.

The boron immobilization is based on the fact that the boric acid is strongly adsorbed on the magnesium hydroxide:

$$H_3BO_3 + Mg(OH)_2 \longrightarrow \text{strong B adsorption}$$

The premise that has been taken into account for the research was confirmed by the experimental results.

The application of magnesium hydroxide in soil has been proved a proper method to release the B deficiency at cauliflower.

So, typical B deficiency symptoms have been observed (tab. 2 and fig. 1 and 2).

The slightly deficiency has been showed by loosing the cell walls stability in the medullar area of the stem, in its upper part, toward the inflorescence, and their breakdown, by loosing the plasmalemma stability and the cytoplasm overflowing in the intercellular spaces, the complete and irreversible alteration of the cellular functions and their death, which encourage the rots instalment and the cells and tissues rot. Because the deficiency was not severe, at 0.5 % and 1 % magnesium hydroxide just slightly browning of the tissue and fine lesions appeared (fig. 1).

It is interesting the experimental finding that at double dose of Mg $(OH)_2$ the symptoms have not been more severe than at the dose equivalent to 0.5 % from soil weight.

The experimentation of higher doses of magnesium hydroxide is needed, which would get to a more severe deficiency, became manifest by appearance of cavities in stem, absolutely specific to B deficiency.

The controlled release of the deficiency in a given nutrient, B in this case, first allows to perform observations and descriptions regarding the specific mode to become manifest at species at which such information are missing and to obtain relevant images; secondly, allows to perform substantiation researches in agrochemistry, biochemistry, plant physiology, plant protection etc. in known conditions of nutritional stress.

CONCLUSIONS

– The premise that the soil hydrosoluble boron is strongly adsorbed on the magnesium hydroxide has been confirmed by the experimental results.
– Even if the initial soil chemical properties were not favourable for B deficiency, specific B deficiency symptoms have been observed in cauliflower as consequence of magnesium hydroxide application**.**

– The research method elaborated represents a scientific priority.

ACKNOWLEDGEMENTS

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Tables

Table 1. Agrochemical properties of the mollic reddish brown soil used in experiment (Budoi Gh. et al., 2005)

Soil chemical properties	Values	Qualitative assessments
pH_{H2O} (1:2.5 soil:water suspension)	6	slightly acid
Ah_K, hydrolytic acidity (Kappen method), me/100 g	3.45	low
SB_K, sum of exchangeable basis (Kappen method), me/100 g	19	middle content
V_{Ah}*, degree of base saturation, %	85	under eubasic
H, humus content (Walkley-Black-Gogoaşă method), %	2.09	low content
IN**, nitrogen index	1.8	low value
P_{AL}, mobile phosphorous (Egner-Riehm-Domingo method), ppm P	34	middle content for field crops; very low for vegetables
K_{AL}, mobile potassium (Egner-Riehm-Domingo method), ppm K	224	very good content for field crops; middle for vegetables
B, hydrosoluble boron, ppm B	0.75	good content
Cu (extractable form in 0,05 n Na_2EDTA, Mitchell method, 1957), ppm	7.35	very good content
Fe (soluble in ammonium acetate 1n, Olson method, 1965), ppm	1.21	good content
Mn, active manganese (Schachtscabel method, 1957), ppm	195	very good content
Zn (extractable form in $(NH_4)_2CO_3$ 1n + EDTA 0,01 m, Trierweiler-Lindsay method, 1969), ppm	2.08	very good content

*$V_{Ah} = [SB_K/(SB_K + Ah_K)]\cdot 100$; **$IN = H\cdot V_{Ah}/100$ (Borlan, 1982)

Table 2. Treatments concerning the *in situ* blocking of the soil hydrosoluble boron with $Mg(OH)_2$ and the symptoms observed in cauliflower

Var. no.	Variant code	Blocking treatments and time of application	Observed symptoms
1	7-4-25a	0 g $Mg(OH)_2$/kg soil (control)	Normal plants
2	7-4-25b	5.05 g $Mg(OH)_2$/kg soil (cca 0.5%) = 16,66 g/pot (5 times the neutralizing rate; for reaction's neutralization needs 1.01 g/kg soil)	Slowly B deficiency, cell walls destruction in the central part of the stem, toward the inflorescence, slowly browning of the tissue and beginning of some fine lesions (fig. 1 and fig. 2)
3	7-4-25c	10.1 g $Mg(OH)_2$/kg soil (cca 1%) = 33,33 g/vas (10 times the neutralizing rate)	Specific slowly B deficiency in stem's section

Figures

Fig. 1. B deficiency in cauliflower determined by the adsorption of soil hydrosoluble B on $Mg(OH)_2$: cell walls destruction in the median part of the stem, slowly browning of the tissue and the beginning of some fine lesions (pot experiment; photo by Gh. Budoi)

Fig. 2. B deficiency in cauliflower – detail (photo by Gh. Budoi)

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VARIABILITY OF THE MAIN CHARACTERISTICS IN A ROMANIAN FRENCH BEAN VARIETY DELICIOASA DE PASAREA DURING THE PROCESS OF CONSERVATIVE SELECTION

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The professor influence for eternity
...he can say never where his influence finish
Henry Broke Adams

Keywords: French bean, variety, variability, morphological traits, conservative selection.

ABSTRACT

The research was made to R.I.D.V.F.G. Vidra, during the year 2005, on the field of prebase seed to the French green bean culture. The biological material was represented by the new Romanian variety: *Delicioasa de Pasarea.* The object of this study was obtain the prebase seed. For determine the variability of principal characters of biological material were made the following biological measurements: number of pods per plant, pod length, number of grains per plant, the number of grains in the pod, the weight of the grains per plant, weight of one thousand grains during the dry stage. There were calculated the arithmetic mean, standard deviation, variability coefficient for integrating those in the variability limits of principal characters studied. *Delicioasa de Pasarea* belongs to the middle late group French bean (72 days from the sprouting date to the technological maturity of the pods), with green pods, middle length (13,0 cm) and elliptical section. The flowers are violet. The dry grain is very big having a variegated colour.

INTRODUCTION

Taking into account the present stage of the research works carried out both in our country and abroad, the researchers' team who has been working at this project aimed to attain the following objectives:

a. providing of the seed stocks belonging to the higher biological links of the French green bean variety *Delicioasa de Pasarea* in order to introduce them in the vegetable growing according to the Romanian assortment of vegetable varieties listed in the Official Register of the year 2003;
b. maintaining of the genetic structure of the new Romanian French green bean varieties at the values of the parameters established by the state standards for every biological category;
c. prevention of the degeneration of the varieties by the conservative selection during the process of the seed production by the specification of the most favourable areas for French bean crops in order to obtain seeds of high agricultural value;
d. drawing up of a new growing systems suitable for the new French green bean destined to the improvement of the seed quality;
e. promotion, dissemination as well as development of the new French green bean varieties by their growing in the demonstrative plots, comparative trials and by training courses with private-farmers.

MATERIALS AND METHODS

During the January-February period of the year 2005, the biological material was sorted out and the physiological particularities of the seeds harvested in the year 2004 from the breeding field were analysed and the seed samples were prepared for sowing. The experimental field, covering 500 square meters, was placed respecting the distances for isolations among the varieties and crop rotation. The field was got ready in spring when the humidity of the soil permitted by two passing of the combinator.

In order to set up the field of prebase seed and the selection field for the elite plants in French green bean, soil was treated with the herbicide Treflan 48 EC-2,5 l/ha that was incorporated at a death of 8-12 cm by the aid of the tractor U 650 M+GDU 3,4 by two perpendicular crossings of the field. The field was tilled with the aid of the tractor U 650 M+MMS 4,5 in furrows having 1,5 m width. Sowing was achieved manually when soil temperature was 10-12 ^{0} C at a depth of 5 cm using a sowing scheme consisting in two rows at a distance of 70 cm apart and assuring a plant density of 350,000 plants per ha. Four manual hoeing were carried out associated by two another mechanical hoeing with the aid of the tractor L 445+CL. Simultaneously at the first manual hoeing complex chemical fertilizers NPK (15-15-15) were applied at a dose of 100 kg/ha. Chemical treatments against *Xanthomonas phaseoli* (Dithane M 45-0,2%+Topsin-0,1%), *Colletotrichum lindemuthianum* (Alcupral-0,2%+Topsin-0,1%), *Trialeurodes vaporariorum* and *Acanthoscelides obtectus* associated with leaves fertilizer application of Sinoratox 35 CE-0,15%+Folimax-0,3%, Merpan-0,2%+Confidor 200 SL-0,075%+Folimax-0,3% were carried out. Several irrigations were performed during this period.

In French green bean crops biological purification was carried out during the cotyledons stage in order to remove the plants attacked by bacteria. Such purification's were also applied later for the elimination of the plants having an early or a late flowering as well as those having flowers of another colour by comparison with the standard variety or being characterized by a stunted development.

Maintaining of the identity and genetically purity of the cultivar characterized as being pure lines is achieved with the aid of the conservative selection. The necessary number of typical elite plants used for the purification of the cultivar included in the seed production system is chosen by calculation. The number of elite plants differs from a species to another and is determined especially by the amount of seed that must be provided for each biological category according to the production plan and it is a function of its multiplication coefficient.

As research methods for the obtaining of the phenologyical phases "observations" were used and for the morphological and productive traits necessary in order to compute the interval of variability "determinations" and "biometrics measurements" were carried out.

In order to establish the variability of the main characteristics of this biological material and for the computing of the variability interval of each trait, under the soil and weather conditions specific to the R.I.D.V.F.G. Vidra, the arithmetic mean (x), the standard deviation (s) and the coefficient of variability (s%) were computed.

RESULTS AND DISCUSSIONS

According to the scheme of conservative selection applied during the year 2005, at the R.I.D.V.F.G. Vidra on a plot having a surface of 500 square meters from the field of prebase seed were obtained 6 kg prebase seed II. On the other hand, about 80 elite plants were chosen, marked and harvested at the French green bean variety *Delicioasa de Pasarea.*

During the vegetative period phenological observations upon the main morphological traits regarding specificity elements of the variety were carried out on the shape and the colour of the leaf, the shape and colour of the flowers as well as pod shape and colour.

Observations on the following phenological stages were carried out: sowing-date, mass sprouting of the plantlets, date of the flowering beginning, pod setting, grain development in the pods, date of the technological and physiological maturation. Concerning the period of vegetation, that character was expressed by the day's number per each phenological stage (Table 1).

In order to obtain data upon the morphological traits and productive ability some determinations and biometrics measurements at the technological maturity of the pods were made for the following quantitative characteristics: stem height, number of pods per plant, pod length and width, number of grains per plant and the number of grains in the pod. Supplementary, at the physiological maturity of the pods was computed the interval of variability for the next traits: weight of the grains per plant, weight of one thousand grains during the dry stage (Table 2).

The statistic results referring to variability of principal characters to the French bean cultivar *Delicioasa de Pasarea* are represented in Table 3.

The characteristic "pod length" presented a medium coefficient of variability.

Among the elements, which lead to the value of the harvest per the surface unity, "medium number of grains in the pod" presented a medium coefficient of variability.

CONCLUSIONS

-During the whole process of seed production of the vegetable species a leading role on the seed quality belongs to the conservative selection.

-The variety *Delicioasa de Pasarea* has got a medium height of 36,3 cm. Its flowering epoch is middle early of 35 days. There are 25 pods per plant, each pod having a medium number of 5 grains while the pods are of medium length of 13,0 cm with a width of 0,8 cm. The stage of seed maturation is considered as being middle late of 82 days. The dry grain is very large of a variegated colour. The value of the weight of one thousand grains in dry state is high of 236,8. This variety belongs to the middle late group being characterized by a vegetative period of 72 days from the sprouting date to the technological maturity of the pods.

The seed material biological retained to carry on the conservative selection process are enclosed to the interval of variability x+/ -s (k= disperse), specific to the characters of the cultivar studied.

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Table 1 The main phenological phases expressed by the number of days for the French green bean varieties *Delicioasa de Pasarea*, R.I.D.V.F.G. Vidra, 2005

Sowing-sprouting	**Sprouting-flowering**	**Sprouting-pod setting**	**Sprouting-grain development**	**Sprouting-technological maturity**	**Sprouting-physiological maturity**
16	35	47	53	72	82

Table 2 The main morphological and productivity characters of the French green bean varieties, RIDVFG Vidra, 2005

Character studied	**Delicioasa de Pasarea**
Stem height (cm)	36,3
Pod width (cm)	0,8
Pod length (cm)	13,0
Number of pods per plant	25
Number of grains per plant	109
Grain number per pod	5
Weight of the grains (gr.)	17,0
Weight of 1000 dried grains (gr.)	236,8

Table 3 Variability of the main characters of the French green bean varieties *Delicioasa de Pasarea*, R.I.D.V.F.G. Vidra, 2005

Character studied	**Arithmetic mean**	**Standard deviation**	**Variability coefficient**	**Variability**
Pod length	12,95	1,36	10,5	middle
Average number of grains per pod	4,52	0,89	19,69	middle

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VARIABILITY OF THE MAIN CHARACTERISTICS IN TWO ROMANIAN GREEN PEA VARIETIES PERLA DE MAI AND DIANA DURING THE PROCESS OF CONSERVATIVE SELECTION

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Keywords: green pea, variety, variability, morphological traits, conservative selection.

ABSTRACT

The research was made to R.I.V.F.G. Vidra, during the year 2005, on the field of prebase seed to the green pea culture. The biological material was represented by two Romanian varieties: *Perla de Mai* and *Diana.* The object of this study was obtain the prebase seed. For determine the variability of principal characters of biological material were made the following biological measurements: the total height of the plant, number of pods per plant, pod length, number of grains per plant, the number of grains in the pod, the weight of the grains per plant, weight of one thousand grains during the dry stage. There were calculated the arithmetic mean, standard deviation, variability coefficient for integrating those in the variability limits of principal characters studied. The cultivar *Perla de Mai* is very early, with long pod (12,6 cm) and middle number of grain (6). *Diana* has tall plants, high inserting point of the pods and extrafine grains.

INTRODUCTION

Taking into account the present stage of the research works carried out both in our country and abroad, the researchers' team who has been working at this project aimed to attain the following objectives:

a. providing of the seed stocks belonging to the higher biological links of the green peas varieties *Perla de Mai* and *Diana* in order to introduce them in the vegetable growing according to the Romanian assortment of vegetable varieties listed in the Official Register of the year 2003;
b. maintaining of the biological, agricultural values as well as phytosanitary state of the seeds of the new Romanian green pea varieties in accordance with the requirements stipulated by the present legislation (Law 266/2002) by application of some differentiated technical methods varying with the stage and species;
c. multiplication of the seeds belonging to higher biological categories in areas characterized by a maximum degree of favourableness for the demonstration of the agronomical characteristics;
d. promotion, dissemination as well as development of the new green pea varieties by their growing in the demonstrative plots, comparative trials and by training courses with private-farmers;

MATERIALS AND METHODS

During the January-February period of the year 2005, the biological material was sorted out and the physiological particularities of the seeds harvested in the year 2004 from the breeding field were analysed and the seed samples were prepared for sowing. The experimental field, covering 2,500 square meters, was placed respecting the distances for isolations among the varieties and crop rotation. The field was got ready in spring when the humidity of the soil permitted by two passing of the combinator.

In order to set up the field of forebase seed and the selection field of the elite plants in green pea crop, the seeds were sown mechanically by the tractor L 445+MELO, when the soil temperature at the depth of 0-5 cm was 3–4ºC. The field was tilled in the furrows having the width of 1,5 m with the tractor U 650 M+MMS 4,5. The density of the plants was about 600.000 plants per ha was assured with a sowing scheme consisting in four rows on the furrows and 25 cm distance between rows.

Immediately after sowing weed control was performed by application of the herbicide Gesagard 500 FW-2,5 l/ha followed by another two mechanical hoeing by the tractor L 445+CL 1,5 and three manual hoeing. When green pea plants began to burst to flower, simultaneously with the second hoeing complex chemical fertilizers NPK (15-15-15) at a dose of 200 kg/ha were applied. Due to a rainy period characterized by low temperatures, favourable conditions for the early blight attack on leaves (*Peronospora pisi*) appeared and the application of a treatment with Dithane M 45–0,2%+Topsin-0,1%+aracet-0,2% was necessary. Another two treatments against pea seed weevil (*Bruchus pisorum*) were applied with Sinoratox 35 CE-0,15% at an interval of ten days in flowering stage. Because this year were recorded favorable conditions for the attack of *Ascochyta pisi* on the leaves and pods, another treatment with Alcupral-0,2%+Topsin-0,1%+aracet-0,2% was applied. During the stage of the grain growing in the pods a single irrigation was necessary to be applied.

After the date of the 28th of April 2005 some works of purification consisting in removing of the plants which differed in the height of the stem, leaf and stipella colour, early or late flowering in comparison with the standard variety.

Elite picking is a link of a maximum importance and is performed only in concordance with a complete knowledge and an observance of the genetic structure of the variety regarding its biotypes. A unilateral picking of the biotypes (taken as elite) leads to a risk of depreciation of the genetic structure achieved by the its plant breeder and on the other hand it has negative repercussions upon the economical value of the variety.

During the vegetative period phenological observations upon the main morphological traits regarding specificity elements of the soil were carried out on the shape and the colour of the leaf, the shape and colour of the flowers as well as pod shape and colour.

In order to obtain data upon the morphological traits and productive ability some determinations and biometrics measurements at the technological maturity of the pods were made for the following quantitative characteristics: the total height of the plant, number of internodes up to the first pod, number of pods per plant, pod length and width, number of grains per plant and the number of grains in the pod, and at the physiological maturity of the pods was computed the weight of the grains per plant, weight of one thousand grains during the dry stage.

In order to establish the variability of the main characteristics of this biological material and for the computing of the variability interval of each trait, under the soil and weather conditions specific to the R.I.D.V.F.G. Vidra, the arithmetic mean (x), the standard deviation (s) and the coefficient of variability (s%) were computed.

RESULTS AND DISCUSSIONS

According to the scheme of conservative selection applied during the year 2005, at the R.I.D.V.F.G. Vidra on a plot having a surface of 2,500 square meters from the field of prebase seed were obtained 104 kg prebase seed II. On the other hand, about 2,420 elite plants were chosen, marked and harvested at the green pea varieties *Perla de M*ai and *Diana*. These elite plants were chosen as ranging in the limits of the variety variability from the field of picking of the elite plants.

Observations on the following phenological stages were carried out: sowing-date, mass sprouting of the plantlets, date of the flowering beginning, pod setting, grain development in the pods, date of the technological and physiological maturation. Concerning the period of vegetation, the day's number per each phenological stage expressed that character (Table 1).

In accordance with biometric date obtained about quantitative characters, there was calculated the interval of variability for the next traits (Table 2).

The variety *Perla de Mai* has genetically stability for both characters total high of plants and weight of 1000 dried grains. The characteristic "pod length" presented a medium coefficient of variability. Among the elements, which lead to the value of the harvest per the surface unity, "medium number of grains in the pod" presented a medium coefficient of variability (Table 3).

The coefficient of variability is small (8,47) to the character "pod length" underline the uniformity of pods to the cultivar *Diana*. The calculus and variability analyzing showed middle variability to the weight of 1000 dried grain character.

Taking into consideration the trait "weight of one thousand grains", during the dry stage its coefficient of variability was found having a medium value at the varieties *Diana* (Table 4).

CONCLUSIONS

Due to the fact that the following links, the picking plot, selection plot, field of prebase seed and the field of prebase seed require special selection works these are set up only to the R.I.D.V.F.G.-Vidra while the categories C1 and C2 which are used for the commercial crops are set up as seed lots in the specialized farms belonging to the different agricultural units.

Morphological and productivity characters of the biological material under investigation during the year 2005 at the R.I.D.V.F.G.-Vidra proved to very much influenced by the growing technology as well as by the environmental factors.

The variety *Perla de Mai* is characterized by a medium height (51,6 cm) and by a medium degree of branching. The node number up to the fertile node is very low (2). Its stage of flowering is considered as being very early registering 28 days. There are five pods per plant and the length of the pod is of 12,6 cm bearing a medium number of grain (6). The stage of maturity of the seed is characterized as early of 80 days. The weight of one thousand grains in the dry state is small of 271,3 g. this variety proved to be a very early variety having a vegetative-period of 53 days from the sprouting to the technological maturity of the grains.

The variety *Diana* is characterized as having a high height of the plants of 85,3 cm owing to the conditions of high humidity of this year while the node number up to the fertile node is high so it has a higher inserting point of the pods (3). Its flowering period is classified as being middle, after 39 days from sowing. There are seven pods per plant that have a medium length of 8,5 cm, each pod containing an average number of five grains. The maturation stage of the seeds is considered as middle this being after 90 days from sowing. The value of the weight of one thousand seeds in dry state is law of 146,7 g. This variety is a middle one having a vegetative period of 71 days from the sprouting date to the technological maturity of the grains.

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Table 1 The main phenological phases expressed by the number of days for the green pea, RIDVFG Vidra, 2005

Variety	Sowing sprouting	Sprout-flower period	Sprouting pod setting	Sprouting grain-growing	Sprouting technological maturity	Sprouting physiological maturity
Perla de Mai	13	28	32	42	53	80
Diana	14	39	52	60	71	90

Table 2 The main morphological and productivity characters of the green pea variety, R.I.D.V.F.G. Vidra, 2005

Variety	Perla de Mai	Diana
Stem height after flowering (cm)	51,6	85,3
Number of pods per plant	5	7
Pod length (cm)	12,6	8,5
Average number of grains in the pod	6	5
Weight of the grains (gr.)	7,1	5,3
Weight of 1000 dried grains (gr.)	271,3	146,7

Table 3 Variability of the main characters of the green pea varieties Perla de Mai, R.I.D.V.F.G. Vidra, 2005

The character studied	Arithmetic mean	Standard deviation	Variability coeficient.	Variability
Total height of the plants	51,90	4,69	9,04	little
Number of nodes up to the first pod	2,18	0,38	17,43	middle
Pod length	10,77	1,60	14,86	middle
Total number of pods per plant	4,58	0,81	17,69	middle
Number of grains per plant	26,58	4,60	17,30	middle
Average number of grains per pod	5,88	0,88	14,97	middle
Grains weight	7,23	1,29	17,84	middle
Weight of 1000 dried grains	272,77	23,69	8,68	little

Table 4 Variability of the main characters of the green pea varieties Diana

The character studied	**Arithmetic mean**	**Standard deviation**	**Variability coefficient**	**Variability**
Pod length	8,5	0,72	8,47	little
Weight of 1000 dried grains	146,75	16,49	11,24	middle

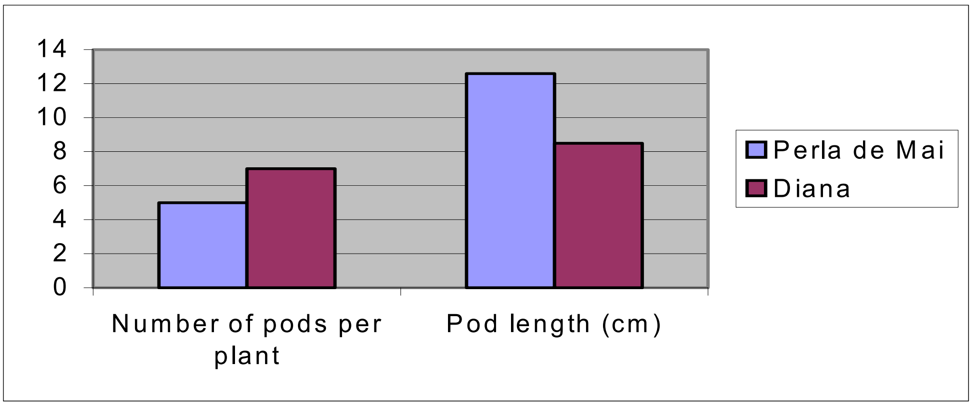

Fig. 1. Comparison between cultivar concerning number of pods /plant and pod length

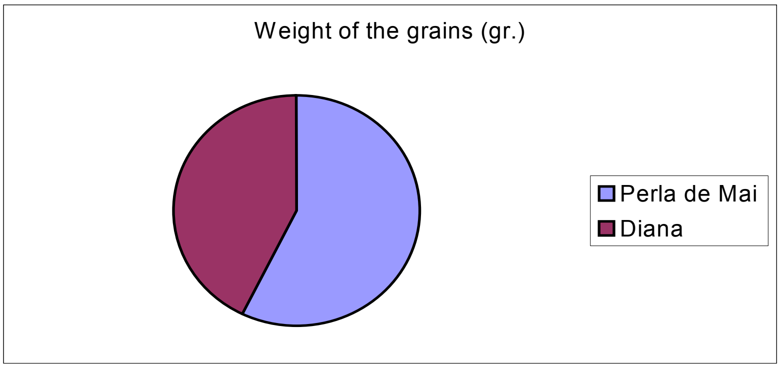

Fig. 2. Comparison between weight of grains

Photo 1. Diana cultivar

Photo 2. Perla de mai cultivar

Lucrări ştiinţifice U.S.A.M.V.B., Seria B, Vol. XLVIII, 2005

MICROCLIMATE MODIFICATIONS IN SOLARIUMS COVERED WITH PHOTOSELECTIVE FOILS

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Keywords: temperature, illumination, relative humidity, soil humidity

ABSTRACT

The work presents the influence of some endogenious photoselective foils on solarium microclimate. The best results concerning the illumination were obtained using the transparent foil treated with chemical additives, and the pink foil, which bouth induced differences of over 2000lx compared with the ordinary PE foil. Over a period of 40 days the sum of temperatures accumulated in the solariums increased by 17,6 °C under the pink foil and 7,9 °C under the green foil, while for the rest of the foils it was below the level registered for the control. Soil temperature was improved under the yellow and pink foils. Generally it was detected an increase of air relative humidity and a decrease of soil water content in the solariums covered with photoselective foils, one exception being the pink foil which supported the water status of the culture environment.

INTRODUCTION

The microclimate modifications of protected cultures with photoselective foils is reported by a great many papers (1,2,3,5). The modified vegetation environmental conditions leads to plant physiological modifications and contributes to changes in plants growth and development (4,6).

In our country were produced some new types of photoselective foils containing additives in their matrix in order to increase their physical and chemical performances, for a better light transmission especially in the visible range and a better resistance to degradation by solar light and chemicals due to chemical treatments applied during the cultivation technologies.

Five new foil types were tested by using them to cover high tunnels solariums in which were intercalated tomato and lettuce cultures.

MATERIALS AND METHODS

Five foils produced by the Romanian company PRODINTERMED SA were compared with a control foil made of ordinary PE. The foils are produced by extrusion from LDPE, having 180 μm width, and containing in their polymeric matrix special chemical additives produced in Belgium such as: UV absorbing pigments, UV and IR protectors, anti-condensation additives. The foils were produced at INCERPLAST S.A having the following optical and mechanical properties:

- photoselective effects due to pigments which block the UV-B radiations
- good light transmission in the range of 400-700nm
- stable physical properties for UV and IR
- excellent mechanical resistance
- anticondensation and antioxidation properties
- optical parameters (transmittance and opacity) in the optimum range for the foils used in protected cultures.

The experiment was set up by covering the solariums before plants cultivation, generating the following treatments:

V1 control – PE transparent, non-additivated foil;
V2 - transparent additivated foil;
V3 – yellow additivated foil;
V4 - pink additivated foil;
V5 – green additivated foil;
V6 – blue additivated foil;

OBSERVATIONS AND MEASUREMENTS

The observations and measurements aimed to characterize the modifications of the microclimate under the photoselective foils. The dynamic evolution of the temperature, light intensity, air humidity, soil water content was registered by specific measurements every two days, inside the solariums and outside them by using specific equipments (termohigrometers, combitesters with luxmeter).

The following synthetic parameters were calculated for the characterisation of the microclimate parameters.

Σ1 = sum of temperature degrees outside the solarium
Σ2 = sum of temperature degrees under the foil
Σ3 = sum of temperature degrees into the soil
D1 = Σ2 – Σ1 (difference 1)
D2 = Σ2 – Σ3 (difference 2)
M = mean light intensity under the foils at plant level;
U1 = mean relative humidity in the solarium;
U2 = mean soil water content

1. Results concerning the variation of light intensity

The foils' characteristics generated the modification of illumination at plant level. The differences obtained, especially for the days with high nebulosity, are presented in figure 1.

The highest level of illumination was registered under the transparent and pink foil for which the increase compared to the control was over 2000 lx (2700 and respectively 2195 lx). For the yellow and green foils the differences were 1960 lx and 1425 lx. Under the blue foil the illumination at plant level was by 110 lx less than the illumination under the ordinary transparent foil.

2. Results concerning thermal modifications

The level of the thermal radiation is modified by covering the soil with photoselective foils (table 1 and figure 2). Due to the optical characteristics of the foils in the nearby exterior of the solarium air layer were detected differences in the values of the global temperature. Thus the sum of temperature degrees, over 40 days, was 425^{0}C for the control, and was exceeded by 6-17,4 ^{o}C under the majority of the foils, which demonstrates a reduced capacity to retain heat for these foils especially for the green and blue ones. One exception was the transparent additivated foil for which $\sum_1$ was decreased by 3,7 ^{o}C compared to the control.

Differences were also registered inside the solarium. The differences figures exceeded the ones of the control for the pink and green foils for which the sum of the temperatures accumulated were greater by 17,6 ^{o}C respectively 7,9 ^{o}C compared to the control. For the rest of the treatments the $\sum_2$ decreased by 0,6-32,4 ^{o}C, especially under the blue foil.

An increase of soil temperature accumulations was observed for the majority of the foils compared with the control, the greatest differences were observed for the green foil (11,5 ^oC) followed by the yellow one (6 ^oC).

Analyzing the data it can be emphasized that the pink foil is the only one to support the thermal conditions, generating differences of the temperature accumulations of 6,8 in the solarium and 16,1 in the soil compared with the control. The other foils have less temperature accumulations compared with the control, the "coolest" foils being the blue and yellow ones.

3. Results concerning the influence of the photoselective foils on the air humidity and soil water content

From figure 8 it can be seen that under the photoselective foils the relative humidity of the air increased compared to the control. The greatest differences (5,2%) were measured under the yellow foil, followed by the transparent treated foil (3,7%).

Under the green and blue foils the relative humidity increased by 1,7-2,2%. The only exception was the pink foil under which the relative humidity of the air decreased by 0.6% compared to the control. The soil water content was decreased compared to the control, the differences having big amplitudes ranging from 0,5% under the pink foil to 10,1% under the blue one. The blue foil may be remarked for it capacity to maintain a low level of the air humidity without reducing the soil humidity significantly.

CONCLUSIONS

- The photoselective foils used for covering the solariums induced modifications of the microclimate in the protected areas.
- The differences concerning plants illumination under the foils were more obvious during the days with high nebulosity.
- The best results were obtained for the transparent treated and pink foils for which the illumination increased by 2700 lx and 2195 lx respectively compared with the control
- Inside the solarium, the global heat accumulation for 40 days were greater by 17,6^oC under the pink foil, and 7,9 ^oC under the green one compared with the control, by decreased under the rest of the foils especially under the blue one (-32,4 ^oC)
- In the soil the heat accumulations were supported by the presence of the photoselective foils, the greatest differences compared with the control were registered for the yellow and green foils (6-11,5 ^oC).
- Generally, considering the thermal conditions, we may consider as "warm" the pink foil while the blue and green foils may be considered "cool".
- The photoselective foils increased the solarium's air relative humidity by 1,7-5,2% and a decreased the soil water content by 0,5-10,1%.
- The pink foil decreased by 0,6% the relative air humidity and induced the smallest decrease of the soil water content compared to the control, thus supporting the thermal conditions in the culture area.
- Several photoselective foils may be recommended for solarium covering taking into consideration the climatic plants need as following: the pink and green foils are recommended for heat demanding species with a reduced air humidity, the blue and yellow ones may be recommended for the species demanding less heat and adapted to high air humidity.

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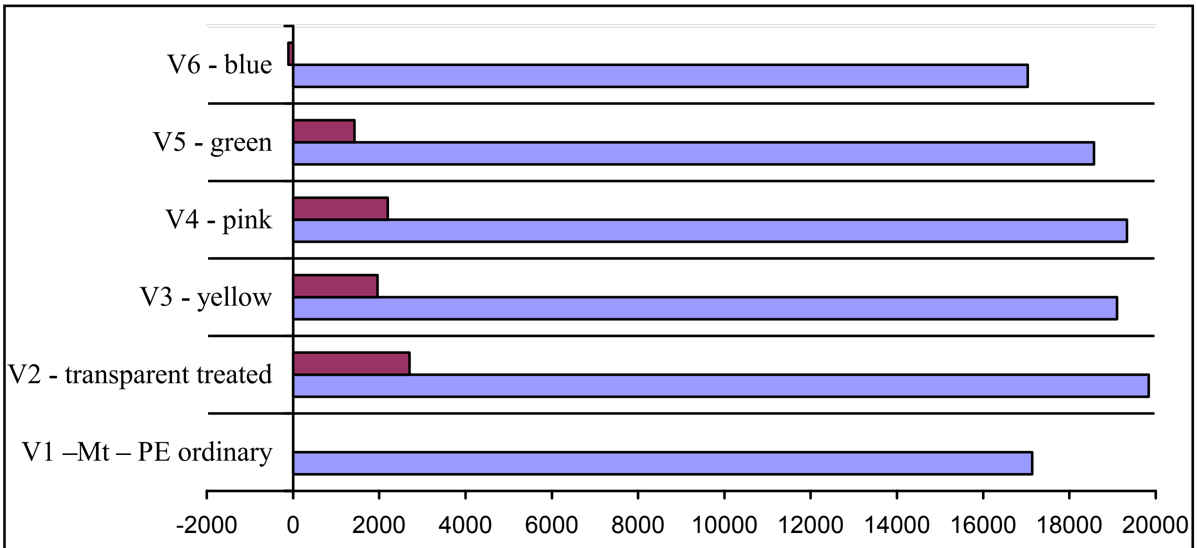
Tables

Table 1. The global variation of the temperatures due to the photoselective foils

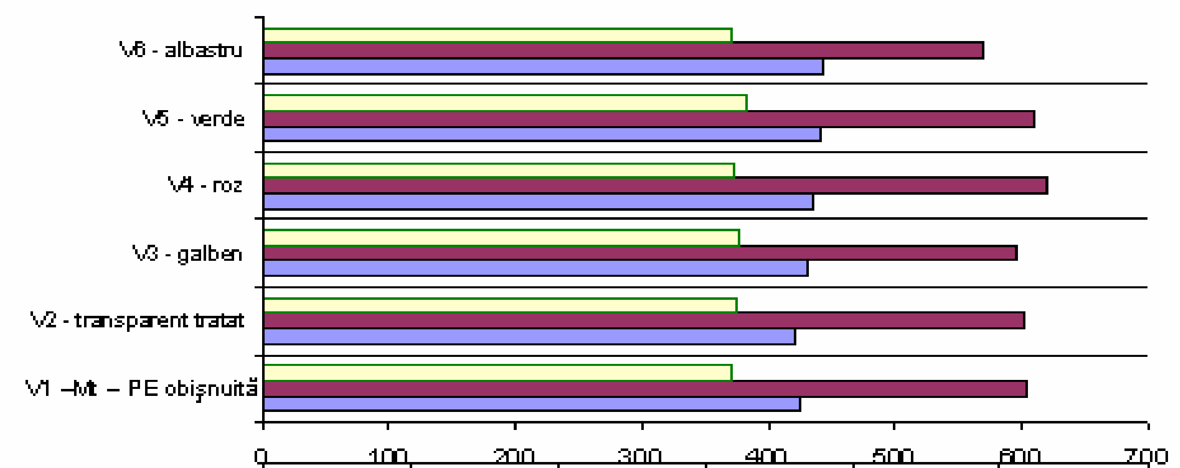
	V1	V2		V3		V4		V5		V6	
		$\sum$	D_{V1}	$\sum$	D_{V1}	$\sum$	D_{V1}	$\sum$	D_{V1}	$\sum$	D_{V1}
$\sum_{1\ (exterior)}$ (°C)	425.1	421.4	-3.7	431.1	6	435.9	10.8	440.7	15.6	442.5	17.4
$\sum_{2\ (solar)}$ (°C)	603.1	602.5	-0.6	595.5	-7.6	620.7	17.6	611	7.9	570.7	-32.4
$\sum_{3\ (sol)}$ (°C)	371.5	374	2.5	377.5	6	373	1.5	383	11.5	370.5	-1
D1 (°C)	178	181.1	3.1	164.4	-13.6	184.8	6.8	170.3	-7.7	128.2	-49.8
D2 (°C)	231.6	228.5	-3.1	218	-10.5	247.7	16.1	228	-3.6	200.2	-31.4

DV1 = difference calculated versus the control ; D1 = $\sum_2 - \sum_1$; D2 = $\sum_2 - \sum_3$



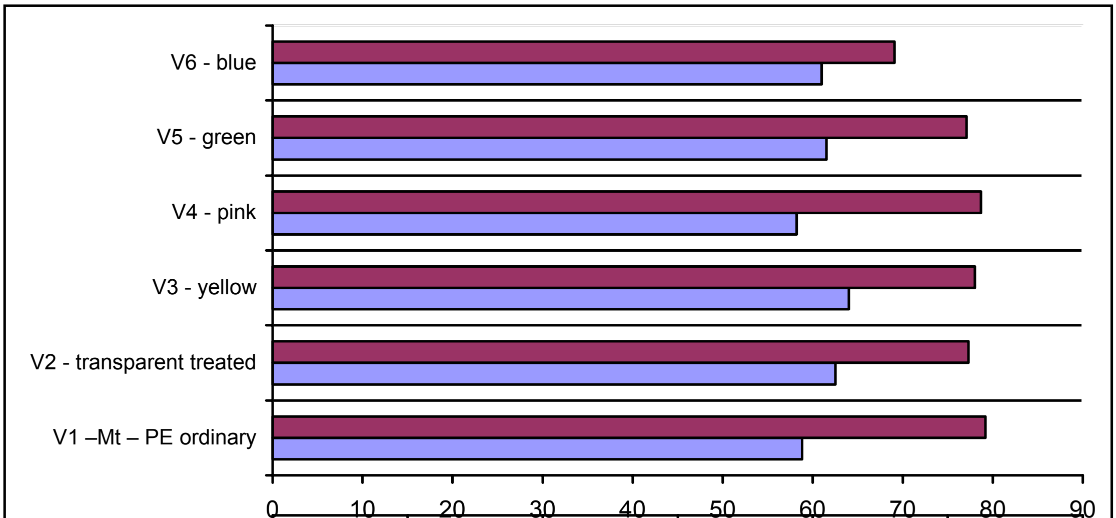
	V1 –Mt – PE ordinary	V2 - transparent treated	V3 - yellow	V4 - pink	V5 - green	V6 - blue
V1diference	0	2700	1960	2195	1425	-110
light intensity	17140	19840	19100	19335	18565	17030

Figure 1. The variation of the light intensity influenced by the foils type.



	V1 –Mt – PE obişnuită	V2 - transparent tratat	V3 - galben	V4 - roz	V5 - verde	V6 - albastru
Σ_3 (oC)	371,5	374	377,5	373	383	370,5
Σ_2 (oC)	603,1	602,5	595,5	620,7	611	570,7
Σ_1 (oC)	425,1	421,4	431,1	435,9	440,7	442,5

Figure 2. The influence of the photoselective foils on heat accumulation
$\sum_1$ = sum of temperature degrees at the exterior (^oC)
$\sum_2$ = sum of temperature degrees in the solarium (^oC)
$\sum_3$ = sum of temperature degrees in the soil (^oC)



	V1 –Mt – PE ordinary	V2 - transparent treated	V3 - yellow	V4 - pink	V5 - green	V6 - blue
U2 (%)	79.2	77.3	78	78.7	77.1	69.1
U1 (%)	58.8	62.5	64	58.2	61.5	61

Figure 3. Variation of air humidity U1 (%) and soil water content U2 (%) in solariums covered with photoselective foils

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STUDY REGARDING PLANT OF SOME LETTUCE VARIETIES WITH DECORATIVE ASPECT

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Keywords: lettuce, cultivars, containers

ABSTRACT

The diversity of lettuce cultivars can be the possibility to select those with a decorative and attractive aspect to cultivate in our garden.

Because the lettuce radicular system is superficial we can cultivate any cultivars of lettuce in jardinière and pots.

The study was proposed the possibility to cultivate of some leave lettuce cultivars in jardinière and pots. For this I selected ten leaves cultivars to be cultived in jardinière and pots. The production dates, regarding to edible mass of plants, has statistically interpreted and the conclusion was that the cultivars can be cultivated in jardinière and pots without existing significant differences of edible mass plant between variants.

INTRODUCTION

The special aspect of some lettuce varieties gives us the opportunity as being specialized vegetable cultivators to choose it in order to arrange the space from the garden for cultivating vegetable plants in a pleasant and attractive way. We also want to cultivate certain kinds of leaves in pots and in this way we decorate the balcony or the house terrace very useful.

MATERIAL AND METHOD

In the present study we used ten cultivars of lettuce for planting in garden and pots which are recommended for planting in field, greenhouse or solarium. The chosen kinds have a very special and decorative aspect of leaves, the colour of leaves being green or red.

The cultivars of lettuce chosen for study and planted in garden and pots are: V1 – Simpson; V2- Gringo; V3- Everest; V4- Piroga; V5- Salad Bowl Carthago; V6- Green Ice; V7- Ascona; V8- Crispy Frills; V9- Lollo rosa and V10- Lollo bionda.

We observed the growth rhythm including the growing forming of edible parts.

The dates regarding the production obtained have been recorded and them interpreted statistically.

RESULTS

The cultivars planted in jardinière indicated average mass of plants between 123 g at V6- Green Ice and 173 g at V2- Gringo (table 1).

Regarding the lettuce cultivars planted in pots they have been recorded average mass of plants of 105.67 g at V1 –Simpson and 138.0 g at V10- Lollo bionda (table 2).

If we analyze the average mass of lettuce plants, by comparing them, those cultivated in jardinière and in pots, we notice that at V7- Ascona the least average mass of plants of 117.5 g was recorded and at V3- Everest the biggest average mass of plants of 149.0 g. They haven't recorded significant statistic differences between the cultivars planting (jardinière-pots) – table 3.

CONCLUSIONS

The average mass of lettuce plants cultivated in jardinière presented positive and significant differences between the studied varieties.

We noticed positive and significant differences only at V5 and V3 regarding the pots cultivation.

The studied lettuce kinds proved themselves that they can be cultivated not only in jardinière but also in pots and their pleasant aspect can be combined with their usefulness, too.

The cultivating of more kinds of lettuce in jardinière gives the possibility that the leaves could be harvest according to the usefulness and we also get a combination of leaves when we prepare a salad.

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Table 1

The average mass of lettuce plants cultivated in jardinières

Variants	Average	Percents %	Diference	Significance
Avrage	141.57	0.00	100.00	Mt
V(1)	132.67	-8.90	93.71	OOO
V(2)	145.00	3.43	102.43	*
V(3)	173.00	31.43	122.20	***
V(4)	155.00	13.43	109.49	***
V(5)	148.00	6.43	104.54	***
V(6)	123.33	-18.23	87.12	OOO
V(7)	136.33	-5.23	96.30	OO
V(8)	125.00	-16.57	88.30	OOO
V(9)	135.00	-6.57	95.36	OOO
V(10)	142.33	0.77	100.54	N
DL5% = 3.100 DL5% in % = 2.1898 **DL1% = 4.260 DL1% in % = 3.0092** **DL01% = 5.800 DL01% in %= 4.0970**				

Table 2

The average mass of plants cultivated in pots

Variants	Average	Percents %	Diference	Significance
Avrage	120.70	0.00	100.00	Mt
V(1)	105.67	-15.03	87.54	OOO
V(2)	112.67	-8.03	93.34	OOO
V(3)	125.00	4.30	103.56	*
V(4)	118.67	-2.03	98.32	N
V(5)	133.33	12.63	110.47	***
V(6)	112.00	-8.70	92.79	OOO
V(7)	125.00	4.30	103.56	*
V(8)	114.67	-6.03	95.00	OO
V(9)	122.00	1.30	101.08	N
V(10)	138.00	17.30	114.33	***
DL5% = 3.930 DL5% in % = 3.2560 **DL1% = 5.400 DL1% in % = 4.4739** **DL01% = 7.360 DL01% in %= 6.0978**				

Table 3

The difference of the average mass plants at the lettuce cultivated in jardinière and pots

Variants	Average	Percents %	Difference	Significance
Average	131.12	0.00	100.00	Mt
V(1)	119.17	-11.95	90.89	N
V(2)	128.83	-2.28	98.26	N
V(3)	149.00	17.88	113.64	N
V(4)	136.83	5.72	104.36	N
V(5)	140.67	9.55	107.28	N
V(6)	117.50	-13.62	89.61	N
V(7)	130.67	-0.45	99.66	N
V(8)	119.83	-11.28	91.40	N
V(9)	128.50	-2.62	98.00	N
V(10)	140.17	9.05	106.90	N
DL5% = 22.470 DL5% in % = 17.1374 **DL1% = 32.310 DL1% in % = 24.6421** **DL01% = 47.450 DL01% in %= 36.1891**				

Fig. 1 Simpson
The leaves are green.
The period of vegetation is of about 45 days.

Fig. 2. Gringo
In lower temperatures (about 8-12 ^{0}C) the leaves get a more intense colour towards red.
The period of vegetation is of about 45 days.

Fig. 3. Everest
The leaves of oak leaf lettuce have a shape resembling the leaves of an oak tree.
The colour of the leaves varies from green and brownish green to red. It looks very decorative and is often combined with other lettuce varieties to bring colour to salads.
The period of vegetation is about 48 days.

Fig. 4. Piroga
The leaves are of light green colour.
The period of vegetation is of about 45 days.

Fig. 5. Salad Bowl Carthago
The lettuce of oak leaves type.
The period of vegetation is of about 45 days.

Fig. 6. Green Ice
Leaves lettuce, presents rigid leaves but they have a delicious taste.
It has a period of vegetation of about 45 days.

Fig. 7. Ascona
The cultivars presents leaves of darks red colour.
It has a period of vegetation of about 45 days.

Fig. 8. Crispy Frills
The leaves are very decorative regarding their aspect and colour.
The period of vegetation is of about 80 days.

Fig. 9. Lollo bionda

The leaves are green, waved on edges and with a decorative aspect.
The period of vegetation is of about 45 days.

Fig. 10. Lollo rosa

The red are red, waved on edges and with a very decorative aspect.
The period of vegetation is of about 45 days.

Fig. 11. Lettuce grown in pots and jardinière

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LEAFS MORPHOLOGICAL MODIFICATION IN SOME VARIETIES LETTUCE INDUCED BY TEMPERATURE

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Keywords: lettuce, cultivars, low temperature

ABSTRACT

The study was made in the Vegetable field of the Horticulture University from Bucharest at Piroga and Paris White lettuce cultivars typical for summer cultures.

In present study we follow the behaviour of two cultivars of lettuce cultivated in cold greenhouse in winter period with the purpose to establish the plant negative reaction in this condition.

We can observe that the low temperature determined the increased of leaves and the detaching of epidermis, darkness spaces between leaves nerves having a negative effect on the commercial aspect.

INTRODUCTION

The lettuce is the most demanded species every season. In our country different variety of lettuce, of head lettuce especially, are planted in winter, spring or autumn period. The variety of leaves lettuce or cos are planted especially only in the field in spring-summer.

Although some types of lettuce or cos are demanded every season we proposed to study their reaction in culture conditions in winter and cold greenhouse conditions.

MATERIAL AND METHODS

The study was made in the didactic field of Horticulture Faculty of Bucharest between 15-th of February and 1-st of May 2005 using two varieties of leaves lettuce and cos type.

Experimental variants:

V1 the leaves lettuce - Piroga; V2 the cos lettuce - Paris White.

The nurseling was produced in greenhouse and at planted it had 32 days. The lettuce cultures were planted on 7-th of March in cold greenhouse and on 20-th in the solarium. We noticed and determined of growth of plants and we recorded the number of leaves, the plant diameter and we also decided the leaves surface, total and edible mass.

The purpose of the study was to follow the reaction of these types in early culture conditions in spring.

REZULTS

According to obtained dates and regarding the number of leaves formed on the plants we remark at Piroga type and Paris White insignificant statistic differences (tables 1 and 2).

Regarding the leaves surface we remarked significant and statistic differences at the type cultivar in greenhouse (not only at Piroga but also at Paris White). If we look at the lettuce cultivated in cold greenhouse the plants presented leaves surfaces being much less comparing them to those grown in solarium (tables 3 and 4).

The average edible mass bigger in culture condition in greenhouse compared to those from cold greenhouse (table 5 and 6).

In table 7 we present the sum of minimum and maximum temperatures in culture periods of March-May recorded in cold greenhouse and in solarium.

CONCLUSION

The low temperature determined the increased of leaves and the detaching of epidermis during the section.

The spaces between nerves present darkness at leaves affected by cold, having a negative effect on the commercial aspect.

When the temperature became high, the new formed leaves got the morphologic aspect according to the cultivar (figures 1-6).

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Table 1

The variation of leaves number at the lettuce cultivate in greenhouse and in solarium depending on the cultivation medium

Cultivar	Place of cultivation	Average nr. of leaves	The difference		The significance
			Nr. frunze	%	
Average		**22.96**	**0.00**	**100.00**	**Mt**
Piroga	Greenhouse	21.05	-1.91	91.67	N
Piroga	Solarium	24.88	1.91	108.33	N

DL5% = 4.780 DL5% in % = 20.8165
DL1% = 8.780 DL1% in % = 38.2363
DL01% = 19.460 DL01% in %= 84.7469

Table 2

Differences regarding the variation of leaves number at the lettuce cultivated in greenhouse and solarium (Paris White cultivar)

Cultivar	Place of cultivation	Average no. of leaves	The difference		The significance
			no. of leaves	%	
Average		**27.24**	**0.00**	**100.00**	**Control**
Paris White	Greenhouse	26.,08	-1.16	95.73	N
Paris White	Solarium	28.40	1.16	104.27	N

DL5% = 1.910 DL5% in % = 7.0124
DL1% = 3.500 DL1% in % = 12.8499
DL01% = 7.770 DL01% in %= 28.5268

Table 3

Differences regarding the variation of leaves surface at the lettuce grown in greenhouse and solarium at Piroga cultivar

Cultivar	Place of cultivation	The foliar surface	The difference		The significance
		cm^2	cm^2	%	
Average		**1012.00**	**0.00**	**100.00**	**Control**
Piroga	Greenhouse	776.00	-236.00	76.68	O
Piroga	Solarium	1248.00	236.00	123.32	*

DL5% = 198.280 DL5% in % = 19.5929
DL1% = 364.130 DL1% in % = 35.9812
DL01% = 806.840 DL01% in %= 79.7273

Table 4

Differences regarding the variation of leaves surface at the lettuce grown in greenhouse and solarium at Paris White cultivar

Cultivar	Place of cultivation	The foliar surface	The difference		The significance
		cm^2	cm^2	%	
Average		1097.50	0.00	100.00	Control
Paris White	Greenhouse	907.75	-189.75	82.71	O
Paris White	Solarium	1287.25	189.75	117.29	*

DL5% = 174.870 DL5% in % = 15.9335
DL1% = 321.150 DL1% in % = 29.2620
DL01% = 711.600 DL01% in %= 64.8383

Table 5

Differences regarding the variation of average edible mass at the lettuce grown in greenhouse and in solarium at Piroga cultivar

Cultivar	Place of cultivation	The average edible mass	The difference		The significance
		g	g	%	
Average		217.50	0.00	100.00	Control
Piroga	Greenhouse	141.50	-76.00	65.,06	O
Piroga	Solarium	293.50	76.00	134.94	*

DL5% = 44.870 DL5% in % = 20.6299
DL1% = 82.410 DL1% in % = 37.8897
DL01% = 182.610 DL01% in %= 83.9586

Table 6

Differences regarding the variation of average edible mass at the lettuce grown in greenhouse and in solarium at Paris White cultivar

Cultivar	Place of cultivation	The average edible mass	The difference		The significance
		g	g	%	
Average		298.75	0.00	100.00	Control
Paris White	Greenhouse	230.50	-68.25	77.15	OO
Paris White	Solarium	367.00	68.25	122.85	**

DL5% = 24.370 DL5% in % = 8.,1573
DL1% = 44.760 DL1% in % = 14.9824
DL01% = 99.180 DL01% in %= 33.1983

Table 7

Daily temperatures recorded in greenhouse and in solarium during the plants growth

Place of cultivation	Temp.	March		April		May		Total	Average
		Sum	Average	Sum	Average	Sum	Average		
Greenhouse	Min.	121	4.84	174	7.25			295	6.02
	Max.	354	27.23	470	19.58			824	16.81
Solarium	Min .			124	7.29	174	8.29	298	8.27
	Max.			330	19.,41	472	22.48	802	22.27

Fig. 1. The leave aspect at Piroga cultivated in cold greenhouse
(in 10 March 2005)

Fig. 2. The leave aspect at Piroga cultivated in cold greenhouse
(in 4 April 2005)

Fig. 3. The leave aspect at Piroga cultivated in cold greenhouse
(in 20 April 2005)

Fig. 4. The aspect of Piroga cultivated in solarium

Fig. 5. The aspect of plant at Paris White cultivated in greenhouse

Fig. 6. The plants aspect of Paris White cultivated in solarium

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STUDY UPON TOMATO CULTURE WITHOUT SOIL, USING ORGANIC SUBSTRATA IN DIFFERENT RECIPIENTS IN INDUSTRIAL HOTHOUSES WITH A NON-CONVENTIONAL ENERGETIC CONSUMPTION

STUDIUL CULTURII TOMATELOR FĂRĂ SOL UTILIZÂND SUBSTRATURI ORGANICE ÎN DIFERIŢI RECIPIENŢI ÎN SERE INDUSTRIALE CU CONSUM ENERGETIC NECONVENŢIONAL

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Keywords: cultură fără sol, tehnică de vârf, oboseala solului, sistem intensiv de cultură, substraturi de pietriş, substraturi organice, seră, apă geotermală.

ABSTRACT

Pe plan mondial cunoştinţele despre aceste sisteme de cultura fără sol, precum si diversitatea lor sunt extrem de avansate. Primul sistem comercial de cultura al plantelor fără sol a fost conceput de Gericke (1930) profesor la Universitatea Barkley, din California.

Anul 1973 marchează începutul erei propriu-zise a tehnicilor de cultura fără sol când Cooper in Anglia da publicitarii rezultate de producţie obţinute prin tehnica filmului nutritiv (NFI).

Griin (1988), aduce în discuţie problema oboselii solului şi lupta împotriva dăunătorilor din sol, a nematozilor in special, din cauza imposibilităţii efectuării unei rotaţii adecvate în ţări cu suprafeţe mari de sere (Olanda, Franţa, Belgia, Anglia, Germania) în care se practică un sistem foarte intensiv de cultură.

În ţara noastră deşi Maier încă din 1969 face primele semnalări asupra acestor culturi, cercetările în acest domeniu au fost puţine.

Răuţă şi col. (1986) dau publicitarii rezultatele obţinute la culturile de legume înfiinţate pe substraturi de pietriş sau alte agregate grosiere, în comparaţie cu cele de la sol, precizând ca au dat in medie sporuri semnificative de producţie.

În ţara noastră, acest sistem de cultură a rămas în stadiul incipient de existenţialitate cu un timid început de cercetare, neavând nici suportul susţinerii industriale, fenomenul condiţionându-se şi excluzându-se reciproc.

În prezenta lucrare se prezintă rezultatele parţiale ale unui studiu privind cultivarea tomatelor pe substraturi organice în diferiţi recipienţi (găleţi din P.V.C. şi saci din folie de polietilenă cu turbă amendată) cu avantajul organizării experimentului într-o seră încălzită cu apă geotermală.

INTRODUCTION

As high-level achievement within the high technologies, the horticultural cultures without soil, especially vegetables and flowers, were placed on the top of the vegetable production, from a productive and qualitative point of view, related to the worldwide agriculture. The productions for tomatoes – 500-550 t/ha and for cucumbers – 700-800 t/ha obtained in hothouses set the non-conventional cultures in the top of productivity (Horgoş, A., 1998, Atanasiu, N., 2002). These cultures, already present on big surfaces in countries as Holland, France, Belgium, Germany, England, Japan, Denmark, are continuously being expanded due to the high agricultural technologies, being supported by a high-tech industry specialized in such direction. This parallel, specialized industry provides high-tech materials and equipment, smartly designed and created, which confer the same high-tech level to these cultures.

Worldwide, the available information regarding cultures without soil and also their diversity are extremely advanced. The first commercial system of plant cultivation without soil was conceived by Gericke (1930), a professor at the Barkley University, California.

Year 1973 marks the beginning of the century of without soil-cultures, when Cooper (England) published some production results obtained using the technique of the nutritive film (NFI). The Dutch apply for the first time the Danish mineral wadding in horticulture (Verwer, 1975, 1976).

Griin (1988) brings into discussion the problem of soil stress and the fight against soil pests, especially nematodes, because of the impossibility of applying an adequate rotation in countries with big surfaces of hothouses (Holland, France, Belgium, England, Germany), in which the very intensive agricultural systems are present.

In our country, the researches regarding this subject are in small number, although Maier has reached this subject since 1969.

Răuță *et al.* (1986) published the results obtained for some vegetable cultures on gravel or some other thick substrata, compared to those on soil, with the specification that they had significant average production growths.

Some attempts to found commercial cultures without soil were made for the first time in our country after 1980, using important total technologies in some hothouse assembles. Unfortunately, any concrete culture system was set after this experiment, accessible for extension in hothouses, so the attempts were not taken into consideration in order to apply a possible modernization or to purchase the necessary materials and equipment for a possible production.

So, in our country, this culture system has remained in its incipient stage of development, with a shy attempt of research, being not supported by industry.

Black and brown peat, sawdust, rind and shavings, but also domestic compost, coconut fibre, mixes of vermiculite with sand or of peat with perlite were used as organic materials.

At the University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, some researchers adopted tomato culture in polyethylene packs, this system being cheaper, and there was not any need to change the outfits and equipment from hothouses, and the soil can be used for successive and interpolated cultures (Maria Apahideanu, 1998).

The systems of cultures without soil differ from one country to another, from one geographical area to another, their extension into production depending on farmers preferences and on their possibilities to apply these systems. Each system has its own advantages and disadvantages because of the installation expenses and of the production growth ensured, compared to the cultures on soil.

In the North-Western Europe, 60-70% from the hothouses surface is used for vegetable cultivation, 20-30% for flowers and 5-10% for nursery transplants. The biggest surfaces are cultivated under the system of no soil- cultures with special results for vegetables, but the researchers also try the ornamental species (Clayton, 1981; Tramier, 1988; Mozard, 1994; Morisot, 1997). At the end of `90s, the surfaces cultivated with no soil- cultures in the North-Western Europe represented for vegetables 4658 ha from the total surface of 11868 ha hothouses, namely about 40% (Benoit and Ceustermans, 1989). According to the same authors, in the last 20 years, 39% of the vegetable hothouses have been cultivated within the no soil-culture systems, in France – 47%, and in Holland – 51%.

The researches have enhanced in the last years, due to the good results that had been obtained.

According to some ecologists, some variants of no soil- cultures may produce residues difficult to recycle, or they can pollute with chemical fertilizers the soil in which they are applied.

Relying on the experience in this field, we initiated some researches taking into account the existence of some industrial hothouses with a non-conventional energetic consumption (geothermal water) and the possibility of using some organic matter at reasonable prices in the experiment field (Curtici area from Arad`s vegetable area).

MATERIAL AND METHOD

The experiment made on tomato cultivation on organic substrata in different recipients using hybrids with a determined growth in the 1st cycle of production was carried out in the hothouses warmed with geothermal water from S.C. Agronin S.A. Curtici. These hothouses, built in the `70s according to Venlo type (3,20 ml width and 2 ml height), with a low technical level compared to the new achievements in this field, influenced negatively the level of the production obtained, because of the impossibility to apply a modern culture technology. The productions obtained according to the old technology of tomato cultivation on soil with outdated technological loops were placed under the profitable level, fact that led to the impossibility to continue the production process by a cyclic and annual reapplication.

Because the soil from the hothouse began to show signs of "tiredness" and we couldn`t support any financial expenses for disinfection, we carried out a bifactorial experiment, in which the experimental factors are:

Factor A – The recipient used for plant cultivation:

a_1 – hothouse soil (without recipient)

a_2 – polyethylene packs with fertilized and neutralized peat

a_3 – pail buckets made of plastic (PVC) with organic substrata (straws 20% + manure 40% + red and black peat 40%).

Factor B – The liquid organic fertilizer Stimusoil 200

b_1 – non/fertilized substratum

b_2 – substratum fertilized with Stimusoil 200 – 1 l/ha.

Within the improved (modern) culture technology that has been applied (drip irrigation, fertirrigation with Kemira-type fertilizers – Cropcare and Ferticare, the use of some high quality hybrids, etc.), we used as fertilization supplement a liquid organic fertilizer – Stimusoil 200, in order to ameliorate and improve the physical-chemical characteristics of the culture substrata, whatever this could be.

Using some calculations of mathematical statistics specific to the method of analysis of variation, we interpreted and evaluated the influence of the experimental factors and also the effect of their interaction upon the productive potential of tomato culture.

RESULTS AND DISCUSSIONS

The results from the Table 1, represented in the graphic from Fig. 1 and Fig. 2, express the specific influence of any of the recipients used for tomato cultivation, and also the influence of the substratum used, whether non-fertilized or fertilized with Stimusoil 200, through the level of the production obtained, but also through the elements specific to this production (number of bunches/plant, number of fruits/plant, average weight of a bunch and of a fruit).

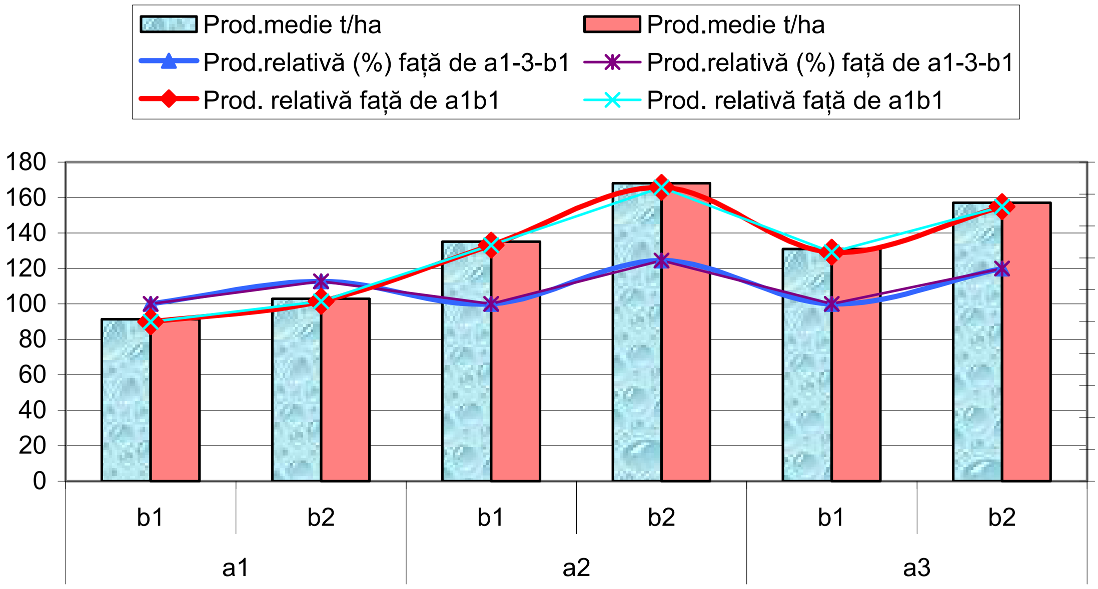

Fig. 1. Production results for tomato culture (hybrid Platus F_1) on organic substrata, in different recipients using the liquid organic fertilizer Stimusoil 200

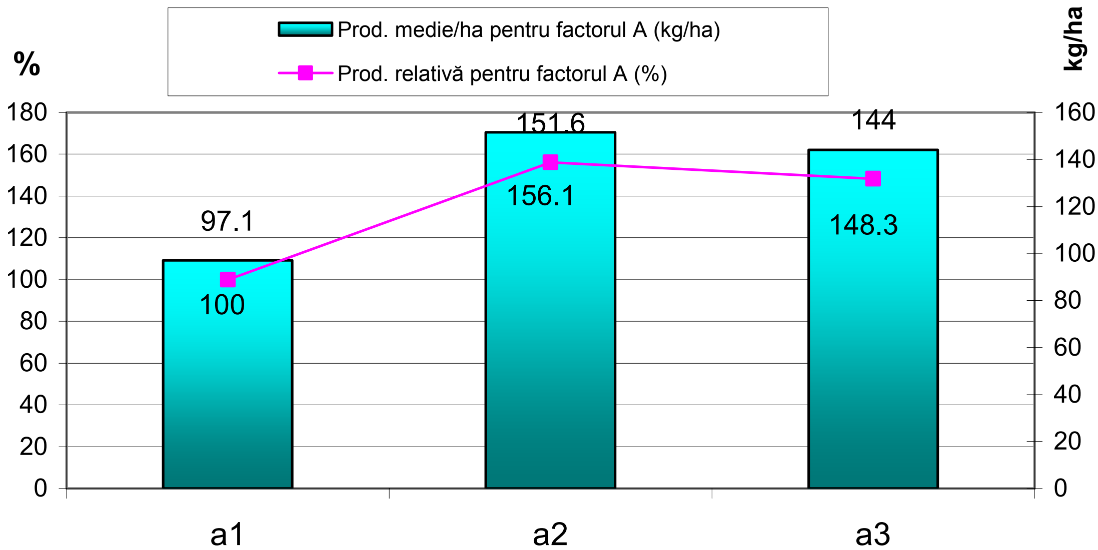

Fig. 2. Average production and relative production for factor A
(the recipient used for tomato plant– Platus F_1)

We could observe big differences regarding the absolute expression of the production per unit of surface (kg/ha), and especially regarding the percentage expression which specifies the production growth compared to the average of the control variant, in bifactorial combinations (a_1 = 100%), by comparison to the others (148,3% for a_3, respectively 156,1% for a_2). Within the same experimental factor represented by the recipient, the differences between the variant fertilized with Stimusoil 200 and the variant not fertilized are not so emphasized, they being between 112,7% and 124,4%.

Table 2 (analysis of variation as a result of the mathematical calculations specific to this method of interpreting the experimentation results) presents us the real situation regarding the singular influences and the influences of the interaction between the experimental factors and the tomato production, using the hybrid Platus F_1 with a determined growth.

We obtained very good results when we used the recipients represented by pale buckets made of PVC and polyethylene packs for cultivation, compared to control (hothouse soil), such materials having a very positive statistical ensuring (2.1.). Regarding the application of the liquid organic fertilizer Stimusoil 200, the average production obtained (b_2 = 142,7 t/ha) had a very significantly positive statistical ensuring in comparison with the production obtained in the case of neutralizing this fertilizer (b_1 = 119,1 t/ha) (2.2.).

From the point of view of the interaction between the experimental factors within the same Table 2 (2.3 and 2.4), we can take conclusions regarding the opportunity to use a recipient (a_2 – packs of polyethylene with neutralized peat) and to use the liquid organic fertilizer Stimusoil 200 (b_2), indifferently of the cultivation recipient, because the production levels vary dramatically from those obtained in the case of the non-fertilized variants. The production growths were singificant in this case and the productions had a very significantly positice statistical ensuring, as follows:

$a_2b_1 – a_1b_1 \rightarrow$ XXX; $a_2b_1 – a_1b_1 \rightarrow$ XXX;
$a_2b_2 – a_1b_2 \rightarrow$ XXX; $a_3b_2 – a_1b_2 \rightarrow$ XXX;
$a_2b_2 – a_1b_1 \rightarrow$ XXX; $a_3b_3 – a_1b_1 \rightarrow$ XXX;
or
$a_1b_2 – a_1b_1 \rightarrow$ XXX; $a_2b_2 – a_2b_1 \rightarrow$ XXX;
$a_2b_3 – a_2b_1 \rightarrow$ XXX; $a_3b_2 – a_3b_1 \rightarrow$ XXX;
$a_4b_2 – a_4b_1 \rightarrow$ XXX; $a_4b_3 – a_4b_1 \rightarrow$ XXX;

Table 1

The singular influences and the influences of the interactions between the experimental factors and the tomato production for Platus F_1, cultivated on organic substrata in different recipients

Variant	Average production (kg/ha)	Relative production (%)	Difference (-+t/ha)	Difference significance
2.1. The influence of the recipient used for cultivation				
a2-al	151,64-97,10	156,17	54,54	XXX
a3-al	144,05-97,10	148,36	46,95	XXX
a4-a1	130,94-97,10	134,86	33,84	XXX
a3-a2	144,05-151,64	95,00	-7,58	-
a4-a2	130,94151,64	86,35	-20,70	00
a4-a3	130,94-144,05	90,90	-13,11	0
DL 5% = 9,339		**DL 1% = 14,141**		**DL 0,1% = 22,718**
2.2. The influence of the fertilization with the liquid organic fertilizer Stimusoil 200 on the culture substratum from recipients				
b2-b1	142,73-119,13	119,81	23,60	XXX
b3-bl	130,94-119,13	109,91	11,80	X
b3-b2	130,94-142,73	91,74	-11,79	0
DL 5% =2,983		**DL 1% = 4,108**		**DL 0,1% = 5,656**
2.3. The influence of the interaction between the cultivation recipient and the culture substratum not fertilized or fertilized with Stimusoil 200				
a2bl-albl	135,10-91,30	147,97	43,80	XXX
a3bl-albl	131,00-91,30	143,48	39,70	XXX
a4b1-a1b1	119,13-91,30	130,49	27,83	XXX
a3bl-a2bl	131,00-135,10	96,97	-4,10	-
a4b1-a2b1	116,13-135,10	88,18	-15,96	00
a4b1-a3b1	119,13-131,00	90,94	-11,86	0

Variant	Average production (kg/ha)	Relative production (%)	Difference (-+t/ha)	Difference significance
a2b2-a1b2	168,20-102,90	163,46	65,30	XXX
a3b2-alb2	157,10-102,90	152,67	54,20	XXX
a4b2-a1b2	142,73-102,90	138,71	39,83	XXX
a3b2-a2b2	157,10-168,20	93,40	-11,10	0
a4b2-a2b2	142,73-168,20	84,86	-25,46	000
a4b2-a3b2	142,73-157,10	90,86	-14,36	0
a2b3-alb3	151,63-97,10	156,16	54,53	XXX
a3b3-alb3	144,06-97,10	148,37	46,96	XXX
a4b3-a1b3	130,96-97,10	134,88	33,86	XXX
a3b3-a2b3	144,06-151,63	95,01	-7,56	-
a4b3-a2b3	130,96-151,63	86,37	-20,66	00
a4b3-a3b3	130,96-144,06	90,91	-13,10	0
a2b2-albl	168,20-91,30	184,23	76,90	XXX
a3b3-albl	144,06-91,30	157,79	52,76	XXX
a3b3-a2b2	144,06-168,20	85,65	-24,13	00
DL 5% =10,512		**DL 1% = 15,574**		**DL 0,1% = 24,224**
2.4. The influence of the interaction between the cultivation recipient and the culture substratum not fertilized or fertilized with Stimusoil 200				
alb2-alb1	120,90-91,30	112,71	11,60	XXX
alb3-a1b1	97,10-91,30	106,35	5,80	-
a1b3-a1b2	97,10-102,90	94,36	-5,80	-
a2b2-a2bl	168,20-135,10	124,50	33,10	XXX
a2b3 - a2bl	151,63-135,10	112,24	16,53	XXX
a2b3- a2b2	151,63-168,20	90,15	-16,56	000
a3b2 - a3bl	157,10-131,00	119,92	26,10	XXX
a3b3 -a3b1	144,06-131,00	109,97	13,06	XXX
a3b3-a3b2	144,06-157,10	91,70	-13,03	000
a4b2-a4b1	142,73-119,13	119,81	23,60	XXX
a4b3-a4b1	130,96-119,13	109,93	11,83	XXX
a4b3-a4b2	130,96-142,73	91,76	-11,76	000
DL 5% =5,965		**DL 1% = 8,216**		**DL 0,1% = 11,311**

CONCLUSIONS AND RECOMMENDATIONS

1. The use of recipients for tomato cultivation compared to the hothouse soil is justified by production growths between 48,3% and 56,1%.

2. The liquid organic fertilizer Stimusoil 200 stimulates the achievement of some production growths of 12,7-24,4%, for each recipient used.

3. The recipient represented by polyethylene packs with neutralized peat are remarkable (156,1% relative average production).

5. It is recommended to continue the researches in order to strengthen the conclusions and to elucidate the extremely positive effects of the liquid organic fertilizer Stimusoil 200 in all culture variants.

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Table 1

Production results for tomato culture (hybrid Platus F_1) on organic substrata, in different recipients using the liquid organic fertilizer Stimusoil 200

Factor A	**Factor B**	**No. of bunches (pieces)**	**No. of fruits/plant (pieces)**	**Average weight**		**Average production**		**Relative production (%) compared to**		**Average production per ha for factor A (kg/ha)**	**Relative production for factor A (%)**
				Bunch (g/piece)	**Fruit (g/piece)**	**Per plant (kg/plant)**	**Per ha (kg/ha)**	**$a_{1-3}b_1$**	**a_1b_1**		
a_1 control	b_1	5,5	27,0	518,9	105,7	2,854	91328	100,0	100,0	97120	100,0
	b_2	6,0	27,5	536,0	116,9	3,216	102912	112,7	112,7		
a_2	b_1	6,1	30,0	693,3	140,8	4,223	135138	100,0	147,9	151649	156,1
	b_2	6,5	32,2	808,4	163,2	5,255	168160	124,4	184,1		
a_3	b_1	6,0	29,5	682,5	138,8	4,095	131040	100,0	143,5	144064	148,3
	b_2	6,3	31,9	779,2	153,9	4,909	157088	119,9	172,0		

Culture density 32000 plants per ha
Tp – main strain

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RESEARCHES REGARDING THE DIVERSITY OF ASSORTMENTS OF TOMATOES VARIETIES AND HYBRIDS FOR GREENHOUSE CULTURE

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Keywords: *Lycopersicon esculentum*, protected culture, production, fruits quality

ABSTRACT

The purpose of this research was to study the behaviour of some tomato hybrids cultivated in cold greenhouse , especially form the production point of view. The culture was led with 5 flower growths. The number of flowers was unequal between hybrids , most of them were at Harmony and the least at Belle. The number of fruits per plant was very different as it follows: 48,1 at Harmony, 30,2 at Fade, 27,6 at Water, 19,7 at Belle and 18,2 at Rally. The percentage of tied fruits swung between 91% at Harmony and 73% at Rally, Marfa having only 86%. The evolution of fruits was influenced not only by the number of fruits per plant but also by their weight. Consequently, the biggest production had been obtained at Fada 3,6 kg/pl, followed by Rally 3,4kg/pl and Marfa 3,1kg/pl. The smallest production was at Harmony 1,3kg/pl. The fruits were big and strong at Belle and Fada, with acceptable taste at Rally, Belle and Harmony. The best early time was registered at Harmony.

INTRODUCTION

To obtain high and of a great quality productions is possible only throughout appropriate technologies in which the choice of nurseries and hybrids is very important. Many researchers were preoccupied by the culture of the most valuable tomato hybrids with tolerance at different pests and by finding some ways to optimize and improve the culture technology. Consequently, there are remarkable researches regarding the use of some very valuable tomato hybrids and the profitableness of the tomato culture by recovering the adventives shoots, rooting and use them as planting material in order to found the culture. Moreover, at the containerized culture, the choice of the culture substratum influences the vegetative growth and the capacity of production of the nursery or hybrid, but is necessary to choose thoughtful the nursery, the hybrid and the fertilization recipes.

MATERIALS AND METHODS

The researches were conducted in the didactic field of Vegetable crops department from Bucharest, in cold greenhouse, using 4 new hybrids and Marfa hybrid as witness. These hybrids formed the experimental variants as it follows:

- Harmony
- Rally
- Belle
- Fado
- Marfa (control)

The planting was effectuated on 25th March at 80/40 cm.

During the vegetation period the fourth hybrids and the witness have been studied from the vegetative growth and from the capacity of production point of view. Consequently, it has been determined the number of leaves until the first flower growth, the distance to the first flower growth, the sequence of the flower growths and the distance between them. These elements represent the features of a nursery or hybrid form the early time point of view. It has also been determined the number of flowers at each flower growth, the number of tied fruits (with the help of which has been determined the percent of tied fruits) at each flower growth as well as at each hybrid. The necessary dates to appreciate the early time of hybrids were the ones of the appearance of the first flower growth, the ageing and the first harvesting of fruits.

To appreciate the quality of fruits there have been effectuated biochemical determinations regarding the strength, the C vitamin content, total acidity and soluble dry substance.

RESULTS AND DISCUSSIONS

Based on the field dates, the processing and interpretation oh they were obtained results on which was made a characterization of the used hybrids and prescriptions for the greenhouse culture.

In which regards the vegetative growth, the hybrids used reached the high of over 1.70 m, big leaves which shows that they are vigorous.

The number of leaves until the first flower growth (table 1) was between 5.5 at Rally and 7.8 at Belle. The distance to the first flower growth was under 40 cm; the smallest was at Rally 27.9 cm connecting with the number of leaves before first flower growth. The flower growths appear after a different number of leaves as it follows: 5-6 at Rally, Belle, Fado and witness and 8 at Harmony. This aspect can be observed at the distance between the flower growths which at Harmony is of 44.4.

The number of flowers at the inflorescences (fig. 1) is very different between hybrids and a little bit between growths. So, at the first flower growth the number was from simple to double, 5.2 at Belle which has big fruits and 10,4 at Harmony with small fruits. At the following growths the number of flowers remains constant.

The number of formed fruits (fig. 2) is very important in calculating the production per area. Its values are quite high mentioning the number of flowers from the growth. The highest number of fruits was formed at Harmony, but they were small sized (variety character). At others hybrids with big fruits the number of fruits was between 18,2 at Rally and 30,2 at Fado.

The most important element to appreciate the capacity of tomato fructification is the tying percent of the fruits (table 2) which is very different between nurseries and growths. Harmony, which has a percentage of 91% at the first growth, is in a slightly fall down at the other growths. In average the tying percentage was of 91%. Rally and Belle had 73% and 74%, but in exchange formed the biggest fruits. The control had 86%.

The average weight was very important in this study. It contributed to establish the production of fruits (table 3). The biggest fruits were obtained at Rally, 190g, followed by Belle, 123g, Fado 118g, and Harmony 28g. The witness weighted 114g. The production of fruits was very different between hybrids and is very mush influenced by the average weight. The biggest production was estimated at Fado, followed by Rally and Belle. Obviously the smallest one was at Harmony which has the small fruit. (fig. 3).

Form the biochemical features point of view, the hybrids contained 20 mg/100g, soluble dry substance 4.9-8.7%, acidity between 0.15-0.54% (table 4). The strongest fruits were at Fado and Belle.

The elements throughout is characterized the early time of a nursery or hybrid are the first flower growth, the ageing and the maturing. The dates regarding these elements are:

- The first flower growth was on the 20th of April at Harmony and Rally and on the 26th of April at Fado and Belle;
- The ageing: 6 June Harmony, 13 June Rally and 15 June Fado and Belle;
- The beginning of maturing: 15 June Harmony and 20 June Rally, Fado and Belle.

CONCLUSIONS

The researches effectuated regarding the behaviour of some new tomato hybrids in greenhouse culture showed the fact that used as biological material, the results were satisfactory and they can be used in cold greenhouse for the fruits production.

The conclusions are the following:

- The most early timed hybrid is Harmony, with small production, small fruits which can be valuable at bunch;
- The biggest fruits were obtained at Rally, followed by Fado and Belle;
- The strongest fruits obtained were at Fado and Belle, being able to resist a longer period of time;
- Fado has a low acidity, but is highly producing;
- Rally, Belle and Harmony have an equilibrate taste and a uniform colour etc.

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Table 1 Biometrical pointers of studied hybrids

The variants	The number of leaves until the first inflorescence	The distance until the first inflorescence	The sequence of inflorescences	The distance between inflorescences
Harmony	7,1	38,8	8	44,4
Rally	5,5	27,9	6,2	29,6
Belle	7,8	38,9	5,4	27,6
Fado	7,0	35,2	6,2	29,6
Marfa - control	6,8	36,8	6,3	28,9

Table 2 The percentage of fruits in inflorescence (%)

The variant	The I^{st} inflorescence	The II^{nd} inflorescence	The III^{rd} inflorescence	The IV^{th} inflorescence	The V^{th} inflorescence	The Average
Harmony	96 a	94 a	90 a	87 b	90 a	91 a
Rally	89 d	67 d	74 d	64 e	72 d	73 c
Belle	77 e	63 e	75 d	73 d	83 c	74 c
Fado	94 b	73 c	87 b	89 a	85 b	86 b
Marfa - mt	92 c	80 b	83 c	85 c	90 a	86 b

Student Newman Keuls test, 5 %

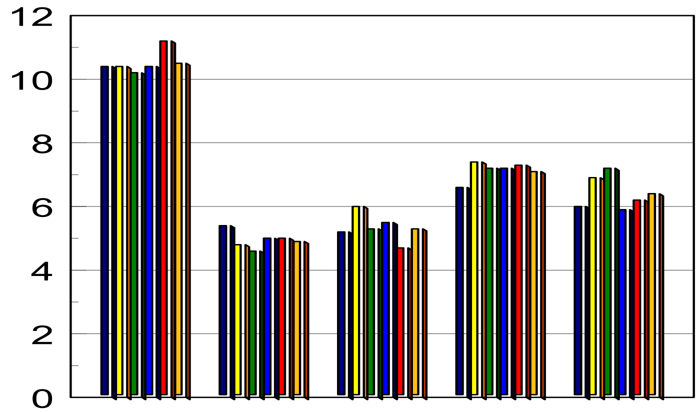
Table 3 The tomato production at studied hybrids

The variant	The average weight (g)	The fruit production	
		kg/plant	The difference to control
Harmony	28 e	1,3 a	-1,8
Rally	190 a	3,4 a	+ 0,3
Belle	123 b	2,4 a	-0,7
Fado	118 c	3,6 a	+ 0,5
Marfa - mt	114 d	3,1 a	0

Student Newman Keuls test, 5 %

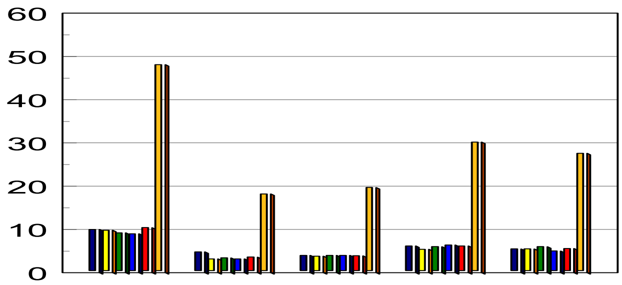
Table 4 The biochemical features of tomato fruits

The variant	C vitamin (mg/100 g)	Total titrable acidity (% ac. oxalic)	Soluble dry substance %	Fermity Kgf/cm^2
Harmony	21,6	0,54	8,7	0,1
Rally	21,8	0,25	6,5	0,2
Belle	21	0,19	5,7	0,7
Fado	19,8	0,15	4,9	0,8
Marfa - mt	20,1	0,19	5,8	0,5



	Harmony	Rally	Belle	Fado	Marfa - control
First infl.	10,4	5,4	5,2	6,6	6,0
Second infl.	10,4	4,8	6,0	7,4	6,9
Thirt infl.	10,2	4,6	5,3	7,2	7,2
Fourt infl.	10,4	5,0	5,5	7,2	5,9
Fifth infl.	11,2	5,0	4,7	7,3	6,2
Average	10,5	4,9	5,3	7,1	6,4

Fig. 1 The number of flowers in inflorescence



	Harmony	Rally	Belle	Fado	Marfa - control
First infl.	10,0	4,8	4,0	6,2	5,5
Second infl.	9,8	3,2	3,8	5,4	5,5
Thirt infl.	9,2	3,4	4,0	6,0	6,0
Fourt infl.	9,0	3,2	4,0	6,4	5,0
Fifth infl.	10,4	3,6	3,9	6,2	5,6
Total	48,1	18,2	19,7	30,2	27,6

Fig. 2 The number of the fruits in inflorescence

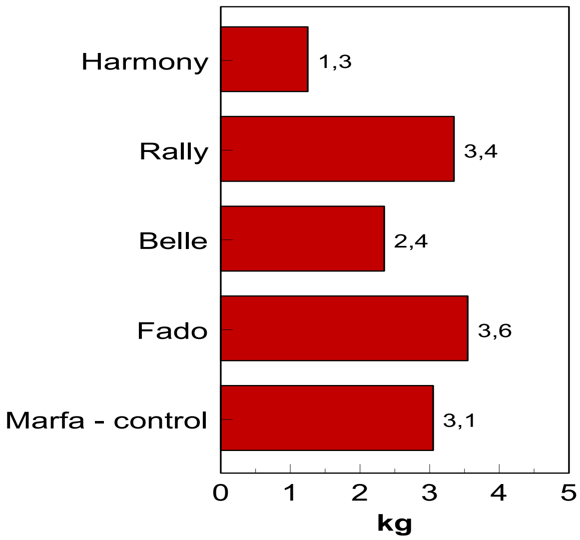


Fig. 3 The fruits production of the plant

Lucrări ştiinţifice U.S.A.M.V.B., Seria B, Vol. XLVIII, 2005

PRELIMINARY RESEARCHES REGARDING THE INFLUENCE OF SOME ORGANIC MATERIALS USED FOR MULCHING THE CUCUMBER CULTURE

Gheorghita HOZA and Al. TODICA

Keywords: *Cucumis sativus*, compost, fruit production, vegetative growing

ABSTRACT

The paper regarding the influence of different organic materials on the cucumber culture was a necessity because of multiple advantages that this work has on cultures. As mulches was used compost from the white mushroom, from *Pleurotus* and straws. After the first experimental year, very good results were obtained at mulching with compost from the white mushroom with the total production of 50 t/ha. Over 90% from production ranged in 6-9 cm and 9-12 cm categories. Also, good results were obtained by using the compost from *Pleurotus*. The straws used as mulches at cucumber determined a production of 30 t/ha comparatively with the one at witness of 23 t/ha.

INTRODUCTION

The mulching represents a very important action applied in the vegetables culture, effected with organic and non organic materials. It has some advantages as it follows: maintains the humidity of the soil, avoids the forming of crust, grows the temperature of non mulched soil with few grades, does not allow the growth of weeds, brings more nutritive elements when mulching with organic materials etc. The mulching is a technological measure with the aim of improving the production especially the early one by its effects on the plants, and to improve the quality of plants and the profit.

MATERIALS AND METHODS

The cucumber culture was founded in the didactic fields of Horticulture Faculty from Bucharest using many organic materials as mulches. The biological material used was the hybrid Royal F1, which is very early timed, which dark green fruits short, with an average weight of 50-60g and a productive potential of 35-40 t/ha. The hybrid is characterized by a genetic resistance at the cucumber virus and *Spherotheca fuliginea*.

As organic materials for mulching were used the compost of mushrooms rooted in the white mushroom, *Agaricus bisporus*, the compost of mushrooms rooted in *Pleurotus* mushrooms and cereal straws. The compost resulted from *Agaricus* mushroom contains: 5 kg of wheat peel, 3 kg of plaster and 600 g of nitrogen all per 100 g of compost. The compost resulted from Pleurotus contains only wheat, straws and plaster.

The scheme of the experience was the following:

V 1 mt - non mulched
V2 -mulching with compost from *Agaricus*
V3 -mulching with compost from *Pleurotus*
V4 -mulching with straws.

The culture of cucumber was founded in greenhouse, with seedlings produced in alveolar palette of 6/5 cm. The seeding was effected directly in alveolar palette on 17 February, the planting in greenhouse on 18 April at a distance of 80cm/50 cm, resulting a denseness of 25000 pl/ha. During the vegetation period, the cucumber culture was cared using the already known technology, applying general works as to sustain, to staking and to pinching off the on side's offshoots at 2 fruits in order to restrain the number of fruits.

The culture was mulched with three organic materials, a month after planting, in conformity with the experimental variants, each one having an area of round 30 cm square. During the experimental period there were executed observations and measures regarding the growth of seedlings, the growth of plants after moving in the permanent place (appreciated by height, the appearance of each side off shoots and pinching at the appropriate time), the fruits estimation, their ranging on size categories. There were also applied 2 leaf fertilizations, from 10 to 10 days. One with Murtonik 0.3% soon after the seedlings tied and started to grow and another one with Agroleaf total 0.3%.

RESULTS AND DISCUSSIONS

The seedlings used to found the cultures were produced following the classical technology. From the quality of seedlings point of view .they reached optimum parameters, quality for greenhouse planting. So, at planting the seedlings had the height of 18.8 cm, the thickness of 6.6 cm and a number of leaves of 5.3. The plants formed a root system well developed with a volume of 3.2 cm^3 and a weight of 2.1 g. The vigorousness of seedlings was also appreciated by the weight of the air par of around 9 g (table 1).

The growth of plants in height (fig.1) was influenced by the materials used as mulches. The manure used at planting and the 2 phase fertilizations, one with Murtonik 0.3% and another with Agroleaf total 0.3% had a positive contribution to sustain the process of vegetative growth. Consequently, the variant mulched with compost resulted from Agaricus grew very fast due to its composition which was food for the plants. A smaller height was registered at mulching with compost resulted from *Pleurotus* and straws, both being poor in nutritive elements.

The hybrids of cucumber are characterized by a big capacity of forming on side off shoots, but the materials for mulching also influenced this process (fig. 2). The highest number of onsides offshoots was registered at the variant mulched with compost resulted from Agaricus (13.6) and witness (11), while at the variants mulched with straws and compost resulted from Pleurotus were less offshoots, respectively 9.

The capacity of fructification was different between variants (table 2). The plants mulched with compost resulted from Agaricus formed the highest number of fruits (28.8), on the main stem as long as on the lateral ones. The straws represent a very good material for mulching the cucumbers, the number of fruits having an average of 25 per plant. The compost from *Pleurotus* has a similar effect as straws. The non mulched witness formed the lower number of fruits (21.3) causing the necessity to effect this work.

The production of cucumber (table 3) was very influenced by mulching the soil which proves again the necessity of doing this kind of work.

The different production between variants was determined by the average number of fruits per plant, (observing that at mulched variants it is higher), by the average weight of fruits (which was influenced by the mulching materials) and by the advantages of the work comparatively with the non mulched witness variant. The biggest production of fruits was registered at the variant mulched with compost from the white mushroom, around 50 t/ha, while the smallest production was obtained at the non mulched witness. In between productions was obtained at variants 3 and 4 were the mulching materials is very similar from the composition point of view, excepting the straws which maintained coldness less than other materials which was not benefic for cucumbers especially in the first period of vegetation.

As regards the ranging on 6-9 cm, 9-12 and over 12 cm size categories (table 4) it can be appreciated that the hybrid of cucumbers Royal F1 had a very good reaction to mulching with organic materials. At the variant mulched with compost from Agaricus almost 60% from the production could be ranged in the 6-9 cm category and over 30% in the 9-12 cm category. These categories had a frequently demand for fresh consumption or for conservation. At the variant mulched with compost from Pleurotus the production from 6-9 cm and 9-12 cm category was smaller, respectively 56.8% and 23%. From this point of view the witness had low results.

CONCLUSIONS

The preliminary researches regarding the mulching of cucumber cultures with different organic materials brought in evidence the following conclusions:

- Mulching with compost from the white mushroom, a cheap material, rich in nutritive elements, gives a very good combination between the culture of mushrooms and of other vegetables;
- The reuse of the compost from Pleurotus leads to important productions at cucumber and positive effects on plants and soil;
- The environment is protected , the soil and product pollution is reduced;
- The use of straws as mulches especially in summer, assures a low temperature under the mulches substrata;
- The production and its quality grow.

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Table1 The features of cucumber nurseries before planting

The variety	Height (cm)	Colet diameter (mm)	Number of leaves	The weight of air part (g)	The weight of roots (g)	The volume of radicular system (cm^3)
Royal	18.8	6.6	5.3	8.9	2.1	3.2

Table 2 The capacity of cucumber fruits of fructification in mulched culture

The variant	The number of fruits on the main stem	The number of fruits on the lateral offshots	The total munber of fruits per plant
V1 mt	7,5	13,8	21,3
V2	9,0	19,8	28,8
V3	7,6	16,8	24,4
V4	7,5	17,5	25,0

Table 3 The production of cucumber in mulched culture

The variant	The total number of fruits per plant	The average weight (g)	The production	
			g/pl	kg/m2
V1 mt	21,3 c	44,3 a	944	2,360 a
V2	28,8 a	69,1 a	1990	4,975 a
V3	24,4 b	49,5 b	1208	3,020 a
V4	25,0 b	48,2 c	1205	3,013 a

Student Newman Keuls test, 5 %

Table 4 The ranging of cucumber production on size categories

The variant	Size category, %		
	6-9 cm	9-12 cm	Peste 12 cm
V1 mt	40,2	30,7	29,1
V2	59,8	32,3	7,9
V3	56,8	23	20,2
V4	41,6	33,9	24,5

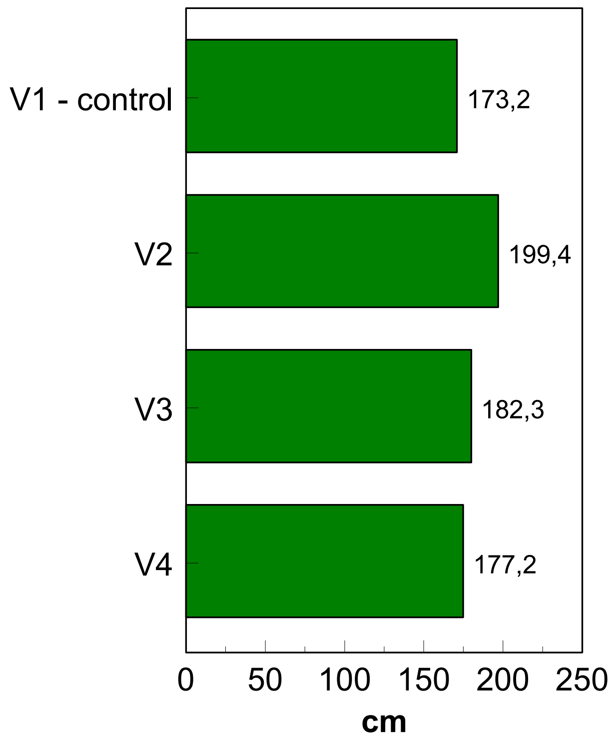

Fig. 1 The height of plants

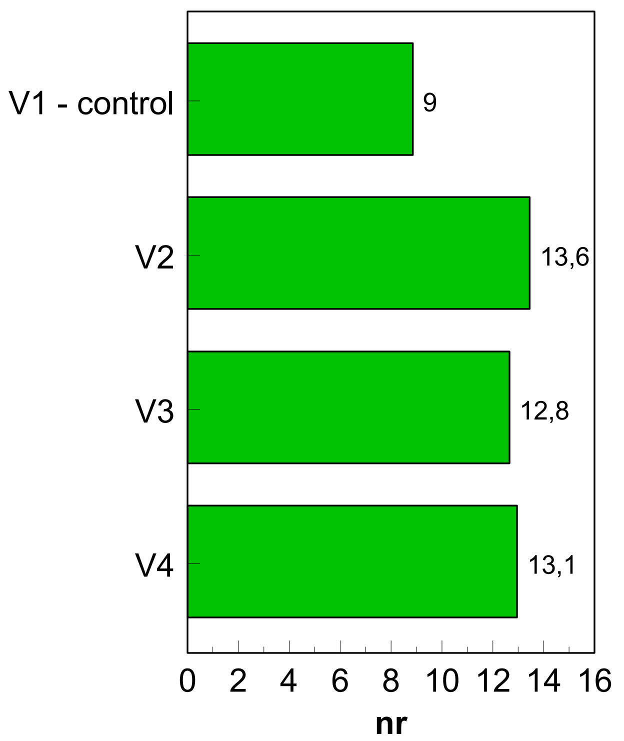

Fig. 2 The capacity of shoots ascelari formatted

Lucrări ştiinţifice U.S.A.M.V.B., Seria B, Vol. XLVIII, 2005

PRELIMINARY RESEARCHES REGARDING THE EFFECT OF SOME LEAF FERTILIZERS AND GROWING STIMULI ON THE QUALITY AND QUANTITY OF TOMATOES FRUITS

Gheorghita HOZA, Madalina RADU, D. NICOLAE

Keywords: *Lycopersicon esculentum*, fruit production, vegetative growth

ABSTRACT

The use of complex leaf fertilizers and growing stimuli represents a very important technological item to obtain very high results in the culture of vegetables. Experiments regarding this aspect were made in 1980s at tomatoes, cucumber, pepper with great results. Nowadays, when the problem of fitosanitar protection of cultures is highly extended is necessary to use the leaf fertilizers and the growing stimuli in order to make the plants stronger and to rise their capacity of fructification. For this reason the experience regarding the effect of the products on tomatoes has been founded, using Microfert U, Agroleaf total and Murtonik. From the data obtained after the first year of use the best results were obtained for Agroleaf total and Microfert U, the extra production being of 50% and respectively of 32% The fruits are bigger with a higher biochemical content in comparison with those obtained from the untreated control.

INTRODUCTION

The leaf fertilization is a method to fertilize the plants during the vegetation period aimed to assure an optimum grows and fructification of cultures and to obtain positive financial results. At the plant level it is very important to establish and maintain a nutritional equilibrium, to prevent and eliminate the lack or insufficiency of some elements, rehabilitating the plant. The leaf fertilizers contain macro elements (NPK) and microelements (Fe, Cu, Zn, Mn, Mo, S, Mg, Co, etc). To apply only microelements is difficult because of the very small doses, because they can turn into insoluble compounds or float with excessive water. The use of complex leaf fertilizers represents an efficient method to apply these elements and to obtain very satisfactory results of production.

MATERIALS AND METHODS

The researches have been conducted in the didactic field of Horticulture faculty from Bucharest, using a new tomato hybrid for cultures in greenhouse, Pitenza. The hybrid has undetermined grow, is resistant to diseases, it has strong fruits weighting 60-80 g, without green "calota". The culture was founded by planting seedlings produced in greenhouse. The seeding was done on the 4th February, the transplant on the 8th March and the planting on the 25 April when the seedling was 58 days old. The planting scheme was of 80/40cm.

During the vegetation period there were applied leaf fertilizations with 3 specific fertilizers which represented the experimental variants as it follows:

V1 – untreated control
V2 – Microfert 0.5%
V3 – Agroleaf 0.3%
V4 – Murtonik 0.3%

The fertilizers were applied by pulverizing 3 times, once at 2 weeks.

During the vegetation period were applied to the culture all the specific technological links. There were observations regarding the influence of products on the vegetative grow of the plants and on the fructification capacity and quality of fruits. In this way was determined the distance to the first flower growth, the number of leaves to it, the sequence of flower growths, the features which characterized the early time of a variety. The plants were conducted with 5 flower growths, at each one being registered the number of leaves and fruits and the tying percentage. Also, it has been determined the average weight of fruits and has been calculated the production of fruits.

To determine the quality of tomato fruits there were effectuated biochemical determinations to bring up the influence of the fertilizers and stimuli used from this point of view.

Describing the products used:

Microfert U

It is a complete and universal leaf fertilizer which contains macro elements and microelements as Mg, B, Fe, Mn, Mo, Zn. It can be used at all cultural plants to prevent or correct the problems of nutrition. It has to be applied 2-4 times, the concentration being of 0.5-1%. It can be applied in the same time with the product used for fitosanitar treatments against diseases and pests. The efficiency is maximum if it is applied on a cloudy , windless time with moderate temperature.

Agroleaf Total

It is a leaf fertilizer with a high absorbency in leaves, used to improve the resistance of plants at stressful factors , the early time of the production and its superior quality. It is recommended for cultures founded on fields with high pH , on the ones with little air and with no equilibriums between K-Ca-Mg. It is compatible with the products used for fotisanitar protection and for eliminates the weeds. The concentration of the substance has to be of 0.3-0.5%.

Mutonik

It is a growing regulator with stimulus role which contains NPK 20-20-20 and microelements used to make plants stronger and for improving their resistance to different pests and stressful factors. It gives early time to plants and determines the growth of fruits production. It can be applied to prevent but also to cure especially in the vegetative growing when the results are very high. It can also be used in the water because in highly soluble, although the best results are obtained when is used on the leaves. The concentration of the substance has to be of 0.3-0.4%.

RESULTS AND DISCUSSIONS

From the preliminary data used after the first year, the results were very good. They were repeated in order to establish with certainty their role in the growth and fructification of tomatoes.

The elements which characterize the early time of a variety or hybrid (table 1) show that after using leaf fertilizers the results were good considering the untreated control because they influence the early time. So, the number of leaves until the first flower growth was between 5 and 6, the distance to it was longer at control (25 cm) and shorter at fertilized variants. The flower growths appeared in average after 3 leaves at all variants and after 3.6 leaves at control. The distance between them is characterized by the variety, but it was influenced by the leaf fertilizers, being of 16-17 cm at fertilized variants and of 20.2 cm at control.

The average number of flowers in inflorescence was similar between variants, having character of variety and being influenced by the leaf fertilization which is aimed to sustain a vegetative growth and a highly fructification (fig. 1). It was registered that the number of leaves in growths was high, being a variety which forms small fruits. At the level of each growth can be observed, at witness, that the number of flowers is smaller at the fertilized variants, which proves that the used products influence the forming of flowers.

The average number of fruits in inflorescence (fig. 2) was also influenced by the fertilized applied; the best results were obtained at the fertilized variants. The untreated control registered the smallest number of tied fruits (6.5-7.4). Between growths is remarkable the fact that the number of fruits was smaller at the first one due to the less appropriate weather conditions form the first period of the vegetative time.

By calculating the percentage of tied fruits in growths (table 2), was noticed that at the first growth the higher percentage (98 %) was registered at V3; at the rest of them was of 90 %. At the following growths the influence of fertilizers, excepting the fourth one, is lower than control.

Regarding the tomato production (table 3) it was noticed that the variants 2 and 3 fertilized with Microfert and Agroleaf had the highest production. The two products influenced not only the vegetative growth but also the tying process. As long as Murtonik regards, it is a stimulus of vegetative growth especially in the first part of the period. That is the reason why the production was not influenced by its appliance.

The average weight of fruits had small values. Pitenza variety has the characteristic of forming small fruits but numerous and strong. It varied between 60 g and 83 g. It was observed that at variants fertilized with Microfert and Agroleaf total over 50% of fruits weighted between 71-80 g, while at witness and the variant fertilized with Murtonik the fruits were under 70g (table 4).

From the biochemical composition point of view, the fruits of Pitenza contain much C vitamin, which slightly grew at studied variants, titrable acidity between 0.23-0.27 influenced by Murtonik, and dry substance around % (table 5).

CONCLUSIONS

After preliminary having been studied the influence of some leaf fertilizers and growing stimuli on growth and fructification of tomatoes can be drawn the following conclusions:

- The leaf fertilizers can be used for tomato culture to strengthen the plants and to improve their fructification capacity;
- Very good results were obtained using Agroleaf total and Microfert U, which determined the growth of the number of flowers, number of fruits and the tying percentage per plant;
- The fruits production at variants fertilized with Agroleaf and Microfert U grew with 50 % and respectively with 32%;
- The quality of fruits was improved by more C vitamin, soluble dry substance and acidity;
- The fruits were stronger, which leads to a better maintenance and fresh consumption.

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Table 1 Biometrical pointers

The variant	The number of leaves before the first inflorescence	The distance before the first inflorescence (cm)	The sequence of inflorescences	The distance between inflorescences (cm)
V1 - martor	5,8	25	3,6	20,2
V2	4,9	24	3,1	16,7
V3	5,2	22	3,2	17,1
V4	5,3	23	3,1	16,9

Table 2 The average percentage of tied fruits (%)

The variant	The I^st inflorescence	The I^nd inflorescence	The III^rd inflorescence	The I^th inflorescence	The V^th inflorescence	The average
V1 – mt	90	85	92	92	93	90,4
V2	90	93	93	86,7	95	92
V3	98	95	93	95	97	95
V4	90	88	93	92	88	90,2

Table 3 The estimated production of fruits

The variant	The production/pl		The production/mp	
	Kg/pl	The diference comparing the control, %	Kg/m^2	The diference comparing the control
V1 – mt	2,2	100 c	6,8	100 c
V2	2,9	132 b	8,9	131 b
V3	3,3	150 a	10,2	150 a
V4	2,2	100 c	6,8	100 c

Test Student Newman Keuls, 5 %

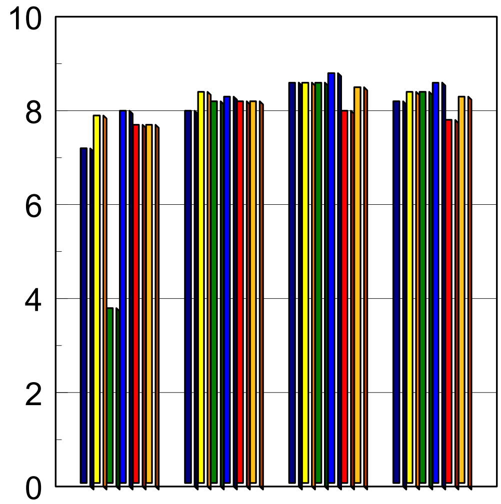
Table 4 The average weight of fruits and ranging on size categories

The variant	The average (g)	The size category, %		
		Under 70 g	71 – 80 g	Above 80 g
V1 – mt	63,4 c	50	40	10
V2	79,0 b	40	50	10
V3	83,2 a	30	60	10
V4	60,0 a	60	40	-

The Student Newman Keuls test, 5 %

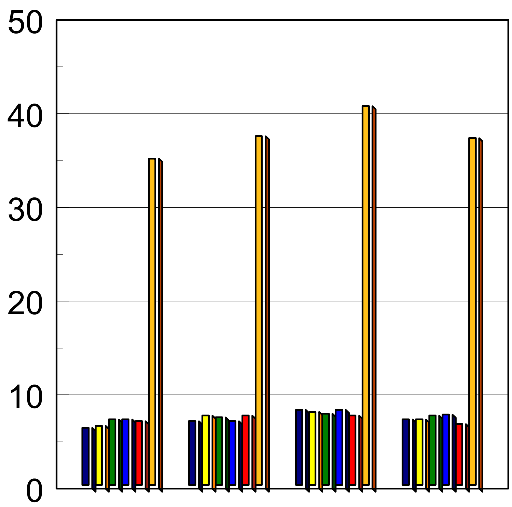
Table 5 Biochemical characteristics of tomato fruits

The variant	The fermity (kgf/cm^2)	C vitamin (mg/100 g)	Total titrable acidity (% ac. oxalic)	Dry soluble substance (%)
V1 – mt	1,37	24,9	0,24	5
V2	1,34	26,7	0,24	5,2
V3	1,35	27,2	0,23	5
V4	1,50	25,8	0,27	5



	V1 - control	V2	V3	V4
first infl.	7,2	8,0	8,6	8,2
Second infl.	7,9	8,4	8,6	8,4
third infl.	3,8	8,2	8,6	8,4
Fourth infl.	8,0	8,3	8,8	8,6
Fifth infl.	7,7	8,2	8,0	7,8
Average	7,7	8,2	8,5	8,3

Fig. 1 The average number of flowers in inflorescence



	V1 - control	V2	V3	V4
first infl.	6,5	7,2	8,4	7,4
Second infl.	6,7	7,8	8,2	7,4
third infl.	7,4	7,6	8,0	7,8
Fourth infl.	7,4	7,2	8,4	7,9
Fifth infl.	7,2	7,8	7,8	6,9
Total	35,2	37,6	40,8	37,4

Fig. 2 The average number of fruits in inflorescence

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NITRATE DETERMINATION METHODS USED FOR SOME VEGETABLES

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Keywords: agrochemical analyse, vegetables, maximum admissible limits

ABSTRACT

The objectives of our study were to analyse the nitrates content of some vegetables through different methods used in agricultural laboratories and also in some certified laboratories for export of products.

There are compared two nitrate determination methods: spectrophotometric and ionometric. The paper also presents the nitrate contents in vegetables from Bucharest markets, interpretation by maximum admitted limits (Addiscott T.M., 1990; Dejeu L., 1997; Lacatus, 2003).

Agrochemical analyses were made on fresh vegetables. To extract the nitrates, it acetic acide 2% was used and to obtain the nitrates two methods were used: one colorimetric and another ionometric one. For colorimetric method the FDS was used in the presence of natrium hydroxide 20% reagent and for the determination spectrophotometer Cecil 2041 was used (England, 1999). For ionometric method a nitrate ion-selective Consort C533 was used (SUA, 1999).

Nitrate contents varied with the species of vegetables. In lettuce plants nitrate, contents varied between 1282 and 4493 ppm, in turnip cabbage between 1272 and 2103 ppm and in cucumber between 287 and 1097 ppm. In most of the cases of analysed vegetables, the maximum admissible limits of the Health Mondial Organization were exceeded (V. Voican, 2002).

INTRODUCTION

The fertilizers with nitrogen applies without agrochemical control could determine nutritive disequilibrium and crop quality depreciation by nitrate accumulation over the maximum limits with real danger for human beings.

The nitrates introduced by ingestion in the human or animal body reduce in nitrite with nitrosamines forming and in reaction with haemoglobin obtain met haemoglobin a compound that stops the blood oxygenation. This process provoks ulcer in the stomach of the adults and at the children the disease called “baby blue” in children.

The research aims are to compare spectrophotometer and ion metric nitrate determination methods used in agriculture laboratories and also in some attested laboratories for export of products. The paper also presents the nitrate contents in vegetables from Bucharest markets, interpreted by maximum admitted limits.

MATERIALS AND METHODS

Agrochemical analyses were made on fresh vegetables. To extract the nitrates acetic acid 2% was used and to obtain the nitrates two methods were used one colorimetric and another ion metric one. For colorimetric method the FDS was used in the presence of natrium hydroxide 20% reagent and for the determination spectrophotometer Cecil 2041 was used (England, 1999). For ion metric method a nitrate ion-selective Consort C533 was used (SUA, 1999).

Spectrophotometer methods were characterized through sensibility, selectivity and rapidity. With a modern apparatus the accuracy and precision of determination is near 0.2%. Although the absorption scale is between 0 and ∞ the best precision is obtained in 0.1 and 1.0 domain.

So, experimental conditions must be adjusted to result data of absorbance between these intervals. If the liquid solution has a bigger absorbance the solution it must be diluted, if the absorbance is too small the solution must be concentrated. The results were between absorbance and the concentration.

The standard curve and analyses were made with spectrophotocolorimetre Cecil, an apparatus with registration possibilities. To obtain the standard curve the method of the smallest squares was used an objective method to obtain such linear figure which corresponded exactly to the experimental results.

The standard curve is obtained automatically (fig. 1. Standard curve for Spectrophotocolorimetre Cecil)

For the ion selective analyses the mechanism of ion-potential analysis involves an ion exchange process respectively by Nernst equation, the ion-selective indicate the activity of a single ion.

In diluted solution, the activity of an ion is appreciatively equal with concentration. So, in the most of cases ion activity is directly proportional with the concentration of the standard electrode in the term of concentration.

In that case, for nitrates determination there used the electrode with membrane which replaces the ion exchange place.

The limits of that method are influenced by the presence of other ions from the determined solution and by the pH solution which must be between 2.5 and 11.

The standard curve is obtained with the measurement of the electrode potential. The graphics 2 and 3 were in logarithmic scale.

RESULTS AND DISCUSSIONS

The comparison of the ionometric method with the colorimetric method reveals that the results were different and the differences were by units and tens of ppm, positively or negatively. The differences of the results were bigger with the ion nitrate concentration. The use of 1:50 dilution of extract determined a better judgment of thenitrates contents in plants (Table 1 and 2).

A comparison between methods revealed that the ionometric method determined a better precision of nitrates content, a better precision and reproducibility of the measurements.

The differences registered were because of the presence of other ions which caused interference problems in the case of that method. The spectrophotometric method is more precise from this point of view because colour reaction is a specific one for nitrate ion. The precise of one method shows how the measured value is near the accurate value.

Nitrate content varied between 1284 ppm (Pipera glass-house lettuce) and maximum 4493 ppm in lettuce from Berceni glasshouse.

Maximum admissible value (LMA) present in the standard for the lettuce plants is 3000ppm. This maximum level was exceeded in 4 from 7 producers (Table 1).

In turnip cabbage the nitrate contents varied between 1272ppm (at Codlea) and 2103 ppm in the same products from Pipera.

Maximum admissible limit is 1500ppm in turnip cabbage. The result shows that this value was exceeded in all the products from Pipera and Codlea glasshouse.

In cucumbers, the nitrate contents varied between 287 ppm (Pipera glasshouse) and 1097 ppm from Berceni glass-house. Comparing with the maximum admissible limits of 400 ppm the results were exceeded at Codlea and Berceni glasshouse (table 2).

CONCLUSIONS

1. Nitrate contents varied with the species of vegetables. In lettuce plants, nitrate contents varied between 1282 and 4493 ppm, in turnip cabbage between 1272, and 2103 ppm and in cucumber between 287 and 1097 ppm;
2. In most of the cases of analysed vegetables, the maximum admissible limits of the Health Mondial Organization were exceeded
3. Organic and chemical fertilizers without agrochemical control directly influence nitrate and nitrite contents from vegetables;
4. In different periods of culture, fertilizations must be correlated with the intensity of light, cloudiness and temperature. The results show that in February and March the requirements were not metin all glasshouses which grew vegetables marked on the Bucharest markets.
5. It is necessary to correct the fertilization system with obligatory agrochemical periodic control in the vegetation periods.
6. In the perspective of the Romanian admission into the European Community and with the admission all activity domains at European standards, it is necessary the revision of Romanian standards from the point of view of maximum admissible limits for the nitrate contents in vegetables and also from the point of view of the standard method of nitrates determination STAS 1158/83 respectively.

ACKNOWLEDGEMENTS

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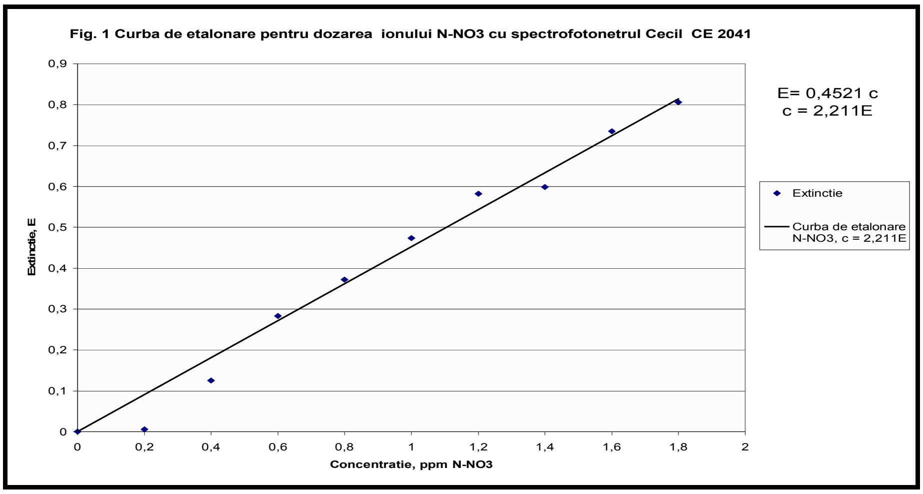

Fig. 1. Standard curve from spectrophotometre Cecil

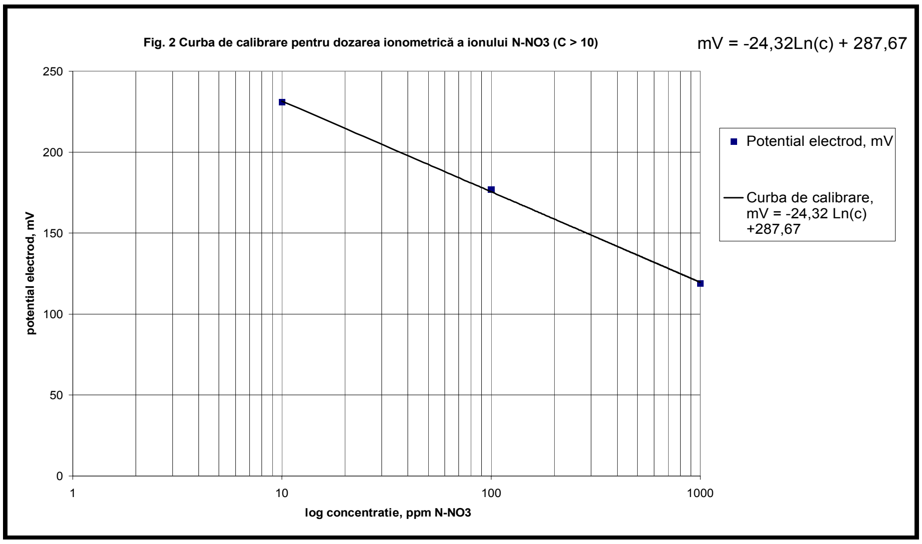

Fig. 2. Standard curve of ionometre

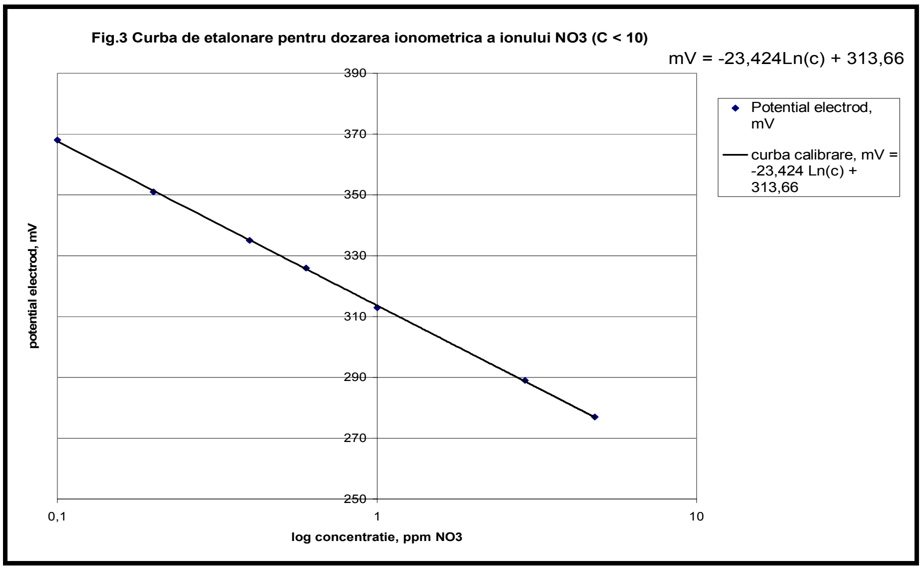

Fig. 3. Standard curve of ionometre at large concentration

Table 1. Comparative data on the determination of nitrate contents in some vegetables with Spectrophotometer Cecil and ionometer Consort

	Market place in Bucharest	Producer	Nitrate determination with Spectrophotometer Dilution 1:5			Nitrate determination with ionometer Dilution 1:50			Nitrate determination with ionometer			Differences + D sau – D from Spectrophotometer determination	
			E	C ppm $N\text{-}NO_3$	ppm $N\text{-}NO_3$	mV	C ppm NO_3	ppm $N\text{-}NO_3$	mV	C ppm NO_3	ppm $N\text{-}NO_3$	ppm $N\text{-}NO_3$	ppm $N\text{-}NO_3$
							Lettuce						
1	Rahova	Glasshouse Popeşti Leordeni	0.335	0.7404	3703	219	16.83	3704	124	837	3683	+ 1	- 20
2	Gorjului	Glasshouse Popeşti Leordeni	0.297	0.6566	3283	222	14.88	3274	127	740	3256	- 9	- 27
3	Pantelimon	Glasshouse Vitan Bărzeşti	0.262	0.5806	2903	225	13.15	2894	130	654	2877	- 9	- 26
4	Matache	Glasshouse Pipera	0.116	0.2564	**1282**	272	5.92	1303	181	288	1268	+ 21	- 14
5	Obor	Giurgiu –solarium	0.298	0.6604	3302	222	14.88	3274	127	740	3256	+ 28	- 46
6	Crângaşi	Glasshouse Berceni	0.406	0.8986	**4493**	214	20.68	4549	119	1028	4523	+ 56	+ 30
7	Domenii	Cojasca Dâmbovița – solarium	0.230	O.5088	2544	228	11.62	2558	133	578	2543	+ 14	- 1
							Parsnip cabbage						
1	Domenii	Glasshouse Codlea	0.148	0.3262	1631	267	7.32	1613	175	372	1638	- 18	+ 7
2	Crângaşi	Glasshouse Pipera	0.189	0.4186	2093	261	9.46	2083	136	470	2071	- 10	- 22
3	Obor	Glasshouse Codlea	0.115	0.2544	**1272**	273	5.67	1248	181	288	1268	- 24	- 4
4	Gorjului	Glasshouse Pipera	0.190	0.4206	**2103**	261	9.46	2083	136	470	2071	- 20	- 32

Table 2. Comparative data on the determination of nitrate contents in cucumber with Spectrophotometer Cecil and ionometer Consort

No.	Market place in Bucharest	Producer Glasshouse	Nitrate determination with Spectrophotometer Dilution 1:5			Nitrate determination with ionometer Dilution 1:50			Nitrate determination with ionometer			Diferences + D sau –D from Spectrophotometer determination	
			E	C ppm $N\text{-}NO_3$	ppm $N\text{-}NO_3$	mV	C ppm NO_3	ppm $N\text{-}NO_3$	mV	C ppm NO_3	ppm $N\text{-}NO_3$	ppm $N\text{-}NO_3$	ppm $N\text{-}NO_3$
Cucumbers													
1	Domenii	Codlea	0.051	0.1330	565	292	2.52	555	170	126	556	- 10	- 9
2	Crângaşi	Pipera	0.026	0.0574	**287**	307	1.32	292	186	65	288	+ 5	+ 1
3	Obor	Codlea	0.034	0.0758	379	301	1.72	378	179	87	384	- 1	+ 5
4	Gorjului	Codlea	0.055	0.1210	605	290	2.74	604	168	137	603	- 1	- 2
5	Rahova	Codlea	0.056	0.1230	615	289	2.86	630	167	143	628	+ 15	+ 13
6	Rahova	Berceni	0.100	0.2194	**1097**	276	4.99	1098	153	254	1117	+ 1	+ 20

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STUDY CONCERNING CABBAGE CULTURE – MUSKETEER HYBRID – USING ORGANIC FERTILIZERS

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Keywords: semi-composted manure, chicken manure, biological agriculture

ABSTRACT

The aim of this research was to determine the optimum doses of the organic fertilizers (manure, chicken manure) for the early cabbage culture. The biological material was represented by the early cabbage hybrid Musketeer. Superior results for the average weight of the cabbage heads were obtained at the variants fertilized with chicken manure, which reached a weight of 1487 g at the variant V_5 fertilized with 1.5 kg/m^2 chicken manure. The content of nitrates as an expression of the cabbage heads' quality, presented exceed levels, over the maximum limit of 600 ppm admitted by OMS at the first harvest time. At the subsequent harvest periods, on 20.06 and 27.06.2005 the nitrates in the cabbage heads were within CMA of 600 ppm. The best yields of 7.6 and 9.8 kg/m^2 were obtained at variants V_4-V_6 fertilized with chicken manure. The maximum yield was given by V_5 fertilized with 1.5 kg/m^2 chicken manure.

INTRODUCTION

Organic farming is an alternative to the common practice of modern agriculture, which tries to put an emphasis on the 'nature's rules', 'life's rules', and its main objective is to obtain agro-food products with high content of substances with active biological role, so that they do not prejudice human health and the environment.

Organic farming avoids environmental contamination and degradation caused by contemporary agriculture which comes with its entire arsenal of chemicals, and sometimes also with an irrational, impulsive or even abusive application of some technological links (Davidescu 1994, 1999).

The starting point attitude of organic farming is to increase the organic matter in the soil using natural organic fertilizers (manure, compost, green manure, urine manure, slurry manure) (Papacostea, 1981, 1993).

The aim of this research, carried out in 2005, was to determine the optimum doses of organic fertilizers (manure, chicken manure) for the early cabbage culture. The research is part of the CNCSIS contract No. 27636/2005.

MATERIALS AND METHODS

The experiments were initiated in the frame of the Vegetable Department of University of Agronomic Sciences and Veterinary Medicine – Bucharest, in an unprotected solarium of 120 m^2. Soil analyses were made previous to the application of the organic fertilizers in order to ensure that the soil was not fertilized before with chemical fertilizers. Six experimental variants were used, three with different doses of semi-composted manure and other three with fresh chicken manure. The organic fertilizers were applied at the same time with the soil preparation for planting seedlings.

The biological material was represented by the early cabbage hybrid Musketeer, a hybrid with very attractive round heads for fresh consumption.

The sowing was made on 27th of January 2005. The seedlings were planted on March 25 acquiring a plant density of 6.6plants/m^2. The soil was regularly cultivated (cca. 4 manual cultivations), and irrigation was applied on furrows once in a week. For the biological quality of the heads, no pathogen or pest control was applied. From the moment of planting in the field, we observed the culture during vegetation. Morphological measurements regarding the height of seedlings and plants, the number of leaves of seedlings and plants and heads diameter in different growth stages were periodically analyzed (7 days interval). Five plants for each variant, i.e. and a total 35 plants were analyzed. These plants were randomly chosen from the culture and for a precise observation, avoiding confusions they were marked on a scheme with the exact position in the variant. This facilitated the measurements.

The quality of the products was checked during vegetation by agrochemical analysis.

During the harvest, the yield was continuously recorded in order to check the early cabbage total production.

RESULTS AND DISCUSSIONS

In the case of manure fertilization of the Musketeer hybrid a good **growth of the cabbage plants** was observed. The results regarding the plants development (Table 2) shows that the highest height with an average of 18.32 cm was recorded for variant V_2 (4 kg/m^2 manure).

The cabbage fertilized with chicken manure recorded a better development of the plants, variant five (1.5 kg/m^2 chicken manure) achieving a height of 20.6 cm. If we compare the results of the variants fertilized with manure and those fertilized with chicken manure, it can be observed that the higher plants were obtained in variant 5 (1.5 kg/m^2 chicken manure) and variant 4 (1.0 kg/m^2 chicken manure).

Concerning the number of the leaves, this parameter varied as following:

- *for the manure fertilization,* the greater number of leaves were counted in variant V_2 (4 kg/m^2 manure),
- *for chicken manure* it was noticed an increase of leaves number of 12.36 in V_5 fertilized with 1.5 kg/m^2 chicken manure. Comparing the variants fertilized with manure, one can observe that the best results of organic fertilization were given by V_2 (4 kg/m^2 manure) which had a mean number of leaves of 29.2.

The effect of manure fertilization compared with those of chicken manure fertilization was also remarked in the case of **heads diameters**, the best result was given by variant V_5 (1.5 kg/m^2 chicken manure), followed by V_6 (2 kg/m^2 chicken manure). All the variants fertilized with chicken manure ensured better results for the heads diameters compared with the manure fertilized variants.

Analyzing all the **measurements made for the cabbage culture**, represented by the height of the plants, the number of leaves and the heads diameter, one can notice that the best results were obtained by V_5 with 1.5 kg/m^2 chicken manure.

Furthermore, it can be remarked the fact that the application of the chicken manure determined the best results for the variants V_4, V_5, V_6 regarding the height of the plants, the number of leaves and the heads diameters.

Comparing the plants of the control developed without fertilization, one can observe that the **value of heads diameter** measured at the same time is superior for the fertilized variants, especially at those fertilized with chicken manure.

The results regarding the weight of the heads for each variant are presented in table 3. Considering the data from the table, one remake that the weight of the heads varied from 951 g at unfertilized variant V_0 (control) and even 913.1 g at variant V_2 fertilized with

80 kg manure to the best results at variant V_5, with a mean weight of 1487 g, variant with the best results for the heads diameter too.

In general, the variants fertilized with chicken manure responded with superior results comparing with those fertilized with manure.

The level of fertilization of the soil after the application of the organic fertilizers was determined testing the soil samples from all seven variants. The results are presented in table 4. **The agrochemical parameters revealed a soil** with a low alkaline pH (pH between 7.28 and 7.66) with a low soluble salts content (soluble salts between 0.046 and 0.124%), a high to very high level of nitrogen, a good content in phosphorus and a normal content in potassium. These results were a good premise for obtaining excellent results in production.

At the first harvest and then after each harvest, the quality of the cabbage heads and the agrochemical parameters at the harvest moment were determined. The results appear in Tables 5, 6 and 7.

The agrochemical analyses regarding the quality of the cabbage heads presents different results for the three elements (N, P, K), depending on the quantity of manure and chicken manure applied.

The content of $N\text{-}NO_3^-$ varied with the harvest time. The highest values varying between 500 ppm at the control and 1025 ppm (V_5 – 1.5 kg/m2 chicken manure) were obtained on 13.June.2005 (first harvest time). It can be observed in table 5 that the cabbage heads from the variants fertilized with chicken manure absorbed high levels of nitrates. The variants fertilized with manure assimilated close quantities of nitrates between 760 ppm and 815 ppm $N\text{-}NO_3$. The nitrates level for this harvest period is beyond the maximum level admitted by OMS of 600 ppm.

For the next harvest periods, corresponding to 20.06 and 27 June 2005, the nitrates content in the cabbage heads are within the CMA of 600 ppm. At 20 June the variants fertilized with manure registered higher levels of nitrates, between 445 and 625 ppm comparing with those fertilized with chicken manure of 450 and 495 ppm. The nitrates values at the last harvest in 27 June 2005 were close and almost equal with very small differences among variants. Thus, the nitrates varied between 260 and 370 ppm.

The content of phosphorus recorded close data for all variants and all harvesting time. In the cabbage heads the values of phosphorus were between 112.4 and 181.2 ppm.

The values concerning the **potassium** were at a high level, indicating a good quality for consumption and preservation.

During the harvest period, data regarding **the production** were collected and now these are presented in table 8 and figure 1.

Putting side by side the data of the variants fertilized with manure and those with chicken manure, one can observe that the highest yields of 7.6 and 9.8 kg/m^2 were obtained by the variants V_4 – V_5, which were fertilized with chicken manure. The best yield was realized by V_5, fertilized with 1.5 kg chicken manure/m^2.

The statistical interpretation of the production was appreciated using the Fisher' test. Thus, very significant results were obtained for the variants V_4, V_5 and V_6 and intensively significant for variant V_1 (table 8).

CONCLUSIONS

The experiences regarding organic fertilization showed the following aspects:

1. The highest plants were developed by the variants V_5 (1.5 kg/m^2 chicken manure) and V_4 (1.0 kg/m^2 chicken manure);
2. Taking into consideration the number of the leaves we can appreciate that the best results were found for V_2 (4kg/m^2 manure) with a average number of leaves of 29.2;

3. The best results regarding the cabbage heads diameters were obtained in variant V_5 (1.5 kg/m^2 chicken manure), followed by V_6 (2 kg/m^2 chicken manure). All the variants fertilized with chicken manure resulted in greater values than those fertilized with manure.
4. Superior results for the average weight of the cabbage heads were obtained in the variants fertilized with chicken manure, which reached a weight of 1487 g in variant V_5 fertilized with 1.5 kg/m^2 chicken manure.
5. The content of nitrates as an expression of the cabbage heads' quality, presented exceeded levels, over the maximum limit of 600 ppm admitted by OMS at the first harvest time. At the subsequent harvest periods, on 20 June and 27 June 2005 the nitrates in the cabbage heads were within CMA of 600 ppm.
6. The content of phosphorus recorded close data for all variants and all harvesting time. The phosphorus level in the cabbage heads was between 112.4 and 181.2 ppm. The values concerning the potassium were at a high level, indicating a good quality for consume and preservation.
7. The best yields of 7.6 and 98 kg/m^2 were obtained at variants V_4-V_6 fertilized with chicken manure. The maximum yield was given by V_5 fertilized with 1.5 kg/m^2 chicken manure.
8. The statistical interpretation using the Fisher' test revealed very significant production results for the variants V_4, V_5 and V_6 and intensively significant for the variant V1.

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Tables and Figures

Table 1. Variants of early cabbage studied – Musketeer hybrid

Variant	Specification
V_0	Control
V_1	2 kg/m^2 semi-composted manure
V_2	4 kg/m^2 semi-composted manure
V_3	6 kg/m^2 semi-composted manure
V_4	1 kg/m^2 chicken manure
V_5	1,5 kg/m^2 chicken manure
V_6	2 kg/m^2 chicken manure

Table 2. Results regarding the biometrics measurements

Variant	Hybrid	Adverage plants height, cm	Number of leaves per plant	Heads diameter, cm
V_0	Musketeer	15.52	11.16	139.55
V_1		17.02	10.92	134.0
V_2		18.32	29.2	140.9
V_3		18.12	11.56	143.3
V_4		18.78	12.08	143.35
V_5		20.6	12.36	147.1
V_6		16.5	11.16	144.5

Table 3. Results regarding the weight of the cabbage heads

Variant	The average weight of the heads (g)
Control (unfertilized)	951
V_1 (40 kg manure)	999
V_2 (80 kg manure)	913.5
V_3 (120 kg manure)	928
V_4 (10 kg chicken manure)	1178
V_5 (15 kg chicken manure)	1487
V_6 (20 kg chicken manure)	1151.5

Table 4. Agrochemical characteristics of the soils from the experimental variants at the beginning of this study (7.04.2005)

Variant		pH	Soluble salts %	Content in ppm			
				NH_4^+	NO_3^-	PO_4^{3-}	K^+
1	V_0(Mt)	7.54	0.046	23.5	12.75	39.0	45
2	V_1	7.59	0.053	34.75	17.75	33.1	50
3	V_2	7.66	0.059	46.0	25.0	42.8	65
4	V_3	7.57	0.057	14.75	18.75	35.0	40
5	V_4	7.54	0.067	28.0	29.5	34.5	45
6	V_5	7.28	0.124	10.25	120.0	25.6	70
7	V_6	7.27	0.057	16.25	22.0	30.7	45

Table 5. Content in nutrients unmetabolized forms

Variant	Dry matter %	Contents, ppm		
		$N\text{-}NO_3^-$	$P\text{-}PO_4^{3-}$	K^+
DATA: 13.06.2005				
Mt Musketeer	5.89	500	141.2	1640
V_1	4.94	760	133.6	1860
V_2	6.17	815	148.2	1640
V_3	6.37	815	149.8	1600
V_4	5.81	435	107.2	1540
V_5	5.99	1025	142.4	1580
V_6	6.08	760	138.0	1500

Table 6. Content in nutrients unmetabolized forms

Variant	Dry matter %	Contents, ppm		
		$N\text{-}NO_3^-$	$P\text{-}PO_4^{3-}$	K^+
DATA: 20.06.2005				
Mt Musketeer	7.10	320	157.6	2620
V_1	6.55	445	154.8	2740
V_2	5.42	625	126.0	2620
V_3	5.51	590	128.4	2540
V_4	6.15	480	153.2	2480
V_5	6.37	495	181.2	2840
V_6	6.00	450	172.0	2620

Table 7. Content in nutrients unmetabolized forms

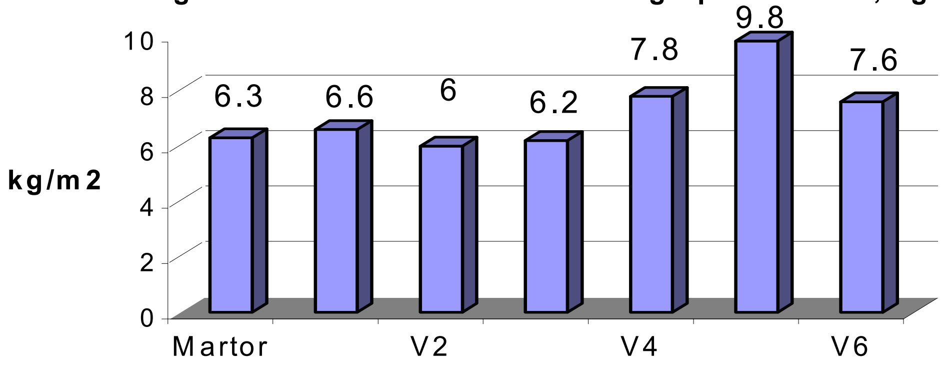
Variant	Dry matter %	Contents, ppm		
		$N\text{-}NO_3^-$	$P\text{-}PO_4^{3-}$	K^+
DATA: 27.06.2005				
Mt Musketeer	5.95	280	115.2	2140
V_1	7.87	220	112.4	1960
V_2	5.94	370	112.4	2140
V_3	6.11	260	174.4	2480
V_4	6.41	300	152.8	2660
V_5	6.67	260	128.8	2180
V_6	6.29	250	181.2	2340

Table 8. Statistical interpretation of the results using the Fisher' test

Variant	Yield (kg/m^2)	Significance
Control	6.3	-
V_1	6.6	* *
V_2	6.0	*
V_3	6.2	*
V_4	7.8	* * *
V_5	9.8	* * *
V_6	7.6	* * *

DL 5% = 4.4 kg/m^2
DL 1% = 6.54 kg/m^2
DL 0.1% = 6.69 kg / m^2

Fig.1.The variation of the cabbage production, kg/m2



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THE INFLUENCE OF PHOTOSELECTIVE FOILS ON LETTUCE PLANTS GROWTH CULTIVATED IN SOLARIUM

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Keywords: *Lactuca Sativa, Ilona variety, high tunnels, plant quality.*

ABSTRACT

The paper presents the preliminary results concerning the influence of photoselective additivated PE foils, produced in our country, on lettuce plants growth. The results show the positive influence of the pink and green foils, which increased the lettuce rosette diameter by 6-8 % as well as their weight for the pink foils. The root system characteristics were not significant although it was detected an increase of the root system volume for the green foils and the transparent treated ones, which implied an increase of the root absorption capacity. For protected lettuce cultivation, the use of pink, green and treated transparent foils are recommended for their positive influence on plants growth.

INTRODUCTION

The effects of solarium covering with photoselective foils consist in the modification of some vegetative growth factors, primarily in the quantity and quality of the light of which plant benefit as well as the thermal and humidity conditions of the air and soil. In these circumstances, the synergetic influence of the modified vegetative growth conditions induced physiological modifications which contributed to the modification of the plant's growth rate and development compared with those of plants grown in normal conditions. *(The stimulation of stem growth, leaf formation and dry weight increase under the influence of light is reported as a processes in which are involved several plant photoreceptors.)*

Light is also necessary to direct plant growth and development. Light acts as a signal to initiate and regulate *photoperiodism* and *photomorphogenesis*. Typically, plants are responsive to wavelengths of light in the blue, red and far-red regions of the spectrum through the action of several different photosensory systems, the blue light sensitive system and the red light sensitive or phytochrome system.

Plants use phytochrome to detect and respond to red and far-red wavelengths. There are at least 5 members of the phytochrome family of photoreceptors. The plant responses regulated by the phytochrome system include photoperiodic induction of flowering, chloroplast development (not including chlorophyll synthesis), leaf senescence and leaf abscission and regulation of hypocotyl elongation (phytochrome A (PhyA), present only in angiosperms, is responsible for early events in germination and seedling de-etiolation).

Based on studies with action spectra, mutants and molecular analyses, it has been determined that higher plants contain at least 4, and probably 5, different blue light photoreceptors such as the cryptochromes. They are responsible for the stem elongation and leaf formation and keeping the plants compact and the dark green colour of the leaves.(Nagy and Schäfer, 2002). Takemiyaa et al (1995) showed that the red and blue light has a greater impact on plant growth compared to the green one, and the white light and blue light is influencing especially leaf growth while the combination of red and blue light is stimulating the flowering.

The present experiment objectives were to highlight the response of the lettuce plants cultivated in solarium covered with novel monolayer photoselective foils produced in Romania. A Relansin programme funded the experiments.

MATERIALS AND METHOD

The experiment was organised in the experimental field of the Legume growing department in USAMV Bucharest, in high tunnel solarium covered with different PE photoselective foils types and compared with a control one – an ordinary PE foil.

The foils of 180 μm width were treated with special chemical additives such as: UV absorbent pigments, UV and IR protection; anti-condensation treatment. These foils have remarkable optical and mechanical characteristics: remarkable photoselective properties, good light transmission in the rage of 400-800 nm; stable physical properties for UV and IR, anti-condensation and anti-oxidative properties, increased mechanical resistance.

The experiment was set up by covering the solariums before the lettuce plants cultivation, by using the linear random block design with 4 replicates on $120m^2$.

The treatments were:

V1 - control – PE foil transparent, nonadditivated;
V2 – transparent foil, additivated;
V3 – yellow foil, additivated;
V4- pink foil, additivated;
V5 – green foil, additivated;
V6 – blue foil, additivated;

The lettuce culture was associated with the tomato plants culture and it was established before these following a band planting scheme on two rows with a distance of 30+40 /25 cm resulting 12 plant per square metre. The lettuce plants used were the Ilona had lettuce

The maintenance work was in accordance with the technology for lettuce cultivation and was identical for all treatments and replicates.

OBSERVATION AND MEASUREMENTS

The observations and measurements were made to highlight the influence of the photoselective foils on plant growth.

It was measured the height, diameter and weight of the lettuce rosette, the volume and the weight of the root system, at harvest time (45 days after planting). Twelve (12) plants were analyzed for each replicate. The statistical analyses we conducted by using ANOVA, Tukey-Kramer and Dunnett tests.

RESULTS

The plants growth was influenced as well as the dynamics of the lettuce rosette formation and the level of the overall production by protecting the solarium with the PE photoselective foils

The plants rosette diameter was influenced by the presence of some photoselective foils. After 45 days from planting significant differences were observed compared with the mean value characteristic for the Ilona variety as well as between treatments (table1).

The foils colour had different influences on the rosette diameter. The pink and green foils increased the rosette diameter by 1.75 to 2.56 cm compared with the control (transparent ordinary PE foil), while under the yellow and transparent foils it was observed a decrease of the rosette diameter by 2-2.92 cm compared with the control which was actually equal to the mean value for the entire experiment. Thanking into consideration the fact that the present standards are considering the “extra” produces the ones having a rosette diameter of 30 cm, the best results were obtained under the green foils for which the 8% increase of the rosette diameter compared with the control suggests the possibility of an early harvest of the lettuce plants. The second efficient treatment was the one with the pink foils which generated a 6%

increase of the plants rosette, while for the yellow and transparent foils, due to the reduced lettuces rosette diameter the harvest was delayed.

The statistical analyses of the data (table 2) reveals that the plants rosette diameter were significant only for the green and transparent treated foils. It should be noticed that the different kind of influences of the photoselective foils on the lettuce plants. The green foils induced a significant increase of the rosette diameter compared to the control, yellow and transparent treated foils. For the transparent additivated foils the lettuce rosette diameter was significantly smaller compared with all the treatment except the yellow foil treatment.

The rosette weight was more influenced by the photoselective foils than the rosette diameter (table3). Compared with the mean value for this variety (302g), the rosette weight increased by 3-7% (312-322g) for plants grown under the transparent (ordinary, treated) foil, yellow and pink. The control plants weight was exceeded only by the plants cultivated under the pink foil for which the mean weight of the plants' rosette was 322g, while for all the other treatments the weight decreased compared with the control.

From table 4 it can be observed that the lettuces rosette weight is significant only for the blue foils treatment, for which we registered the greatest weight decrease compared with the control (260g/rosette, less by 19%). This treatment was significant compared with all the other treatments except the green foil treatment. Generally it can be observed an inverse relationship between rosette diameter and rosette weight. The treatments generating big lettuce rosette diameters induced a decrease of their weight. One exception is the pink foil treatment which induced an increase of the plants rosette diameter and of their weight compared with the control and which were greater than the variety's characteristics by 6-7%.

The weight of the root system was smaller by 3 –10 % for all treatments compared with the control, one exception being the transparent foil treatment for which the root weight increased by 2 %. Compared with the variety characteristics higher values were obtained for the plants grown under the ordinary transparent foils and the green foils for which the weight of the root system was increased by 2-8%.

It can be stated that covering the solariums with transparent and green additivated foils improves the growth of lettuce plants root system especial by increasing the number of radicels and thus increasing its total volume. However the statistical analyses does not show significant results in this case.

CONCLUSIONS

- The use of photoselective foils for solarium covering, influence lettuce plants growth for early cultivation.
- The green and pink foils treatments induced an increase by 8% respectively 6% of the lettuce plants rosette diameter compared to the controls. Significant differences were obtained for the green foil and the transparent treated one.
- The lettuce plants rosette weight was increased only for the plants grown under the pink foils, for the rest of the plants the weight was decreased and significantly decreased only for the blue foil.
- The root system characteristics are not influenced by the photoselective foils although for the plants grown under the green and transparent foils the volume of the root system increased, influencing the plants' absorption capacity
- For the protected cultivation of lettuce plants we can recommend the use of pink, green and transparent treated foils which induces an increase of the plants' rosette diameter and weight as well as a positive influence on the root system.

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Table 1. The influence of different kind of foils on the lettuce rosette diameter (10.05.2005)

Treatment	Rosette diameter (cm)	Differences compared with			
		control (cm)	Variety mean (cm)	control %	Variety mean %
V1 –Mt – PE ordinary	31,58	-	0,04	100	100
V2 – transparent treated	28,66	-2,92	-2,88	91	91
V3 - yellow	29,58	-2,00	-1,96	94	94
V4 - pink	33,33	1,75	1,79	106	106
V5 - green	34,16	2,58	2,62	108	108
V6 - blue	31,91	0,33	0,37	101	101
Mean for the variety	31,54	-0,04	-	100	100

Table 2. Statistical interpretation of the results concerning the foils influence on the lettuce plants rosette diameter

Treatment	Rosette diameter		
	cm	Tukey-Kramer*	Dunnett**
V5 - green	34,17	A	0,47
V4 - pink	33,33	AB	-0,36
V6 - blue	31,91	ABC	-1,78
V1 –Mt – PE ordinary	31,58	BC	-2,11
V3 - yellow	29,58	CD	-0,11
V2 – transparent treated	28,67	D	0,81

*Takey-Kramer HSD – α = 0,05; q^* = 2,93510 Levels not connected by same letter are significantly ifferent
**Dunnett - α = 0,05; d = 2,57590 Positive values show pairs of means that are significantly different

Table 3. The foils influence on lettuce plants weight (10.05.2005)

Treatment	Rosette weight (g)	Differences compared with			
		control (g)	Variety mean (g)	control %	Variety mean %
V1 –Mt – PE ordinary	319,33	-	17,5	100	106
V2 – transparent	311,91	-7,42	10,08	98	103
V3 - yellow	315,62	-3,71	13,79	99	104
V4 - pink	322,41	3,08	20,58	101	107
V5 - green	281,16	-38,17	-20,67	88	93
V6 - blue	260,58	-58,75	-41,25	81	86
Variety mean	301,83	-17,5	-	94	100

Table 4. Statistical interpretation of the results concerning the foils influence on lettuce rosette weight

Treatment	Rosette weight		
	g	Tukey-Kramer *	Dunnett**
V4 - pink	322,42	A	-42,92
V1 –Mt – PE ordinary	320,33	A	-44,99
V3 yellow	315,62	A	-41,75
V2 – transparent treted	311,92	A	-36,58
V5 - green	281,17	AB	-5,83
V6 - blue	260,58	B	14,75

*Takey-Kramer HSD – □ = 0,05; q^* = 2,93510 Levels not connected by same letter are significantly different
**Dunnett - □= 0,05; d = 2,57590 Positive values show pairs of means that are significantly different

Table 5. The foils influence and the root system volume for the lettuce plants (10.05.2005)

Treatment	**Root volume (cm^3)**	**Differences compared with**			
		control (cm^3)	**variety mean (cm^3)**	**control %**	**variety mean %**
V1 –Mt – PE ordinary	26,25	-	-1,25	100	95
V2 – transparent treated	33,75	7,50	6,25	129	123
V3 - yellow	25,00	-1,25	-2,50	95	91
V4 - pink	22,50	-3,75	-5,00	86	81
V5 - green	32,50	6,25	5,00	124	118
V6 - blue	25,00	-1,25	-2,50	95	91
Variety mean	27,50	1,25	-	105	100

Table 6. The foils' influence on the root system weight (10.05.2005)

Treatment	**Root system weight (g)**	**Differences compared with**			
		Control (g)	**Variety mean (g)**	**Control %**	**Variety mean %**
V1 –Mt – PE ordinary	9,50	-	0,44	100	104
V2 – transparent treated	9,75	0,25	0,69	102	108
V3 - yellow	8,66	-0,84	-0,40	91	96
V4 - pink	8,58	-0,92	-0,48	90	95
V5 - green	9,25	-0,25	0,19	97	102
V6 - blue	8,66	-0,84	-0,40	91	96
Variety mean	9,06	-0,44	-	95	100

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THE INFLUENCE THE METHOD OF OBTAINING SEEDLINGS HAS ON THE GROWING AND DEVELOPMENT OF TOMATO PLANTS CULTIVATED IN A GREENHOUSE

PRELIMINARY RESEARCH

Florentina Marcela STANCIU, V. POPESCU

Keywords: *tomatoes, seedling, Jiffy pots, Jiffy 7, Jiffy strips, cell-like palettes*

INTRODUCTION

Producing vegetable seedling for the forced protected cultures requires their being transplanted, obligatory, in different types of pots.

World wide, the utilization of peat pots has greatly utilized the nutritive cubes made of different soil mixtures; also, regularly used in our country are the flexible or rigid plastic but non-degrading (Ciofu R., 2004). The producing of seedling in alveolus palettes made of plastic material of different sizes has also greatly increased (Marinescu A., 1986).

This research paper presents the study of the method of producing seedlings in different pots, made of both by biodegrading and ne-degrading materials and the continuation of the experiment until the obtaining of the production.

MATERIAL AND METHOD

The experiment took place in 2005 in the didactic and research department of the Vegetable Growing Department within the USAMV Bucharest.

The experiment accomplished effectuated concerns the producing of the tomato seedlings using the F1 Crystal hybrid, resulting the following variants:

Table no 1

Species	The experiment – the system of producing seedlings	Hybrid	Variant
Tomatoes	Plastic pot, side= 7cm	Crystal F1	V1 Mt
	Alveolus palettes, side=5cm		V2
	Jiffy strips, side= 4cm		V3
	Jiffy pots, in diameter=6cm		V4
	Jiffy 7, in diameter=4.5cm		V5

RESULTS AND COMMENTS

Results concerning the seedlings

Table number 2 and in graphic number 1 containing biometric data regarding the number of leaves and the length of the stem, thus analyzing the etiolating degree of the seedling.

The physiological data existent in table number 3 and in graphic number 2 refer to the respiration of the plants tissues. Based on these data, conclusions can be drawn regarding the intensity of the metabolism and the degree of juvenility of the tissues.

Results concerning the production

The determinations concerning the production have been registered during 26.06-08.08.2005 and the results are presented in graphic number 3.

Taking into consideration the evolution of the climate during the last years, in summer time there is a great climacteric risk as for as the tomato cultures in the field are concerned, therefore in our country the cultures within protected environments in the warm season will too make more and more ground.

The advantages of the cultures within protected areas (in this case – the greenhouse) follow from the reduction to almost of the risks given by the climacteric accidents (hail, very strong winds), from the ability to control the attacks of different diseases and parasites, from the possibility to utilize the new hybrids especially adapted for this type of culture which ensures uniform and quality production.

CONCLUSIONS

- The utilization of the Jiffy pots ensures the uniformity of the seedlings and it reduces to zero stress caused by the transplanting process
- The more a tissues has a more active metabolism and is more juvenile, the greater the growing capacity of the plants
- Within a system having a technology in which the fert-irrigation has not been made adequately the results are not satisfactory

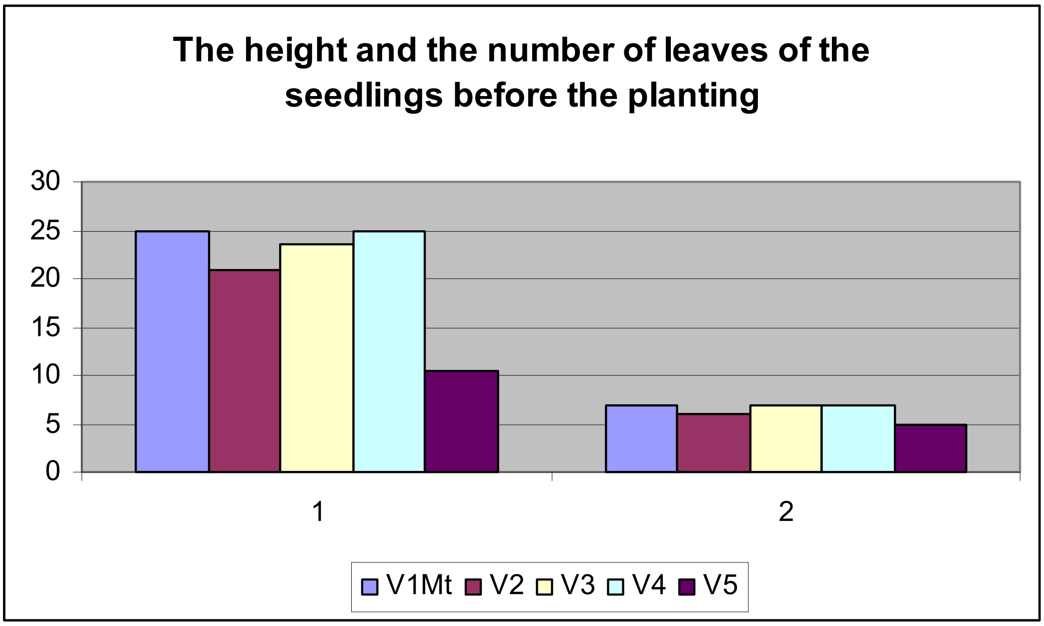
Table no 2

The dynamics of the seedlings growth in height and of the forming of the leaves

Variant	14.03.2005		23.03.2005		30.03.205		05.04.2005	
	height(cm)	No of leaves	Height (cm)	No of leaves	Height (cm)	No of leaves	Height (cm)	No of leaves
V1Mt	5,2	4	9	5	15,5	7	25	7
V2	5,2	3	9,5	4	14	5	21	6
V3	4,6	3	12	4	18,5	6	23,5	7
V4	4,1	3	13	4	17	7	25	7
V5	4,4	3	6	3	10	5	10,5	5

- The lowest degree of growing within the first phase is seen in the case of the seedlings in the Jiffy pots. Noticing the relation between the number of leaves and the length of the stem the seedlings in Jiffy pots and the witness are the least etiolated
- A tendency of etiolating can be noticed in the other phases of measuring at the seedlings in the 6 cm diameter peat(march 23rd and 30th).

Graphic no 1



- The most balanced growing in the seedlings phase can be sees at the seedlings within the witness variant and those within variant V4-Jiffy pots. The most etiolated seedlings are those in the variant V2 – alveolus plates and the variant V3 – Jiffy strips. The explication for this phenomenon is the too thronged disposing of the plants within the palettes and the pots batteries utilized

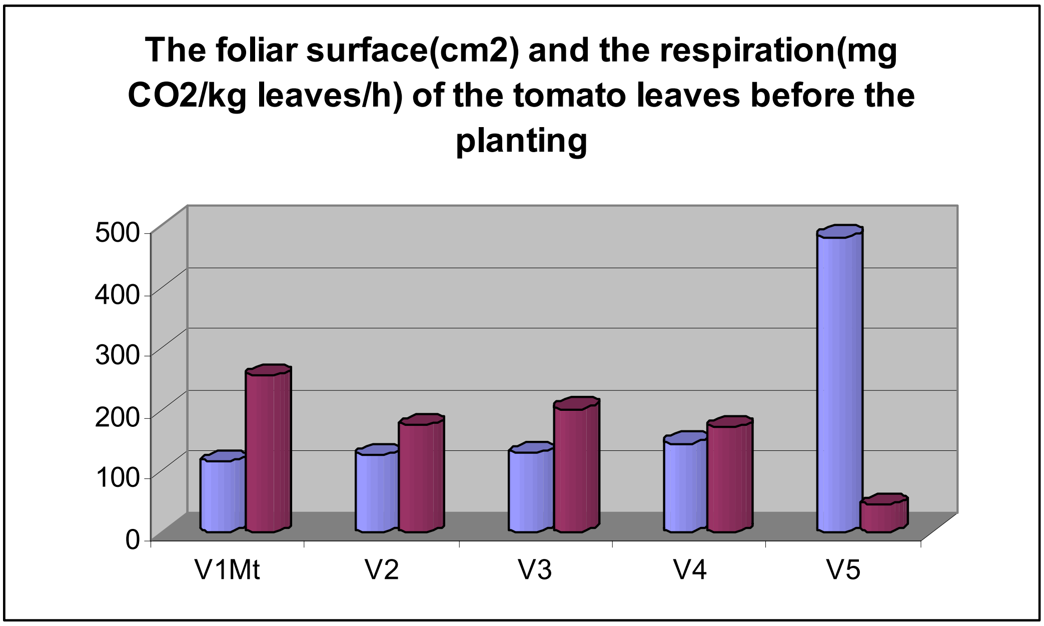
Table no 3

The characteristics of the tomato seedlings before the planting

Variant	The foliar surface cm^2	The weight of the plants(g)	The weight of the rots(g)	The height of the plant(cm)	The respiration mg CO_2/kg leaves/h
V1Mt	255,15	8,6	1,5	25	114,80
V2	173,88	12,7	2,4	21	125,52
V3	201,14	12,5	1,6	23,5	127,98
V4	170,00	10,5	1,3	25	145,18
V5	45,00	3,2	0,8	10,5	480,94

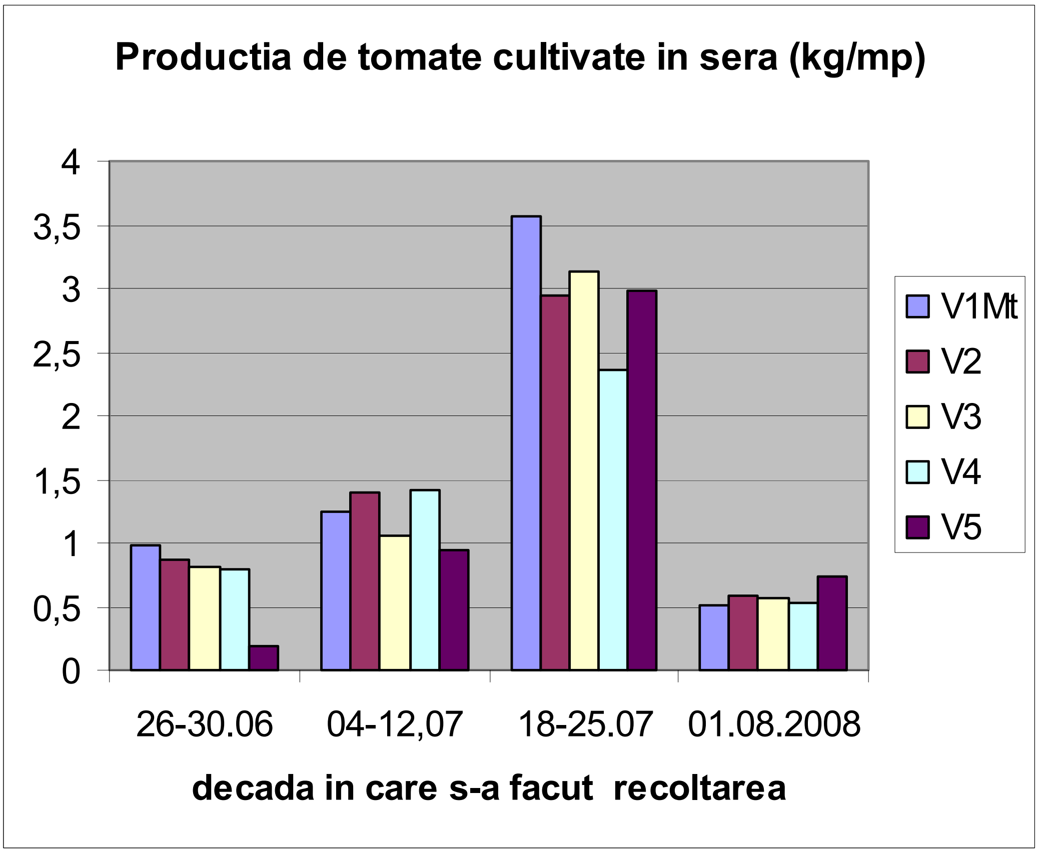
- The smallest growing are noticed at V5 – Jiffy 7. the phenomenon is explaind by the reduced quantity of minerals and by the volume offered by the substratum
- The greatest intensity of the respiration, which shows the juvenility of the tissues , an active metabolism and thus an increased growing capacity , can be noticed at V4(Jiffy pots) – 145,1 and at V5(Jiffy 7) – 480,9. the great growing capacity can be noticed afterwards too, within the culture, when after a certain time period the plants the same dimensions

Graphic no. 2



- The more a tissue has a more active metabolism and is more juvenile, the more the growing capacity of the plants in greater

Graphic no 3



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THE INFLUENCE OF DIFFERENT TYPES OF COMPOSTS TO THE GROWING AND YIELDING BELL PEPPER CULTIVATED IN UNHEATED GREENHOUSE

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Keywords: greenhouse, compost, fertilization

ABSTRACT

The research was made in an unheated greenhouse of Vegetable Department of Horticulture Faculty of University of Agricultural Sciences and Veterinary Medicine, in 2005.

The influence of compost types and organic mixtures on peppers was investigated. Bianca and Nikita cultivars were used under the following variants: V_0 control – hybrid Bianca, non-fertilized, V_2 - hybrid Bianca, fertilized with leaves compost, V_3 - hybrid Bianca, fertilized with chopped branch wine compost, V_4 - hybrid Bianca, fertilized with mushrooms compost, V_5 - hybrid Bianca, fertilized with vegetable waste compost, V_6 - hybrid Nikita, fertilized with vegetable waste compost, V_7 - hybrid Nikita, fertilized with mushrooms compost, V_8 - hybrid Nikita, fertilized with chopped branch wine compost, V_9 - hybrid Nikita, fertilized with leaves compost, V_1 control – hybrid Nikita, non-fertilized. The experimental design was organized over the subdivided plots with three repetitions.

On 15 April 2005 we planted the peppers (3.7 plants/m^2). The organic composts were applied once (fundamental fertilization rate 30t/ha). The growing and developing dynamics of the studied plants, soil and compost analyses, and yield and yield quality were measured.

Variants fertilized with mushrooms compost 3.91 kg/ m^2 to Nikita and 5.86 kg/ m^2 to Bianca and leaves compost (4.19 kg/ m^2 to Nikita) had the best results.

INTRODUCTION

The present paper wants to demonstrate how many types of composts may influence the rate of plant growing, the amount of yielding and the quality of harvesting. Organic fertilizers improve the soil organic matter, increase biological activity and have appreciable quantity of nutrients, which are availed to the plants for a long period of time.

MATERIALS AND METHODS

The research was made in an unheated greenhouse of Vegetable Department of Horticulture Faculty of University of Agricultural Sciences and Veterinary Medicine.

There were used four types of composts: leaves compost (leaves, barks, and grass clippings), chopped branch wine compost, mushrooms compost and vegetable waste compost. The amount of compost utilized was the same for all variants (excerpt variants control), 30 tons/hectar.

The culture was started on 15 April 2005. The biological material was represented by two cultivars of pepper, Nikita and Bianca with blocky yellow fruits. Density, for both hybrids was 37000 plants/hectare (distance between rows being 60 cm and between plants 45 cm).

The experiment included ten variants with three repetitions for each variant with the following experimental variants:

V_0 control – hybrid Bianca, non-fertilized
V_2 - hybrid Bianca, fertilized with leaves compost (30 tons/hectar)
V_3 - hybrid Bianca, fertilized with chopped branch wine compost (30 tons/hectar)
V_4 - hybrid Bianca, fertilized with mushrooms compost (30 tons/hectar)

V_5 - hybrid Bianca, fertilized with vegetable waste compost (30 tons/hectar)
V_6 - hybrid Nikita, fertilized with vegetable waste compost (30 tons/hectar)
V_7 - hybrid Nikita, fertilized with mushrooms compost (30 tons/hectar)
V_8 - hybrid Nikita, fertilized with chopped branch wine compost (30 tons/hectar)
V_9 - hybrid Nikita, fertilized with leaves compost (30 tons/hectar)
V_1 control – hybrid Nikita, non-fertilized

RESULTS AND DISCUSSIONS

The determination of level of nutritive elements, ph and soluble salts in organics substrates, before the starting experience, show that soil reaction (ph analyzed in water suspension 1:5) recommended for growing pepper in greenhouse is between 6,3 and 7.5 (from very low acid to low basic). Leaves compost and chopped branch wine compost have a low acid ph, mushrooms compost is neutral, only vegetable waste compost is very acid. All composts utilized have very low level of soluble salts (< 0.5%) only the greenhouse soil has a low level of salts (Table1).

The optimal level of $N\text{-}NH^+_4$ and $N\text{-}NO^-_3$ varies between 61 and 80 ppm. Control variant, chopped branch wine compost and vegetable waste compost have optimal content of nitrogen, mushrooms compost and leaves compost have a high level of NH^+_4+NO^-_3. Mushrooms compost and leaves compost have an optimal level of P_2O_5, chopped branch wine compost and vegetable waste compost are middle content of phosphorus (Table 1, Fig. 1).

Bianca has the tallest plants to variant fertilized with mushrooms compost, 55.2 cm growing difference, followed by V2 and V3. To the hybrid Nikita, in the last period of growing V9 had 74.3 cm, seconded by variants V7 and V8 with the same value, 67.1 cm (Table 2).

To hybrid Bianca V2, fertilized with leaves compost has 14.6fruits/plant, average weight of fruits is 108.6g, the length of fruits is 9.3cm and the yield is 1.58kg fruits/plant. To Nikita the average number of fruits/plant varies between 11 to V1mt and 14 to V7. The average weight of fruits has very close values to V7 (80.9 g/fruit) and V9 (80.2 g/fruit). The best production is obtained to V7 fertilized with mushroom compost, 1.13kg fruits/plant and the lowest to V1mt only 0.82 kg fruits/plant (Table 3).

Variants fertilized with mushroom compost and leaves compost outstand by quantity (58.6 and 56.6t/ha) and by quality (81% first quality) (Table 4) .

Hybrid Bianca realizes an average yield better than Nikita. The difference between productions is 16.4 t/ha and is statistical represented by very significant. From variants fertilized with mushroom compost were obtained the best productions. The average yield to mushroom compost is 49.4t/ha, the difference between variant fertilized with mushroom compost being very significant. Also variants fertilized with leaves compost has a very significant difference to Bianca, but Nikita has a distinct significance in comparison with V1mt. Variants fertilized with chopped branch wine compost have a yield higher than control variants, with 5.6t/ha (distinct significance). The best production is realized to Bianca, fertilized with mushroom compost (56.9t/ha) with 15t/ha more than Nikita, fertilized with the same type of compost. Vegetable waste compost provided the lowest yield, even lower than control variants (table 5, table 6).

CONCLUSION

All compost studied, chopped branch wine compost, vegetable waste compost, mushrooms compost and leaves compost, are very good for bell pepper culture in greenhouse. The nutrient level of principal elements is optimal and high for growing bell pepper.

Mushrooms compost and leaves compost determined forming the most vigorous plants. This growing is determined by the high level of nitrogen from compost.

V2 fertilized with leaves compost had 14.6 fruits/plant, the average weight of fruits is greater than other variants, with 5,86 kg/m2 yield surpass de control variant.

To Nikita, mushrooms compost realizes a great number of fruits/plant, 14 big fruits with 9.74 cm length. Also, very good results were obtained to V5 and V9 with 3.74 and 3.94 kg/m2 production.

To Bianca, variants fertilized with leaves compost and mushrooms compost realize not only high yielding (58.6 and 56.9 t/ha) but and commercial quality of production (81% quality I).

V7 Nikita, fertilized with mushrooms compost has a very high production 41.9 t/ha, with 80% quality I from total yield, followed by V9 with 32.3 t/ha, but better percent with good quality fruits.

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Table 1. Analyses of ph and nutritive elements in organic substrates and greenhouse soil

variants	PH	Salts %	$N\text{-}NH^{+}_{4}$ ppm	$N\text{-}NO^{-}_{3}$ ppm	P_2O_5 ppm	K^+ ppm
Greenhouse soil	7,25	0,099	21,1	40,5	45	41
leaves compost	6,5	0,012	25	65,3	45,2	105,3
chopped branch wine compost	6,5	0,0102	17,5	60,5	25,7	57,6
mushrooms compost	7	0,015	20	98,8	50,5	115,3
vegetable waste compost	5,5	0,0145	15,3	45,5	32,5	68,5

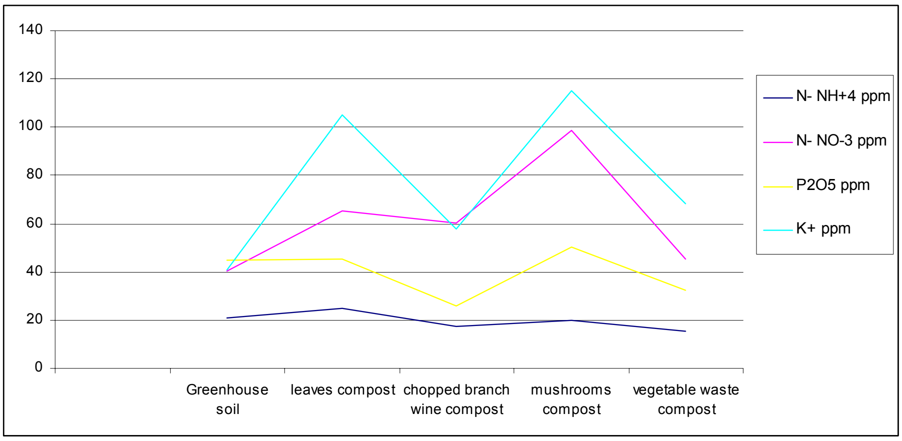

Fig. 1. Principal nutritive elements contents in composts

Table 2. The influence of compost fertilization to the growing pepper, cultivated in unheated greenhouse (cm)

hybrid	variants	13 May	27 May	10 June	24 June	8 July	22 July	5 August	Growing difference
Bianca	V0mt	20.1	34.2	46.1	49.2	56.3	63.7	70.8	50.7
	V2	24.7	38.1	49.2	52.1	54.6	65.1	76.2	51.5
	V3	24.3	37.6	47.7	50.2	54.8	63.7	75.6	51.3
	V4	23.2	37.9	46.5	51.0	58.2	68.2	78.4	55.2
	V5	20.9	32.3	43.1	45.2	51.0	63.5	71.8	50.9
Nikita	V6	22.9	29.3	37.4	44.2	48.0	53.4	61.6	36.7
	V7	25.1	37.2	50.3	53.1	56.2	61.2	67.1	42.0
	V8	25.0	36.3	49.0	53.4	57.3	60.1	67.1	42.1
	V9	25.3	38.5	54.0	60.2	65.7	70.2	74.3	48.9
	V1mt	23.2	36.5	48.8	51.3	54.4	58.2	63.2	40

Table 3. Synthesis of experimental data

hybrids	variants	Average number of fruit/plant	Average weight/fruit (g/piece)	Average length of fruits(cm)	Average yield (kg/plant)	Average yield (Kg/m^2)
Bianca	V0mt	12.6	104.1	9.7	1.31	4.85
	V2	14.6	108.6	9.6	1.58	5.86
	V3	13.8	105.3	9.4	1.45	5.37
	V4	14.5	106.2	9.6	1.53	5.69
	V5	12.0	99.2	9.4	1.19	4.40
Nikita	V6	11.2	75.2	8.8	0.82	3.12
	V7	14.0	80.9	9.4	1.13	4.19
	V8	12.8	79.0	9.3	1.01	3.74
	V9	13.2	80.2	9.3	1.06	3.91
	V1mt	11.0	77.0	8.7	0.85	3.14

Table 4. Pepper fruit quality

hybrids	Variants	Production Quality I		Production Quality II		Production
		t/ha	%	t/ha	%	t/ha
Bianca	V0mt	36.8	76	11.7	24	48.5
	V2	47.5	81	11.0	19	58.6
	V3	42.4	79	11.3	21	53.7
	V4	46.0	81	10.9	19	56.9
	V5	32.9	75	11	25	44.0
Nikita	V6	24.1	76	7.6	24	31.2
	V7	33.5	80	8.4	20	41.9
	V8	29.2	78	8.1	22	37.4
	V9	32.5	83	6.6	17	39.1
	V1mt	24.2	77	7.2	13	31.4

Table 5. Pepper yield depending on hybrids (t/ha)

Compost hybrids	no fertilized	leaves compost	chopped branch wine compost	mushrooms compost	vegetable waste compost	Average hybrids
Bianca	48.5^{Mt}	58.6^{xxx}_{xxx}	53.7^{xx}_{xxx}	56.9^{xxx}_{xxx}	44^{0}_{xx}	52.34_{xxx}
Nikita	31.4_{Mt}^{Mt}	39.1_{Mt}^{xx}	37.4_{Mt}^{xx}	41.9_{Mt}^{xxx}	31.2_{Mt}^{0}	36.2_{Mt}
Compost average	39.95^{Mt}	48.85^{xxx}	45.55^{xx}	49.4^{xxx}	37.6^{0}	

For hybrids: $D_{5\%}$=2.00t/ha, $D_{1\%}$=4.63t/ha, $D_{0.1\%}$=14.72t/ha
For composts: $D_{5\%}$=4.13t/ha, $D_{1\%}$=5.69t/ha, $D_{0.1\%}$=7.63t/ha

Table 6. The combination action of two factors upon pepper production cultivated in greenhouse

Hybrid (A) Compost (B)	BIANCA			NIKITA			Difference between hybrids	
	t/ha	difference	Signific.	t/ha	difference	Signific.	a_2-a_1	Signific
no fertilized	48.5	---	Mt	31.4	---	Mt	+17.1	xxx
Leaves compost	58.6	+10.1	xx	39.1	+7.7	x	+19.5	xxx
chopped branch compost	53.7	+5.2	---	37.4	+6.1	---	+16.3	xxx
mushrooms compost	56.9	+8.4	xx	41.9	+10.5	xx	+15	xxx
vegetable waste compost	44.0	-4.5	0	31.2	-0.2	0	+12.8	xxx

Comparison of two B average to the same graduation of A: $D_{5\%}$=5.83t/ha, $D_{1\%}$=8.03t/ha, $D_{0.1\%}$=11.05t/ha
Comparison of two A average to the same graduation of B: $D_{5\%}$=4.92t/ha, $D_{1\%}$=7.83t/ha, $D_{0.1\%}$=12.32t/ha

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EVALUATION OF THE QUALITY AND PRODUCTIVITY FOR FEW NEW HYBRIDS OF ASPARAGUS

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Keywords: Asparagus officinalis, evaluation, hybrids, quality, productivity

ABSTRACT

The asparagus is worldwide considered as a very important therapeutically and industrial crop. As an early vegetable it is successfully cultivated from North and South America to Europe and Asia, been considered as a very productive and profitable agricultural business . Romania is a country where the asparagus crop is still not very spread. One of the purposes of this experiment was to argument the importance of this crop among the traditional vegetables cultivated by the Romanian farmers. Between 2002-2004 the behaviour of the five asparagus hybrids have been studied concerning their level of adaptation to environment conditions in our country. From this five hybrids, Andreas is French and the others are Californian: Atlas F1, Grande F1, Apollo F1 and UC 157 F1. The objective of the experiment in 2003 and 2004 consisted in examination the biological development of the French hybrid in comparison with the Californians ones. After two years of experiment, no significant difference were noticed.

INTRODUCTION

Although the economic profitability is very long (10-15 years) and no very many maintenance work is required, in Romania the asparagus crop is not so preferred by the farmers as a consequence of a low demand on the market. Creating a demo plot in a very traditional area for vegetables growing, followed by yearly presentations was considered as a important and convincing step in the extension of this species.

MATERIALS AND METHODS

The material used in this experience is represented by five asparagus hybrids: Andreas F1, Atlas F1, Grande F1, Apollo F1 and UC 157 F1.

Andreas F1-French hybrid, from Darbonne Company. This hybrid is cultivated for the white spears production. It is 100% male and with medium to large diameter of the spears. The most important character is his adaptation level to the continental frost.

Atlas F1 is a di-hybrid cross that has a very wide range in adaptability with excellent spear yields. It's tightly headed, tapering spears are green, medium to large diameters, and slightly purple at the tip and butt. Atlas F1 is very tolerant to Fusarium and Rust and is free of Asparagus Latent Virus II.

Grande F1 is an early, di-hybrid cross with medium to large diameter, very tightly closed, tapering tips. Its green spears have a slight purple cast at the tips. It is suited for early spring production and is used for both green and white spear productions. Grande F1 has a high tolerance to Fusarium and Rust and is free of Asparagus Latent Virus II.

Apollo F1 is an early, vigorous clonal hybrid with spears that taper to a tight, rounded tip. Its green colour turns slightly purple at the tip and butt of the spear. Apollo F1 has a high tolerance to Fusarium and Rust and is free of Asparagus Latent Virus II.

UC 157 F1 is a tried and true clonal hybrid that has set the standard for yield and all of the spear quality characteristics of fresh green asparagus. The green spear quality characteristics of fresh green asparagus. The green spears are smooth, tight tipped and medium in spear diameter. UC 157 F1 is tolerant to Fusarium and Rust and is free of Asparagus Latent Virus II.

The last five hybrids are created by Asparagus Seed and Transplant, Inc from California who is tested their hybrids in various countries of the world: Hawai, Peru, Filipine, Taiwan, Chile.

The seeding was made directly in the field in April 2002, using a mixing soil. The seeding depth has been 5-6 cm, the distance between rows 25 cm and between the plants of the rows 3-4 cm. From each hybrid were seeded 30 seeds.

The spring of the plants started after 20 days and the percentage of the emerged ones was 98%. After the spring, at 10-12 cm height, their were transplanted in the field at 10 cm distance. Than, for a good growth and development of the plants, the soil was fertilized with N (100 g), and we applied five periodical irrigation until the autumn beginning, in relation with the plant consumption.

Not significant attacks of fungus or pest were noticed, no fitosanitary treatments were applied. Until the fine of the vegetation season, the plants were normally developed with 3-4 shoots, 30-50 cm height.

Since Autumn 2002, we maintained the soil and in April 2003 the plants have been planted in the field according to the scheme of planting: distance between rows 1,5 m and between the plants of the rows 0,5 m. We organized a field with five rows, one row for each hybrid, with 26 plants per row.

RESULTS AND DISCUSSIONS

The results show that, in 2005, the French hybrid Andreas had a very good growth of the shoots. It was a big difference of higher, number and diameter, compared to last years. Concerning the Californian hybrids the results were similar to Andreas, the hybrids Atlas, UC 157 and Appolo being the most developed in this year. Regarding the number of the shoots, Appolo is the most developed with an average of 9,5, regarding the diameter of the shoots, the same Appolo shows the best results. The highest hybrid being Atlas, with 172,4 cm.

This year, it was the first production of spears.

The chemical composition of the shoots has been determined. The following biochemical analysis have been performed:

1. Dry soluble matter: by refractometry
2. Dry total matter :by gravimetry (after drying at 100-105°C)
3. Clorofilian pigments: by colorimetry at 649 si 665 nm;
4. Total sugar : Fehling – Soxhlet method;
5. Titrated acidity: with Na OH 0,1 N in fenolftalein , after boiling;
6. C vitamin: titration with 2-6 diclorfenol indofenol.

CONCLUSIONS

After three years of the culture, the hybrid Andreas and the Californians had a very good level of the growth and development. The climate conditions in our country are different from the Californians, they had a good adaptation. The conclusion is the Californians hybrids can be successfully cultivated in our country. This year, it whose the first production of spears. I compare it with the French hybrid Andreas and this one is the most productive hybrid. For this hybrid, the level of C vitamin is the highest as well.

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Fenological observations – first year of growing

Hybrid	Maximum average height (cm)	Number of shoots (average)	Diameter of shoots (average-cm)
Andreas	59,76	4,08	3,53
Appolo	58,50	4,07	3,15
Grande	59,80	3,50	3,07
Atlas	62,42	3,61	3,19
UC 157	62,69	4,19	3,57

Fenological observations – second year of growing

Hybrid	Maximum average height (cm)	Number of shoots (average)	Diameter of shoots (average-cm)
Andreas	107,91	4,29	5,79
Appolo	104,61	4,50	5,88
Grande	127,69	5,84	5,46
Atlas	111,20	6,40	6,04
UC 157	106,90	4,19	5,53

Fenological observations – third year of growing

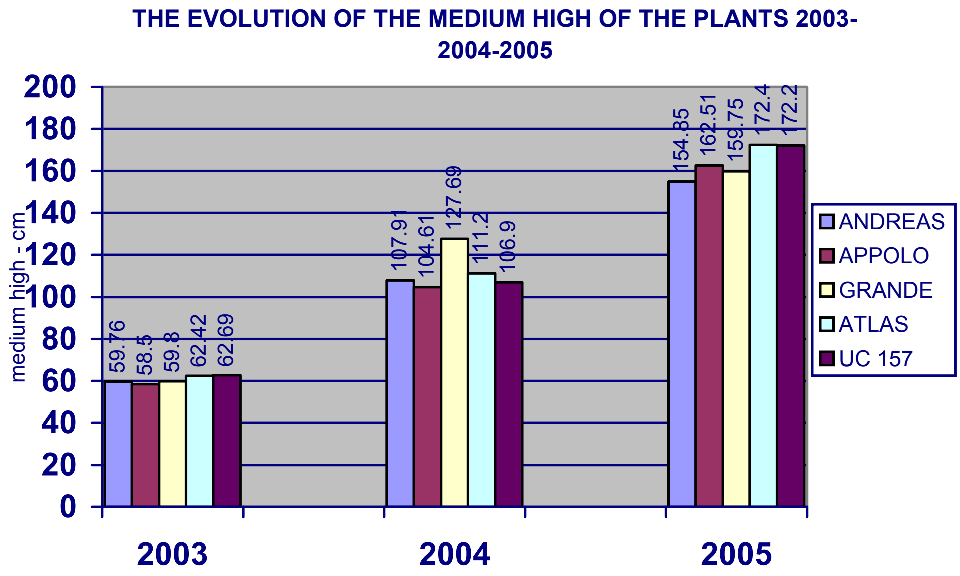
Hybrid	Maximum average height (cm)	Number of shoots (average)	Diameter of shoots (average-cm)
Andreas	154,85	8,35	9,66
Appolo	162,51	9,50	10,75
Grande	159,75	7,86	8,86
Atlas	172,40	8,60	8,74
UC 157	172,20	9,19	9,65

The yield level of the Andreas hybrid and Californian hybrids – first year

Yield / Hybrid	I (g)	II (g)	TOTAL (g)
Andreas	1202,76	1566,76	2769,52
Appolo	1035,51	1223,15	2258,66
Grande	995,23	1015,45	2010,68
Atlas	1066,89	1157,34	2224,23
UC 157	1102,03	1157,23	2259,26

Hybrid	Total dry matter* %	Soluble dry matter %	Total sugar %	C vitamin mg/100gfm	Clorofilian pigments mg/100gfm	Acidity %
Andreas	8,28	5,0	0,88	24,07	0,40	0,25
Appolo	8,16	4,5	2,06	24,02	0,14	0,17
Grande	8,87	4,5	2,92	24,02	0,21	0,22
Atlas	8,36	6,5	2,56	16,02	0,35	0,11
UC 157	9,06	5,5	1,48	24,02	0,76	0,23

*the difference up to 100 is represented by water


THE EVOLUTION OF THE MEDIUM HIGH OF THE PLANTS 2003-2004-2005
medium high - cm
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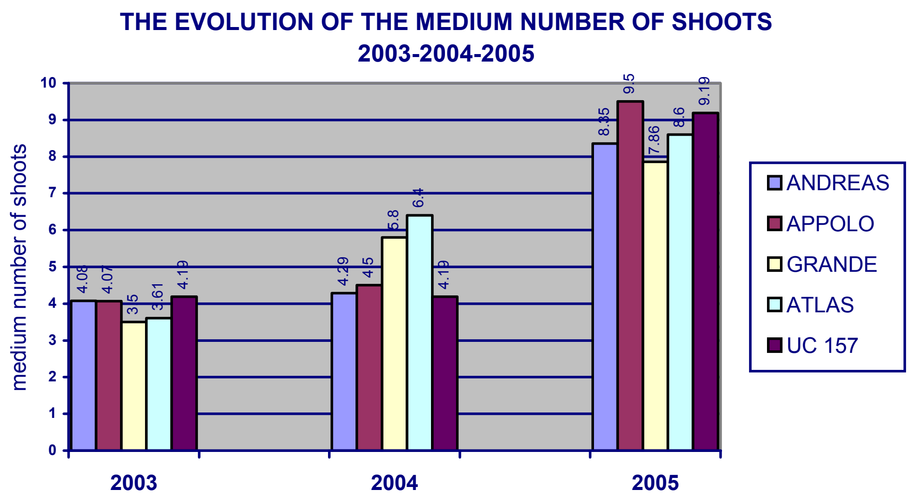
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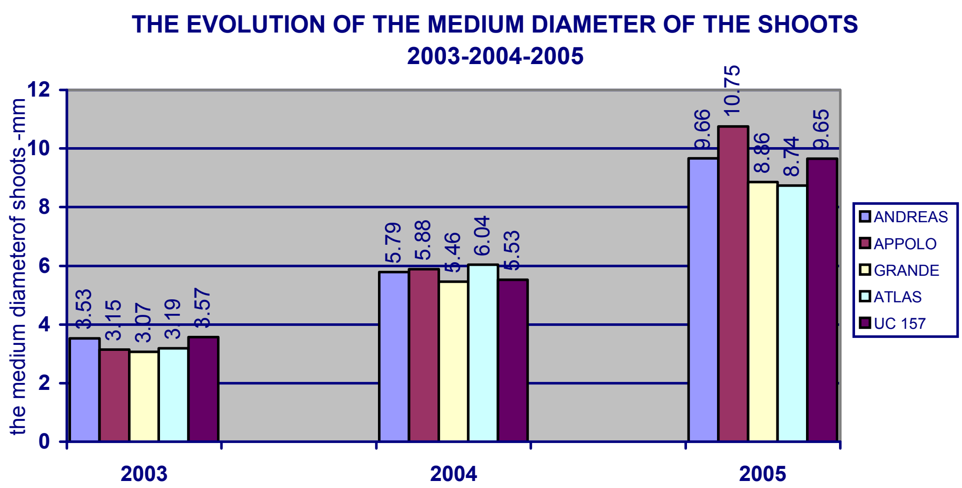
THE EVOLUTION OF THE MEDIUM DIAMETER OF THE SHOOTS 2003-2004-2005
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APPOLO
GRANDE
ATLAS
UC 157

Lucrări ştiinţifice U.S.A.M.V., Seria B, Vol. XLVIII, 2005

ORNAMENTAL PLANTS & LANDSCAPE ARCHITECTURE

PRELIMINARY RESULTS REGARDING THE ROOTING OF THE *JASMINUM* CUTTINGS

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Keywords: propagation, auxin, rhyzogene

ABSTRACT

Jasminum is a very appreciated specie for its decorative qualities, the aim of this paper is to improve the way to obtain new plants very quickly using different types of cuttings. In this direction we start to treat the cuttings of the *Jasminum* with hormonal substances like auxins (ANA, IBA) and compare them with the effect of the rhizogene substances (Radistim 1, Radistim 2) and untreated control. It was also studied the influence of the cutting types on the rooting, separating the cuttings in three categories: herbaceous, semi-woody and woody cuttings, corroborated with the hormonal and rhizogene substances application.

INTRODUCTION

Jasminum is an ornamental pot plant with fast and vigorous grows and all year blossom if is assured the light, high temperature and a good organic matter content in substrate. It is present in greenhouses and homes, in the originary regions are a shrubby plant with beautiful and odorized flower. Substances with hormonal role, such as auxins are involved in many biological processes including rooting, and are used especially at the species which present difficulties in rooting. The treatment of the plants with these kind of hormonal substances has different response depending on specie, variety and the concentration of the solution used. So, we need to know what auxin is the best and what concentration has good results in correlation with the cutting type. Usually, it seems that big concentration of auxin solutions determinates callus, depending on concentration degree, the results of cuttings rooting are different for the woody, semi-woody and herbaceous type.

MATERIALS AND METHODS

The experiences were carried out in the frame of the Greenhouse from the Floriculture Desk of the Faculty of Horticulture Bucharest. The biological material was represented by the *Jasminum* sp.

In the spring, from the mother plants were picked up shoots. The shoots were separated in three parts resulting three types of cuttings. All the cuttings were treated at the bottom with different concentrations of auxin and Radistim 1 and 2, the control remaining untreated. The auxin solutions used were IBA, ANA and the mixture of them. The concentration of the auxin solution varied between 500 and 2500 ppm. To stimulate the rooting, the cuttings were immersed in the auxin solutions a couple of seconds, with the basal part, 2 cm long. In the case of the Radistim 1 and Radistim 2, the cuttings were introduced in the powder with the basal part. All the cuttings, treated as we mentioned before were introduced in the rooting substrate represented by the perlit.

During the rooting period, the cuttings were all the time sprayed out for decrease the temperature and to reduce the transpiration. To avoid the direct light, the cuttings were shaded with a green heddle. After 3 month, the cuttings were carefully extracted from the rooting substrate and were made observations and measurements, it was recorded the percentage of the rooted and callused cuttings.

RESULTS AND DISCUSSION

The treatment of the *Jasminum* cuttings with the hormonal substances shows differences regarding the percentage of the rooted cuttings, the concentration of the auxin solutions and the type of the cutting influenced it. Thus, concerning the type of the cutting, it was observed that thick cuttings rooted better than the others, except the ones treated with mixture solution of auxins, where the semi-woody cuttings recorded the best percentage of rooted cuttings.

The average percent of the cuttings treated with the hormonal and rhizogene substances, emphasize that the cuttings treatment with IBA recorded best results. For the woody cuttings, IBA treatment register 45% rooted cuttings, next by Radistim 2 (41,66%) and IBA+ANA with 35%. In the semi-woody cuttings case, best results were recorded by the mixture solution of IBA+ANA (45%), only 20% cuttings root with ANA treatment. Herbaceous cuttings root well with IBA (40%), the same ANA showing lower values of rooted cuttings (Table 1).

Regarding the optimum concentration of the solution used for the cuttings treatment, it was observed that for each variant, concentration had different depending on the cutting type as well. So, in the frame of the hormonal substances, IBA had great results at the 1500 and 2000 ppm (Fig. 2), ANA at 1500 and 1000 ppm especially for the woody type of cutting and in the case of the mixture IBA+ANA, the concentration of 1500 ppm was the best for the semi-woody and herbaceous cuttings type.

IBA comparatively with the Radistim 1 or 2 treatments was superior regarding the rooted cuttings percentage no matter what kind of cutting was (woody, semi-woody or herbaceous) (Fig. 1). A lot of callus was observed at the cuttings treated with ANA and IBA. The herbaceous cuttings rooted and callused only in little percentage but when was treated with IBA, the percentage increase very much.

CONCLUSIONS

From this paper, it could be emphasized the next conclusions:

The concentration of the auxin solutions and the type of the cutting influenced the percentage of the rooted and callused *Jasminum* cuttings.

The cuttings treatment with IBA recorded best results for the woody cuttings, next by Radistim 2 and the mixture of IBA+ANA. IBA increase evidently the percentage of the rooted and callused herbaceous cuttings.

The best concentration of the hormonal substances for rooting was different depending also on the type of cutting respectively IBA at 1500 and 2000 ppm, ANA at 1500 and 1000 ppm, IBA+ANA mixture in concentration of 1500 ppm especially for the semi-woody and herbaceous cuttings type.

Radistim 1 and 2 registered also good results, outruned by the IBA treatment and with better percentages comparatively with the ANA treatment.

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Table 1. The influence of the auxin concentration and rhyzogene substances on rooting at the Jasminum cuttings

Rooting substance (ppm)	**Rooted cuttings (%)**			**Callused cuttings (%)**		
	Woody	**Semi-woody**	**Herbaceous**	**Woody**	**Semi-woody**	**Herbaceous**
IBA						
500	25	25	0	75	75	100
1000	25	0	25	75	75	75
1500	75	50	75	25	25	25
2000	50	75	50	25	0	50
2500	50	25	50	25	25	50
Average	*45*	*35*	*40*	*45*	*40*	*60*
ANA						
500	50	25	0	50	75	75
1000	75	0	0	25	75	0
1500	25	50	25	50	50	25
2000	25	25	25	75	75	25
2500	0	0	0	75	75	75
Average	*35*	*20*	*10*	*55*	*70*	*40*
IBA+ANA						
500	50	25	50	50	50	25
1000	25	75	0	25	25	25
1500	25	75	75	0	0	0
2000	75	0	0	0	100	25
2500	0	50	0	25	25	25
Average	*35*	*45*	*25*	*20*	*40*	*20*
Average percent of the rooted/callused cuttings						
Radistim 1	33,33	25	16,66	25	25	33,33
Radistim 2	41,66	33,33	33,33	16,66	25	25
Control	16,66	8,33	8,33	33,33	16,66	16,66

Fig. 1 The average rooted cuttings treated with root stimulators (%)

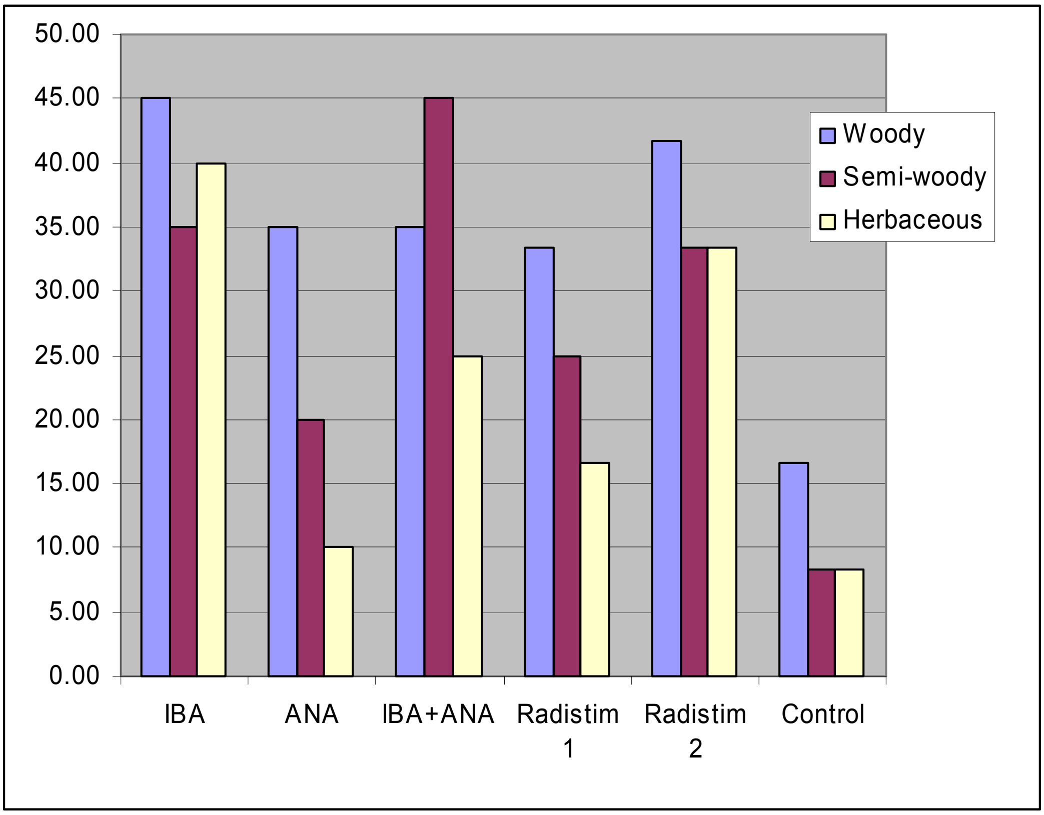

Fig 2. The effect of the hormonal substances on rooting at the Jasminum cuttings

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PRELIMINARY RESEARCH REGARDING THE BEHAVIOUR OF *SPATHIPHYLLUM* PLANTS ON DIFFERENT SUBSTRATES

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Keywords: *Spathiphyllum wallisi* 'Viscount', substrates, containerized culture, growth.

ABSTRACT

The research aim was to establish and develop some substrates containing biodegradable organic materials like bark, leaves compost, marc of grapes and manure in the cultural technologies of for *Spathiphyllum* plants. Biometrics measurements and agrochemical analysis of experimental substrates - pH, soluble salts, nitrogen, phosphorus and potassium supply - were made during the vegetation period.

INTRODUCTION

In the context of preserving and recycling the substrates used in containerized culture, the concern of maintaining the fertility estate of those was an important standing for researchers among years. Sometimes, these natural materials are difficult to procure, because in our days, the number of both agricultural and animal farms decreased, the manure resulting from these activities is in low quantities and the peat from natural resources is an expensive material and hard to get. This is the reason for finding new recyclable and cheaper sources for organic materials, proper for flowers cultural technologies (Davidescu, 1992, 2002).

Regarding the substrate constituents used in containerized culture of *Spathiphyllum* plants, the literature recommends different mixtures with a fibrous and porous structure, an optimal air/water ratio and a good drainage. These mixtures are made from peat, manure, leaves compost, bark and conifers needles (Şelaru, 2000), marc of grapes (Toma, 2000), sand, perlite in different proportions and variants.

The aim of the present paper was to observe the growth and development of *Spathiphyllum wallisi* 'Viscount' plants on various substrates types in order to establish the best mixture for containerized culture of this species.

MATERIALS AND METHODS

The experiment was set up on 13rd of April 2005 in the conservatory of University of Agronomical Sciences and Veterinary Medicine Bucharest, and the analysis were realized by the Agrochemistry laboratory of the same institute. *Spathiphyllum wallisi* 'Viscount' plants were used as biological material provided by the flowers greenhouse of Horticulture Faculty.

The substrates variants presented in table 1 were obtained by volumetrical mixing of the constituents. Before setting up the culture, the pH, soluble salts content, nitric and ammonium nitrogen forms, phosphorus and potassium of all substrates constituents were analyzed.

The pH was determined by potentiometrical method, in water suspension, with 1:2.5 ratio using a pH-meter HI 9321.

The total soluble salts content was analyzed with OK 102/1 conductometer.

The nutrients in soluble forms (N, P, K) was extracted in water using a 1:5 extraction ratio.

Nitrate content was measured by Cecil spectophotocolorimeter (λ= 420nm), after the specific reaction of NO_3^- with phenol disulphonic acid in alkaline medium (NaOH).

Ammonium nitrogen content was dosed with Nessler reactive and measured by Cecil spectophotocolorimeter (λ= 420nm).

Phosphorus content was determined by colorimetric method with Duval reactive in the presence of ascorbic acid, and measured by Cecil spectophotocolorimeter (λ= 720nm).

Potassium content, soluble form was determined with a flame-photometer.

RESULTS AND DISSCUSIONS

Analyses concerning the agrochemical indices of substrates were made before planting (table 3).

We remarked that the pH values were varied between 6.46 (V2) and 8.71 (V4). According the literature *Spathiphyllum* require an acid pH, so the V3 and V4 variants were not proper from this point of view.

Analyzing the soluble salts content we observed a low value at V2 variant (0.20mS/cm), middle content at V1 variant (0.52 mS/cm) and high at V3 and V4.

Regarding the content of $N\text{-}NH_4^+$ in substrates, we remarked that the V1 and V2 variants were middle supplied with this element and high at V3 and V4 (34, respectively 45.75ppm).

$N\text{-}NO_3$ content in substrates was low at V2 (8.25 ppm). This nutrient was well supplied in V1 substrate and very well in both V3 and V4 substrates.

Phosphorus had a low value at V2 (6.50ppm), high at V1 (169.75 ppm) and very high at V3 and V4 (413,50 ppm and respectively 436. 50 ppm). Potassium content was high (85 ppm) when the substrate was made of 50% peat, 30% bark and 20% sand (V2) and very high for the other variants (300 ppm - V1, 950 ppm - V3 and V4).

Monthly, the plant height, diameter, the number of both leaves and inflorescences, height of flower stem, spatha and spadix length were measured (table 4). The height of plants varied between 17.27 cm at bark substrate (V2) and 20.61 cm at 30% marc of grapes variant (V3). The values showed that for V2 variant the growth was inhibited by the low nitrogen content (27 ppm) and for V3 variant this phenomenon was stimulated, the plants height reaching a value of 20.61 cm (fig. 2), because of its very high nitrogen content (128.75 ppm).

The mean value of the leaves number was situated between 5.31 - 5.87, the maximum values being recorded at V3 and V4, substrates variants with marc of grapes in 30% and respectively 50% (fig.3).

The data showed that the blooming was influenced by the presence of nitrogen and potassium in substrates. Consequently, the mean number of inflorescences per plant varied between 0.09 and 0.22 (fig. 1).

CONCLUSIONS

1. Substrates had different pH values due to the mixture constituents. Their nutrients supply was very high in general, excepting V2 variant poorer in elements explained by the presence of bark;
2. The most vigorous plants from the point of view of height and diameter were observed at variant with 30% marc of grapes (V3);
3. The substrates with 30% and respectively 50% marc of grapes (V3 and V4) developed plants with the biggest number of leaves;

4. Nitrogen and potassium in the substrates determined a mean value of inflorescences per plant between 0.09 and 0.22. Therefore, the greatest number of inflorescences was at variants V1 and V3;
5. Further studies of the substrates are needed to clarify the influence of the constituents and agrochemical properties on the growth and development of *Spathiphyllum* plants.

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Tables

Table 1. Substrates variants

Substrates variants	CONSTITUENTS						
	Leaves compost	Peat	Manure	Bark	Perlite	Sand	Marc of grapes
V1	10%	40%	20%	10%	-	20%	-
V2	-	50%	-	30%	-	20%	-
V3	14%	-	42%	-	14%	-	30%
V4	20%	-	30%	-	10%	-	50%

Table 2. Agrochemical analysis of substrates constituents

Constituents	pH	Soluble salts (mS/cm)	$N\text{-}NH_4$ (ppm)	$N\text{-}NO_3$ (ppm)	$P\text{-}PO_4$ (ppm)	K (ppm)
Leaves compost	7.89	3.45	111.500	145.250	111.40	2210
Peat	5.97	0.43	18.000	42.250	28.00	150
Manure	8.10	1.30	28.000	132.000	448.5	710
Bark	5.18	0.46	637.000	87.750	93.4	410
Marc of grapes	8.17	0.85	37.000	65.500	323	655
Perlite	8.37	0.18	14.750	8.250	urme	105
Sand	8.18	0.16	6.625	5.750	urme	25

Table 3. The analysis of agrochemical characteristics of substrates before planting

VARIANT	Substrates constituents	pH	Soluble salts (mS/cm)	$N\text{-}NH_4$ (ppm)	$N\text{-}NO_3$ (ppm)	$P\text{-}PO_4$ (ppm)	K (ppm)
V1	10% leaves compost : 40% peat : 20% manure : 10% bark : 20% sand	6.99	0.52	19.25	49.75	169.75	300.00
V2	50% peat : 20% manure : 30% bark : 20% sand	6.46	0.20	18.75	8.25	6.50	85.00
V3	14% leaves compost : 42% manure : 14% perlite : 30% marc of grapes	8.44	1.50	34.00	94.75	413.50	950.00
V4	10% leaves compost : 30% manure : 10% perlite : 50% marc of grapes	8.71	1.40	45.75	70.50	436.50	950.00

Table 4. Biometrics measurements of *Spathiphyllum* plants

VAR.	Average height (cm)	Average diameter (cm)	Average number of leaves/ plant	Average number of flowers/ plant	Average height of inflorescences (cm)	Average length of spatha (cm)	Average length of spadix (cm)
V1	20.06	30.11	5.31	0.22	29.59	11.13	3.95
V2	17.27	27.01	5.31	0.13	28.50	10.62	3.50
V3	20.61	33.63	5.87	0.22	25.88	11.32	3.57
V4	20.34	31.10	5.87	0.09	30.33	11.25	3.00

Figures

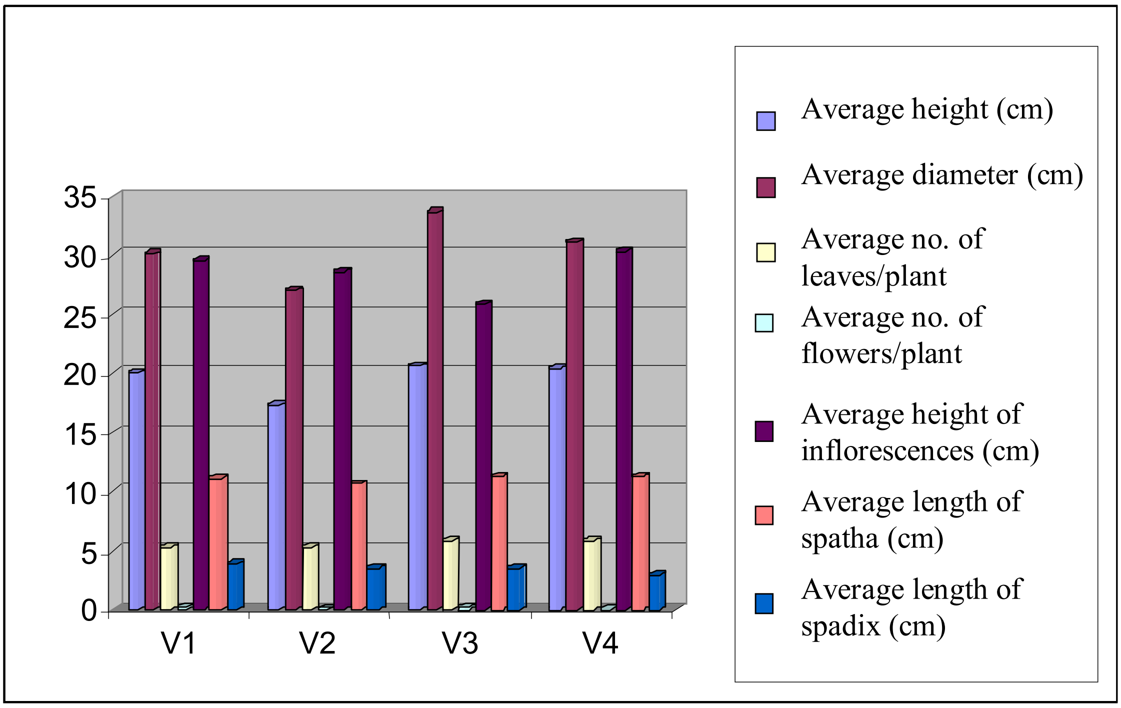

Fig. 1. Biometrics measurements of *Spathiphyllum wallisi* plants

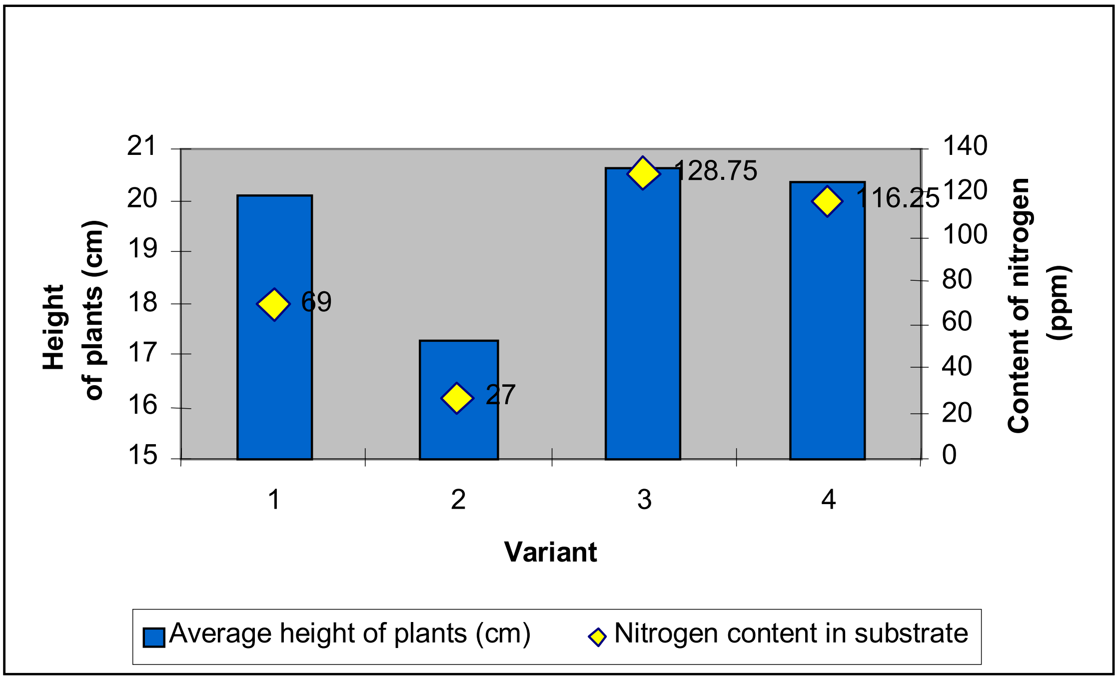

Fig. 2. Nitrogen content and plants height

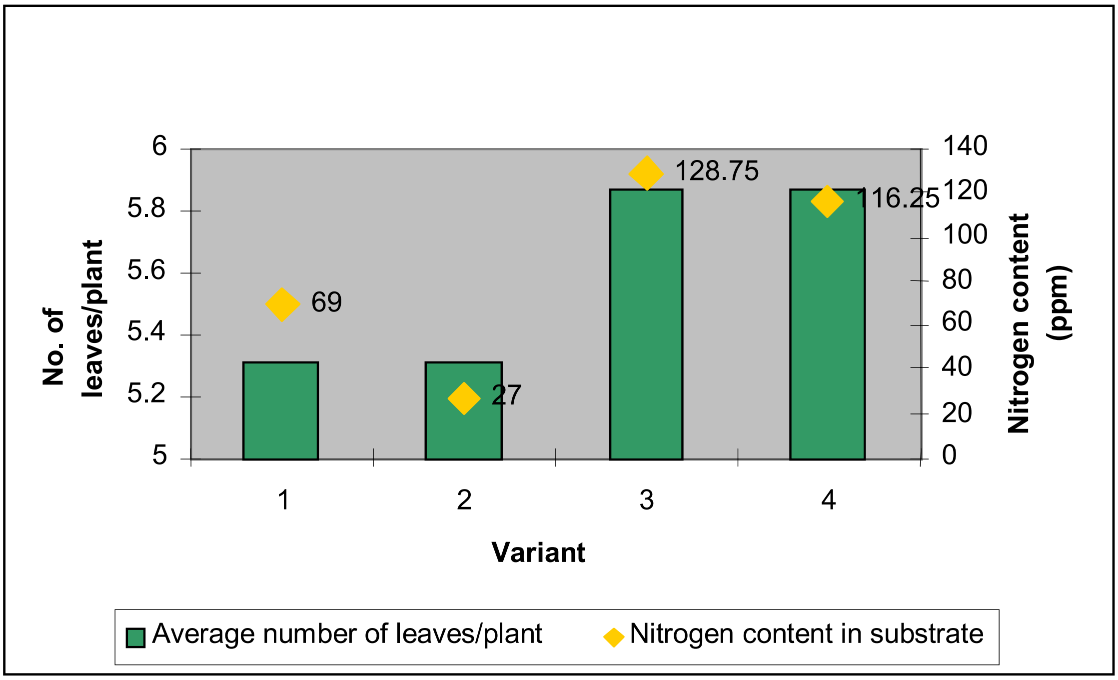

Fig. 3. Nitrogen content and leaves number

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PRELIMINARY RESEARCH REGARDING THE REGENERATION IN VITRO, FROM INFLORESCENCE AT *SPATHIPHYLLUM SP.*

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Keywords: tissue culture, regeneration, callus, micropropagation, inflorescence, *Spathiphyllum wallisi* 'Viscount'

ABSTRACT

Plant regeneration of *Spathiphyllum sp.* as possible using in vitro culture of inflorescences. Callus induction was obtained after three months in explants growing in Murashige & Skoog (MS) medium supplemented with 10 mg/l of IBA and 10 mg/l of alpha-naphtil-acetic acid (ANA). In the same medium the formation of small shoots was observed. Biometrics measurements of plants regarding the explants number, length and width of explants, number of fruits, number of fragments, number of leaves/explant and the length of both limb and petiole, number of roots and their length.

INTRODUCTION

Spathiphyllum sp. belong of the Araceae Family. They produce a showy white inflorescence consisting hood-shaped spatha surrounding the spadix, which adds to their ornamental value. For this reason, *Spathiphyllum* are often called Peace Lilies, White Anthuriums, Snowflowers or Spathe Flowers. These plants are suitable for growing as house or greenhouse plants in cool regions and outdoors in mild climates.

Spathiphyllums are one of the plants used in the NASA Clean Air Study and shown to help remove formaldehyde, benzene and carbon monoxide.

It can be propagated by division in winter or immediately after flowering but the most utilized method is grown from tissue culture. It is the best product of its kind on the market today. Plants are usually grown from "liners" which have been produced from tissue culture and placed into trays. These liners are then planted into larger containers in a well-drained soil.

Many studies were made on the propagation of Araceae Family species. One of those was conducted by Fonnesbech M. and Fonnesbech A. (1979), who elaborate a new technique of *Spathiphyllum* propagation starting from different inflorescences fragments. Geier (1986) studied *Anthurium* micropropagation.

The aim of the present study was to succeed the micropropagation of *Spathiphyllum* starting from inflorescences fragments.

MATERIALS AND METHODS

The experiences were conducted in the Micropropagation Laboratory of Faculty of Horticulture, from University of Agronomical Sciences and Veterinary Medicine, Bucharest. Spathiphyllum wallisi 'Viscount' plants were used as biological material provided by the flowers greenhouse of Horticulture Faculty.

In April 2005 flowers were harvested from mother plants, then the flowers spadix were sectioned in 0.5 cm semicircular fragments. A Murashige & Skoog (MS) medium was supplemented with auxines and cytokinins using 10 mg/l of IBA and 10 mg/l of ANA. The medium was distributed in flacons then covered with sterile stoppers and autoclaved.

The fragments were sterilized with sodium hypocloride 10% followed by four washing of five minutes each with distilled sterile water. The inoculation of fragments on the MS medium was made in a sterile laminar flux. The flacons containing the fragments were placed in the culture room. After two weeks the viability of explants was checked.

Due to the consume of nutrients from the medium, the explants were placed on new flacons with the same medium formula three times.

Biometrics measurements of plants regarding the explants number, length and width of explants, number of fruits, number of fragments, number of leaves/explant and the length of both limb and petiole, number of roots and their length.

RESULTS AND DISCUSSIONS

The results of *Spathiphyllum* regeneration from flower spadix fragments were successful. Callus induction was obtained after three months.

Before first explants transferred on new flacons, we checked the viability after two weeks, one month and finally two months from inoculation (table 1). The viability percent was observed to be 100% at the end of the first observations.

The second transfer of explants on new flacons containing MS medium had an impact on the viability of explants. Therefore, the percent of viable explants was of 48.15% after 30 days, and after 110 days of 39.81% (fig. 1). We explain this decrease in viability by the age of explants and protocol.

Biometrics measurements were made after two and six months from inoculation (table 2 and 3). The fragments inoculated on MS medium continued to increase due to the natural development of fruits. Regarding their length this indicator showed a difference of tree times, from 0.5 cm at the inoculation to 1.48 cm after two months. We observed that the length of fragments did not change after six months.

After two months the average number of fruits/explants was 6.13 and after six months of 3.66. This fact could be explained by the plants initiation on the fragments.

The average number of plants/fragment was 2.66 after six months. The average number of leaves/fragment was about 3.42 (fig. 2).

The explants developed roots on the same time with shoots. The leaves and root development was not expected on this phase of the experiment (callus initiation). This may be an effect of high concentration of BAP from medium.

The average number of roots/plant was about 0.43 with an average length of 1.38 cm, after six months.

The influence of initiation medium on different cultivars of *Spathiphyllum* was remarked. Vargas and Garcia (1995) recommended by for the micropropagation of *Spathiphyllum* cultivar Clevelandii a similar with this used in the present work. Surprising, *Spathiphyllum* cultivar Viscount developed not only shoots but also roots on the same phase. This may be an inconvenient for the multiplication of this cultivar. Further studies will be needed to find a proper initiation medium for *Spathiphyllum* 'Viscount'.

CONCLUSIONS

1. *Spathiphyllum sp*. showed a good response to the indirect organogenesis starting from spadix fragments.
2. Optimal results were obtained using a MS medium supplied with 10 mg/l of IBA and 10 mg/l of ANA.
3. The total number of explants movement in new flacons with medium will be five.
4. Further researches are needed to establish the multiplication, rooting and acclimatization percent.

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Tables

Table 1. Fragments number at the initiation and after 14, 30 and 60 days

Initial fragments 11.04.2005		Viable fragments 25.04.2005		Viable fragments 11.05.2005		Viable fragments 10.06.2005	
No.	%	No.	%	No.	%	No.	%
54	100	54	100	54	100	54	100

Table 2. Biometrics measurements of fragments after two months

Total no. of fragments	Average length of fragments (cm)	Average width of fragments (cm)	Average no. of fruits/fragment
52	1.48	1.15	6.13

Table 3. Biometrics measurements of fragments after six months

Av. length of frag. (cm)	Av. no. of pl./frag.	Av. no. of pl. (cm)	Av. no. of fruits/frag.	Av. no. of leaves/frag.	Av. length of limb (cm)	Av. length of petiole (cm)	Av. no. of roots/pl.	Av. length of roots (cm)
1,50	2,66	1,37	3,66	3,42	0,99	0,81	0,43	1,38

Figures

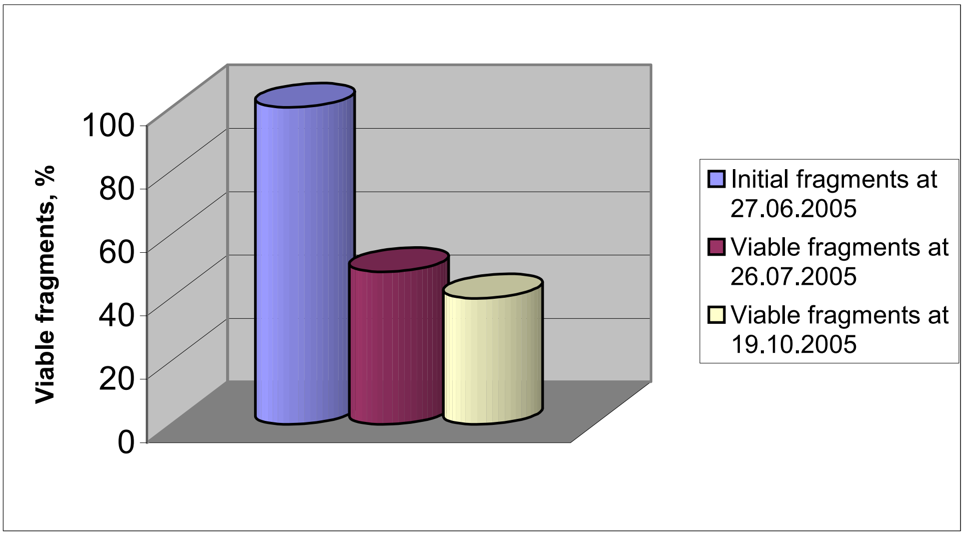

Fig. 1. Viable fragments after transferring on new flacons

Fig. 2. Young plants developed on fragment

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PARTIAL RESEARCHES CONCERNING THE MULTIPLICATION BY SPORES AT *POLYPODIUM VULGARE*

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Keywords: polypody, substrate, temperature, humidity

INTRODUCTION

Polypodium vulgare - Common polypody, Little fern

Relative small fern with very deeply bipinnatefid, green fronds, wearing on back fronds plump sporangia distribute in two parallel lines.

The second nervures have three-four bifurcations.

Forms new fronds in summer-autumn. They are often found growing on trees, rocks or shady side of the woods. It is a rustic species, needs acid compost (peat), fertile, humus-rich.

Economical matter

Are highly valued for the elegant symmetry of their fronds, growing fast, easy maintenance, pests and diseases - trouble free.

Pharmaceutical industry use essential oil extract from this ferns.

Propagation

Usually by divide bush or sow spores when ripe in natural way (they falling down on earth) or artificial way (by horticulturalist). To propagate from spores small prothalli appear, growing independent by sporophit, humidity level, having self-nutrition. Male and female gamets forms at prothalli.

Because, these ferns are sculptural fronds and the propagation is made by divide bush , I chose to sow spores.

The purpose is to obtain in short time a large number of plants, knowing by divisation obtain 2-3 new plants.

In west country the propagation by spores it's a usually proceeding, but the technology is expensive .

The method presume high technology, special greenhouse and mist system. Very important is to control the atmosphere and substrate; humidity 70-80% .

I purpose these method to prove, it can obtain the new plants without mist system.

MATERIALS AND METHODS

For this study I use biological material representing spores which was harvest from a mature plant - Common polypody as part of "Flower" sector of USAMV in 22.03.2005.

The spores sowed in a terra-cotte propagator in a same day with harvest and using peat . It was two variants: first (V1) - sowed the spores in the whole surface of peat. The peat was moisten in advance. Second variant (V2)- place fragments of fronds with plump sporangia directly on peat and fix with clamps.

In both variants, after sow, cover the propagators with a glass and situated in greenhouse or warm room.

RESULTS AND DISCUSSIONS

At the end of September the propagator from V1 was covered 95% by a layer of small prothalli high 2-3 mm.

In the propagator from V2 only 2% of prothalli coming up.

On 6.10.2005, was making first replaced. The small plants have 7-12 mm high. Because, the plants aren't grow in same time, I made the replace step by step. The second date for replace was in 10.10.2005 and the third in 26.10.2005.

I put up the plants singly and used two substrates types: peat and compost of manure(not in mixture).

Between sow and prothalli appear, I assured suitable rooting medium, such us keep moist the peat (U= 80%) and high temperature (T= 20 °C). Water moderately during the growing fronds.

CONCLUSION

The results show that: obtain the ferns propagation by sow spores without mist system.

The time gone by appear prothalli is longest in researches study than using the mist system.

I'll have in view for next time, see how they grow up and develop, witch are the growing frequency , doing measures.

The purpose is to obtain all dates about grow and develop without special system or other stuffs. After the ferns touch the dimensions of mature plant, it can creating a new technology to apply successfully to this culture and another kind of plants.

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Fig. 1. Polypodium vulgare

Fig. 2. Frond with plump sporangia

Fig. 3. Terra-cotta propagator

Fig. 4. Prothalli

Fig. 5. Replaced plants

Fig. 6. Transplants – general view

Fig. 7. Detail

Fig. 8. Detail

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PARTIAL RESEARCH CONCERNING THE INFLUENCE OF ORGANIC FERTILIZERS UPON THE GROWING AND FLOWERING OF *AMARYLLIS VITTATA* PLANTS

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Keywords: Amarillis, bulb, substrate, organic fertilizer, fertilizing

ABSTRACT

We realized eight culture variants in containers using as substrate the classic soil without fertilization and the sawdust compost with fertilization. We used three organic fertilizers applied as solutions with different concentration. The growing and the flowering of the plants were observed through biometrical observations. The plants cultivated on the classic soil had a better vegetative growing because of their bigger capacity to retain the solution. The plants that were cultivated in sawdust compost have developed many and longer roots, just to achieve to the fertilizer solution in the plate from the container's base. The flowering of the plants cultivated in a classic soil was better comparing to the plants cultivated on sawdust compost.

INTRODUCTION

Amaryllis, a lively, bulbous plant, that has big bulbs, gives out floral rods empty on the inside, which in most of the cases are containing 2-4 flowers in form of a trumpet made by 6 red, white, pink, orange or bicolour petals (fig. 1). Original form Central and South America, it is cultivated in our country as inner plants, only hybrids. In the reason of using amaryllis as inner plant our researches want to demonstrate how is possible the containerized culture, applying the organic fertilizers. This work is part of one big research program concerning the containerized culture of flowers species on the un-pollution substrates ensuring the plants nutrition by organic fertilizers. The purpose was finding the best organic fertilizer for the accomplishment of containerized and not polluting cultures.

MATERIALS AND METHODS

We used bulbs of more 6,68-6,05 cm diameter (fig. 2), keeping in the rest period 20-22 C and 75-80% relative humidity. The bulbs were planted in April (fig. 3) in containers with 15 cm height and 17 cm diameter, in two types of substrates (classic soil and sawdust compost). The containers were preserved in one glasshouse, in the first two weeks with less light, and then they very exposed to a stronger light. Eight experimental variants were realized by the combination of the culture substrate with the fertilization program (table 1).We fertilized from May to July, every three weeks and from August until September each month. We used 40 bulbs for each variant, each one having 5 repetitions of 5 bulbs per variant. The growing and the flowering of the plants have been followed by the next biometrical observations: the length of leaves, the length of the flowers stems, the diameter of the opened flowers.

RESULTS AND DISCUSSION

Analyzing the length of the leaves in May-June, we may observe that the plants cultivated in classic soil are the best values of this parameter. In July, the 4th variant has the length of the leaves bigger that the variants cultivated in the classic soil, and in August the 3rd variant is bigger. Towards the end of the period of vegetation (September), the length of the leaves cultivated in the classic soil is recording again the biggest values of the leaves length (table 2).

This diminution of the plants cultivated in the classic soil is caused by the higher number of flowers towards the plants cultivated in sawdust compost (July-August). The bulb from the 26^{th} container of the 6^{th} variant has given his first leave at the beginning of August but he retrieved then very fast. At the end of August the leaves presented an easy discolouring after flowering. The flower stems appear in May to the plants cultivated in classic soil, and also to the plants cultivated in sawdust compost (table 3).The biggest length of the flower stems was registered to the plants cultivated in the classic soil. At the end of

June an exception is given by the average of the flower stems of 50 cm. Of the bulb from the 16th container and of the 7^{th} variant cultivated in sawdust compost, fertilized with bovine and equine solution. The flowering lasted from the middle of May until the end of June. The biggest diameter of the flowers was registered on the plants cultivated on a classic soil (4^{th} table). On the first observation the first, the 4^{th} and the 7^{th} variant presented closer values to the plants cultivated in the classic soil. On the second observation only the 4^{th} variant had values close to the plants cultivated in the classic soil. The bulb from the 9^{th} container of the 8^{th} variant and the bulb from the 26^{th} container of the 6^{th} variant didn't form flower stems.

In these conditions we can say that the developing isn't influenced only by the nutrients but also by the reserve substance from the bulb. We may observe the influence of the nutrition of this year better next year.

CONCLUSIONS

The results of our researches demonstrate that is possible the containerized of *Amaryllis vittata* for their using as inner plants.

The best values of the vegetative growing were observed at the plants cultivated on the classic soil even if this variant wasn't fertilized.

The plants cultivated on sawdust compost have developed bigger and numerous roots because this substrate has a small capacity of retaining nutrients.

The developing isn't influenced only by the nutritive from this year but also by the reserve substance accumulated in the bulb from the last year.

In the future it will be interesting to test also other substrates with bigger capacity of retaining the nutritive solution combined with the organic fertilizers.

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Tables

Table 1. The experimental variants (cm)

Variant	Substrate	Solution fertilizers
V1	Compost of sawdust	0.05% CP
V2	Compost of sawdust	0.1% CE
V3	Compost of sawdust	0.1% CB
V4	Compost of sawdust	0.05% CP+ 0.1%CE
VM	Classic soil (2parts compost of manure +1 part compost of leaves +1 part compost of sawdust+0.25 parts of sand)	-
V6	Compost of sawdust	0.1%CB+0.1%CE
V7	Compost of sawdust	0.05%CP+0.1%CB
V8	Compost of sawdust	0.05% CP +0.1% CE+ 0.1%CB

CP - compost of poultry; CE- compost of equine; CB -compost of bovine

Table 2. The variation of the length of leaves (cm)

Variant	Month				
	May	*June*	*July*	*August*	*September*
V1	4,44	9,63	31,64	41,86	43,36
V2	3,67	8,57	27,22	39,85	45,70
V3	12,70	26,32	26,08	43,87	43,76
V4	3,95	14,43	36,73	42,27	44,66
VM	12,64	27,47	35,57	38,69	48,78
V6	2,27	11,92	21,38	41,40	43,31
V7	11,6	21,89	29,93	39,79	45,12
V8	4,05	9,67	24,86	36,97	40,86

Table 3. The variation of the length of flowers stems(cm)

Variant	Month			
	18.05	***24.05***	***1.06***	***23.06***
V1	17,57	10,0	0	0
V2	5,75	8,50	0	0
V3	10,33	9,0	10,50	0
V4	22,5	26,50	12,50	0
VM	29,66	37,25	0	28,0
V6	9,02	9,94	6,0	0
V7	28,83	0	0	50,0
V8	12,0	12,90	0	0

Table 4. The variation of the opened flowers(cm)

Variant	Data			
	18.05	***24.05***	***1.06***	***23.06***
V1	13,62	7,25	0	0
V2	0	9,37	0	0
V3	9,33	8,75	9,75	0
V4	12,66	14,12	10,0	0
VM	15,50	15,25	0	15,75
V6	10,0	6,66	8,50	0
V7	13,02	0	0	14,70
V8	0	10,5	0	0

Fig. 1. –Amarilis vittata – maximum opening

Fig. 2 – The aspect of bulbs before planting

Fig. 3 – Bulbs of Amarilis vittata in sawdust compost

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PARTIAL RESEARCHES CONCERNING THE INFLUENCE OF ORGANIC FERTILIZERS UPON THE GROWING AND FLOWERING OF *SPATHILLUM WALLISII* PLANTS

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Keywords: Spathiphyllum, substrate, organic fertilizer, fertilization, development.

ABSTRACT

I realized eight culture variants, using as the lower layout some sawdust compost, to whom I month applied some fertilization procedures, and I used a mixture of land without any fertilization.

For the fertilization procedure I used some organics fertilizer, as solutions of different concentration.

The plants grew in the mixture of land, had a very good evolution, the green colour of the leaves was more intensive. The dimension of the petiole and of the limb was bigger in comparison with the plants cultivated on the sawdust compost.

At the plants cultivated on the sawdust compost is obvious the development of the roots, orientated towards the fertilization solution from the plate.

First the plants flowering were the plants cultivated on sawdust compost.

INTRODUCTION

Spathiphyllum is a recent cultivated specie, who became very popular.

The culture on organic layers represents the modern technology reality of ours day. The need of mineral substances for growing and development is brought exclusively by the nutrition solution in different ways. The use of these methods determined the elimination of the disinfection labour, more efficiency in consuming the water, a better protection from the hygienic point of view for the plants, superior production results.

MATERIALS AND METHODS

For the experienced dated 23. 03. 2005 I had used small plants with 2-3 leaves and a dimension of 8-12 cm.

The plants of Spathiphyllum were organized in pots of 12 cm diameter. It was used for the lower layout sawdust compost disseminated in 35 pots and 5 pots with classic soil (1 part compost of manure + 2 parts compost of leaves).

Monthly it was fertilized and any changes were observed.

The number of leaves, the dimension of the petiole, the dimension of the limb, the number of flowers were determined.

The quantity of solution used for a pot was of 250 ml.

RESULTS AND DISCUSSION

The percentage was 100%, this means that the under layer is very profuse.

Determined the number of leaves, at the first stage of observation we realized that the plants cultivated in under sawdust compost had bigger values. The V5 type, fertilized with 0,05% compost of poultry + 0,1% compost of equine, had the best results. And for the other plants is obvious that the V5 method had the best results regarding the number of leaves, in comparison with the ones cultivated in mixtures as V1-3,2 method (table 1)

The leaves are much lurid and colourful at the plants cultivated in this kind of mixture (table 2).

The best results are obtain on this plants cultivated in the mixture of different grounds, and are reflected in the length of the petiole at the method V1-12,57 cm and at the method V6-8,52 (table 3).

Analyzing the number of flowers, we determined that at the V5 and V6 method had the best results (table 5). The plants of the V6 experiment show a good flowering even from may, fact that show the possibilities of flowering earlier for this plants.

The biggest values of the flowers stem were counted in the V4-27 cm, V1, V2-24 cm method.

For the plants cultivated in background of sawdust we have observed that the roots are very long and dense (fig. 3), which means that sawdust compost are has small capacity of retaining the water and the solution is pushed immediately to the base of the pot.

The plants cultivated on the sawdust compost with organic fertilization were positive influenced the growing and the flowering.

CONCLUSION

The percent of strike of the plants was very good.

The best values of the vegetative growing and flowering were observed at the plants cultivated of sawdust compost.

The plants cultivated of sawdust compost were developed the big and numerous roots because the sawdust have a small capacity of nutrients retention.

The leaves are much lurid and colourful at the plants cultivated in classic soil.

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Tables

Table 1. The experimental variants

Variant	Substrate	Solution fertilizers
V1	Classic soil (1 part compost of manure + 2 parts compost of leaves)	-
V2	Compost of sawdust	0,05% compost of poultry
V3	Compost of sawdust	0,1% compost of equine
V4	Compost of sawdust	0,1% compost of bovine
V5	Compost of sawdust	0,05% compost of poultry + 0,1% compost of equine
V6	Compost of sawdust	0,05% compost of poultry + 0,1% compost of bovine
V7	Compost of sawdust	0,1% compost of equine + 0,1% compost of bovine
V8	Compost of sawdust	0,05% compost of poultry + 0,1% compost of equine + 0,1% compost of bovine

Table 2. The variation of the number of leaves

Variant	Month	
	May	August
V1	2	3,2
V2	2,4	3,6
V3	3	4,4
V4	3,2	4,4
V5	3,8	5
V6	2,4	4
V7	2,8	3,2
V8	2,2	4,4

Table 3. The variation of the length of petiole

Variant	**Month**	
	May	**August**
V1	**14,45**	**12,57**
V2	**11,81**	**9,38**
V3	**10,4**	**9,86**
V4	**7,46**	**8,70**
V5	**8,42**	**8,86**
V6	**10,12**	**8,52**
V7	**10**	**10,25**
V8	**11,36**	**9,36**

Table 4. The variation of the length of limb

Variant	**Month**	
	May	**August**
V1	**14,75**	**12,93**
V2	**13,33**	**11,50**
V3	**13,52**	**12,86**
V4	**12,78**	**12,45**
V5	**11,60**	**12,08**
V6	**13,10**	**12,12**
V7	**13,50**	**13,50**
V8	**13,35**	**12,29**

Table 5. The variation of the number of flowers

Variant	Month	
	May	August
V1	1	1
V2	2	-
V3	-	1
V4	-	1
V5	1	3
V6	3	1
V7	-	1
V8	1	1

Table 6. The variation of the number of roots

Variant	The length of roots (cm)
V2	33,6
V3	39,7
V4	32,9
V5	39,1
V6	33,5
V7	34,4
V8	27,6

Fig. 1 Aspect of the roots

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CASE STUDY REGARDING THE APPLICATION OF THE METHODOLOGY FOR THE ANALYSIS AND VALUATION OF THE PARK OF THE MOGOŞOAIA PALACE

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Keywords: Restoration, historic site, landscape, historic-stylistic value, esthetical-functional value, global value

ABSTRACT

The researches regarding the restoration of the park of the Mogoşoaia Palace imposed the study of the analysis criteria and valuation method that enabled the quantification of the historic-stylistic, esthetical-functional values and finally the determination of the global value of the studied historic site. Further to establishing the global value, the emergencies of the interventions and the scheduling of the works for the restoration of the park were determined.

INTRODUCTION

1. Motivation and context

1.1 The objective necessity of restoring the landscape historic monuments, particular case – park of the Mogoşoaia Palace

The restoration of historic parks and gardens, as a branch of landscape architecture, fulfils the three objectives of the profession, i.e.: the capitalization, preservation and amelioration of the landscape patrimony. Although apparently the nature of this branch refers to its greatest extent to the preservation of gardens, landscape restoration should answer to the system of the three professional exigencies, not separately to one or another of them. The cultural benefits are reflected in long-term economic benefits, the investment in culture is necessary for a standing development, and thus the restoration of a historic site answers first of all to the objectives of maintaining the domain as a historic monument and of restoring in a standing manner in economic view, thus due to the circumstances, to the economic necessity of capitalization. In order to make this process efficient, restoration should consider the specific rhythms of the economic life that at macro-scale is far more dynamic than the spiritual one.

Another reason wherefore the landscape monument from Mogoşoaia should be included on the list of restoration priorities is the danger of changing into a place that is foreign to its memorial value.

The significance of the assembly in Brâncoveanu manner from Mogoşoaia is rendered by the fact that (besides the assembly from Potlogi) it is the only structure of such type that is fully preserved and that remained in Romania from the era of Brâncoveanu. It is the only palace of Brâncoveanu that remained as a whole and keeps the elements from the Italian renaissance architecture.

Such assemblies are currently the unique evidence of a flourishing period of cultural and spiritual life from the history of Romania.

1.2 The scope of the research

The scope of the study is to track and establish the hierarchic order of dysfunctions by an exhaustive analysis based on criteria of analysis and interpretation of specific indicators. The analysis and valuation of the historic park was performed within the inspection of the landscape monument.

MATERIALS AND METHODS

The research for the restoration of the park of the Mogoşoaia Palace is based on the objective inspection of the monument, analyzing the historic-stylistic and the esthetical-functional criteria of the site.

During the historic analysis were quantified the values of the monumental constructions (buildings, sculptures, etc.). Another analyzed criterion was the artistic (stylistic) value in whose interpretation were considered the poignancy (quantity), expressivity and stylistic authenticity, physical condition, as well as the restored value and the stylistic weight.

The esthetical-functional criteria aimed at the compositional value, the vegetation value, the circulation value, the value of the specific outfit, the value of the electric equipment and the value of the watering equipment.

The principles of the method reside in the valuation of the estimations within a unique scoring system at the scale from 1 to 5. According to the general value, the priority of the interventions is decided, so that the higher value determines the urgent intervention of the restoration actions.

For the analysis and valuation of the park of the Mogoşoaia Palace, the entire historic area was divided into 4 separate zones:

I – historic zone
II – connection zone to the village
III – English park zone
IV – zone of former orchards

Each zone was valuated according to the method of analyzing and valuating historic parks and gardens previously drafted and finalized by a team of Landscape Specialization in the year 2005. Thus:

The historic value: (VI)

VI = 0.2 VCS + 0.4 VA + 0.2 VR + 0.2 PS

Where: - VCS – monumental value of constructions

- VA artistic value given by the - stylistic poignancy (Ps) stylistic expressivity (Es), stylistic authenticity (As), physical condition (Sf)

VA = 0.4 Ps + 0.3 Es + 0.2 As + 0.1 Sf

- VR - restorative value – percentages from the historic area with suffice documents for restoration

- PS – stylistic weight (percentages from the area of the park)

Esthetical-functional value: (VEF)

VEF = 0.4 VC + 0.3 VV + 0.1 VR + 0.1 VD + 0.05 VE + 0.05 VU

VC (composition value) = 0.3Vu + 0.2 Vd + 0.2 Ve + 0.1 Vp + 0.1Vf + 0.1 Va

Vu - unit value
Vd – diversity value
Ve – value of volumetric and chromatic balance
Vp – depth value
Vf – focus value
Va – amplitude value

VV (vegetation value) = 0.3 Vsf + 0.3 Vm + 0.1 Va + 0.1 Vf + 0.2 Vu

Vsf – value of physical condition (degree of exceeding the physiological longevity)
Vm = value of tree bulk

- for zone III – Valuation of intervention urgency (VU) = (0.4x2.47) + (0.2x2) + (0.4x5);
  VU = 3.388

- for zone IV – Valuation of the intervention urgency (VU) = (0.4x1.135)+(0.2x1)+(0.4x5)
  VU = 2.654

As areas II and III had close scores, they were similarly valuated as a priority for restoration.

Hence, the restoration order was established as follows:

1. Zone I: historic zone
2. Zones II and III: connection zone with the village and English park zone
3. Zone IV: zone of former orchards

CONCLUSIONS

This determination of the hierarchy of priorities in restoration shall enable the approach of the works according to the real landscape potential of each zone within the historic assembly, so that restoration should enable the development of the site both in historic and in esthetical-functional view and in managerial view.

It is recommended to continue the performed research with pre-feasibility and feasibility studies to apply the restoration project.

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PARCUL PALATULUI MOGOSOAIA
ANALIZĂ FUNCȚIONALĂ ȘI ISTORICĂ
LEGENDĂ
ZONIFICARE FUNCTIONALA
ZONIFICARE ISTORICA
CLĂDIRI RESTAURATE
CLĂDIRI ȘI PLATFORME DEGRADATE
REȚEA APĂ-CANALIZARE
REȚEA ELECTRICĂ
LACUL MOGOSOAIA
ÎNCADRARE ZONALĂ
SCARA GRAFICA
0 20 40 60 80 100
DOBRESCU ELISABETA

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RESEARCHES REGARDING THE VEGETATIVE PROPAGATION OF *COTONEASTER SP.*

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Key words: rooting, substrate, cutting time, culture system

ABSTRACT

The aim of this work was to establish the rooting capacity of *Cotoneaster dammeri*. We tested the time of cuttings collection, the influence of rooting media and the system of culture. The cuttings were rooted under a mist in the greenhouse and mist. Cuttings were collected in June (herbaceous cuttings) and August (semi-hardwood cuttings) and were treated with hydro alcoholic solution of IBA 1000 ppm. Two different rooting substrates: peat + sand (2:1, by volume) and peat + perlite (2:1) and in two systems of culture: rooting bed and multipot systems were used. Rooting performances were expressed in terms of rooting percentage, average root number per rooted cutting, roots length, average number and shoot length per cutting. An 86,9 % rooting percentage was obtained on peat + perlite substrate and multipot rooting system. August time collection (semi-hardwood cuttings) is recommended for *Cotoneaster dammeri* propagation by cuttings.

INTRODUCTION

Evergreen species are frequently used in landscape architecture. In Romania the ornamental plants production is poor and is very important to develop the activity in this area and to improve the propagation technology. Modern plant propagation revolves around the use of IBA, NAA and their derivatives. Cuttings can be rooted in any substrate providing good air/water relationship are maintained (25 to 40% air space is perhaps ideal) (Dirr and Heuser, 1987). Numerous studies (Pokorny and Perkins, 1966; Robinson, 1967; Cowan, 1973; Cook and Dunsby, 1978; Whalley, 1979; Tilt and Bilderback, 1984) have been conducted to determinate the best medium.
The objectives of our experiments are to establish the cuttings rooting capacity of *Cotoneaster sp.*, to establish the best moment for cutting and influence of rooting media and culture system on evergreen plant cuttings.

MATERIALS AND METHODS

As biological material were used 8-12 cm stem cuttings prelevated from young mother plants of *Cotoneaster dammeri*.

Cuttings were collected two different periods, respectively June, as herbaceous cuttings and august as semi-hardwood cuttings. Cuttings were prepared for rooting on the same day of collection by trimming to 8-12 cm length.

As rooting stimulator was used IBA 1000 ppm in hydro alcoholic solution. The basal one cm of each cutting was dipped in the rooting solution for 5 seconds.

For *Cotoneaster dammeri* cuttings rooting were tested two variants of substrates, respectively peat + sand 2 : 1 and peat + perlite 2 : 1.

It was studied too the influence of two different culture systems - bed system culture and multipot system culture for *Cotoneaster sp*. cuttings rooting (Table 1).

Rooting occurred in cold greenhouse conditions with both mist system and shadow system.

Rooting response was assessed in terms of percentage of cuttings with one or more roots longer than 1 cm; number of roots per rooted cutting, length and number of shoots per cutting.

RESULTS AND DISCUSSION

For herbaceous cuttings**,** the highest rooting percentage (63,5%) was obtained on V3 variant with peat + sand substrate and multipot system, comparatively with 15,0% on V2 variant – peat + perlite substrate on bed rooting system (Table 2).

Rooting substrate peat + sand showed better results regarding rooting percentage (43,95%), roots number/cutting (5.75) and roots length (9.35 cm) (Fig. 1, Fig. 3).

How it can be see, *Cotoneaster dammeri* rooted better in multipot system rooting (57,3%) then in bed rooting system (19,7%); the multipot system stimulate the increase of short roots number per cutting, according to an higher percent of reacting plants to transplantation (Fig. 4).

For semi-hardwood cuttings the best rooting percentage (86,9 %) was obtain to the V4 variant - peat + perlite substrate and multipot system-, comparatively with 15,0 % rooting percentage registered to V1 peat + sand substrate and bed rooting system variant (Table 3).

On peat + perlite rooting substrate were registered better results regarding both rooting percentage (61,2%) and roots number per cutting (3,8) (Fig. 1, Fig. 3).

Similarly as for herbaceous cuttings, the multipot rooting system showed better results (51,6% rooting percentage) comparatively with multipot rooting system (39,9% rooting percentage) (Fig. 2).

Evaluating the average of rooting performances we can say that semi-hardwood cutting are recommended for *Cotoneaster dammeri* propagation.

CONCLUSIONS

The experiment shown that *Cotoneaster dammeri*, has a good propagation capacity by cuttings**.**

Evaluating the cutting moment (collection time) we can say that semi-hardwood cuttings are recommended for *Cotoneaster dammeri* propagation.

The quantity and quality of *Cotoneaster dammeri* cuttings roots are positively influenced by peat + perlite 2:1 substrate ratio and by the multipot rooting system.

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Tables

Table 1. Experimental variants for *Cotoneaster dammeri* propagation.

Culture system	Variants	Rooting substrate
Bed rooting system	V1	peat + sand
	V2	peat + perlite
Multipot rooting system	V3	peat + sand
	V4	peat + perlite

Table 2. Variant influence upon herbaceous *Cotoneaster dammeri* cuttings.

Variants	Rooting (%)	Roots/ cutting (no.)	Roots length/ cutting (cm)	Shoots/ cutting (no.)	Shoots length /cutting (cm)
V1	24,4	4	10	3,2	1,5
V2	15	4,5	8,7	2	2,5
V3	63,5	7,5	8,7	3,2	1,5
V4	51,1	5,8	5,8	2	2,5

Table 3. Variants influence upon semi-hardwood *Cotoneaster dammeri* cuttings.

Variants	Rooting (%)	Roots/ cutting (no.)	Roots length/ cutting (cm)	Shoots/ cutting (no.)	Shoots length /cutting (cm)
V1	15	2,7	4	1,5	3,1
V2	35,5	3,4	4	2,5	8,3
V3	69,8	3,5	7,8	1,5	3,1
V4	86,9	4,2	8,2	2,5	8,3

Figures

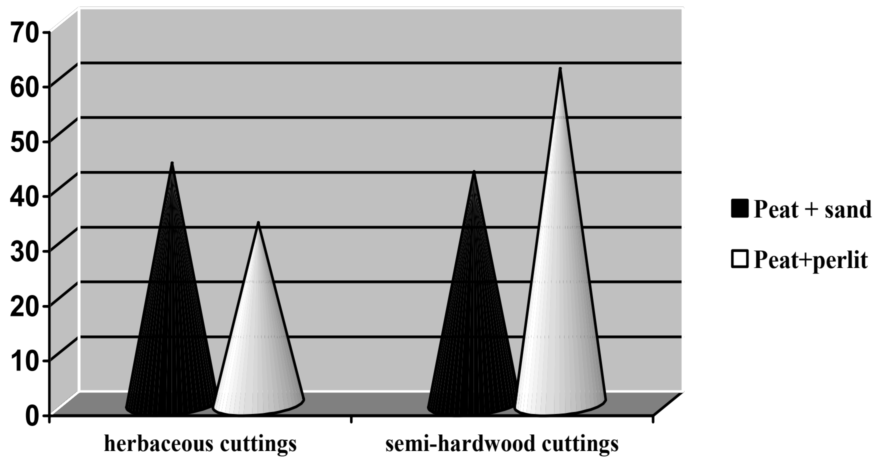

Fig. 1. Substrate influence on rooting percentage of *Cotoneaster dammeri* cuttings

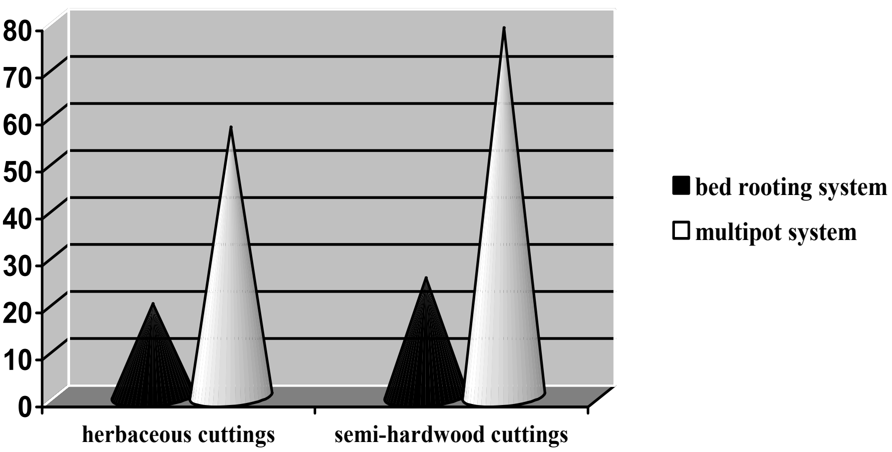

Fig. 2. Culture system influence on rooting percentage of *Cotoneaster dammeri* cuttings

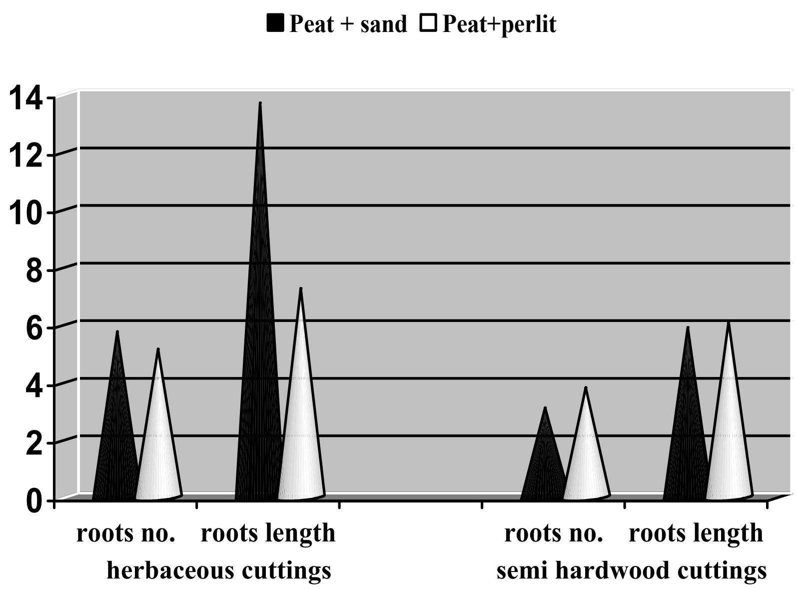

Fig. 3. Substrate influence on *Cotoneaster dammeri* roots formation.

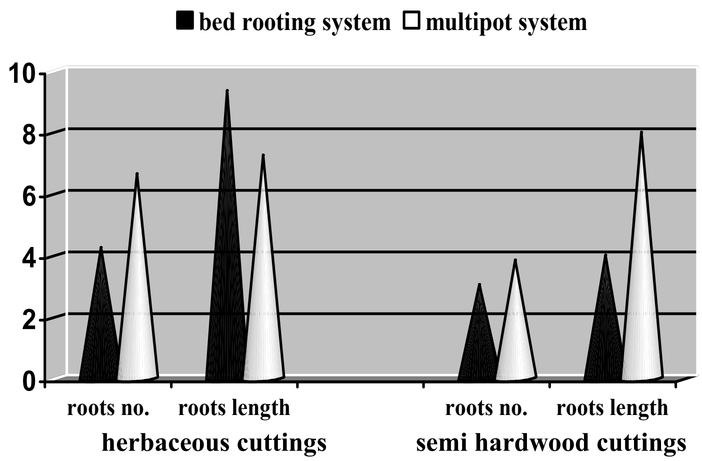

Fig. 4. Culture system influence on *Cotoneaster dammeri* roots formation.

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STUDY ON THE FOREIGN ARTISTIC INFLUENCES UPON PUBLIC GARDENS FROM ROMANIA FROM THE SECOND HALF OF THE 19TH CENTURY AND THE BEGINNING OF THE 20TH CENTURY. THE DEFINITION OF THE GARDEN AS A WORK OF ART.

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Keywords: historical context, urban development,artistical gardens, quality, historical art monuments.

ABSTRACT

The study deals with the conditions under which the first urban public gardens from Walachia appeared and have developed starting as of the second half of the 19th century under a strong foreign influence. The historical context of that period also enabled the influence of the great European artistic currents upon the Romanian culture. The artistic incursions of certain professionals in the field determined the creation of gardens that finally materialized in valuable works of art. The garden is defined as a work of art created by a landscape artist and the main inspiration model is “live nature”, the thoroughly studied landscape that is also represented in the painting of the time – the one that actually was the first stage of knowing “orderly” nature in esthetic view and the idea was later taken over in the arrangement of gardens.

INTRODUCTION

In order to understand why Romanian historical “gardens”, such as the Cismigiu Garden from Bucharest and the Bibescu Park from Craiova, which were the first ones of their kind – urban public gardens – were created with great local efforts, with a participation and a major interest from the administration and the power of the period, with the special contribution of significant representatives of the famous European landscape schools, foreign representatives invited and employed to create and supervise such works, I researched the historical circumstances underpinning this.

The approval of the population to change the external environment of the dwelling into a public green space that is esthetical and functionally arranged was decisive. This fact was first of all due to the manner in which Romanians were already using the natural green spaces in the city, in comparison to Westerners, and secondly to a proper historical environment that enabled the cultural exchange between Walachia and the outer world, especially due to the presence of a foreign occupation here.

The artistic styles approached in creating such gardens correspond to the currents of the time, upon which a great influence was exerted by the Cultural Revolution from Europe.

The purpose of this research is to place these historical gardens as proofs and witnesses of the influence of the European Cultural Revolution in Romania, to demonstrate that they are works of art and to include them in the national patrimony as historical art monuments, considering the problematic of valuation and valorisation, restoration and protection thereof.

Also, the quality of these historical works of art that are acknowledged worldwide, is desired to be an example for students in the field in taking over the knowledge and complex study within varied necessary fields, among which also notions of art.

MATERIALS AND METHODS

In order to research the proofs demonstrating the classification of these two Romanian public gardens among European landscape artistic works, I used the study of historical documents, mainly descriptions made by foreigners who were visiting the country, historical and current plans, books of famous Romanian historians and chronologists, and also of sociologists who were approaching fashionable events of the time and the behaviour of the Romanian society participating in the new influences, inclusively in the creation and usage of public gardens.

The method supposed the study on the used composition structures. The data on the artistic components and their accomplishment method have been also researched. A special significance had the reports of the time on the atmosphere desired by the creators in the gardens, reports that were extracted from a series of written documents.

For a better correlation with the idea of artistic works of art, I have accomplished a comparison of these created models with examples of the great Western creations and images from the paintings of the time.

As materials, I itemize: old plans, historic documents, art books, photos, old pictures.

RESULTS AND DISCUSSIONS

The European art in the 18^{th}-19^{th} centuries experienced an agitated period of continuous transformations of certain strong stylistic dominants versus the new thinking of the time due to the Cultural Revolution in England and France.

During this period, gardens from Europe evolved under the influence of great changes in art, literature and philosophy, but especially under the influence of the romantic period in painting, where landscape played the most significant part (England, France) until the moment of partially resuming the classical ideology in neoclassicism.

The approach of a harmonious and perfect landscape in unison with the feeling of action of the characters in the represented scenes was replaced in the 18^{th} century by the image of “the elation of simple and real nature” and nature itself served as a model to the painter in order to create a work of art.

In rendering the “natural” scenario with a picturesque and dramatic effect, the most studied element was light that was continuously changing the perspective of the viewer – an idea also taken over in garden arrangement.

Corot – the most appreciated French landscape painter in the 19^{th} century – approaches virgin landscapes and such of villages, harmoniously integrating them into the painting.

In England – the English painter Turner – was the initiator of the “lyric landscape” that supposed the changing of reality into a dream and that exteriorized the inner world of the creator, having a natural landscape as a model.

Countries with a large artistic concentration that spread throughout and influenced the entire Europe were France, Italy and England. Landscape painters and artists were also influenced by the travels to the Orient.

Strong landscape schools promoting the styles of the time were also formed in Europe within this period.

In comparison to classical gardens built up in geometrical style subordinated to the architecture that was already installed in neoclassical style, after an agitated period of forms in rococo, the gardens of free style abandoned the Roman influence in favor of naturalism and the returned to the antique ideology (England).

Sculpture – a change manifested itself in France where they returned to old Greek art, which was not influenced by the Roman era. Reproductions of animals appear again.

As there were already many gardens under the influence of the old style, the innovating spirit led to the occurrence of overlapping areas that were treated in view of the landscape within a geometrical space. The vision of the vegetation grown in free shape with a natural aspect becomes visible in the arrangement of gardens.

The event occurred in France in the 2nd half of the 18th century in Paris (Bagatelle) and it preceded the occurrence of a mixed style in the composition of artistic gardens that developed at the end of the 19th century.

In Walachia, in the 19th century, the French civilization played a very significant part upon the Romanian culture and public spirit – since the time of Phanariot reigns (cultural relations at the level of high societies). The progress of the Crimean War also imposed a foreign occupation of the Principalities (Russian-Austrian), and during history it changed the traditional ideologies to a great extent. Such causes favoured the modernization of the Romanian culture by assimilation (in the reality of a strong psychological fight between traditionalism and modernity, a fight that marked the 19th and the 20th centuries).

The possibilities of taking over the external artistic influences:

- The travels of the bourgeoisie abroad and once with the return to the country the desire to develop internally in cultural and economic view, just like the large European capitals;
- The exchange of visits and exhibitions of Romanian artists and foreign ones, also of art collectors;
- The long period when the country was under foreign occupation;
- The desire of the company to participate in the urban and spiritual development.

The intellectual population had under such circumstances access to the modern cultural ideas of the time, as in case of arranging gardens no evolution is possible due to the absence of professional preoccupations and due to the more “natural” environment in which the city activities were carried out in comparison to the other towns of Europe that had long before lost the remnants of the natural habitat integrated into the urban structure.

The desire to adopt cultural values outside the country and the desire to get aligned with the other modern European cities was interesting, as it somehow contradicted the traditionalist spirit of the Romanians. As I noticed, people here were used to a more natural urban environment, knew its benefits versus the other countries, but did not protect it.

Due to the absence of this field in the country, foreign landscape professionals, who represented the great European schools, were hired.

They presented a “noble” practice in creating gardens, where a special novelty was rendered by the “public” functions that created a unity with the esthetical composition of the arrangement.

The repercussions of such ideas upon the manner in which a garden could be arranged led to the change of the perception upon its “creation”: the public garden was considered a “work created with art”, with “a lot of skill and expense”, in the end an independent artistic work, esthetical and functionally integrated into the urban structure.

The garden created and accomplished in original was defined with style by a landscape artist and he needed ample knowledge both from the field of horticulture and constructions and that of art (history, drawing, perspective, design, painting).

In this artistically designed and arranged garden, the visitor appeared in two hypostases: as a spectator of the scenario offered by the creator and as part of the “live painting”.

The landscape subordinated to the garden was accomplished from a series of frames (in unison with the aggregate) that were carried out from certain viewpoints of pre-established routes, offering the visual emotional feeling of esthetical sights and the possibility to experiment sensations from the reproduced “nature”.

In the 2nd half of the 19th century, the landscape artist Carl Wilhelm Friederich Meyer and the gardener Franz Horer fulfilled this part and created the first public gardens from Bucharest. Such was created according to the spirit of the time in Europe – the neo-classicist influence upon the dominant of the English landscape style.

The Cismigiu Garden - Bucharest: in the initial plan of the garden created by Meyer in 1850 we notice the existence of a strict composition structure;

The design of the elements was performed in accordance with the rules of drawing, the artistic shape of the lake was studied and designed; also: the drawing and the structure of the alleys, some of them versus the others; the structure of the vegetation according to the shape, colour, size, compatibility among species; the creation of sights and visual perspectives using the laws of optic deformation; the optimal choice of the decorative elements (fences, pots, statutes, fountains, sculptures, pavement, etc.) according to the entire composition.

The rehabilitation and intervention in the 20th century of the German architect Rebhun supposed also an artistic intervention within the same character of the garden, enriching the image and adapting it in certain limits to the new functions.

In case of the Bibescu Park from Craiova, the decision to create such was taken under the circumstances of a precedent created by the apparition of public parks from Bucharest. It was also created in the landscape style of the beginning of the 20th century by the French landscape artist Eduard Redont, a pupil of Barillet-Dechamps, a significant representative of the French landscape school.

As in the case of Meyer, he was called to the country in order to create and accomplish in Craiova this large public park that partially extended on the former Bibescu garden. The influence of the great European school was decisive and a vast naturalist landscape with the value of art resulted. The succession of the relief deformations in harmony with the masses of vegetation and the rhythm of the water surfaces resemble paintings from the era of "landscape artists" and then the period of impressionist excellence.

CONCLUSIONS

The stylistic currents that appeared during the 18th and the 19th centuries in Europe suffered continuous and significant transformations in relation to the birth of new philosophies within the cultural and artistic revolutions that took place.

Such currents also reached the Romanian Principalities due to varied factors.

The consequence by which the foreign influences came to Walachia produced a current favourable to the urban development and modernization, according to the other European towns.

The Romanian society acknowledged the event of creating public gardens that were artistically and functionally arranged. An artistic precedent was also created in the field of architecture where it was already fashionable to employ foreign architects that executed buildings according to the European ones. The concept of space outside the dwelling was changed and the collective awareness of the urban public space and of the manner of using it in a completely different manner than the previous practices was gradually formed.

I presented two such spaces that became representative for two significant towns of Romania – the capital and Craiova, a town with a special historical tradition and value that formed numerous political and intellectual personalities (a fact that increased the possibilities of foreign influences to penetrate and be assimilated).

Besides the modern approach style, "imported" in the same manner as the landscape artists that created the gardens, I noticed the artistic model whereby they perfected their works of art. The proofs certify such creations as artistic accomplishments made according to the laws of art. Hence, I could decipher the structure of the used composition, I studied the artistic components and the manner of accomplishing such, all being characterized by complex working out which were reached only by professionalism.

We find here again the phenomenon of the historical and artistic garden that is temporarily dynamic: it enables the accomplishment of certain transformations (ameliorations, rehabilitations) in time according to the evolution of the society, its requirements, the new functions a.o., but without altering the basic structure of the initial composition and the character/atmosphere of the garden (this being possibly only with a serious valuation of varied factors (historical, artistic, esthetical, functional etc.) by the professionals in the field – landscape artistic/architects. The "Chart of the Garden" is also extremely necessary, left as an inheritance by the creator for this very purpose.

I noticed that although initially an artistic arrangement was the result of a creator, it is possible in time that other landscape artists take over the rehabilitation of the space without degrading the basic idea and the garden becomes thus an independent work of art and numerous artists would interfere with it during its existence in order to save, restore and protect it.

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Figures

a.

b.

c.

d.

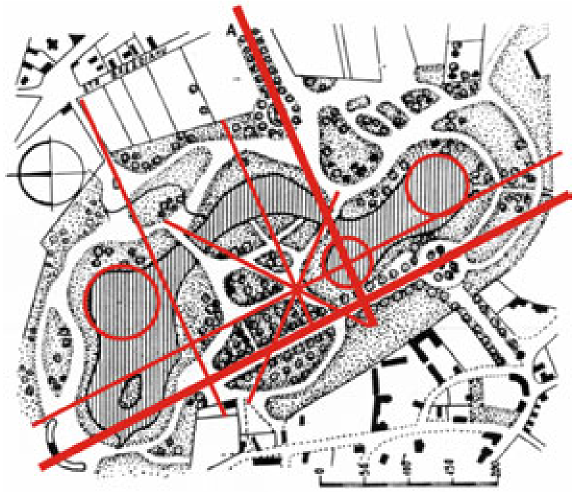
Fig. 1. Western European paintings with new subjects of rustic or natural landscapes, that appeared during the 18th and the 19th centuries:

a. Francois Boucher; b. Claude Lorrain (the end of 17th century); c. Camille Coro; d. Claude Monet.

Fig. 2. Images of English style landscapes of gardens and parks at the 18th and the 19th centuries (Source: Loxton H. "The Garden").

Fig. 3. Pictures of Cismigiu Garden - Bucharest -in present

Fig. 4 Pictures of Bibescu Park – Craiova – in present.



a.

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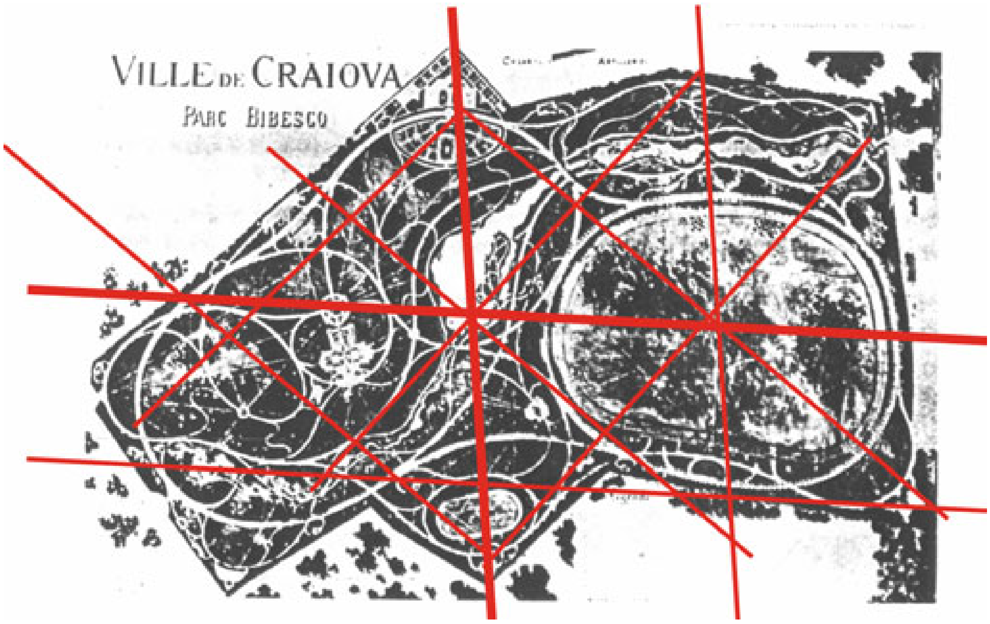

c.

Fig. 5 Historical plans of Cismigiu Garden and Bibescu Park:
a. The structure of the used composition of the initial plan of the Cismigiu Garden in Bucharest, after Meyer's design (Plan of Bucharest drawn by Eng. Boroczin – 1850);
b. Cismigiu Garden Plan as rearranged by Rebhun, at beginning of the 20th century;
c. The structure of the used composition of the initial plan of the Bibescu Park in Craiova.

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THE ELABORATION OF A METHODOLOGY TO ANALYZE AND VALUATE HISTORIC GARDENS AND PARKS FOR RESTORATION/REHABILITATION

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Keywords: establishing a hierarchy, criteria, indicators, registration sheet

ABSTRACT

The scope of this paper is the elaboration of a methodology to analyze and valuate historic gardens and parks that should enable the establishing of a hierarchy of their values and the determination of the priorities of granting the restoration and rehabilitation funds and of the order of the necessary intervention works. The methodology comprises the analysis and valuation method, criteria and indicators and a valuation sheet.

INTRODUCTION

From the experience of the National Commission for Historic Monuments it results that the most difficult problem in managing the historic patrimony is generally the directing of budgetary funds. The difficulty of this problem lies in the incapacity of establishing a hierarchy of priorities generated by the absence of a method to establish the values of historic monuments. This situation is also valid for historic gardens, as most of them are completely neglected due to the absence of money.

The approach of the methodological research for analysis and valuation within this grant is an important step in the process of the restoration and rehabilitation of historic parks and gardens.

This paper with the scope of issuing an analysis and valuation methodology of historic parks and gardens enables the tracking of dysfunctions and the determination of their hierarchy and represents a necessary stage for the assignment of restoration and rehabilitation funds according to priorities.

MATERIALS AND METHODS

The studies for the fulfilment of the set scopes were based on adapting and improving a methodology for the analysis and valuation of sites that are interesting in view of the landscape within localities and outside them, which was previously issued (2000-2004) by a team of Landscape Specialization of the Faculty of Horticulture, Bucharest.

The following principles were established in order to eliminate the subjectivism of the proposed method: a) the application of firm and exhaustive analysis criteria; b) the professionalism of the valuators; c) the usage of a larger number of valuators.

RESULTS AND DISCUSSIONS

The following criteria were established in the methodology:

1. Historic and stylistic criteria

The historic value of a park or garden is largely determined by monumental constructions (buildings, sculptures, etc.), if they are in place in the concerned site.

The value of the concerned parks and gardens also derives from the monumental value of the constructions itemized hierarchically in their list drawn up by the Ministry of Culture and Faiths.

Another criterion is the artistic (stylistic) value considering:

- stylistic conspicuousness (number of stylistic elements)
- stylistic expressivity (comparable to known sites)
- stylistic authenticity
- physical condition
- restorative value (degree of coverage by written or drawn documents)
- stylistic weight (in the territory of the garden or park)

2. Esthetical and functional criteria

2.1. Compositional value

It is deemed the most significant one (rank I). The following specific indicators were proposed for its analysis: unity, diversity, visual depth, amplitude, focus, volumetric and chromatic balance.

2.2. Value of the vegetation

It is deemed of rank II. The analysis involves the following specific factors: physical condition, weight of the bulk of trees, shrubs, flowers, shadow-casting degree of the alleys.

2.3. Value of the circulation

Rank III. It is estimated on basis of the following indicators: fluency, reception capacity, physical condition of the alleys.

2.4. Value of specific outfits

Rank III. It is estimated on basis of the following indicators: diversity of outfit, capacity, aesthetics and their physical condition.

2.5. Value of electrical equipment (functional and decorative lighting)

Rank IV. It is estimated on basis of the following indicators: the coverage degree of the lighting in the field, the aesthetics of lighting bodies and physical condition.

2.6. Value of the watering facility

Rank IV. It is estimated on basis of the following indicators: the capacity of the watering facility, the coverage degree in the field and the technological level.

3. The proposed **valuation method** implies the conversion of the estimations into a unique scoring system on a scale from 1 to 5.

The method aims in the first stage at scoring all indicators resulting from the analysis criteria. In the second stage, indicators are aggregated so that each criterion should be independently valuated. In the third stage, the synthesis is performed, i.e. the global valuation of the historic parks and gardens. In the fourth stage are valuated the emergencies of interventions resulting from the weighted aggregation of three specific indicators:

- the previously established global value;
- the degradation value (degradation degree of the objective to be restored);
- the vulnerability value (aggressiveness degree of degradation factors).

The higher the general value, the more urgent the intervention.

The weight of the indicators was established according to their significance.

4. Valuation sheet (table 1)

CONCLUSIONS

The presented methodology offers a scientific and objective instrument of valuating historic parks and gardens for the specialists involved in the process of assigning funds for the restoration and rehabilitation of the patrimony of historic gardens and parks.

The global value computed on basis of the registration sheet concurrently contributes to establish the hierarchy of the significance of the parks and gardens as landscape patrimony that should be considered by the National Commission of Historic Monuments.

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Table 1. Valuation Sheet

CRITERIA	FORMULA	EXPLANATIONS
Historic value (VI)	VI = 0.2 VCS + 0.6 VA + 0.2 VR + 0.2 PS	VCS – monumental value of constructions VA - artistic value VR – restorative value PS – stylistic weight Note: in case of the lack of historic monument buildings, VCS is eliminated and for VA the quotient 0.6 is used
Esthetic and functional value (VEF)	VEF = 0.4VC + 0.3VV + 0.1 VCR + 0.1 VD + 0.5 VE + 0.5 VU	VC – composition value VD – diversity value VP – depth value VA – amplitude value VF – focus value VE – value of the volumetric and chromatic balance VV – value of vegetation
	VC = 0.3 VU + 0.2 VD + 0.2 VE + 0.1 VP + 0.1 VF + 0.1 VA	
	VV = 0.3 VSF + 0.3 VM + 0.1 VA + 0.1 VF + 0.2 VU	VV – value of vegetation VSF – value of physical condition (degree of exceeding the technical longevity) VM – value of tree bulk (percentage from the green space estimated differently according to the plain, hill, mountain area, from below 20% up to maximum 70%) VA – value of shrubs (the same as for VM) VF - value of flowers (the same as for VM) VU – value of shadow-casting on alleys (percentage from the length of the alleys)
	VCR = 0.6 VFI + 0.3 VCp + 0.1 VTh	VCR – circulation value VFI – fluency value VCp – value of the circulation capacity VTh – technical value (physical condition)
	VD = 0.4 VDv + 0.3 VCp + 0.2 Ves + 0.1 VTh	VD – value of outfit VDv – value of outfit diversity VCp – value of outfit capacity VEs – esthetical value VTh – technical value (physical condition)
	VE = 07 VCp + 0.3 VEs	VE – value of electrical equipment VCp – capacity value (insurance of night lighting) VEs – esthetical value
	VU = 0.7 VCp + 0.3 VThu	VU – value of watering facility VCp – value of capacity (coverage degree of the land) VThu – technological value (technological level)
Global value of the park or garden (VG)	VG = 0.5 VI + 0.5 VEF	
Valuation of the urgency of interventions (VU)	VU = 0.4 VG + 0.2 VD + 0.4 VV	VD – degradation value (percentage of the objective to be restored) VV – vulnerability value (aggressiveness of degradation factors)

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EVALUATION OF STRAWBERRIES QUALITY AFTER ANTAGONIST YEAST PRODUCT TESTED

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ABSTRACT

Because of the existing trend at international level to supply to the consumer horticultural products with high quality, presented in food safety and hygienically conditions; modalities of fruit storage are in continuous extension, being tested and used different storage methodologies for a large number of fruit.

Because of fruit storage in low temperature conditions, controlled humidity and different atmosphere composition is a simple and economical procedure and does not involve use of chemicals which affect consumer's health we had in mind to apply these techniques for storage of some strawberry cultivars.

Strawberry fruits were analysed in all experimental variants for quality parameters (dry matter, titratable acidity, soluble solids, ascorbic acid content) at harvest and after five days of cold storage in the aim to evaluate influence of fungicide treatments about fruit quality evolution.

INTRODUCTION

Strawberry is a known like a high perishable fruit but very appreciated by the consumers.

Sensory attributes are important aspects of fruit quality; colour, texture, odour and the balance between sweetness and sourness have been identified as important determinants of overall quality of strawberry fruit (Montero et al, 1996).

The flavour is one of the most important properties that gives commercial value to the fruits in general. Strawberry flavour is conditioned in part by the balance between sugars and acids expressed in ripe fruit. It is very important to know the best stage at which we can harvest the fruits. Attempts have been made to asses the stage of ripeness of strawberry fruits in terms of titratable acidity or sugar/acid ratio.

The high perishability of strawberry is the reason for its relatively short period of harvest compels the producer to sell the fruits immediately, evidently prejudicing him with respect to the reduced price due to its sale in large volumes.

Due to high moisture, sugars and acids content, these fruits are high perishable, being an ideal substrate for the proliferation of microorganisms, such as fungus of the generous: *Botrytis* and *Rhizopus.*

Among the main problems associated with the quality of strawberry, we can distinguished the grey rotting (*Botrytis cinerea*) a common type of rottenness that attacks the fruit during any of its developing stage, and is the main disease during harvesting period. (Wselaki and Mitcham, 2003).

Due to the high affinity to rotting, researches are being conducted to find a method of conserving the fruit for a longer period by the use different methods in order to make its transport to farther markets viable.

Taking into the account these and the fact that fruits are eaten especially by the children and by the people with health problems, the researchers are concerned to find storage methods without chemicals (fungicides) (De Souza et al., 1999; Sanz et al 1999).

Above these in our study we applied an antagonists yeasts biological treatment and storage in cold conditions for two strawberry cultivars and evaluate fruit quality

MATERIALS AND METHODS

Strawberry cultivars studied were Favette and Cardinal; both with space out fruit ripening.

For both cultivars were made three plant treatments in different stages: at full bloom, fruit onset and preripening of fruit at three experimental variants:
V1-control-plants was sprayed with distilled water
V2-plants was sprayed with Topsin solution
V3-plants was sprayed with antagonist yeast product

Fruits was harvested full ripe and analyzed at harvest and after five days of cold storage by specific methods:

- dry matter was measured by drying a known amount of fresh fruit at 105˚C for 4-6 hours.
- soluble solids were determined from strawberry juice by using an Abbe refractometer with temperature correction.
- the titratable acidity was obtained through titration of juice with solution 0.1 N NaOH until reaching an endpoint of pH 8.1 and expressed in percentage of citric acid.
- the ratio between the soluble solids and the titratable acidity, which reflects the fruit taste feature, was derived.
- ascorbic acid content was spectrophotometrically determined using 2,6-diclorphenol-indophenol.

RESULTS AND DISCUSSIONS

Strawberry fruits were analysed in all experimental variants for quality parameters (dry matter, titratable acidity, soluble solids, ascorbic acid content) at harvest and after five days of cold storage (4-6ºC) in the aim to evaluate influence of antifungal treatments about fruit quality evolution.

For **Favette cultivar** we can observe that the high content of dry matter are for V2 (10.8%) and the same situation was for soluble solids content(10.25%). After storage both dry matter and soluble solids content was slightly high for all variants.

At harvest the lowest titratable acidity was for control sprayed with distilled water (0.63g citric acid /100ml juice). After storage organic acids content is high for all variants

Strawberry flavour is obtained by the balance between sweet taste give by sugars solubilized in cellular juice and sour taste give by citric and malic acids especially expressed in ripe fruit.

The ratio soluble solids /acidity is an index of the ripening level of the fresh fruits. A ratio value greater than 8 points out a balanced taste that corresponds to an optimum maturity.

For Favette cultivars ratio values for all variant is greater than 12 and the sweets fruits are for control (13.69).

The strawberry are fruits with medium ascorbic acid content, for cultivar studied 58 mg% are medium quantity.

For **Cardinal cultivar** we can observe that the high content of dry matter are for V3 (13.4%) and the same situation was for soluble solids content (12.8%). After storage both dry matter and soluble solids content was slightly high for all variants.

At harvest the lowest titratable acidity was for control sprayed with distilled water (0.61g citric acid/100ml juice). After storage organic acids content is high for all variants.

For all variants of Cardinal cultivar value of soluble solids/acidity ratio was greater than 12, the sweets fruits are in case of sample sprayed with antagonist yeast product (16.62).

CONCLUSIONS

In the case of strawberry cultivars studied we can concluded that antifungal treatments (with Topsin and antagonist yeast product) not affected negatively fruit quality.

Chemical fruits features and storage evolution of them are cultivar characteristic.

ACKNOWLEDGEMENTS

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Table 1 Strawberries quality parameter's at harvest

Sample	Variant	Dry matter %	Soluble solids %	Titratable acidity as citric acid %	Soluble solids/ acidity	Ascorbic acid mg%
Favette	V1	10.15	9.5	0.63	15	57
	V2	10.8	10.25	0.79	12.97	60
	V3	9.8	8.9	0.65	13.69	58
Cardinal	V1	9.6	9	0.61	15	68
	V2	12	11.5	0.94	12.23	74
	V3	13.4	12.8	0.77	16.62	70

Table 2 Strawberries quality parameter's after storage

Sample	Variant	Dry matter %	Soluble solids %	Titratable acidity as citric acid %	Soluble solids/ acidity	Ascorbic acid mg%
Favette	V1	10.2	9.6	0.73	13.15	58
	V2	11.1	10.3	0.82	12.56	60
	V3	9.9	8.9	0.69	12.89	59
Cardinal	V1	9.9	9.2	0.66	13.93	67
	V2	12.7	11.5	0.99	15.15	70
	V3	13.6	13	0.79	16.45	54

V1-sample was sprayed with distilled water (control)
V2-sample was sprayed with Topsin
V3- sample was sprayed with antagonist yeast product

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SALINITY RESISTANCE OF SOME ORNAMENTAL WOODY SPECIES FERTILIZED WITH HELLRIEGEL NUTRITIVE SOLUTION

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Keywords: substrate, ornamental species, salinity, nutritive solution

ABSTRACT

Some ornamental woody species are adapted to various conditions, while some other can survive only in certain conditions. The substrate total content of salts and pH are restrictive factors for the growth and the development of ornamental plants.

INTRODUCTION

Since the containerized culture of ornamental plants has become an important link for the production of plant material with special destination, the salinity resistance of ornamental plants is considered a factor limiting the selection of species for street plantation, terraces and balconies. However, some dendrological species are known to be much more sensitive to increased salinity levels and some others are very resistant. In the proposed research, the salinity resistance of some dendrological species was tested in controlled conditions. Following the application of the nutritive solution (alkaline pH), the behaviour of the plants during the vegetation was observed. At the same time, the content in dry matter, mineral salts, nitrogen, phosphorus and potassium and the pH were measured.

MATERIALS AND METHODS

At present, research of the resistance to salinity of some ornamental plants was tested under controlled conditions assured by the vegetation house of USAMV Bucharest.

The biological material used was represented by three ornamental woody species: *Tamarix tetrandra*, *Symphoricarpos orbiculatus doorenbossii* and *Philadelphus coronaries.* (Iliescu A. F., 2002)

One-year old plants were planted in containers in March. For a month, the plants were irrigated only with water, and starting with May a nutritive solution with alkaline pH (Hellriegel solution) was applied. The conductivity and the pH of both irrigation water and nutritive solution were analyzed. The control was continuously irrigated with simple water. After the application of nutritive solution with alkaline pH, the behaviour of the plants during vegetation was observed. (Davidescu V. and al., 2001)

RESULTS AND DISCUSSIONS

Table 1 presents the chemical characteristics of the initial substrate, before fertilization with nutritive solution, and the data indicate favourable conditions for ornamentals. At the end of September, modification of the agrochemical parameters can be remarked analyzing the data in table 2.

During vegetation the EC values varied due to the fertilization, and significant differences can be observed compared with the control. Despite the application of the Hellriegel solution, the pH value remained at an optimal level and the plants grown actively until the end of September. The evolution of the dry matter content is presented in Table 3.

The dry matter content, expressed in %, was influenced by the nutritive solution used, due to the physiological and nutritional stage of plants. We can mention that the values of this parameter were constant in August because of the slow growth of the plants at high temperatures during the summer months, a normal process in the woody species (Davidescu D., 1963).

CONCLUSIONS

The results of this research show the possibility of obtaining a good quality plant material with salinity resistance. The fertilization of the plants with Hellriegel nutritive solution with alkaline pH determined for all three species tested: *Tamarix tetrandra*, *Symphoricarpos orbiculatus doorenbossii* and *Philadelphus coronarius* significant differences compared with the plants irrigated with simple water. Following the fertilizations, the values of the pH increased during the five months but in a normal range.

Although all the species marked a rapid growth, analyzing the substrate, we noticed a high concentration of salts and an alkaline pH, as a consequence of the additional salts from the nutritive solution.

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Table 1. Agrochemical parameters of the initial substrate before fertilizations

Substrate	pH (H_2O)	Electrical conductivity (EC)
Pământ țelină+Pământ frunze+Compost forestier+Nisip (1:1:1:0.3)	**7.98**	**0.075**

Table 2. Agrochemical parameters of the substrate in September

Species	**Nutritive solution**	**pH**	**EC**	**$N\text{-}NH_4$ ppm**	**$N\text{-}NO_3$ ppm**	**$P\text{-}PO_4$ ppm**	**K ppm**
Tamarix tetrandra	Water(M)	7.99	0.069	traces	5	4.5	30
Tamarix tetrandra	Hellriegel	**7.95**	**0.265**	**traces**	**9.5**	**10**	**25**
Symphoricarpos orbiculatus doorembossii	Water(M)	8.06	0.078	traces	traces	2.6	25
Symphoricarpos orbiculatus doorembossii	Hellriegel	**8.10**	**0.086**	**traces**	**0.75**	**4.7**	**35**
Philadelphus coronarius	Water(M)	8.05	0.138	traces	3	0.8	25
Philadelphus coronarius	Hellriegel	**7.98**	**0.086**	**traces**	**11.5**	**5.5**	**25**

Table 3. Dry matter content (%) during vegetation

Species	**Nutritive solution**	**June**	**July**	**August**	**September**
Tamarix tetrandra	Water(M)	24.46	36.38	36.57	34.91
Tamarix tetrandra	Hellriegel	**28.24**	**39.03**	**31.97**	**36.02**
Symphoricarpos orbiculatus doorembossii	Water (M)	39.28	47	44.86	48.28
Symphoricarpos orbiculatus doorembossii	Hellriegel	**38.08**	**48.75**	**49.68**	**48.61**
Philadelphus coronarius	Water(M)	24.22	27.93	35.21	34.8
Philadelphus coronarius	Hellriegel	**12.96**	**30.06**	**34.16**	**35.6**

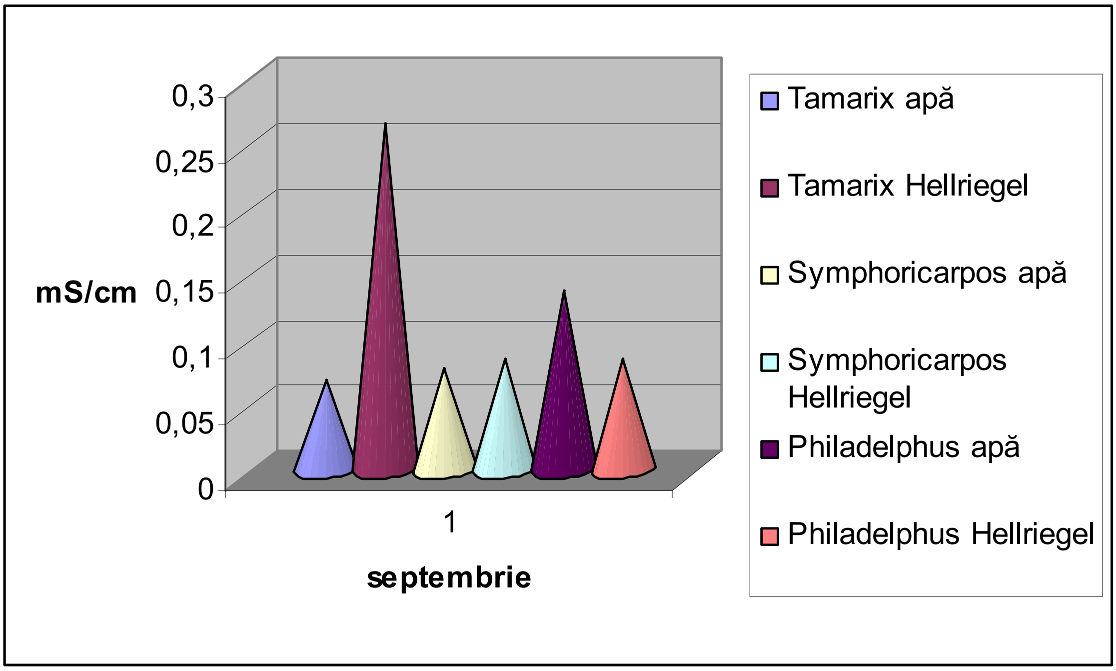

Fig. 1. Electrical conductivity evolution (mS/cm) in substrate at: *Tamarix tetrandra, Symphoricarpos orbiculatus doorembossii , Philadelphus coronarius*

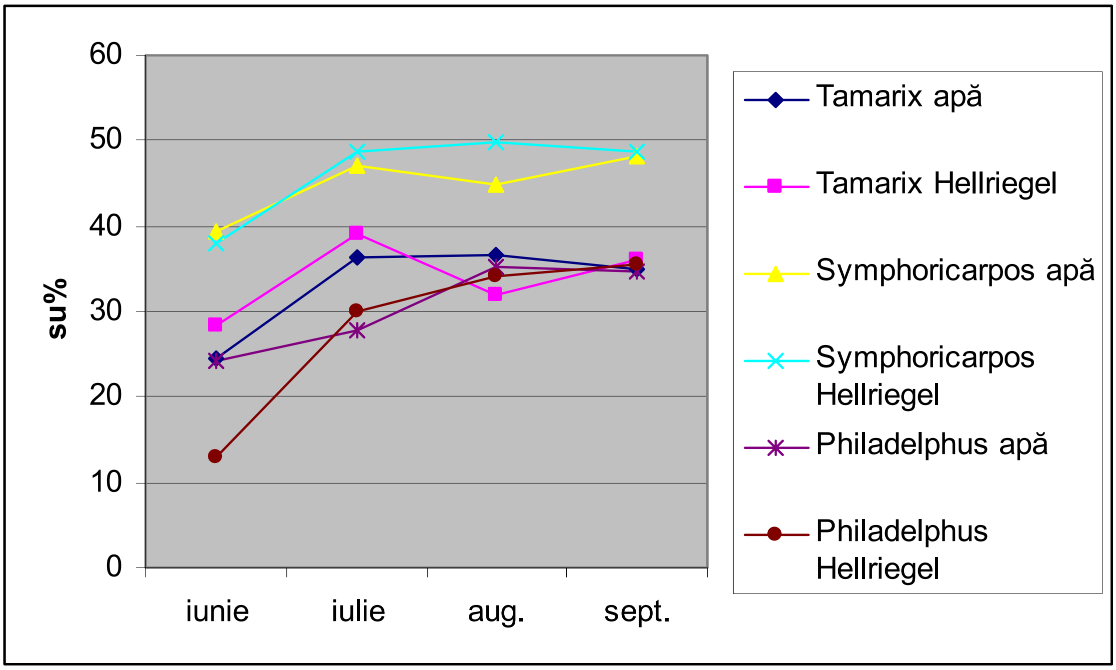

Fig. 2. Evolution of soluble solids contain for: *Tamarix tetrandra, Symphoricarpos orbiculatus doorembossii, Philadelphus coronarius* species.

Lucrări ştiinţifice U.S.A.M.V., Seria B, Vol. XLVIII, 2005

THE COURT OF GHEORGHE GRIGORE CANTACUZINO IN FLOREŞTI - PRAHOVA

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Keywords: Romantic park, river, water-features, lake, stream,

ABSTRACT

The Court of Gheorghe Grigore Cantacuzino, in Floreşti village, Prahova county, is situated on the eastern border of Prahova river, between the villages Floreşti and Cap Roşu. Its surface is about 160 hectares, and its length is about 3 kilometers. This ensemble, with a significant historic, architectural, artistic and documentary value, which is now a ruin, deserves to be brought to life, with any effort. The proximities and their effects produced on the ensemble, has been analyzed by the point of view of circulations, accesses, functions, networks and vegetation. The hole composition of the ensemble, and each element of it too, has been analyzed. The area of the ensemble is possible to be divided into two functional zones: the south zone - dedicated to hotels and some functions associated to them, and the northern zone - dedicated to sports. The park, with its Romantic nature, where walking is a very important *activity*, is the connection between the two zones. A proposal was elaborated in order to bring to life and to emphasize this significant ensemble, partially by restoration, partially by restitution, partially by changing some actual functions and by creating new functions, in relation with some sports.

INTRODUCTION

According to its great value, this significant ensemble was included in the Official List of Romanian Historical Monuments in 2004 (PH-II-a-A-16490). This ensemble consists of: the ruins of the palace known as “*Petit Trianon*”, one of the masterpieces of the Romanian architect I. D. Berindei (PH-II-m-A-16490.01), the water-tower (PH-II-m-A-16490.02), the park (PH-II-m-A-16490.03), the walls which surround the property (PH-II-m-A-16490.04), the Sanatorium zone, “*St. Trinity*“, “*The Birth of God*” Church (1887) and the Crypt of the boyar Grigore Cantacuzino and his family (PH-II-m-A-16491). The ensemble was constituted between 1910 and 1916, and it was strongly damaged during the Second Great War. Now it is a ruin. The present study proposes the bringing to life the Cantacuzino ensemble in Floreşti by:

- The restoration of the park with all its features (the wall of the Court, the tower for water, bridges, the lake, water streams, vegetation, …);
- Creating a zone for luxurious hotels and cultural and pleasure activities, in the southern area of the park. “*Petit Trianon*” palace and the old Sanatorium will be transformed into 5 and 3 stars hotels;
- Creating a zone dedicated for sports, in the northern area of the park.

This study has in view to demonstrate that this ruined ensemble can be brought to life, for important cultural, sportive and economic purposes.

The abandonment of this significant ensemble will bring its inevitable disappearance.

MATERIALS AND METHODS

The analyze was the principal method for the study of entire ensemble and its environments:

- The environments and their implications on the ensemble were studied by the point of view of circulations, functions, networks and vegetation;
- The composition of the entire ensemble was studied;
- Each feature of this composition was also studied carefully.

According to these analyzes, a possible system of zones has resulted:

- The southern zone of the park - with "*Petit Trianon*" palace and its terraces, the water tower, bridges, the lake, the water features, the old Sanatorium and the church - the representative zone of the ensemble, with a great cultural value, concentrates the most of the features of the ensemble. This zone, with a significant merit, should be emphasized, acording to its Romantic nature.
- The northern zone of the park, with beautiful views, has an ambient value.
- The park, with its Romantic nature, will be the connection between the two zones.

RESULTS AND DISCUSSION

In connection with the analyzes we obtained some important results:

- The evidence of the nature of the park, which is a Romantic one;
- The evidence of the Romantic nature of the entire ensemble, including the Eclectic palace named "*Petit Trianon*", its terraces, inspired by English Eclectic terraces (created *à l'italienne*), the water tower, the old Sanatorium;
- The necessity to restore the entire ensemble, emphasizing its Romantic nature;
- The necessity to eliminate the networks traversing the park (electric networks, hot-water furnace from „Victoria" tire works, waterworks, gas networks); They caused important damage to the entire ensemble, and especially to the park;
- The necessity to change the function of the old Sanatorium;
- The necessity to bring some new activities in the area of the ensemble, especially in the northern zone.

These new activities will bring a new life to this ensemble, emphasizing its Romantic nature. As a result, the southern zone will be dedicated to some luxurious hotels and cultural activities and the northern zone will be dedicated for pleasure sports (riding and golf). The connection between the two zones will be by walking: pedestrian, on horseback or by carriage. The presence of horses and carriages in the park background, will emphasize its Romantic nature.

CONCLUSIONS

This ruined ensemble can be brought to life, for important cultural, sportive and economic purposes. The abandonment of this significant ensemble will bring its inevitable disappearance. The Complex will be very attractive, and a lot of visitors will come here for cultural purposes or for pleasure sports and for walk. The Palace and the park, as background, will be a place for many activities, performances and competitions and a place for meditation, for study and for cultural meetings.

ACKNOWLEDGEMENTS

This study was accomplished without any financial support. Many thanks to the mayor of Floreşti village, for cooperation, to Adam Florin Valentin, for his serious study, to architect Călin Hoinărescu for his research concerning the ruin of "*Petit Trianon*" palace.

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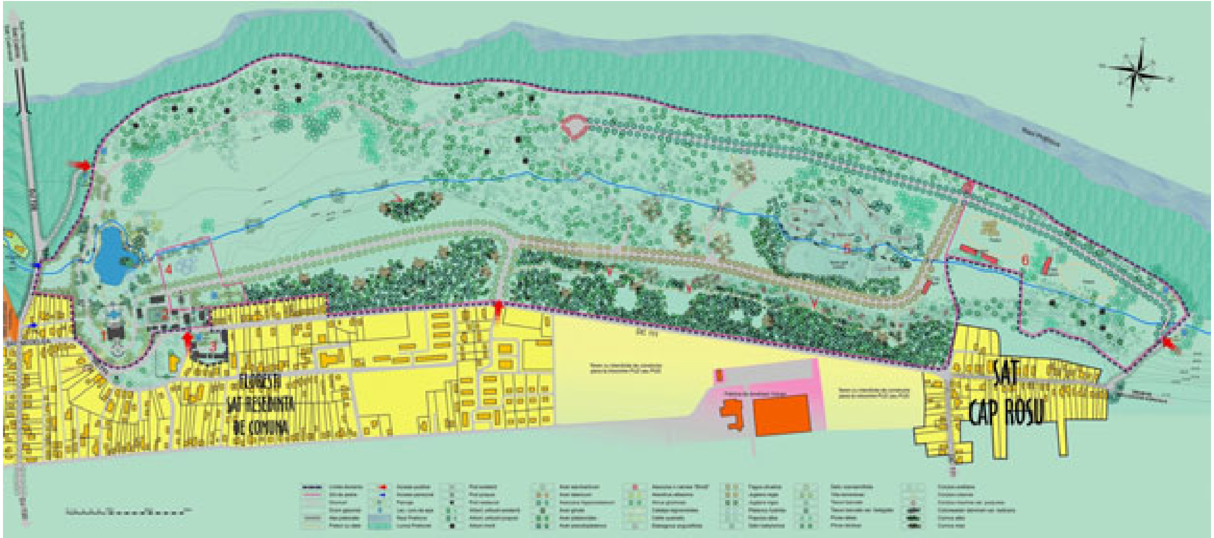
Figures:



The main layout
of The Court of Gheorghe Grigore Cantacuzino in Floreşti - Prahova
by Florin Valentin Adam
Consultant: lecturer architect Violeta Răducan

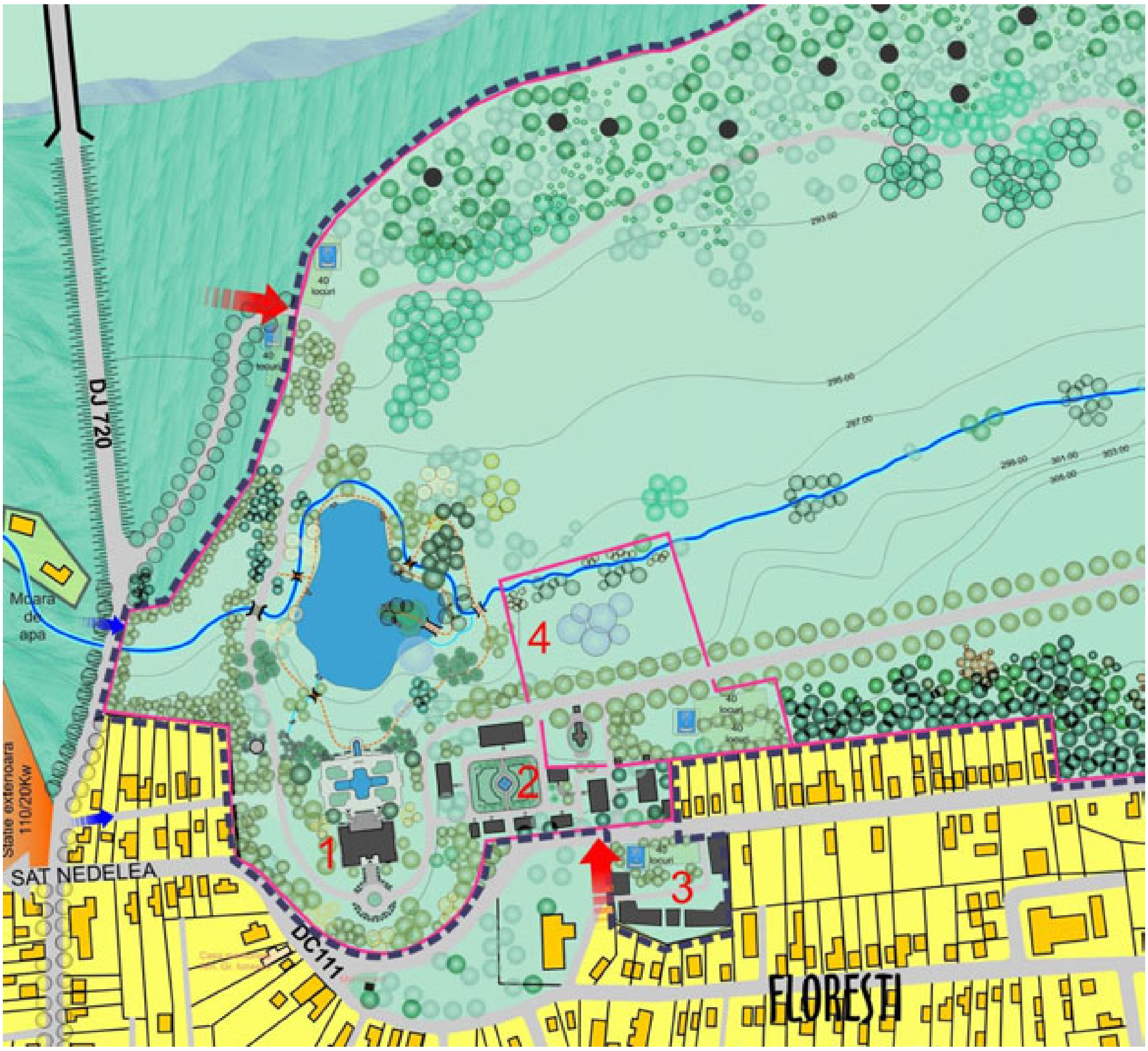
1. "*Petit Trianon*" palace and its terraces
2. 3 stars Hotels
3. Administrative Area
4. Land Art Area
5. Golf Area
6. Riding Area

SOUTHERN ZONE

"*The French area*" of the Sanatorium
"*St. Trinity*" Church

The Romantic bridge to the island

Water feature



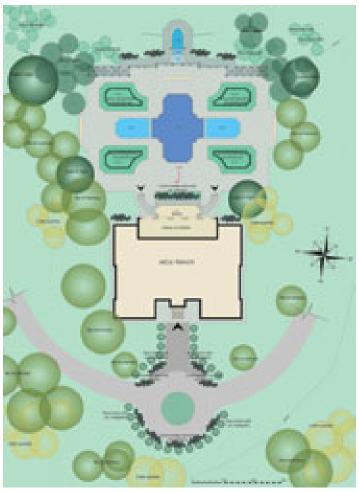
Layout by Florin Valentin Adam
Consultant: lecturer architect Violeta Răducan
The main upper terrace
in front of “*Petit Trianon*” Palace

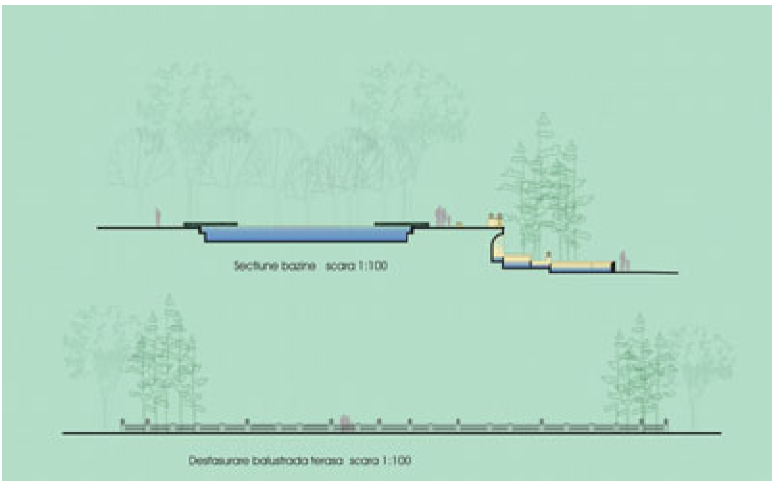
“*Petit Trianon*”, the water tower and the lake

The basins of the main upper terrace and the old Sanatorium

“*Petit Trianon*”
and the basins of the main upper terrace

The main lower terrace
in front of “*Petit Trianon*”





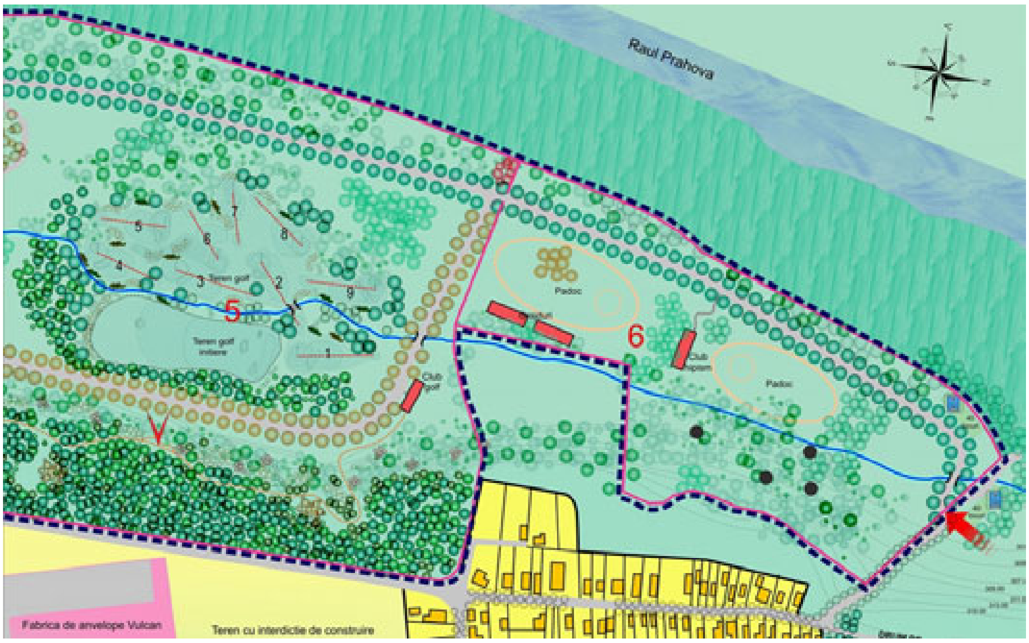
Details of the main upper terrace in front of “*Petit Trianon*” palace
Design by Florin Valentin Adam
Consultant: lecturer architect Violeta Răducan
NORTHERN ZONE

Stone bridge

View of the Riding Area

The gate to the Riding Area

The area dedicated to Golf



Northern Zone dedicated to sports: Riding Area (6) and Golf Area (5)
Layout by Adam Florin Valentin
Consultant: lecturer architect Violeta Răducan

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ORIENT AND OCCIDENT IN CONSTANTINE BRÂNCOVEANU'S COURT IN POTLOGI

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Keywords: study, documents, synthesis, Oriental and Occidental influences

ABSTRACT

Romanian Architecture was marked by the personality of Constantine Brâncoveanu, the powerful, rich, Christian Prince of Wallachia. The Architectural Style which was created in the 17th century and developed during the following century, known as the "Brâncoveanu Architectural Style", generated the "New-Romanian Architectural Style", at the end of the 19th century and the beginning of the 20th century. The gorgeous palaces of Constantine Brâncoveanu had also Beautiful Gardens. Assuming the idea that these Gardens had the same origins as the Architecture of the Palaces, we are trying to recreate the atmosphere of the civil and official events of that time, by synthesizing Oriental and Occidental Influences. This magic mixture become a New Style of its own, an Authentic Romanian Style.

INTRODUCTION

An Architectural Ensemble as the "Potlogi -Dâmboviţa" with its significant merit, should be emphasized and shown, by creating the glorious atmosphere of the end of the 17th century. "The Brâncoveanu Gardens" were very famous, but we have only written documents by scholars and travellers from Europe, Byzantium and the Near Orient. The Potlogi Palace is a synthesis of the melting pot of the European and Oriental cultures and it is typical for the Architectural Style known as "Brâncoveanu Architectural Style". The Palace without its Gardens, is only a portion of the entire complex. Our research has the ambition to complete the beauty of the ensemble.

MATERIALS AND METHODS

The methods we used in order to elaborate this synthesis of oriental and occidental influences were:

- Studies of the documents from the archives: photos of the palace, which were taken at the beginning of the 20th century, and old chronicles concerning the daily life at Brâncoveanu's Court;
- Studies of the influences on the Architecture of the Palace:
    - Oriental influences;
    - Occidental influences (especially Venetian and Palladian);
- Studies of the influences on "Prince Brâncoveanu's Gardens":
    - old Oriental Gardens ;
    - historical European Gardens (especially Venetian);
- Studies of Contemporary Gardens:
    - Oriental Gardens;
    - European Gardens;

- Studies of other contemporary synthesis:
    - in Contemporary Gardens
    - in Contemporary Architecture
- Synthesis of the abstract influences into a single, unified entity: the Gardens of Brâncoveanu's Court in Potlogi, which were made by Romanian Craftsmen.

RESULTS AND DISCUSSION

The Palace, without its Gardens, is only a part of an entity. The brilliant appearance of the Gardens will make complete the splendour of the Palace. As a whole, the Court of Prince Brâncoveanu" is alive only being accomplished by its Gardens. The oriental and occidental influences, mixed in a succession of contemporary Gardens, will bring the old splendour to the court of Prince Brâncoveanu". All this effort is to elaborate a single, unified entity, bringing back the old spirit of Prince Brâncoveanu's Court.

CONCLUSIONS

The Complex will be more attractive, and the number of its visitors will increase significantly. The Palace and its Gardens, as background, will be a place for many activities, performances and competitions and a place for meditation, for study and for cultural meetings. It will be a desired Cultural Centre, due to the accomplishment of its Gardens.

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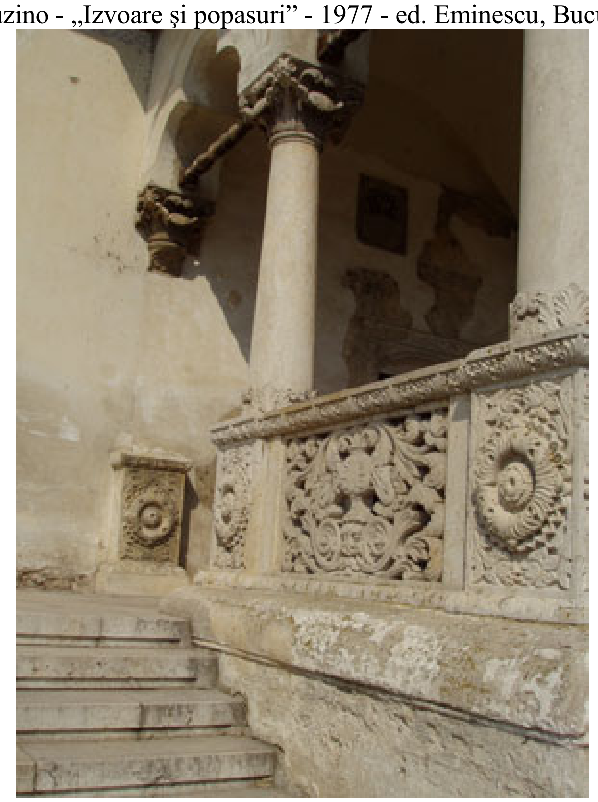
Figures

The influences on the Architecture of the Palace

Anton Maria del Chiaro, the Italian chronicle of Constantine Brâncoveanu:
"Wallachians…understand easily everything they see and there is no craft that they can't copy, be it Turkish or of our own Venetian custom."

Oriental Decoration
photo of the palace, which was taken in 1904 image from INMI archive

G. M. Cantacuzino about Potlogi Court:
"Clasical and Oriental elements are blended into a Baroque verve."
G. M. Cantacuzino - „Izvoare şi popasuri" - 1977 - ed. Eminescu, Bucureşti, page 79.



Venetian influence on sculpture

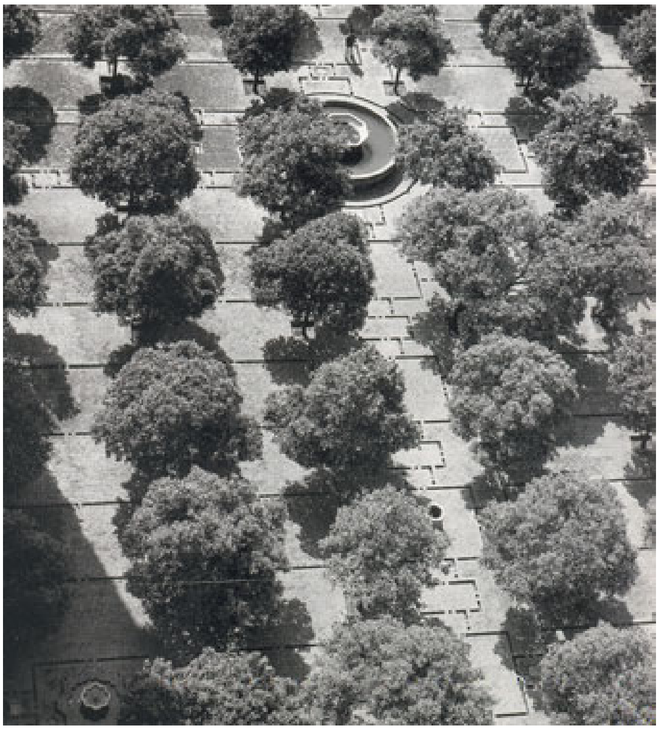
European Influence

Venetian influence double "Loggia"

Palladian influence
The palace had an access on each of its four façades

The influences on “Prince Brâncoveanu’s Gardens”: Old Oriental Gardens

Mogul painting, taken from the Va Ki’at-i Baburi (c. 1590)
A garden of fidelity, includes the characteristic features of the Muslim garden: enclosed by walls and filled with fruit trees and other leafy trees. It has a pool of water in the middle with four streams running from it.
Filippo Pizzoni, *The Garden. A History in Landscape and Art*, page 13



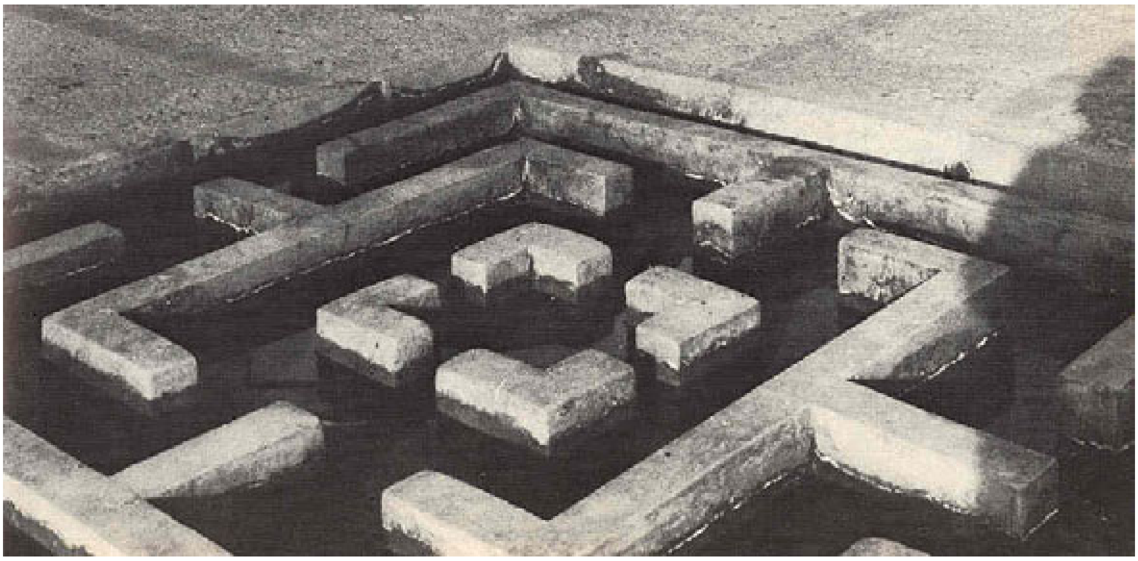
Tthe Court of the Oranges, built in 1420, it takes its name from the orange trees planted at regular intervals in a grid pattern, irrigated by small channels fed by the central fountain.
Filippo Pizzoni, *The Garden. A History in Landscape and Art*, page 14

Historical European Gardens

The Gardens of Villa d'Este, Tivoli 1560 - 1575 - 1790
The so-called Pathway of the Hundred Fountains, is a succession of water jets,
Filippo Pizzoni, *The Garden- A History in Landscape and Art*, page 62

Boboli Gardens 1619
Fountain of the Mostaccini, pietraforte

Contemporary Gardens

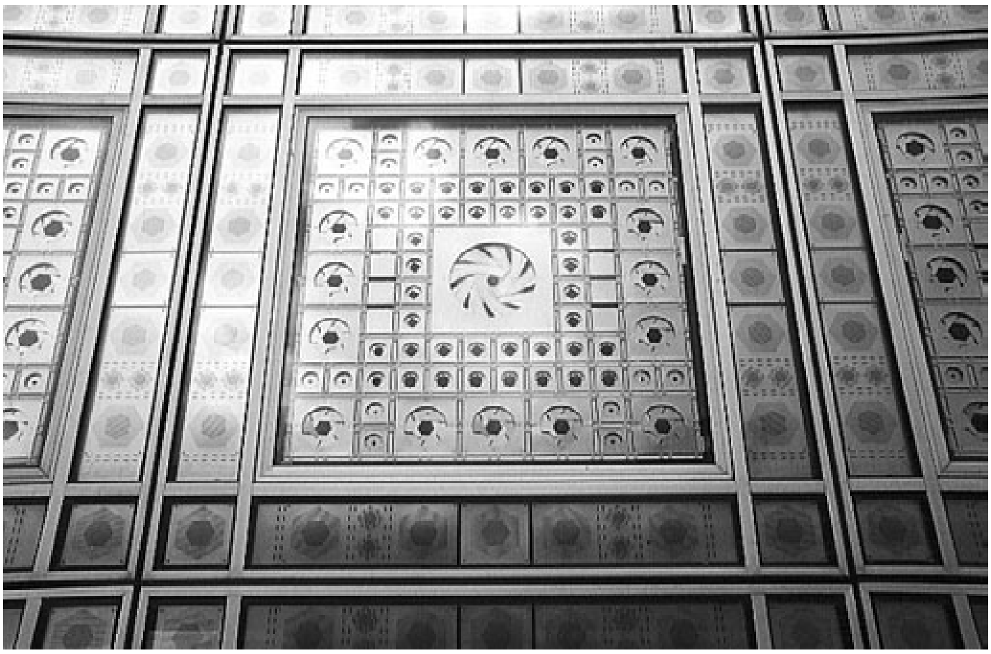


“Labyrinth Fountain” of the Management Centre in Teheran

André Citroien Park, Paris
Simplicity of line and harmony of form

Contemporary Synthesis

Kathryn Gustafson,
Terrasson-La-Villedieu, Dordogne, France, 1995



The French architect Jean Nouvelle
"*Arabian Cultural Centre*", Paris

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A CONTEMPORARY APPROACH TO THE COURT OF CONSTANTINE BRÂNCOVEANU IN POTLOGI - DÂMBOVIȚA

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Keywords: European garden, Oriental garden, synthesis, contemporary manner.

ABSTRACT

An Architectural Ensemble as the Potlogi - Dâmbovița, with its significant merit, should be emphasized and shown. The Potlogi Palace is a synthesis of the melting pot of the European and Oriental cultures and it is typical for the Architectural Style known as “Brâncoveanu Architectural Style”. “The Brâncoveanu Gardens” were very famous, but we have only written documents by scholars and travelers from Europe, Byzantium and the Near Orient. The aim of this approach is to bring to life the Court of Constantine Brâncoveanu in Potlogi, for cultural reasons. The motivation of this approach is to make complete the beauty of the architectural ensemble, with a succession of fabulous gardens, in a contemporary manner, by creating the glorious atmosphere of the end of the 17th century. The harmony and the contrast, the deep link with the past and the contemporary approach are the features of our proposal. This is the first Romanian Contemporary Synthesis of Oriental and European influences, in landscape design and in approach to a historic ensemble. The Court of Constantine Brâncoveanu in Potlogi will be a desired Cultural Center, due to the accomplishment of its Gardens, and to the freshness unexpected contemporary ideas for the gardens and for the present landscape problems.

INTRODUCTION

- The great cultural significance of Brâncoveanu’s Court in Potlogi has to be emphasized, by creating the glorious atmosphere of the end of the 17th century. In our country, Brâncoveanu’s Palace in Potlogi - Dâmbovița is the first one in a large series of significant monuments, for the following reasons:
  - It is the first summer - residence of a Romanian prince;
  - It is the first palace of Constantine Brâncoveanu, chronologically speaking (in 1698);
  - It is the first Romanian palace influenced by the principles of Andrea Palladio;
  - It is the first Romanian ensemble opened to a view; that is the northern side opened to the lake ant the forest.

Obviously, Brâncoveanu’s Gardens in Potlogi, are completely disappeared. Constantine Brâncoveanu’s Gardens were very famous, but we have only written documents by scholars and travelers from Europe, Byzantium and the Near Orient. We have no drawings, engravings, designs, or other images. In consequence, we chouse to create a proposal in a Contemporary manner, synthesizing the Oriental and European influences, in order to bring to us the glorious atmosphere of the end of the 17th century, the atmosphere of the domestic and official events at Constantine Brâncoveanu’s Court.

- The aim of this approach is to bring to life the Court of Constantine Brâncoveanu in Potlogi, for cultural reasons.
- The motivation of this approach is to make complete the Court with a succession of Contemporary Gardens, the Palace without the Gardens being only a portion of the ensemble.

MATERIALS AND METHODS

• Assuming the idea that the Gardens had the same origins as the Architecture of the Palace, we are trying to re-create the atmosphere of the civil and official events of that time, by synthesizing Oriental and Occidental Influences, in a contemporary proposal.
• Our approach has the ambition to complete the beauty of the architectural ensemble, with a succession of fabulous gardens, in a contemporary manner.
• The methods we used in order to bring to life the Court of Constantine Brâncoveanu were:
  - To study the archive documents;
  - To study the environment in order discover aggressive or harmony less surroundings and valueless buildings;
  - To open the view to the Palace, for an better visual perception over the pond;
  - To open the view from the *loggia* of the palace to the pond and the forest;
  - To elaborate a synthesis of oriental and occidental influences.

RESULTS AND DISCUSSION

• Our approach strives for:
  - making complete the Court with a succession of Contemporary Gardens;
  - creating a new image for the pond and the forest;
  - integrating the church in the ensemble;
  - creating an opened space for cultural meetings, near the Court and the church;
  - proposing the demolition of some disagreeable and valueless buildings;
• The brilliant appearance of the Gardens will be brought back to us by:
  - creating a focus point in the center of the *Court d'honneur*, a squared basin, and stressing this space, like a *piazza*, by other alleys surrounding it;
  - re-creating the volume of the disappeared buildings in the *Court d'honneur* and in the carriages court, by clipped *Thuja occidenthalis*;
  - creating an orchard, a veritable fruit garden, or a garden of fidelity, with *Prunus persica* planted at regular intervals in a grid pattern, irrigated by small channels fed by the central fountain and the other two little fountains, in an oriental manner;
  - creating a pool of water in the middle of the orchard, with four streams, running from it; other two squared little fountains will feed the channels;
  - creating two squared areas, with water jets, flanking the Palace, and a succession of water jets in front of it, reminding the atmosphere of Oriental gardens;
  - creating alleys accompanied by basins and fountains in an European manner and other in an Oriental manner;
  - creating an open space area for cultural meetings, an amphitheatre, nearby the Court, on its eastern side.

• We tried to obtain a composition with the highly rigor of the hieratic gardens in Baroque period, with its strong asserted axes, equilibrium, serenity and bright-ness, and, in the same time, with the brilliance of the luxurious old oriental gardens, enclosed by walls, filled with fruit trees and other leafy trees, with fountains and small channels, where the moving shades of the leafs are precious.
• We have choused to elaborate a contemporary proposal not a pastiche.
• We strived for he simplicity of line, the harmony of form, the contrast between the past and the present, the deep link with the past and the contemporary approach are the features of our proposal.
• This is the first Romanian Contemporary Synthesis of Oriental and European influences, in approach to a garden, a succession of gardens or in landscape design.

- This is the first Romanian Contemporary Synthesis of Oriental and European influences, in approach to a historic ensemble.
- The oriental and occidental influences, synthesized in this succession of Contemporary Gardens, will bring the old splendor to the Court of Constantine Brâncoveanu.
- Due to the accomplishment of its gardens, and to the freshness unexpected contemporary proposal for the gardens and for the present landscape problems, the Court of Constantine Brâncoveanu will be a desired Cultural Center.

CONCLUSIONS

The brilliant appearance of these Contemporary Gardens will make complete the old splendor of the Palace. As a result, the Court of Constantine Brâncoveanu in Potlogi will be the place for many activities, performances and competitions and a place for meditation, for study and for cultural meetings. The Complex will be more attractive, and the number of its visitors will increase significantly. For the future it will be necessary to elaborate a new Detailed Urban Layout, establishing the high of the buildings in this area, using traditional materials, laying down the maintenance vegetation works and first of all, including the new layout for the gardens of Brâncoveanu's Court.

ACKNOWLEDGEMENTS

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We thank to the architects and historians from INMI for helping us in our research.

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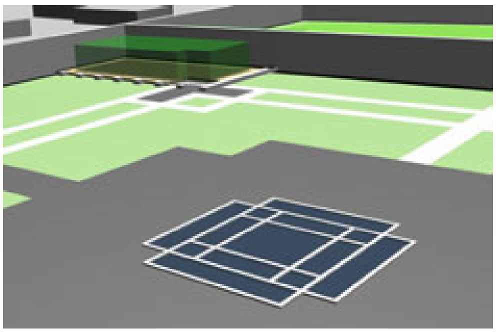
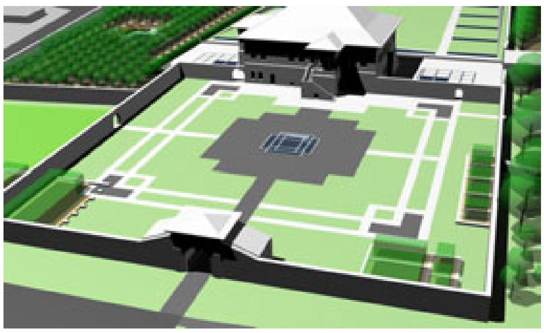
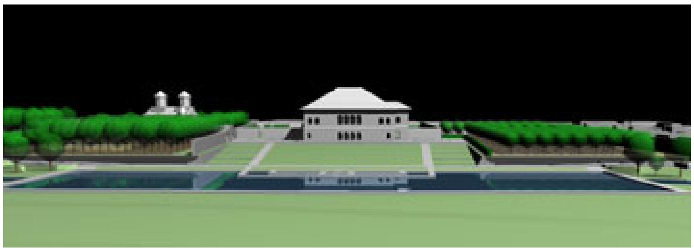
Figures:

The main layout for the Court of Constantine Brâncoveanu in Potlogi - Dâmbovița
the first Romanian Contemporary Synthesis of Oriental and European influences, in approach to a landscape design and in approach to a historic ensemble.

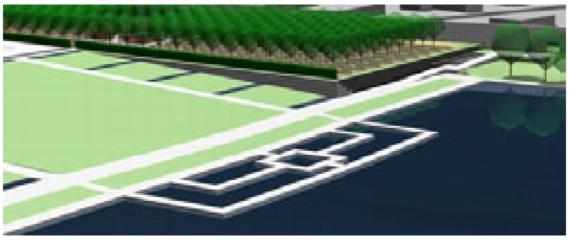




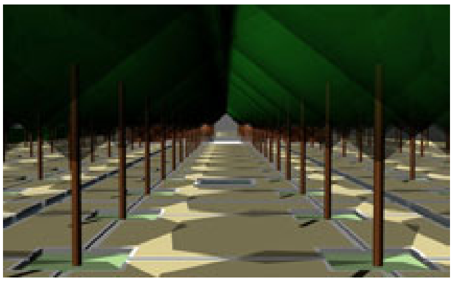
"*La Court d'honneur*"
We have in view the simplicity of line, the harmony of form, the contrast between the past and the present, the deep link with the past and the contemporary approach. The squared basin creates a focus point in the center of the *Court d'honneur*. The *volume* of the disappeared buildings, not the buildings, was re-created by clipped *Thuja occidenthalis*.

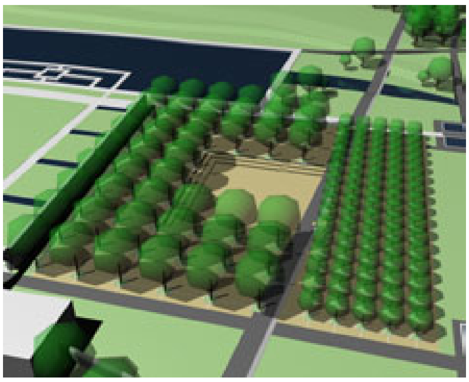
"*The Great Garden*"
with its strong asserted axes, equilibrium, serenity and bright-ness,
reminds of the highly rigor of the hieratic gardens in Baroque period.
Two squared areas, with water jets, flank the Palace, and a succession of water jets are placed in front of it, reminding the atmosphere of Oriental gardens.

"*La Grande Parterre d'eau*"
stressing and prolonging the main axis of the composition, with its labyrinthine alleys.

"*The Orchard*"
with *Prunus persica* planted at regular intervals in a grid pattern, irrigated by small channels fed by the central fountain (surrounded by *Ficus carica, Olea europaea, Prunus tenella, Punica granatum*) and other two little fountains, in an oriental manner.




"*The Amphitheatre*"
an open space area for cultural meetings with *Tilia tomentosa* and *Prunus cerasifera* planted at regular intervals in a grid pattern.

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REHABILITATION OF “CHILDREN’S PALACE” PARK- BUCHAREST

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Keywords: Urban landscape, continuity, urban green area, specificity, functionality, diversity.

ABSTRACT

The topic discussed herein refers to the impact of the degraded green areas and parks’ improvement on the urban habitat, an issue of concern both for local authorities (the Municipality) and for specialists: landscape architects, architects, city planners. Such degraded urban green areas are real and they might be restored to their former good condition for the benefit of the city, and also enriched with new functional, aesthetic or ecological elements.

INTRODUCTION

The “Children’s Palace” Park is located in the 4th Sector of Bucharest, more specifically in the Southern part of the city, which displays an ample “green island” made up of the Carol Park, the Tineretului Park, the Amusement Park and the “Children’s Palace” Park. This lush green area unfolds along the Southern cornice of the Dambovita River might be the expanded by the integration and lay-out as public recreational area of the Vacaresti Lake zone (another degraded environment in the Southern part of Bucharest). The entire area represents a significant recreational potential of the city, thus balancing out the Northern part of the city, which is endowed with much more luxuriant green areas, laid out along the group of lakes arranged on the course of the Colentina River.

The zone studied herein – the “Children’s Palace” Park and its neighbourhoods – is positioned at the Southern outskirts of the central area perimeter, spreading out on around 42 hectares.

The area under review borders Tineretului Boulevard at the North-East, Calea Vacaresti/Pridvorului Street – at the East, Tineretului Park (Sala Polivalenta) – at the West and the small residential neighbourhood (houses of the type Ground Floor, Ground Floor + 1 Storey, Ground Floor + 2 Stories) at the crossroads of Calea Vacaresti with Oltenitei Road – at the South.

The area is very accessible due, on the one hand, to the existence of a vast public transport network and, on the other hand, to the fact that the area is crossed by important traffic arteries of the city oriented on the North – South axis (Tineretului Boulevard – Calea Vacaresti), as well as on the South-western and North-eastern axis (Calea Serban Voda – Sincai Boulevard).

At the main entrance of the Park, on the Tineretului Boulevard, a significant objective at city level is located: the Children’s Palace, which enhances the park’s value turning it into a one of the most important green recreational areas of Bucharest, given that, apart from its basic recreational and amusement functions, it also transcends into the cultural and educational spheres, which are foreseen to be expanded by such proposals as those included in the approved documentations related the headquarters of the “Romania de Maine” Foundation. At the same time, the Children’s Palace outer spaces are used for the organisation of trade shows, contests, carting races etc., thus revealing an important functional potential of the space, enabling further diversification of the current profile.

MATERIALS AND METHODS

Analysis of the current state of the park (see Figure 1)

a) **Spatiality and structure**

The actual space of the Park, in its entirety, is made up of partially coherent sequences by themselves, lacking, however a unitary compositional principle for the whole structure.

Several compositional "units" may be distinguished, corresponding partially to certain relatively coherent zones: the area adjacent to the Children's Palace – being defined by a more geometrical composition, with strong axial ratios (unfortunately, not backed up spatially) and numerous circular spaces, designed (originally) for the precise guidance and orientation of the public. However, being neglected and functioning only sporadically, emptied thus of their initial purpose, the spaces making up this compositional scheme have become over time non-spaces, or "chance spaces", being not able to concentrate enough value so as to be considered real places.

The swimming pool area, together with its neighbouring areas, including the uneven cornice, represents an area intriguing by the dominant absence of any compositional line, except the small nucleus of the Summer Theatre. The deviation from the pattern is obvious, as well as the split to the structures' density, to the vegetal fund and to the lay-out that otherwise have a relatively constant presence over the rest of the park. The genuineness of the space, added to the slight remnants of an old composition, perturbed or abandoned over time, gives rise to an feeling of forgotten space, of non-space or vague space (vaguely defined, vaguely used).

As a conclusion, the main issues of concern, noticeable in all sub-areas described above, resulting both from the way the park was conceived and put into service, and from its exploitation over time, are as follows:

- lack of unity at the level of the entire park,
- lack of spatial communication between the park's fragments,
- total break between the two parks (Tineretului Park and Children's Palace), to which the presence of the cornice is added, being not sufficiently assimilated into their structure,
- lack of communication between the park and its neighbouring areas,
- total degradation of certain equipment and absence of other equipment.

b) Perspectives, visibility, ambience

The element that must be taken into consideration upon the spatial configuration of the park is exactly the presence of the cornice, a unique point within the city, where the vegetal mass meets such natural relief shape, otherwise very rare and very hard to maintain as such within a space constrained by the rigours of construction rules.

The cornice area between the Children City (within the Tineretului Park) and the areas neighbouring the Swimming Pool and the Children's Palace, represents an area «perfectly non-integrated» both into the city and within the park – an alien space impressing both by the overwhelming presence of this gross relief, displaying an infinity of shaping possibilities, having thus a hidden potential much greater than visible at first glance. Somehow, the break between the two spaces reaches here a balance of forces: the space that has a clear lay-out and use, that is differentiated and saturated (the area of Tineretului Park) is offset here by emptiness, by non-differentiation, by structural and functional amorphism – everything is spontaneous, sporadic, left to chance.

c) Equipment - Functions

Within the compositional structure of the park, the equipment / functions' segment is the most poorly represented.

The Summer Theatre represents and important element, but is very degraded as a result of weathering and lack of use. The Swimming Pool and the Restaurant are in a relatively good state, due to the investments made here following their privatisation.

The Children's Palace is equipped with specific installations: carting track, model aircraft track, captive models' track, traffic signs' grid; however, all such equipment is degraded severely, and their original design is currently obsolete as against international standards.

The central platform where various concerts, celebrations, tradeshows and other outdoor events are held is an amorphous space, and degraded as well.

The three playgrounds are also degraded almost entirely and they do not correspond anymore to their original functions and destination.

Other types of functions, such as sports, promenade, trade, entertainment, are lacking entirely.

d) Vegetal Fund

Generally, the vegetal fund displays a poor quality, being represented mainly by spontaneous herbaceous vegetation. The decorative species are almost inexistent, consisting in several incomplete alignments along the alleys near the Children's Palace and in the Swimming Pool area. Such alignments are made up of species such as: *Tilia, Carpinus* and *Quercus*. The rest of the vegetation is made up of various species: *Fraxinus, Quercus, Ulmus, Populus, Prunus Pisardii, Acer.*

Of the total surface of the park – about 42 hectares – only 10% is covered by dendrologic vegetation, much of it dried out due to diseases or pests. Given such circumstances, the vast majority of the park displays a large area of emptiness and non-space.

Apart from such degradation, it is obvious that the park has a high landscape-related potential, both functionally and aesthetically, due to its location within the city, to its interesting relief but also to the needs of the population residing in the Southern part of the city.

RESULTS AND DISCUSSIONS

Following the general analysis of this urban area, it is obvious that a general development plan for this park is needed, as well as the setting forth of specific objectives and the developing of lay-out proposals.

Targeted Objectives:

- enhancement of the park's importance within the green spaces' system of the city and consolidation of its role as "link" ensuring the continuity of such system;
- assignment of the functional profile specific to the Children's;
- turning the park into an active pole designed for recreation and relaxation within the Southern part of the city;
- adjusting the park's functionality to other age categories as well, apart from children;
- development of a public green area combining superior aesthetic and environmental qualities, able to answer the needs of recreation of the area's inhabitants, and also the specific activities related to the Children's Palace.

Proposals (Fig no. 3):

- restructuring all park's alleys through:
  1. restoration of the two entrance axis leading to the par's central zone;
  2. development of new circulation paths within a coherent system of traffic links and means of access to the park;
  3. turning the central platform from an amorphous space into a dynamic one, by decorating the pavement and developing water-play at the level of this pavement.

- rehabilitation of existing equipment and buildings, such as the Summer Theatre and the playgrounds;
- reconstruction – to international standards – of the carting and model aircrafts' tracks;
- development of sports spaces and installations: football, tennis, basket, alpinism, role-skating etc
- development of spaces and areas for other age groups (adults, senior citizens), and of areas for resting and relaxation: bench-sitting, walking, static games, lecture etc.
- restoration of the vegetal fund through appropriate planting, both from a compositional point of view (stylistic and aesthetic) and from a functional one (the new vegetation must match the entire functionality of the park).

The proposed vegetation will be varied, but will also have a significant ecologic role.

CONCLUSIONS

Rehabilitation of the "Children's Palace" involves a diversified lay-out of this urban park, and by assigning it specific aesthetic traits specific to such type of parks.

Related to the general situation of the green areas located in the 4th Sector of Bucharest, "the green breakdown" present in the Southern part of the city might be improved by the restoration of this new green area entity – the "Children's Palace" Park, which might result in enhancing the environmental quality, and of the urban environment quality, contributing to improving the quality of life and in compliance with the idea that public parks may be among the urbanity ideals.

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Figure 1 – Pictures of the park – existing situation.

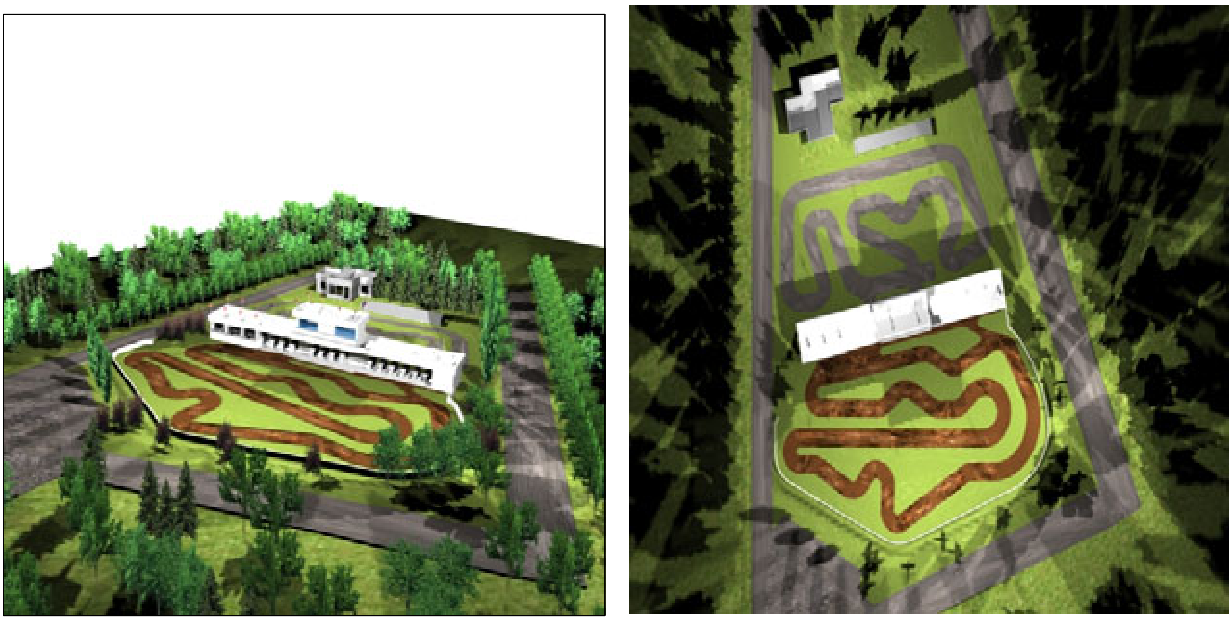

Figure 2 – Details – Proposals on the carting track.

Figure 3 – Chart including proposals for the park rearrangement.

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ANALYSIS OF THE FUNCTIONAL, AESTHETIC AND ECOLOGICAL DEFICIENCIES OF THE AREA SURROUNDING VACARESTI LAKE OF BUCHAREST, AS SPACE ANTHROPIZATION FACTORS

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Keywords: Urban landscape, grassland "shortage", continuity, functionality, anthropization, enhancement of urban green areas' quality, diversity.

ABSTRACT

This study is focused on the analysis of the main anthropization factors identified for the area under discussion, and having a negative impact on the urban habitat. The main dysfunctions are related to the environment quality, the area's traffic flow, the area's urban development potential, as well as to the overall aesthetic and ecological features of the respective zone.

INTRODUCTION

The area under discussion is located in South-Eastern Bucharest, spreading over a surface of about 240 hectares. It has the following neighbourhoods: Calea Vacaresti, Sos. Oltenitei, Sos. Vitan-Barzesti and Splaiul Unirii, and it was included in the grassland "shortage" identified for the Southern Bucharest, comprising also the Carol Park, Tineretului Park and Children's Park. Such area was to be added a public green area, located on the current Vacaresti site.

MATERIALS AND METHODS

The analysis of the site condition must be based on data related to the area's climate, relief, soil quality, vegetation, traffic, as well as on the site's main urban functions, or its visual survey. The examination of all these information revealed the high anthropization level of Vacaresti area.

Climate (Source: Meteorology and Hydrology National Institute (INMH) of Bucharest – Climatology Laboratory)

The climate in the area is temperate – continental, with extreme tendencies. The annual average temperature is of 10.6^{0}C.

The lowest average monthly temperature has a multi-annual average of -2.4^{0}C (in January), and the highest average monthly temperature has a multi-annual average of +22.8^{0}C (in July). During 1990 – 1998, the number of days with temperatures in excess of +10^{0}C ranged between 95 and 138 (as recorded at the Filaret Meteorological Station). The above values are typical to urban environments in this latitude, but exceed the regular peri-urban values.

The relative humidity registers annual average values of 74%, on an ascending trend from the centre to the outskirts of the town: 74.2% at Filaret, 75.6% at Baneasa and 78.2% at Afumati.

Annually, there are 40 – 50 foggy days - more numerous in areas with lakes and watercourses (evapotranspiration fog). This is different from the urban smog occurring over cities as a result of airborne pollutants such as smoke, soot, various chemical products, dust, exhaust fumes etc. In some cases, the meteorological fog may overlap the urban smog, which is noticeable especially during transition seasons.

The nebulosity, more intense over the city than over the bordering areas, registers in Vacaresti zone average monthly values ranging between 8.0 (in December) and 4.3 (from August to September), the annual average standing at 6.1 days per month.

The precipitations is considered among one of the significant meteorological parameters in assessing the topo-climate, due to the lower layer air washing effect, where the industrial pollution has the most powerful impact.

At Bucharest – Filaret Station, the precipitations' dynamic over 1990 – 1998 was characterised by ample fluctuations. The annual output ranged between 396.6 mm in 1990 and 852.6 in 1997. The snow layer depth is visibly influenced by even atmospheric conditions, by wind and by the active surface's particularities. The duration of the snow layer varies, depending on the weather and local conditions, as follows: 53 days at Filaret, 46 days at Baneasa and 54 days at Afumati, the first snowfall being recorded at the end of November, sometimes earlier, and the last snowfall on March 20th, but sometimes occurring even in April.

As regards the circulation of air masses, changes induced by cities on regular winds were noticed, as well as the creation of specific urban circulation. The winds prevailing, present during all seasons, are blowing from South and South-West (7.4% and 8.2% respectively). Such airstreams experience deviations from their dominant directions and their speed is decreased inside built areas. Calm weather registers a doubled frequency within central areas as compared to peripheral areas, not allowing the dispersion of impurities present in the air and thus maintaining pollution.

Inside built-up areas, local winds occur, the so-called "urban breezes", blowing from peripheral to central areas. They are the result of the air heating within zones with intensely populated and with intense traffic, which generates the air masses ascension within central areas and their dropping within marginal areas.

Due to general climatic variations, local thermal alterations are also produced, generated by inner-city structure and functionality. Consequently, there are certain climate differences between the surrounding zones and the built-up zones inside the area under discussion.

Thus, the following micro-climate types were identified inside the area analysed:

- residential micro-climate, along Soseaua Oltenitei, characteristic to built-up areas, being strongly influenced by the buildings' density, and recording high thermal values, intense vehicle traffic and frequent occurrence of athmospheric calmness and nebulosity;
- micro-climate of Dambovita chute and in the barrier basin of the lake generating air currents channelled along it.

Relief (figure 1)

As concerns the relief, Vacaresti Lake is located in plains area, specific to Dambovita Meadow, namely the Bucharest Plains – Vlasiei Plains, more specifically The altitude is of 65-70 m.

The area was strongly anthropized, being levelled for the construction of the lake and of the imposing dam. So, the relief is anthropic, represented by cutting slopes and dams.

Soil

Being situated within Dambovita Meadow, the area is characterised by sands and gravel arranged in horizontal layers with depths of 3 – 6 m, over which the loessoid water fingering banks are spread.

The excavation works triggered the soil alteration within perimetric areas, where a part of the non-corresponding soil was laid. Within the lake's tub, the fertile layer has been removed, only clay soil being left in order to waterproof the bottom of the lake. As a result of this alteration, the soil of the lake is mainly marshy and, every now and than, the underground waters are surfacing (depending on their level).

As regards the hydro-geology, two aquiferous types are present:

- phreatic aquiferous on the base of the loess deposits, at depths of 2 m (in the meadow, up to 15 m (on the terrace and field). These have depths of 5 – 10 m;
- aquiferous of medium depth on the terrace of the Dambovita River, at 10 – 28 m in depth, captured with a flow of 1.5 – 2 l per second.

Vegetation (figure 2)

The vegetation growing on the site under analysis is mostly made up of spontaneous herbaceous species (*Hordeetum sp., Bromus sp., Erigeron Canadensis, Carduus nutans, Atriplex*), as well as of spontaneous spring wood (*Ailanthus*).

A strip of wood vegetation was planted along Calea Vacaresti, including species such as: *Pinus Nigra, Fraxinus, Tilia* and *Quercus*.

To the East, along Calea Vitan-Barzesti, there is a line of *Populus*, in good condition and interesting from a visual point of view.

Traffic Analysis (figure 2)

The traffic analysis indicated an intense vehicle circulation in the South, South-West and West of Calea Vacaresti, but especially on Soseaua Oltenitei. At the same time, the crossroads of these two arteries represent the most important nodal point in close proximity to the area under analysis.

Towards the North and North-East, the traffic is less intense, with one exception: the crossroads of Vitan-Barzesti, where the pedestrian and vehicle traffic is very busy, especially during weekends when Autovit Fair is in full swing. During such periods, traffic jams were known to occur on Splaiul Unirii.

As regards pedestrian traffic, it is more intense at the crossroads of Vacaresti – Sos. Oltenitei also due to the presence in the area of the "Aleea Castanilor" Shopping Mall, of the Big Berceni Commercial Centre and of the Sudului Commercial Centre.

The connection to the centre of the city is made mainly through Tineretului Blvd. and Splaiul Unirii (vehicle traffic), but also through the subway (pedestrian traffic).

Functional Analysis (figure 3)

On the Northern part of the area, the main functions of the space are industrial and research-related ones, such as the Institute of Thermal Energetics Research and Upgrading – CET Sud, having cooling towers of 60 m in height and smokestacks of 140 m in height.

The South and South-Western areas are mostly residential, the dense residential compounds being made up of blocks of apartments of 6 to 8 storeys, spreading from Sos. Oltenitei to Sos. Berceni.

As regards the commercial function, mention should be made of Big Supermarket, of Sudului Commercial Centre and of "Aleea Castanilor" Shopping Mall".

To the East, along Soseaua Vitan-Barzesti, there is a greenhouses' compound and the Forensic Institute.

Visual Analysis (figure 1)

It is marked by the aggressive presence, in the Northern part of the territory, of the five cooling towers of 60 m in height and two smokestacks of 140 m in height belonging to CET Sud.

A negative visual impact is created by the garbage stored in the South-Eastern area and by unfinished foundations and constructions spread all over the former Vacaresti Monastery. The concrete dam that was to be the dry wall of the lake has also a negative visual impact.

RESULTS AND DISCUSSIONS

Following the analysis of the site under discussion, it is obvious that the location is much degraded, the entire area being strongly anthropized.

The major malfunctions are evident not only within the zones in close proximity to the site, but also at urban scale, negatively affecting the entire South-Eastern Bucharest.

Such malfunctions noticeable within the area under study are due not only to the high level of Anthropization of the zone, but also to the lack of green appropriate areas, to which the micro-climate conditions and the pollution are added; all the above could be summarized as follows:

- general functionality of the area characterised by reduced diversity;
- environmental malfunctions:
  - ⇒ air pollution;
  - ⇒ noise pollution;
  - ⇒ presence of stagnant surfaced underground waters;
  - ⇒ poor waste management;
- vehicle traffic malfunctions;
- inappropriate green areas (planted vegetation);
- visual (aesthetical) malfunctions.

CONCLUSIONS

In **conclusion** to those stated above, the <u>absence</u> of an urban green area on the site under study contributes to the overall degradation of the urban comfort and standard of life. The arranging of this zone (spreading over 200 ha) as complex planted area would lead to the improvement of the negative environmental factors and would complete the Southern Bucharest green area, enhancing, at the same time, the green space per inhabitant (at the level of the entire city) to approximately 1 square meter.

Considering the overall situation of the public green areas of Bucharest, the green space shortage along the Southern cornice of Dambovita Lake – including Carol, Tineretului and Children’s Parks – could be improved by the construction – on the territory under study – of the Vacaresti Park, which would be an important oasis of urban green space. It would also represent a **<u>solution related to the quality enhancement</u>** of the entire city green areas, not only functionally, but also aesthetically and ecologically.

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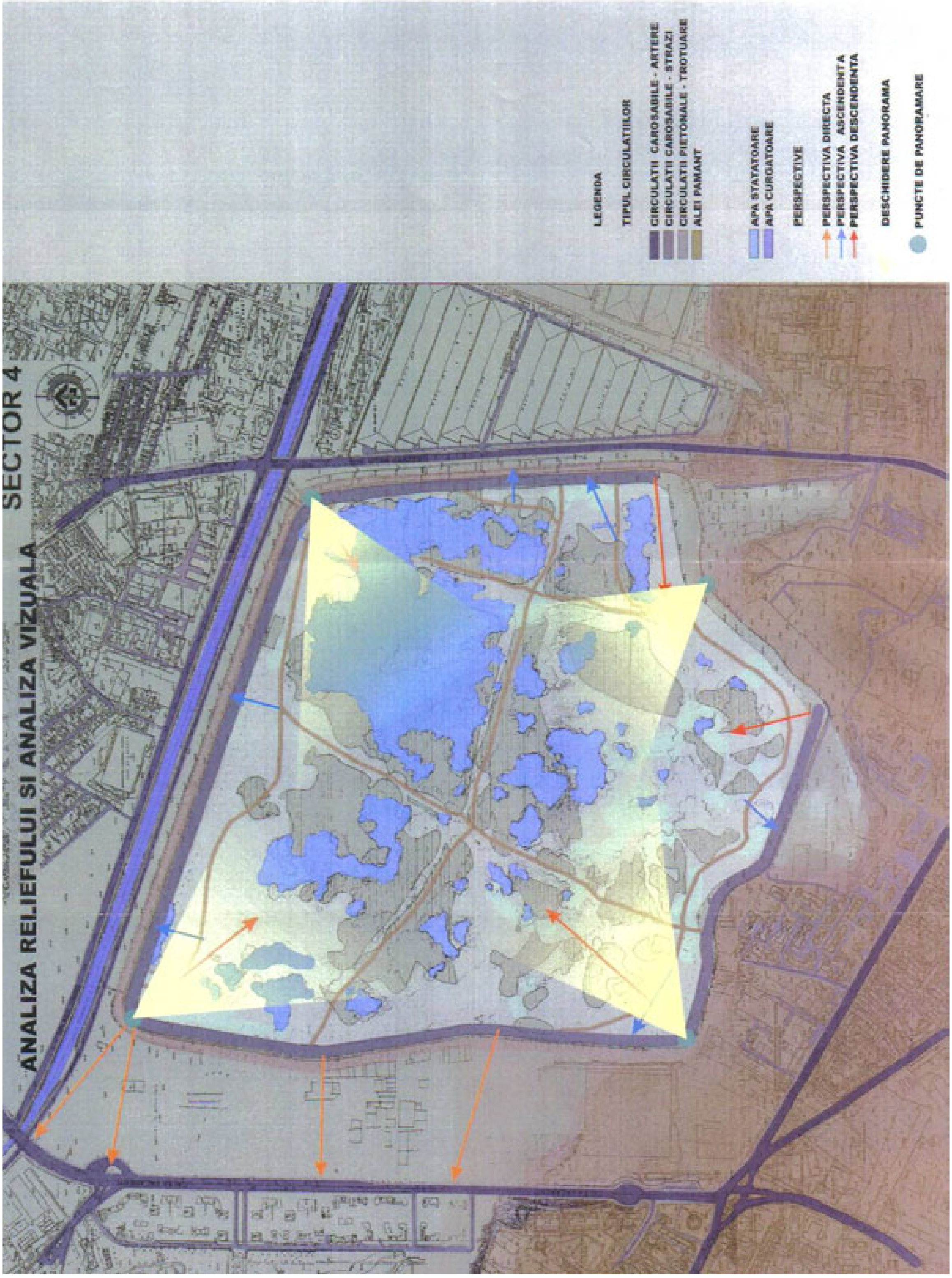

Fig.1- Relief analysis and visual analysis

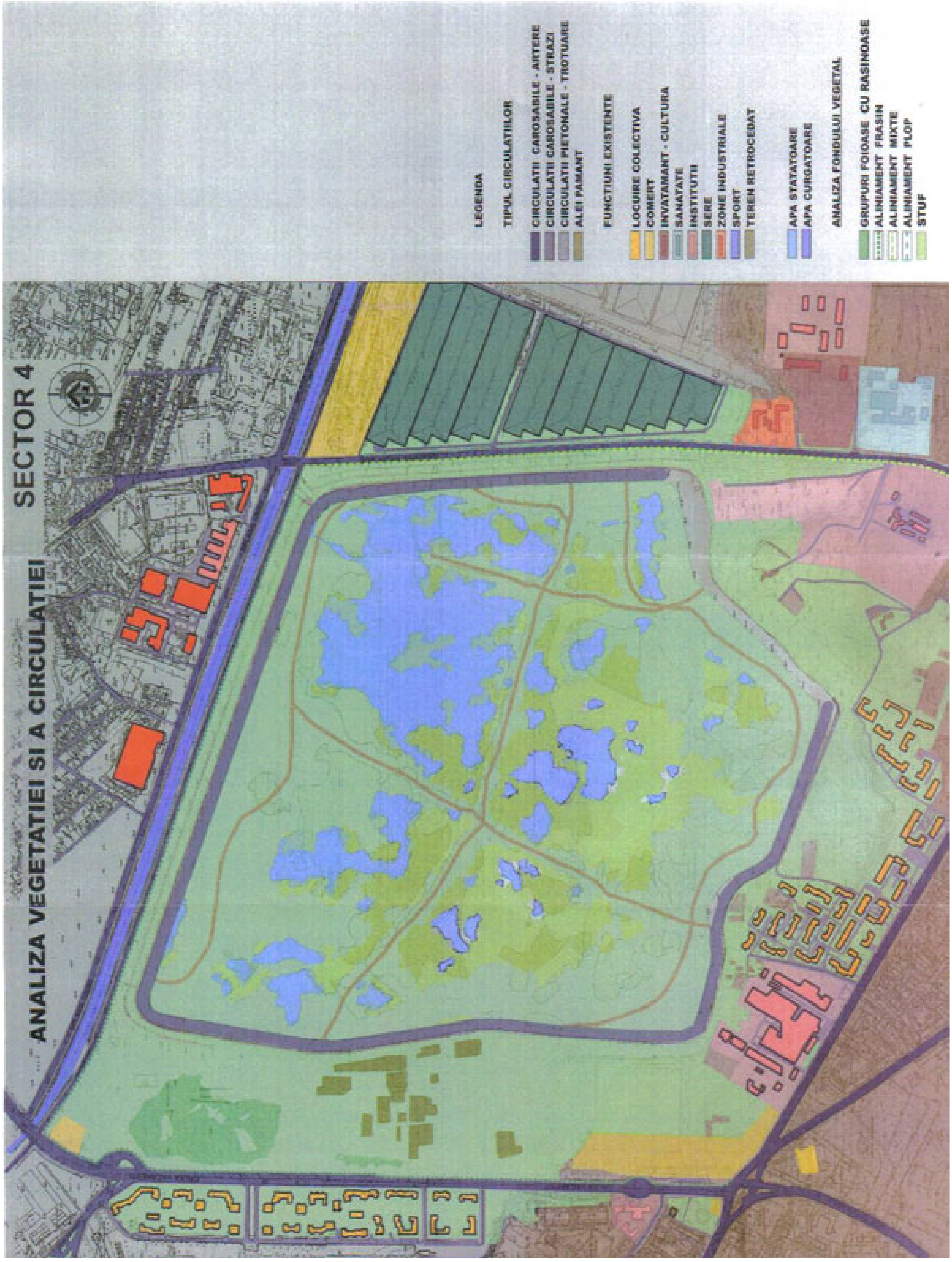

Fig.2- Vegetation and circulation analysis

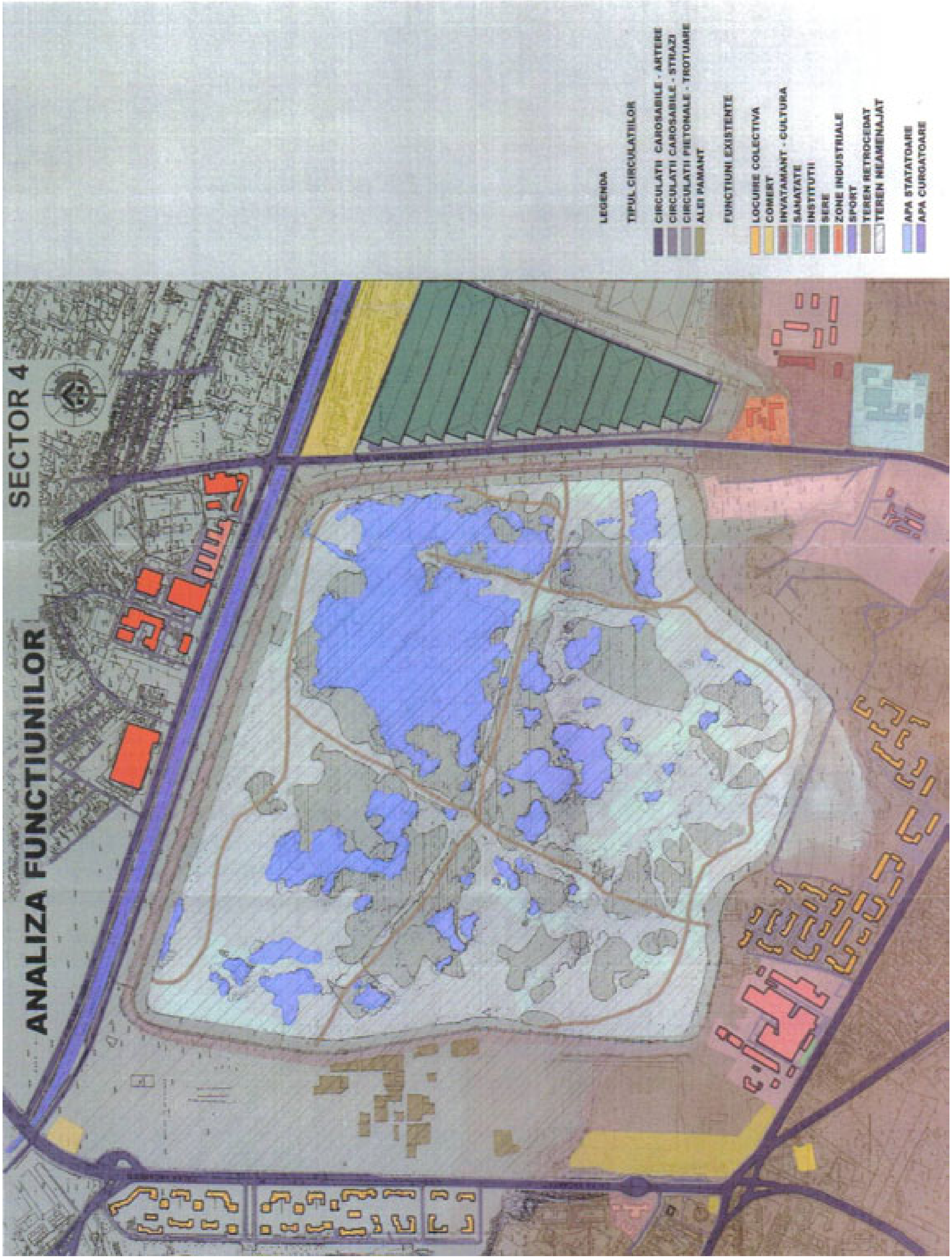

Fig.3- Functions analysis

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A NEW GLADIOLUS HYBRID CREATED TO R.D.I.V.F. VIDRA

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Keywords: hybrid, gladiolus, spike, corm, cultivar

ABSTRACT

The research was made in experimental fields of Department of Flower Growing of Research and Development Institute for Vegetable and Flower Growing- Vidra, in 2005. The biological material was represented by four gladiolus cultivars: Oscar, Priscilla, Nova Lux, Wind Song and the new hybrid H.G. 9631-3. Large corms were planted on April, in sandy-loam soil, to 10 cm deep, spaced 10 cm apart in the row and 25 cm between rows.

After an overall and exacting analysis of main characteristics, the following conclusions were drawn regarding hybrid H.G. 9631-3 is the earliest cultivar, the flower colour is red-orange, the length of spike is 55 cm, 20 florets/spike, and large, showy flowers has a very good multiplication capacity 3 corms/plant.

INTRODUCTION

Gladiolus is appreciated for many reasons. Arguably, the most important is its beautiful flowers, with long and elegant stems, with a wide range of colours, sizes and flowers types. Second, gladiolus is valued for transport resistance and for storage and vas life. They offer a graduate blooming in water for 10-14 days (Amariutei Alexandrinei, 1987). Practically, the summer market is dominated by this beautiful flower.

In Romania, there were multiple research on breeding gladiolus, the most productive being to S.C.P.P. Cluj, where were created more than 30 valuable cultivars. Many of them didn’t survive the test of time; the last creations exist only in cultivar collections. On the cultivar list there are only a small number of Romanian cultivars. New cultivars with high valuable decoration need to be added.

R.D.I.V.F. Vidra is another important research center where gladiolus breeding, has been studied. In 1990 were obtained some hybrids with high valuable decoration, good capacity of breeding and good capacity of storage.

MATERIAL AND METHODS

The breeding method we used is free pollination. The mother genitor of our hybrid is a cultivar from international assortment. Oscar. We followed with individual selection annually repeated, for characters and quality objective established for research.

There was studied the hybrid H.G. 9631-3 comparatively with other four cultivars Oscar, Priscilla, Nova Lux and Wind Song. From each cultivar and hybrid were analyzed 50 plants, studying the follow characteristics: plant height, spike length, number of florets/spike, flower diameter and number of stems/plant.

RESULTS AND DISCUSSION

There were carried out the phonological data and biometric measurement to H.G. 9631-3 hybrid and to control cultivars Oscar, Priscilla, Nova Lux and Wind Song. Phonological dates of cultivars are showed in table 1 and 2.

The hybrid H.G. 9631-3 is the earliest comparatively with all control cultivars (flowering after 83 days after planting), Oscar 89 days, Priscilla and Nova Lux after 85 days and Wind Song blooming after 86 days after planting.

In blooming period were made biometrical measurement such as: stem length, spike length, number of simultaneously blooming flowers, number of florets/spike, flower diameter and number of stems/plant (Table 3, Fig. 1.). The length of plants varies between 115 cm (Oscar) and 101 cm (Priscilla), H.G. 9631-3 having 105,3 cm.

H.G. 9631-3 has the length of spike 55 cm, 20 florets/spike, big flower, 12,7 cm diameter, bloom simultaneously 7 flowers, many number of stems/plant and high multiplication capacity (Table 3, Fig. 2.).

CONCLUSION

After a complete, exacting and general analyze of distinctive and basic quality, there were recorded the following conclusion:

The flower color of H.G. 9631-3 is red-orange, light, and very attractive, in comparison with Oscar cultivar (mother parent) that is dark red.

H.G. 9631-3 is the earliest cultivar, in comparison with all control cultivars (blooming after 83 days).

Comparatively with mother parent, H.G. 9631-3 has a very good capacity of breeding, 3 corms/plant (Oscar 1corm/plant).The length of H.G. 9631-3 is longer then control cultivars: Priscilla and Nova Lux H.G. 9631-3 has the length of spike 55 cm, who is longer with 6-14 cm than the control cultivars

H.G. 9631-3 is used manly for cutting, being excellent for bouquets and floral arrangement.

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Table 1. Gladiolus cultivars

Cultivar	Color	
9631-3	Red-orange	Middle season
PRISCILLA	Pink with white	Middle season
NOVA LUX	Deep yellow	Middle season
OSCAR	Dark-red	Middle season
WIND SONG	Purple with yellow	Middle season

Table 2. Phenological data of cultivars

Cultivar	Planting date	Start blooming	Full blooming	End of blooming	Nr of days planting-blooming
9631-3	26.04	18.07	20-25.07	1.08	83
PRISCILLA	26.04	20.07	24-30.07	3.08	85
NOVA LUX	26.04	20.07	23-27.07	4.08	85
OSCAR	26.04	23.07	28-30.07	8.08	89
WIND SONG	26.04	21.07	24-28.07	3.08	86

Table 3. Physiological characteristics of gladiolus cultivars

Cultivar	Plant length	spike length	Florets/ spike	Flower diameter	Nr flower open simultaneously	Stem nr /plant
9631-3	105,3	55	20	12,7	7	2-3
PRISCILLA	101	49	16	12	5	1-2
NOVA LUX	103	41	15	11	4	2-3
OSCAR	115	58	21	12,5	3	1
WIND SONG	108	48	17	10	4	1-2

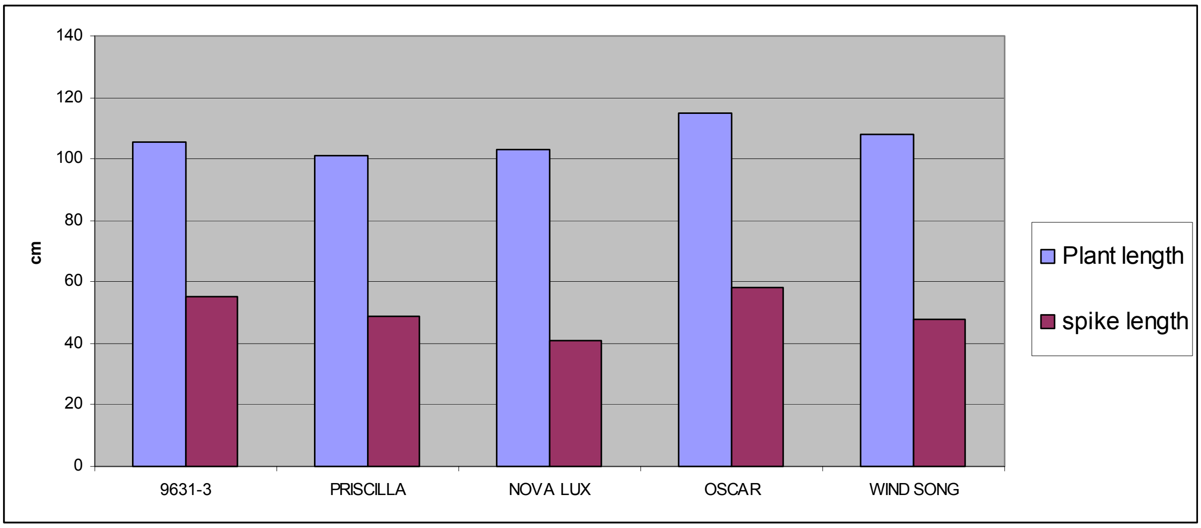

Fig. 1. Correlations between plant and spike length

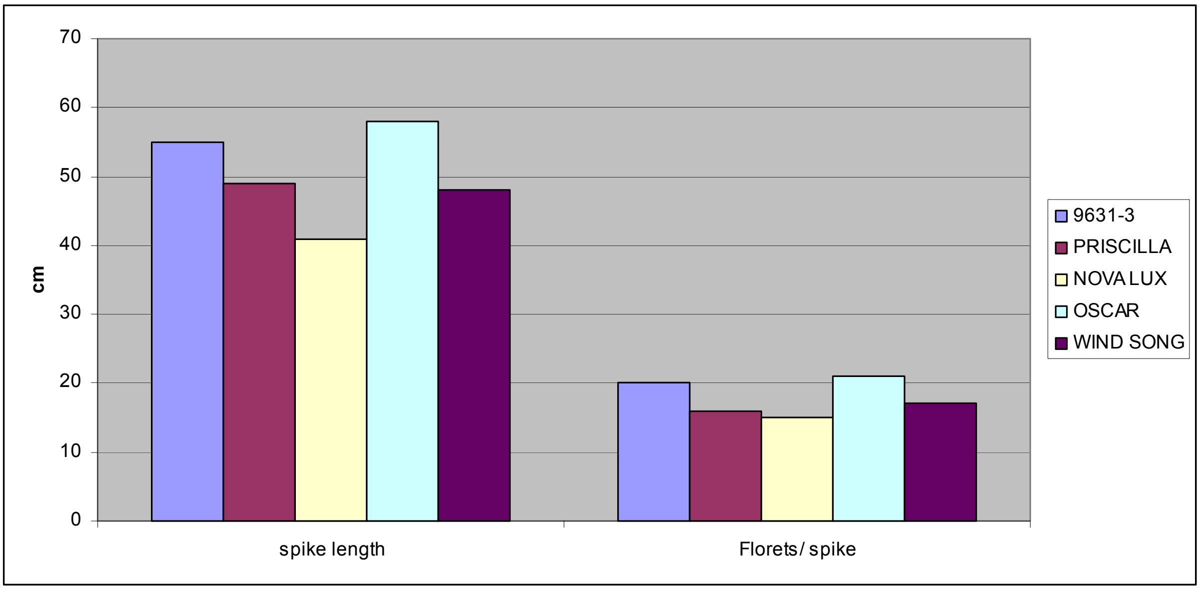

Fig. 2. Correlations between spike length and florets/spike

Photo 1.

Photo 2.

Lucrări ştiinţifice U.S.A.M.V.B., Seria B, Vol. XLVIII, 2005

RESEARCHES CONCERNING THE CONTAINERIZED AND UN-POLLUTION CULTURE OF *POLYANTHES TUBEROSA L.* PLANTS

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Keywords: tuberose, substrate, container, organic fertilizer, flowering

ABSTRACT

The growing and the flowering of tuberose are very highly influenced by the quality of substrate and the fertilizer program. We realized eight culture variants in containers using as substrate the classic soil without fertilizations and the sawdust compost with fertilizations. We used three organic fertilizers applied as solutions with different concentrations. The growing and the flowering of the plants were observed by biometrical observations. The plants cultivated on the classic soil were the best vegetative growing because the nutrients were better used; we observed that the leaves colour of these plants was more intensive green than the plants cultivated on the sawdust compost. Also, the flowering of the plants cultivated on the classic soil was better comparatively the plants cultivated on the sawdust compost. In the sawdust compost, the fertilizers are not well restrained and the plants can not use in the optimum conditions the nutrients. These results were also demonstrates by the big values of the number and the length of roots of plants cultivated on the sawdust compost. However, the plants cultivated on the sawdust compost were the big values of the flowers stem. Also, the number of the flowers in inflorescence was comparable with one of plants cultivated on the sawdust substrate.

INTRODUCTION

The tuberose is one of the most appreciated cut flowers because of it perfume, very strong and very pleasant. In the reason of used tuberose as plant for balcony and terraces our researches wants to demonstrate how is possible the containerized culture, applying the organic fertilizers. This work is part of one big researches program concerning the containerized culture of flowers species on the un-pollution substrates ensuring the plants nutrition by organic fertilizers.

MATERIALS AND METHODS

We used bulbs of more 3,5 cm diameter belong of aboriginal population from Bucharest area, keeping of 20-22 ° C and 75-80 % Relative Humidity in the rest period.

The bulbs were planted in the containers with 35 cm height and 20 cm diameter, in two types of substrates (classic soil and sawdust compost).

We made the planting of the fin of April and the containers were preserved in one glasshouse until the fin of May, because of the unfavourable temperature of exterior.

Eight experimental variants were realized by the combination of the culture substrate with the fertilization program (table 1).

The fertilizations were being at three weeks of the started in vegetation of the bulbs and we weekly applied its.

We used 40 bulbs for each variant, in the 4 repetition of 10 bulbs per variant.

The growing and the flowering of the plants were followed by the next biometrical observations: the percent of started in vegetation of the bulbs, the number and the length of leaves, the length of the flowers stems, the length of the inflorescences and the number of the opened flowers.

RESULTS AND DISCUSSION

The percent of started in vegetation of the bulbs was not presented a significant differences between the variants which show that the substrate is not influenced this parameter (table 2).

Analyzing the number of the leaves, both at the first series of observations and in the rest period of vegetation, we observed that the plants cultivated on classic soil were the best values of this parameter (table 3). Among the variants realized on the sawdust compost the variant V 6 (which the plants were fertilized with solution of 0,1% compost of bovine and 0,1% compost of equine) were the best result concerning the number of leaves (fig. 1).

The inferior results of this parameter at the plants cultivate on the sawdust compost can be explained that the fertilizers are not well restrained by the substrate and the plants can not use in the optimum conditions the nutrients, even the plants were weekly fertilized. In this reason, we can observe that the roots of plants cultivated on the sawdust compost a very long and numerous, for get around at the solution of fertilizers from plate of the base of container (fig. 2).

The length of the leaves presented the same characteristics that the number of leaves, the best values being obtained at the plants cultivated on the classic soil (table 4). But the differences between the variants are not the same values than in the case of the number of leaves.

We also observed that the green colour of the leaves was more intensive at the plants cultivated on the classic soil.

Concerning the plants flowering we observed that the first flowers stems issued at the variants V 7 and V 8, in June (table 5). We observed that in July the plants from variants V 6 and V 7 present the best values of the length of flowers stems which demonstrate an early blossoming of the plants from these variants (fig. 3).

Besides, the superior values of the length of flowers stems were observed of all the plants cultivated on the sawdust compost but without the significant differences between the variants.

The similar results we observed also for the length of inflorescences (table 6), the big values of this parameter being obtained at variants V 6 – 24,8 cm, V 7 – 23,9 cm, V 1 – 23,5 cm and V2 – 23,2 cm.

The number of the flowers buds from inflorescence was not significant varied, the best values – 23,4 being obtained at variant V 8 (table 7).

Concerning the number of opened flowers we observed that at 1 August the first flowers were opened at variants V 7, V5 and V 8 (table 7), which demonstrate an early blossoming for the plants of this variants.

The total number of flowers opened varied between 17,7 at variant V 7 and 13,8 variant V 4 (fig. 4). We can say that the organic fertilizers were well influenced the quality of the flowering even the vegetative growing was not better of these plants.

The inferior vegetative growing of the plants cultivated on sawdust compost is finding again in the bad quality of the bulbs produced by plants.

CONCLUSIONS

The results of our researches demonstrate that is possible the containerized culture of tuberoses for their used as plants for balcony and terraces.

The best values of the vegetative growing were observed at the plants cultivated on the classic soil even at this variant the plants were not fertilized.

The plants cultivated of sawdust compost were developed the big and the numerous roots because this substrate have a small capacity of nutrients retention.

The flowering of the plants have the comparatively values for all the variants, with a little superior values at the plants cultivated on sawdust compost, both concerning the early of blossoming and the quality of the blossoming.

In the future will be interesting to testing also others substrates combined with the organics fertilizers being know that the tuberose is a very exigent plant concerning the nutrition.

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Tables

Table 1. The experimental variants

Variant	Substrate	Solution of fertilizers
V 1	Classic soil (2 part compost of manure + 1 part compost of leaves + 1 part compost of sawdust + 0,25 parts sand	–
V 2	Compost of sawdust	0,05 % compost of poultry
V 3	Compost of sawdust	0,1 % compost of bovine
V 4	Compost of sawdust	0,1 % compost of equine
V 5	Compost of sawdust	0,05 % compost of poultry + 0,1 % compost of bovine
V 6	Compost of sawdust	0,1 % compost of bovine + 0,1 % compost of equine
V 7	Compost of sawdust	0,05 % compost of poultry + 0,1 % compost of bovine
V 8	Compost of sawdust	0,05 % compost of poultry + 0,1 % compost of bovine + 0,1 % compost of equine

Table 2. The variation of started in vegetation of the bulbs

Variant	Bulbs started in vegetation upon : (%)			
	2 weeks	3 weeks	4 weeks	5 weeks
V 1	22,00	43,54	83,85	100,00
V 2	22,85	42,85	83,85	100,00
V 3	19,14	42,85	82,57	100,00
V 4	21,85	46,57	88,57	100,00
V 5	21,85	56,14	89,42	100,00
V 6	24,57	65,57	94,35	100,00
V 7	25,71	65,57	91,42	100,00
V 8	24,57	67,42	97,54	100,00

Table 3. The variation of the number of leaves

Variant	Month			
	June	July	August	September
V 1	17,0	39,5	60,5	87,4
V 2	10,7	25,5	38,7	56,5
V 3	9,2	25,0	41,5	55,9
V 4	9,5	25,0	40,5	53,5
V 5	10,5	21,0	33,2	58,1
V 6	14,0	27,7	48,5	66,3
V 7	7,5	15,5	38,0	53,4
V 8	6,7	22,7	45,0	54,6

Table 4. The variation of the length of leaves

Variant	The length of leaves in the month: (cm)			
	June	July	August	September
V 1	2,8	30,5	45,7	41,0
V 2	4,0	26,9	37,5	35,2
V 3	2,2	22,1	38,7	37,8
V 4	1,9	21,7	38,7	36,7
V 5	3,0	23,7	38,5	36,0
V 6	5,1	23,3	36,8	36,6
V 7	5,5	24,1	37,8	37,0
V 8	8,4	24,0	37,2	36,5

Table 5. The variation of the length of flowers stems

Variant	The length of flowers stems in the month: (cm)			
	June	July	August	September
V 1	–	20,5	42,3	46,7
V 2	–	22,0	55,0	61,0
V 3	–	19,0	42,3	51,6
V 4	–	21,5	47,0	50,4
V 5	–	29,0	45,2	45,7
V 6	–	32,5	56,0	57,2
V 7	26,0	46,6	58,0	66,8
V 8	19,4	36,0	56,0	60,4

Table 6. The variation of the length of inflorescences

Variant	The length of inflorescences in the month: (cm)			
	June	July	August	September
V 1	–	1,7	19,2	23,5
V 2	–	3,2	17,4	23,2
V 3	–	1,2	8,4	17,4
V 4	–	2,2	15,6	18,7
V 5	–	8,7	21,6	21,6
V 6	–	11,4	23,9	24,8
V 7	5,9	13,7	15,3	23,9
V 8	1,9	3,2	18,5	22,4

Table 7. The variation of the opened flowers and the flowers buds from inflorescence

Variant	Opened flowers at:				Number of flowers buds from inflorescence	Total opened flowers
	1 VIII	15 VIII	1 IX	15 IX		
V 1	–	1,0	7,6	5,2	20,2	13,8
V 2	–	5,3	5,5	3,3	21,3	14,1
V 3	–	2,3	3,2	3,5	21,7	16,0
V 4	–	2,7	5,4	5,4	20,5	13,5
V 5	3,2	5,7	2,5	4,3	20,5	15,7
V 6	–	2,2	5,4	6,0	21,5	13,6
V 7	4,4	7,9	2,1	3,3	22,2	17,7
V 8	2,3	3,4	4,5	4,7	23,4	14,9

Figures

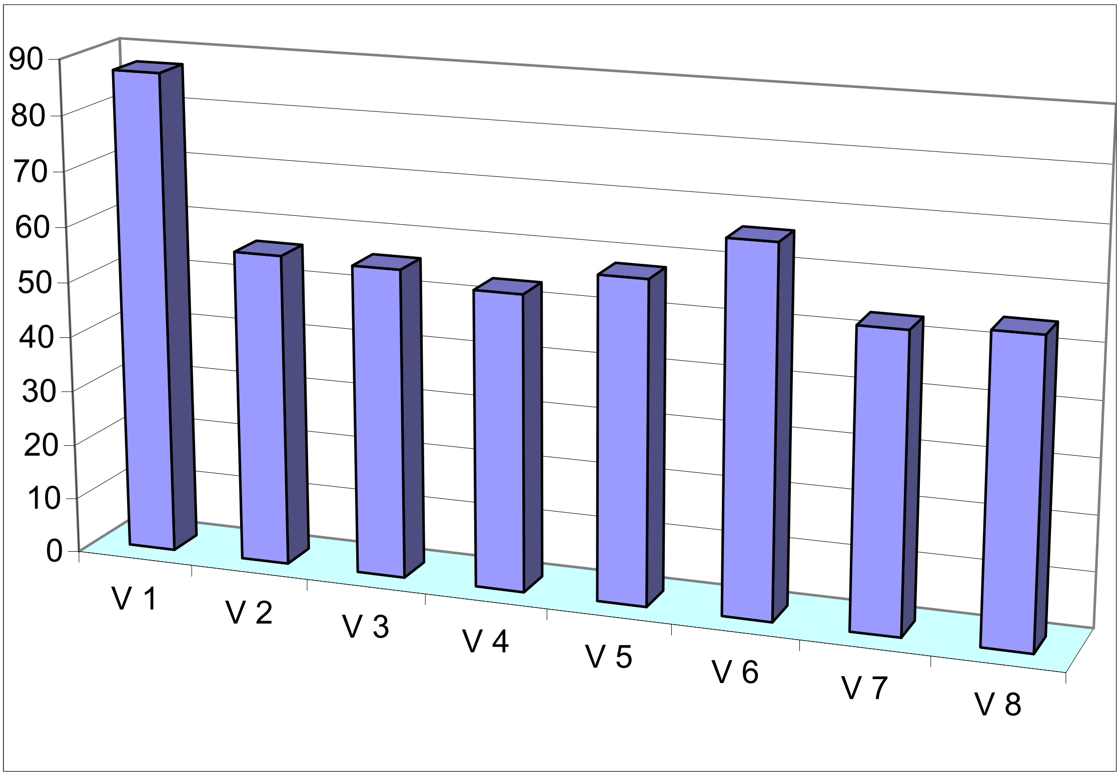

Figure 1. The variation of the final number of leaves

Figure 2. The variation of the number of roots

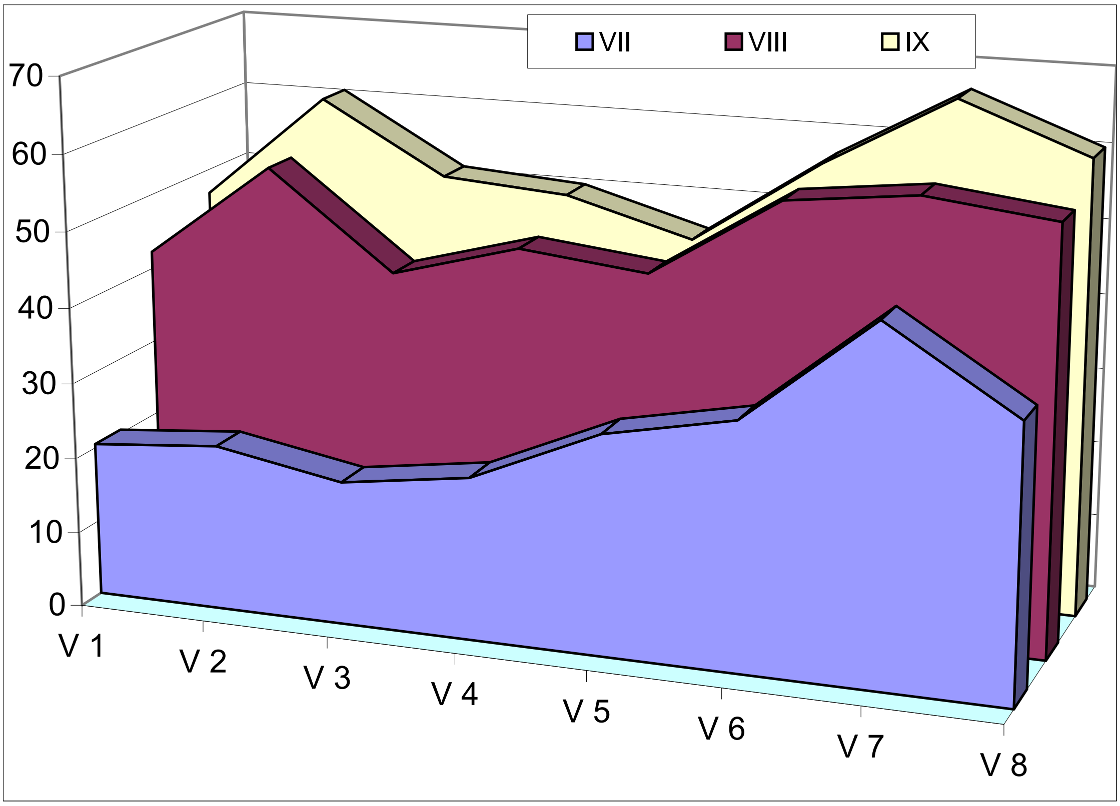

Figure 3. The variation of the dynamical of flowers stems length

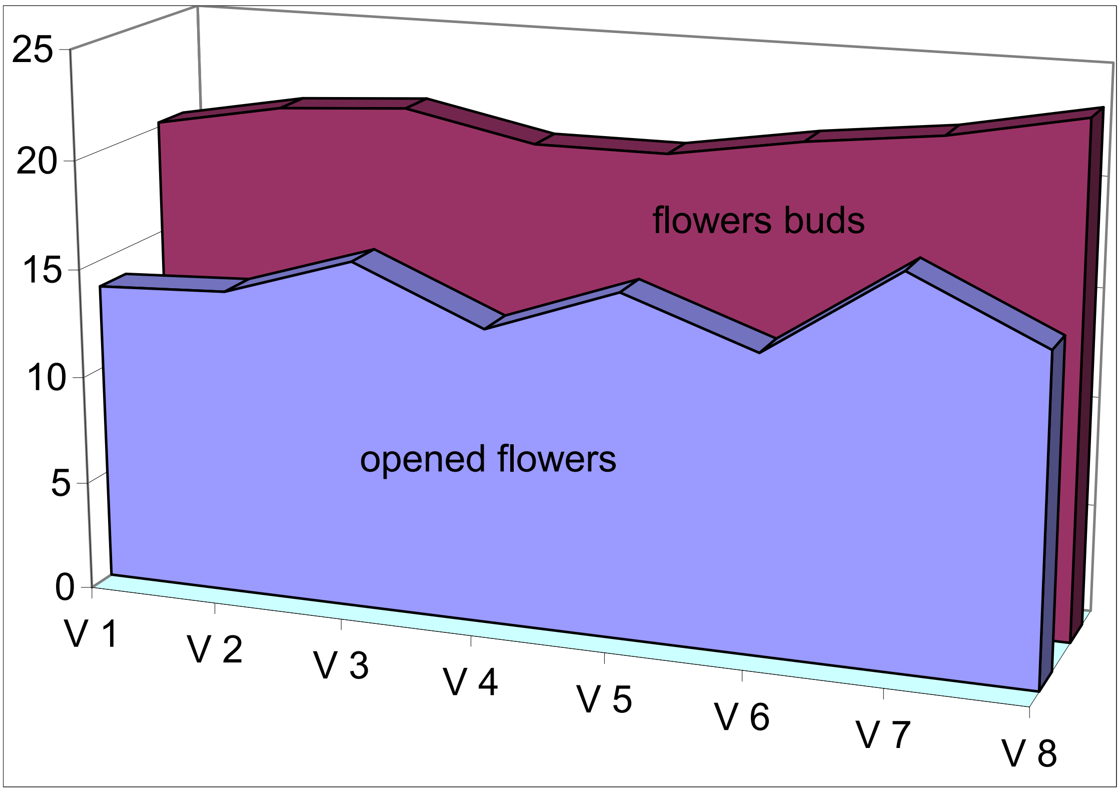

Figure 4. The variation of the number of flowers buds and opened flowers

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RESEARCHES CONCERNING THE CULTURE SUBSTRATE INFLUENCE UPON GROWING AND FLOURISHING OF SOME *MAMMILLARIA* SP. PLANTS

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Keywords: *Mammillaria elongata, Mammillaria backenbergiana,* cacti, offshoots, flower

ABSTRACT

The aim of the present researches was to find the optimal substrate for growing and flourishing of and plant. There were made studies of different substrates type, on two different years, looking for plant height at the beginning and at the end of the studies, offshoots growth, and the number of flower on a plant.

INTRODUCTION

The Cactuses, this beautiful and interesting group of ornamental plant, is frequently founded in botanical private or public collections, and more than ever in our houses. This fact is enough to prove the very important interest.

The passion for those plants, the higher market (especially European one) request, had determined a real development, on industrial scale, of them growth. The Netherlands is the country with the most important cactus crops, exported in the whole world.

MATERIALS AND METHODS

These researches, performed on the U.S.A.M.V. Bucharest flower greenhouses, use the experimental data registered on two cycles, during 2003-2004 and 2004-2005 study years.

The biological material was represented by two cacti species, *Mammillaria elongata* and *Mammillaria backenbergiana,* organized on 4 repetitions, each of them consisting of 5 mature plants.

The plant, 6-7 years aged, came from the Netherlands, were planted in white 3 cm diameter plastic pots.

On the bottom of the pots was placed a draining layer consists of sand, with ceramics shiver covering the draining orifice.

The five experimental variants substrates were made of sod land (Sl); leaves compost (Lc) + sawdust (Sd); sand (S) + charcoal (C), mixed in different proportion:

$\mathbf{V_1}$ (used as witness): Sl: (Lc + Sd): (S + C) = 1:1:1

$\mathbf{V_2}$: Sl: (Lc + Sd): (S + C) = 1:2:1

$\mathbf{V_3}$: Sl: (Lc + Sd): (S + C) = 2:1:1

$\mathbf{V_4}$: Sl: (Lc + Sd): (S + C) = 1:1:2

During the experimental period were made a series of measurement and determination such as: plant height at the beginning and at the end of the period, offshoots growth and number (only on *Mammillaria elongata* plants), the number of flower on a plant.

Experimental results were statistically processed, using the Duncan Test for testing the significance of the differences.

RESULTS AND DISCUSSIONS

The experimental data presented in table 1 showed that the influence of culture substrates on plants height is available for both species.

The maximum influence level was founded on V_2 (a substrate with a rich proportion of lither and sawdust).

The results are confirmed by the offshoots growing analyze after 2 year from de beginning of the experience.

As we can see from the experimental data, the highest level of growth was on V_2 (3,80 cm medium value), with significant differences among the others experimental variants. Decreasing order was V_2, V_3, V_1 and V_4 (2,85 cm).

Plant growth suffered a real influence from the factor species too, higher on *Mammillaria elongata* than on *Mammillaria backenbergiana*.

Offshoots appeared in two years of experience was different depending on experimental variant.

Thus on *Mammillaria elongata* V_3 registered the biggest offshoots number (13), followed by V_1 (11,6). The lowest value was on V_2 (7,4), as we can see from figure 1.

Regarding the flower number on a plant, as can be observed from table 2 and table 3, the influence of substrate was visible in both species.

On *Mammillaria elongata* V_3 was the variant with the higher value (46 flowers on a plant in the first year and 45 flowers in the second year of study). V_3 has also the highest value on *Mammillaria backenbergiana* too (50,2 flower in the first and 54,4 flower in the second year).

As we can see from figures 2 and 3 the trend was increasing from November to march in both study years and species.

Between V_3 and the other variants the differences were significant, on both species.

An average for this parameter (flower number on a plant) for each of the experimental year showed that V_3 is the variant with the highest values (45,5 on *Mammillaria elongata* and 52,3 on *Mammillaria backenbergiana*) and in the same time that between these variants and the others exist significant differences.

Though in the first year of study the values were higher for the most of the experimental variants, we can say that the year doesn't have any influence.

CONCLUSIONS

Based on the experimental results above presented there can be extracted the following conclusions:

- the better results for height growth were obtained on the experimental variant (V_2) which has more leaves compost and sawdust, in both species.
- the substrate with more sod land (V_3) determines the appearance of more offshoots than in other variants, on *Mammillaria elongata* plants.
- the best results for flower number on a plant were obtained on the substrate from (V_3), for both species.

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Tables

Table 1. The influence of culture substrate on *Mammillaria elongata* and *Mammillaria backenbergiana* plant height (cm), after 2 years of study.

Experimental variants	Plant height (cm)		Substrate average
	Mammillaria elongata	***Mammillaria backenbergiana***	
V_1	3,80	2,80	3,30 B*)
V_2	4,10	3,50	3,80 A
V3	3,70	3,10	3,40 B
V_4	2,90	2,80	2,85 C
Species average	3,63 M*)	3,05 N*)	

*) *in the same column, the value noted with the same letter doesn't show significant differences on the 5% level, according to the Duncan Test*

Table 2. The influence of culture substrate on *Mammillaria elongata* flower number, after 2 years of study.

Experimental variants	The flower number/plant/year		Substrate average
	2003-2004	**2004-2005**	
V_1	37,80	42,20	40,00 B*)
V_2	37,80	37,80	37,80 BC
V3	46,00	45,00	45,50 A
V_4	36,60	37,40	37,00 BC
Year average	39,60 M*)	40,60 M	

*) *in the same column, the value noted with the same letter doesn't show significant differences on the 5% level, according to the Duncan Test*

Table 3. The influence of culture substrate on *Mammillaria backenbergiana* flower number, after 2 years of study.

Experimental variants	The flower number/plant/year		Substrate average
	2003- 2004	**2004- 2005**	
V_1	40,20	42,40	41,30 C*)
V_2	48,40	46,80	47,60 B
V3	50,20	54,40	52,30 A
V_4	42,60	45,00	43,80 C
Year average	45,35 M	47,15 M	

*) *in the same column, the value noted with the same letter doesn't show significant differences on the 5% level, according to the Duncan Test*

Figures

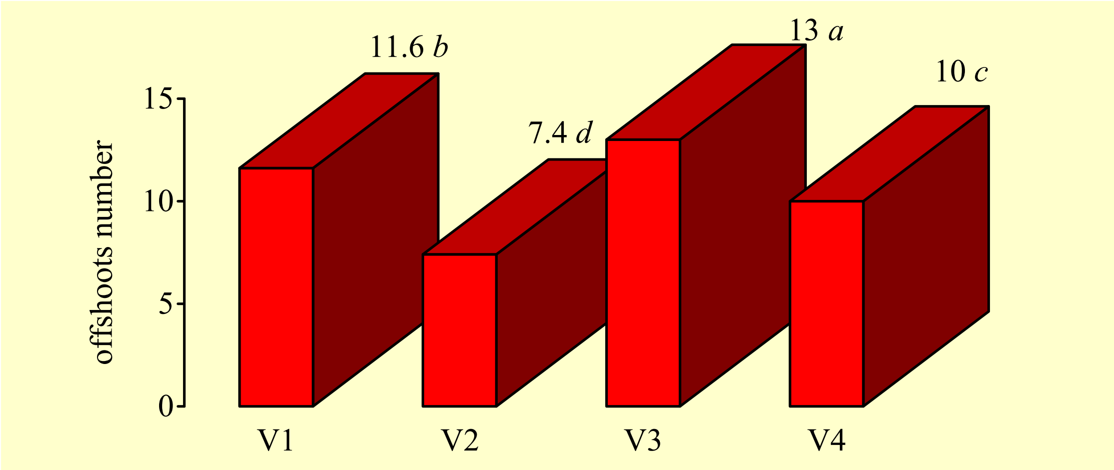

Fig. 1. The offshoots number on *Mammillaria elongata* plants after 2 years of study

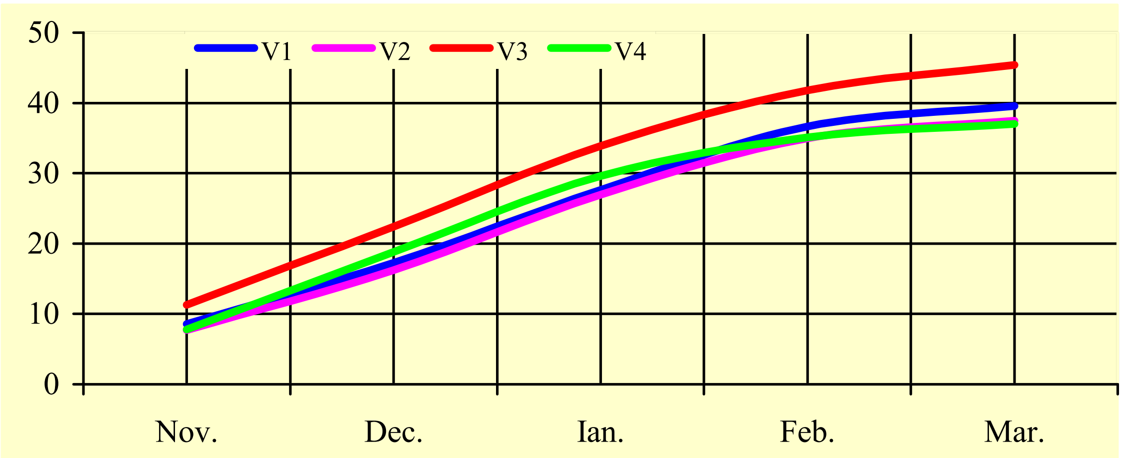

Fig. 2. The flower appearance on *Mammillaria elongata* plants

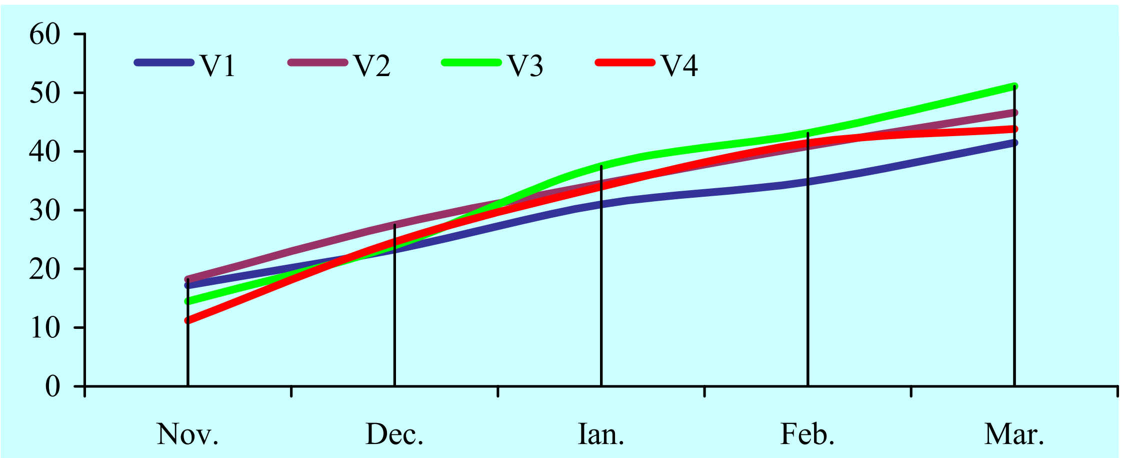

Fig. 3. The flower appearance on *Mammillaria backenbergiana* plants

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RESEARCHES ON ORNAMENTAL POTENTIAL OF SOME *HIPPEASTRUM* SP. CULTIVARS, INTRODUCED ON CULTURE AT UNIVERSITY OF AGRONOMIC SCIENCES AND VETERINARY MEDICINE BUCHAREST FLOWER GREENHOUSES

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Keywords: greenhouse, bulbs, flowering parameters

ABSTRACT

The aim of the present researches was to obtain more information about the ornamental potential of some new *Hippeastrum* sp. cultivars, useful for greenhouse culture in specific condition of Romania. On the international flower market there can be find a lot of *Hippeastrum* sp. cultivars, very close as quality parameters, with differences visible only in very close analyze, using statistically methods.

INTRODUCTION

Hippeastrum (The Red Lily, Gramophone), also known by the growers as *Amaryllis* (a typical and very frequent confusion), is a spontaneous species on the tropical and subtropical areas of the Southern and Central American continent, while the Amaryllis genus is native on Southern Africa.

For this reason we prefer to use, in our researches, the name *Hippeastrum,* to make a clear distinction between the two genres.

Because of the plant ornamental high value, like potted plant and cut flower too, including the market demands, we think that the efforts on studying this plant are justified.

MATERIALS AND METHODS

These researches, performed on the U.S.A.M.V. Bucharest flower greenhouses, use the experimental data registered during 2004-2005 study year.

The biological material was represented by 3 flowering bulbs for each of the 19 *Hippeastrum* sp. cultivars.

The bulbs, with the dormancy period satisfied in optimal condition in the Netherlands, were planted in pots in specifically substrates.

The pots were made of plastic, with 12 cm diameter, on the bottom was placed a draining layer consists of sand, with ceramics shiver covering the draining orifice.

Before planting there were made some observation that includes the bulb weight height and circumference, and also the length of the roots.

After planting, during the vegetative grow period, were determined the leaves number and length, dynamically.

The observations, on the flowering period, were based on measuring and observing of the following parameters: floral stem appearance moment, the number and length of the floral stems, the number of flower on the floral stem, the flower diameter.

Experimental results, for the flowering period, were statistically processed, using the Duncan Test for testing the significance of the differences between the cultivars.

RESULTS AND DISCUSSIONS

From table 1 there can be seen the main characteristic of the bulbs.

The bulb weight was between 0,75 kg (*Minerva*) and 0,26 kg (*Red Peacock*), with a medium value of 0,48 kg.

Measurements of the bulbs height show values between 4,80 cm (*Red Peacock*) and 7,00 cm (*Red Pearl*) with a medium of 5,87 cm.

Bulb circumference was from 23,60 cm (*Roma*) to 34,30 cm (*CHN Gift*), with a medium of 30,67 cm.

Roots lengths oscillate from 5,30 cm (*Mont Blanc*) to 18 cm (*Apple Blossom*). The medium value for this parameter was 9,60 cm.

In figure 1 are presented the values for the main vegetative character: the leaves length and number.

The leaves number is situated on the interval delimited by the cultivar *Baby Star* (13) and *Red Pearl* (2), with a medium value of 7, 17 leaves on a plant.

The leaves length has a medium value of 23, 11 cm, a maximum of 33, 68 cm (*Olympus*) and a minimum of 8, 51 cm (*Mont Blanc*).

As we can see from table 2, among the studied cultivars exists differences on the flowering parameters (the number of floral stems on the bulb, the length of the floral stem, the number of the flower on the floral stem and the flower diameter).

The number of floral stem started from one bulb is situated between 2,67 and 1,00 depending on the cultivar.

Toledo has the highest value (2,67), with significant difference compared to the other cultivars. It was followed by *Baby Star* (2,33), *Amigo, Olympus, Picotee* and *Roma* (2,00) while the lowest value was on Hercules and Ludwig Dazzler (1,00).

Other studied parameter was the floral stem length, which was situated between a maximum value of 40, 33 cm (*Toledo*) and a minimum of 23, 37 cm (*Baby Star*). There were significant differences between the studied cultivars.

According to our results, the numbers of flower on a floral stem depend on the cultivar. For example, there was a maximum value of 6,00 on *Apple Blossom*, followed by *Monis Hehhen* (5,33), and *Baby Star* (5,00). The differences between the highest value and the two others were significant. All the other cultivars have value under 4,00, excepting *Toledo* (4,33).

The flower diameter is like the others parameters, a main characteristic of the cultivar. We noted the highest value on Apple Blossom (19,47 cm), and the lowest on Baby Star (10,27).

CONCLUSIONS

The studied *Hippeastrum* sp. cultivars are typical for the species characteristic, according to the specialty literature.

The bulbs are well sized, matured, optimally for the future plant growth.

Their biological parameter allows supporting all the processes during the dormancy period and after. This facts were proved also by the afterwards plant development.

The floral stem is strong enough to sustain a good flower development.

The number of the floral stem, the flower number on a plant and the flower diameter are determined by the cultivars. There are significant differences between cultivars,

Researches results encourage us to continue studying on others *Hippeastrum* sp. cultivar, because of the species higher ornamental potential and the Romanian growers and customers interest on it.

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Tables

Table 1. The main bulb characteristic on 19 *Hippeastrum sp.* cultivars

Cultivar	Bulbs characteristics			
	Weight (kg)	Circumference (cm)	Height (cm)	Root length (cm)
Apple Blossom	0,46	29,80	5,50	18,00
Amigo	0,46	32,00	5,80	16,40
Aphrodite	0,43	30,10	6,10	9,40
Baby Star	0,52	33,30	5,70	5,90
CHN Gift	0,54	34,30	6,20	6,10
Hercules	0,40	29,00	5,60	9,60
Ludwig Dazzler	0,51	32,00	6,40	6,80
Muttenhorn	0,50	31,30	6,70	7,00
Monis Hehhen	0,44	30,30	5,50	8,30
Minerva	0,75	32,00	6,00	11,50
Mont Blanc	0,47	30,60	6,10	5,30
Olympus	0,45	30,60	5,80	12,90
Picotee	0,55	33,00	6,20	10,00
Piquant	0,45	31,60	5,90	9,80
Red Lion	0,36	29,60	4,80	8,46
Red Peacock	0,26	25,50	4,80	8,30
Red Pearl	0,61	31,60	7,00	7,70
Roma	0,48	32,60	5,00	12,60
Toledo	0,57	32,60	6,40	8,30

Table 2. The Flowering parameters on 19 *Hippeastrum sp.* cultivars

Cultivar	Flowering parameters			
	Floral stem number/bulb	Floral stem length (cm)	Flower number/stem	Flower diameter (cm)
Apple Blossom	1,67 bcd*)	32,10 g*)	6,00 a*)	19,47 a*)
Amigo	2,00 abc	27,17 m	4,00 c	17,33 d
Aphrodite	1,33 cd	27,00 m	4,00 c	18,67 c
Baby Star	2,33 ab	23,37 p	5,00 b	10,27 j
CHN Gift	1,67 bcd	23,57 p	4,00 c	17,57 d
Hercules	1,00 d	29,80 i	4,00 c	18,60 c
Ludwig Dazzler	1,00 d	29,30 j	4,00 c	17,40 d
Muttenhorn	1,67 bcd	32,50 f	4,00 c	16,23 f
Monis Hehhen	1,33 cd	24,77 o	5,33 b	14,73 h
Minerva	1,33 cd	28,67 k	4,00 c	17,57 d
Mont Blanc	1,33 cd	32,00 g	4,00 c	19,00 b
Olympus	2,00 abc	25,50 n	4,00 c	15,67 g
Picotee	2,00 abc	35,67 e	4,00 c	18,67 c
Piquant	1,33 cd	39,73 b	4,00 c	17,00 e
Red Lion	1,33 cd	30,50 h	4,00 c	16,23 f
Red Peacock	1,33 cd	27,83 l	4,00 c	15,83 g
Red Pearl	2,33 ab	39,33 c	4,00 c	12,00 i
Roma	2,00 abc	36,67 d	4,00 c	15,97 fg
Toledo	2,67 a	40,33 a	4,33 c	11,83 i

*) *in the same column, the value noted with the same letter doesn't show significant differences on the 5% level, according to the Duncan Test*

Figure

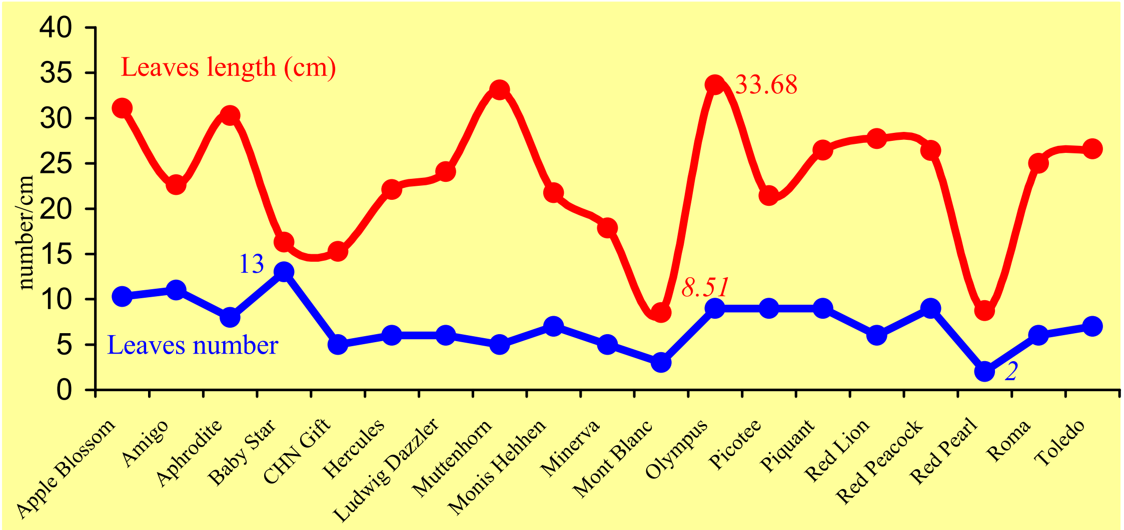

Fig. 1. The leaves number and length on 19 *Hippeastrum* sp. cultivars, until flower opening

Lucrări ştiinţifice U.S.A.M.V.B., Seria B, Vol. XLVIII, 2005

FRUIT GROWING & TECHNOLOGY

THE EFFICACY OF SOME PHYTOSANITARY TREATMENTS, ON SOME APPLE FRUITS CULTIVARS STORAGE CAPACITY

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Keywords: moisture, treatments, pre-harvest, post-harvest

ABSTRACT

Looses during storage of fruits are still considerable in some cases about 20-30% of all produced harvested worldwide is not consumed because of fungal or physiological deterioration. In the present paper, we present the research results of the pre-harvest treatments using the products: Rover- 0,2%; Sumilex 0,1% and Topsin – 0,1%, as well as post-harvest treatments: using Rover – 0,2% and Sumilex –0,1%. The studied apple varieties (Jonathan, Generous and Golden Delicious) were provenance from the private farmers, Voinesti – Dambovita.

INTRODUCTION

In the apple growth technology, the most important link is constituted by the phytosanitary treatments performed in the orchard, as well during the storage period. The losses due to the fungus impact during the storage period are considerable, being up to 20% from the total yield.

Improving the cultural practices and to choose the best varieties has an important contribution to yield increase and to the fruit quality.

Pre-harvest and post-harvest phytosanitary treatments represent an indispensable link for apple culture.

Economical losses caused by the parasite fungus justify the phytosanitary treatments during the vegetation period, but in the same time, imply a special care, to diminish the pesticide residuum on fruits (1).

During storage period, apples can be attacked by a high number of fungus pathogens that produce their moisture. Infection can begins from the orchard or during transport and storage period (2).

MATERIALS AND METHODS

The experience has been organized at Voinesti, in the private orchards of some members of The Dambovita Fruit Growing Association.

The purpose of this experience was those to evaluate the apple fruits storage capacity and quality maintaining, following to phytosanitary treatments applied in the orchard and after harvest, in the autumn of the year 2004. There were also analyzed samples of fruits, with a view to appreciate the physique-chemical characteristics, at the end of the storage period, for Jonathan, Golden Delicious and Generous varieties.

It is necessary to mention that in the orchard the treatments have been performed on 0,5ha/farmer, and after harvest there were exposed to phytosanitary treatments, 100 kg fruits on each variety.

The pre-harvest used fungicides were Rover 0,2%; Sumilex 0,1% and Topsin 0,1%. These have been applied with 20 days before harvesting and are recommended to prevent and to control the major apple fruits storage diseases, produced by the fungus: *Penicillium sp.*; *Botrytis cinerea* and *Gloeosporium album*.

Fruits storage has been realized in the store with natural ventilation, with the following conditions: temperature 14-15^{o}C ad air relative humidity 70-75%.

Spraying has performed the post-harvest treatments, using the products: Rover 0,2% and Topsin 0,1%. The two experimental variants were treatment on fruits and treatment on wrap + fruits.

RESULTS AND DISCUTIONS

As regard to the pre-harvest treatment, from data presented in Table 1 it can be noticed that for all varieties, the best results have been obtained with the product Rover at 0,2%. The attack percent was 6,8 in the case of Jonathan; 6,9% for Generous and 9,2% at Golden Delicious, but after different storage period, in function of variety.

Between the tested products, the bad results have been obtained in the case of Topsin, apple fruits being attacked in a percent of 8,6% - Jonathan; 9,4% - Generous and 11,3%- Golden Delicious. The product Sumilex was more efficient than the fungicide Topsin, but less efficient than Rover product.

We can remark that the treatments performed in the orchard before harvest period have had a major effect to reduce the percent of moisture fruits in the storehouse. The reduction was above 50% in the case of Rover 0,2%, as compared with the untreated control.

Also, it was observed that at Jonathan cv. the principal pathogen agent was *Penicillium sp.* which produce the moist rot, while at Golden Delicious the most important was the lenticelary rot produced by the fungus *Gloeosporium album*.

If we consider the storage period, that was 80 days for Jonathan, 60 days for Generous and 95 days for Golden Delicious, we can say that the last variety had a very good behaviour during storage, in relation with the major pathogens.

As concerning the post-harvest treatment, as it can be observed in Table 2, these were more efficiently than those performed during vegetation period, at the same product and concentration. The Rover product in a concentration of 0,2% was again remarked and it gave the best results. Golden Delicious had a high percent of rooting fruits, as a consequence of the longer storage period.

As we can observe, in the case of all varieties, the lower rooting percent has been registered at variant where there were treated fruits as well wraps, so, this is an alarm signal for he who deposits fruits for a longer time. To prevent rooting, it is recommended to disinfect the wraps, because these are an important source of pathogen infection. Thus, in the case of Jonathan- V3, the attack percent was only 1,6%, as compared with the control – 13,2%, or with the variant when there only fruits have been treated– 5,9%.

From the present data it can be noticed that the pre-harvest and especially the post-harvest treatments, including wraps disinfecting, are efficient to control pathogens during storage period.

Finally, at the end of the storage period, there were performed physics-chemical analyses, with a view to characterize the fruit quality. Results are resented in Tables 3 and 4.
It was emphasized that as against with the storage starting time, the water contents decreased and there is a higher soluble carbohydrate content, a diminishing of fruits weight as a

consequence of water losses, and a decrease of fruits firmness because of pectin's enzymatic breakdown.

In the case of fruit originated from the treated variants, the fruit storage capacity was better and the qualitative characteristics were higher as compared with the untreated control.

CONCLUSIONS

1. The treatments performed in the orchard before harvest period have had a major effect to reduce the percent of moisture fruits in the storehouse. The reduction was above 50% in the case of Rover 0,2%, as compared with the untreated control.
2. For all varieties, the lower rooting (moisture) percent has been registered at variant were there were treated fruits as well wraps because these are an important source of pathogen infection
3. In the case of fruit originated from the treated variants, the fruit storage capacity was better and the qualitative characteristics were higher as compared with the untreated control.

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Tables

Table 1. Pre-harvest treatments efficacy, during storage period

Variety	Variant	Concentration (%)	Storage period (days)	Moisture
Jonathan	Control	-	80	17,2
	Rover	0,2	80	6,8
	Sumilex	0,1	80	7,0
	Topsin	0,1	40	8,6
Generos	Control	-	60	14,0
	Rover	0,2	60	6,9
	Sumilex	0,1	60	7,9
	Topsin	0,1	60	9,4
Golden Delicious	Control	-	95	19,0
	Rover	0,2	95	9,2
	Sumilex	0,1	95	10,4
	Topsin	0,1	95	11,3

Table 2. The efficacy of post-harvest treatments on losses caused by rooting, during storage period

Variety	Variant	Concentration (%)	Storage period (days)	Moisture (%)
Jonathan	V1- Control	-	80	13,2
	V2- Rover (fruits)	0,2	80	5,9
	V3- Rover wrap+fruits)	0,2	80	1,6
	V4- Sumilex (fruits)	0,1	80	6,6
	V5- Sumilex (wrap+fruits)	0,1	80	3,4
Generos	V1- Control	-	60	11,2
	V2- Rover (fruits)	0,2	60	5,8
	V3- Rover wrap+fruits)	0,2	60	1,2
	V4- Sumilex (fruits)	0,1	60	6,6
	V5- Sumilex (wrap+fruits)	0,1	60	2,8
Golden Delicious	V1- Control	-	95	14,2
	V2- Rover (fruits)	0,2	95	7,2
	V3- Rover wrap+fruits)	0,2	95	1,9
	V4- Sumilex (fruits)	0,1	95	8,5
	V5- Sumilex (wrap+fruits)	0,1	95	3,8

Table 3. Fruits chemical analysis

Variety	Water content (%)	Total dry weight (%)	Soluble dry weight (%)	Total acidity (%)	Ascorbic acid (mg/100 g fw.)	Minerals (%)
Jonathan	81,40	18,60	15,60	0,27	3,96	0,25
Generos	80,50	19,50	14,90	0,43	4,76	0,27
Golden Delicious	78,60	21,40	15,10	0,18	4,25	0,23

Table 4. Fruits physical analysis

Variety	Mean weight (g)	Specific weight (g/cm^3)	Firmness (kgf/cm^3)
Jonathan	120	0,744	3,9
Generos	135	0,780	3,7
Golden Delicious	138	0,760	3,6

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THE RECIPROCAL INFLUENCE BETWEEN GRAFT X ROOTSTOCK AT PLUM SPECIES IN THE SOUTH AREA OF OLTENIA REGION

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Keywords: plum tree, variety, rootstock, compatibility, interaction

ABSTRACT

The plum is a plant very important of temperate zone thanks to fruits solicitation to consume in state fresh and for processing.

To obtained production grands it is necessary testing for all rootstock and variety as and retaining their for each area to precocious, productive and with high quality.

INTRODUCTION

The plum assortment of our country is more complex which introduce in culture a new varieties of plum autochthonous, uppermost of viewpoint but to productions. Among internal factors which influences tree development are variety and rootstock. Using in assortment any rootstock and variety make necessary the control and the holding for every zone of precocious species, productive and with fruits of high quality.

MATERIALS AND METHODS

The experiment was placed at Banu Mărăcine starting with spring 1995. It covers 20 plum tree varieties in three repetitions with 10 trees in repetition, in all, 30 trees for every variety, respectively for every variant. The trees are guided as superpose vessel with a planting distance of 4/4m, respectively 625 trees per ha. As biological material we used 2 plum tree varieties (Tuleu Gras and Renclod Althan) grafted on tree rootstock: Oteşani 8, Pixy şi Miroval.

Our observations and measurements refer to the 1995-2001 period. Every year the soil was maintained on the rows and between rows was ploughed field. Yearly, it was applied 10 plum tree specific treatments, unvarying for all varieties.

In aspects interpretation under influence to both partners (variety and rootstock), it was initiated a experience in the south area of Oltenia region, to accomplish the goal proposed, we established as objectives:

- the study interaction variety x rootstock on trees growth. In this direction was effectuation determination and observations concerning: the behaviour of the plum varieties in the development process; the behaviour of the plum varieties in the fructification process; the resistance at the main diseases and pests; production and quality.

RESULTS AND DISCUSSIONS

Analyzed the variety effect (means) on annual increases, we can ascertain bigger at variety Renclod Althan which has a significant to a very positive significant, succeed of variety Tuleu Gras, (table 1).

The means annual values correlative to vegetative increases on variants total with the effect means varieties in four years last, mentioned not exist positive correlations between annuals increases and variety. The rootstock influence separate analysed, ladle out in evidence a great strength to annuals increases on Miroval rootstock, obtained a average in year 2001 of 0.83 m/pom, a middle strength on rootstock Oteşani 8 (0.72 m/pom), and lesser increases observed at rootstock Pixy (0.67 m/pom).

The rootstock Miroval give a increasing very positive significant o comparative with Oteşani 8 and Pixy, and between last two registering a increase distinct significant positive the rootstock Oteşani 8.

The variety with big increase to trunk section area (SST) it is Renclod Althan with 95.3 cm^2 /tree succeed of variety Tuleu Gras - 70.6 cm^2/tree, (table 2).

Comparative the last two years between them (2000-2001), the variety realised correlation positive with means values to SST where r = 0.1221 (year 2000) and r = 0.1324 (year 2001), but not are significant.

In all years 1995-2001, the rootstock Miroval give a greater strength comparative with other two rootstock Oteşani 8 and Pixy.

Differences of strength to rootstock Miroval are distinct significant positive comparative with Oteşani 8 and Pixy. Correlation the annuals on means values on variants total to rootstock effect with SST , result positive correlations but not significant.

As regards the rapport graft/rootstock in terms of variety influence (table 3), nearer of 1 (unit) as it stands to both varieties, has proven a good affinity.

The rapport graft/rootstock in function of rootstock influence, with nearer of 1, so with a good compatibility values, are realised rootstocks Pixy (1.01), succeed of Miroval (1.04) and Oteşani 8 (1.06) – year 2001, (table 4).

The annual increases, crown diameter, high tree and the progress of the trunck area section, (the values annual means) on the total variants are correlated positive with the rapport graft/rootstock, after seven years of vegetation (year 2001), to evidenced a good compatibility with all these elements.

The variety and rootstock effect is very significant to obtained production, and the interaction variety x rootstock presented a effect insignificant.

Under influence those two partners, grand productions to obtained at the two varieties on rootstock Miroval (16.5 kg/tree), succeed of both varieties on rootstock Oteşani 8 (14.9 kg/tree), and with productions something smaller the varieties grafted on Pixy (11.8/ kg/tree).

Too, after seven years of vegetation (year 2001), correlated annual means values on total variants to productions with annuals increases, crown diameter, trunk section area and with the rapport rootstock/graft, we have positive correlations (r = +0,32; r = +0,18; r = +0,13; r = +0,23) but insignificant.

We have determined like in frame all rootstocks but and varieties studied to obtain middle fruits until at very big. In frame those two varieties on tree rootstocks, uppermost characteristic value of weight fruits to obtained on rootstock Pixy (46.2 g) succeed nearly of rootstocks Oteşani 8 (43.5 g) and Miroval (41.2 g).

The rootstock what influence a high concentration in sugar for majority varieties is Miroval (12.8), succeed of rootstock Pixy and Oteşani 8 (12.2 – 10.6).

To remarked to values significant in vitamin C the varieties grafted on rootstocks Miroval (5.0) and Pixy (4.1).

CONCLUSIONS

1. The specific pedoclimatic conditions for the South Oltenia are propitious for plum tree culture.
2. The annual increases, crown diameter, high tree and the progress of the trunck area section, (the values annual means) on the total variants are correlated positive with the rapport graft/rootstock, after seven years of vegetation (year 2001), to evidenced a good compatibility with all these elements.
3. The varieties grafted on rootstocks Pixy and Oteşani 8 had remarked best compatibility, succeed of varieties grafted on Miroval.
4. Earliness of fructification to presented both varieties, beginning to fruitage of year three of plantation.
5. Pedoclimatic conditions specific for Oltenia hill zone are favourable to plum culture, at varieties studied, grafted on rootstocks respective, represented of perspective rootstocks to plum culture.
6. For Southern area of Oltenia region and zones analogous these conditions, we have recommended the rootstock Oteşani 8, Pixy, and both varieties studied.

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Tables

The annual increases in function of variety influence (m/tree) - (1995-2001)

Table 1

ROOTSTOCK / VARIETY	YEAR 1995	YEAR 1996	YEAR 1997	YEAR 1998	YEAR 1999	YEAR 2000	YEAR 2001
.... TULEU G.	0,14	0,34	0,32	0,44	0,57	0,73	0,74
.... RENCLOD A.	0,23	0,35	0,58	0,65	0,71	0,77	0,79

The trunk section area in function of variety influence (cm^2/tree) - (1995-2001)

Table 2

ROOTSTOCK / VARIETY	YEAR 1995	YEAR 1996	YEAR 1997	YEAR 1998	YEAR 1999	YEAR 2000	YEAR 2001
.... TULEU G.	12,15	19,11	24,83	31,00	42,28	59,26	70,68
.... RENCLOD A.	15,65	23,35	31,71	41,30	61,60	81,63	95,37

The rapport graft/rootstock in function of variety influence (1996-2001)

Table 3

ROOTSTOCK / VARIETY	YEAR 1996	YEAR 1997	YEAR 1998	YEAR 1999	YEAR 2000	YEAR 2001
.... TULEU G.	0,98	1,20	1,28	1,09	1,02	1,04
.... RENCLOD A.	1,00	1,15	1,28	1,09	1,02	1,04

The rapport graft/rootstock in function of rootstock influence (1996-2001)

Table 4

ROOTSTOCK / VARIETY	YEAR 1996	YEAR 1997	YEAR 1998	YEAR 1999	YEAR 2000	YEAR 2001
OTEŞANI 8	0.99	1.22	1.25	1.10	1.01	1.06
PIXY	0.99	1.13	1.23	1.05	1.00	1.01
MIROVAL	0.98	1.23	1.32	1.10	1.02	1.04

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THE BIOCHEMICAL FRUITS COMPOSITION TO SOME SELECTION OF *ASIMINA TRILOBA (L.) DUNAL*

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Keywords: northern banana, breeding, hybrids

ABSTRACT

Asimina or northern banana is a new fruit specie that incited the interest of the specialists and growers in the native area – Northern America, but also in many European countries. Northern banana *(Asimina triloba L.)* belongs to the Annonaceae family and is known in America under the name of pawpaw, Indiana banana or northern banana. In our country this new fruit specie current exists in Cotroceni Botanical Garden, in few private gardens, and in 2003, a small collection was established within the Faculty of Horticulture in Bucureşti, with varieties and hybrids from Italy. The present paper shows the preliminary results concerning fruits biochemical composition, nutritional and caloric content to some new selections of *Asimina triloba.* The new selections *Vitroplant 2* and *Vitroplant 3,* have a unique tropical flavour and powerful aroma*,* a high nutritional quality with high content in vitamins, minerals, and amino acids.

INTRODUCTION

Asimina [***Asimina triloba (L.) Dunal***] is the largest fruit native to the United States (Darrow 1975). This fruit, known commonly as northern banana or Indiana banana, grow wild in the rich hardwood forests of 25 states in the eastern United States, ranging from northern Florida to southern Ontario (Canada) and as far west as eastern Nebraska (Kral, 1960) [1,2,5].

The genus *Asimina* is the only temperate climate representative of the tropical family *Annonaceae*. This family is famous for a number of fine fruit, including cherimoya (*Annona cherimola* Mill.), sugar apple (*Annona squamosa* L.), atemoya (*Annona reticulata* L.), ilama (*Annona diversifolia* Safford), soncoya (*Annona purpurea* Moc.& Sesse), and biriba (*Rollinia mucosa* Bill.) (Morton, 1987) [3,4].

Of the nine species of *Asimina* found in the United States, *Asimina triloba* has the greatest potential for commercial fruit production. Other species are lacking in quality, size, hardiness, or other important characteristics. Asimina fruit have a unique tropical flavour and powerful aroma. The fruits are very nutritious, with high values in vitamins, minerals, and amino acids [4,8].

In addition to its promising potential for fruit production, certain parts of *Asimina triloba* plants contain asimicine, a compound with active pesticidal and neoplastic properties (Rupprecht et al 1986, 1990; Ratnayake et al 1993)[3, 4,7].

In this paper we are presenting the preliminary results concerning fruits biochemical composition, nutritional and caloric content to some new selection of *Asimina triloba*.

MATERIALS AND METHODS

We have used, for the chemical composition study, ripped asimina fruits from two selections: ***Vitroplant 2*** and ***Vitroplant 3.***

Vitroplant 2 fruits description: large fruits, oblong-cylindrical shape, with a green to yellow skin colour, covered with thin layer of bloom; medium weight is: 210,62 g; flesh colour is yellow-white with a flavoured creamy texture and two rows of large light brown seeds inside(fig. 1).

Vitroplant 3 fruits description: medium fruits, oblong-spherical shape, with a yellow to green skin colour (much more coloured than ***Vitroplant 2***); covered with thin layer of bloom; medium weight is: 73.76 g; flesh colour is yellow-orange with a rich flavoured creamy texture and two rows of large dark brown seeds inside (fig. 2).

The analysis which we make to the ripe fruits from the two selection, *Vitroplant 2 şi Vitroplant 3,* was to establish pulp fruits firmness with the penetrometer, to determinate the total dry matter content, to establish fruits respiration intensity, to establish the quantity of vitamin C through iodometric method, to determinate soluble substance through refractometry and to establish mineral substances and water.

RESULTS AND DISCUSSIONS

Ripe asimina fruits have a pronounced aroma that is fruity and floral; the flavour is sweet, fragrant and complex, with a lingering after taste. When ripe, the fruits are soft, like a ripe avocado or peach, and very perishable.

Their respiration rate is higher than the most fruits (62.45 – 63.86 – 74.23 mg CO_2/kgh), and the respiration process emits quite a bit of moisture, heat, carbon dioxide, and ethylene [6].

Fruit can vary considerably in size and shape, depending on cultivar and the number of seeds in each fruit.

Our analyses show that Asimina fruits have a highly nutritional and caloric content: they are rich in vitamin C (table 1), in minerals like: calcium, magnesium, iron, potassium, phosphorus, cooper, zinc (table 2).

CONCLUSIONS

The analyses which we take on Asimina triloba fruits led us to the following conclusions:

- the biggest fruits were obtained to *Vitroplant 2* (162–260 cm^3) given the recording values at *Vitroplant 3* (40–95 cm^3).
- asimina fruits have a highly content in ascorbic acid (33.60-35.20 mg/100g/sp), and also in mineral elements, like: K (301-316 mg/100g sp), P (7.35-7.62 mg 100g/sp), Ca (21.27-29.76 mg/100g sp), Mg, Na şi Fe.
- when *Asimina triloba* fruits are fully ripe respiration intensity was very height (69.70 CO_2/kg h), and that determinate a low capacity of storage.
- ripe fruit can be stored 2-3 days at room temperature and with good refrigeration fruit can be held up to 2 weeks while maintaining good eating quality.

Evaluating the composition of asimina fruits we can conclude that the fruit have a high nutritional quality compared to temperate fruits such as apple, peach, and grape.

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Tables

Table 1 . The *Asimina triloba* fruits biochemical characteristics

	Soluble dry matter (%)	Total dry matter (g)	Pulp firmness (kg F/cm^2)	Mineral substances (%)	Acidity (%)	Vitamin C (mg/100g)	Water (%)	Respiration intensity (mgCO_2/kgh
Control	20.0	24.9	0,25	0.80	0.930	41.25	75.10	62.45
Vitroplant 2	23.0	22.81	0.30	0.81	0.119	35.20	77.19	63.86
Vitroplant 3	24.5	25,67	0.29	0.83	0.112	33.60	74.33	74.23

Table 2. The *Asimina triloba* fruits content in mineral elements

Mineral elements (mg/100 g fs)	Vitroplant 2	Vitroplant 3
Aluminium	0.57	1.20
Barium	17.93	14.38
Boron	0.02	0.03
Calcium	29.76	21.27
Chromium	0.02	0.02
Cooper	0.09	0.12
Iron	0.17	0.26
Phosphorus	7.35	7.62
Magnesium	16.91	14.01
Manganese	0.10	0.12
Lead	0.06	0.03
Potassium	301.63	316.28
Sodium	15.56	8.05
Strontium	4.24	3.49
Zinc	0.15	0.18

Figures

Fig. 1 Fruits from *Vitroplant 2* selection

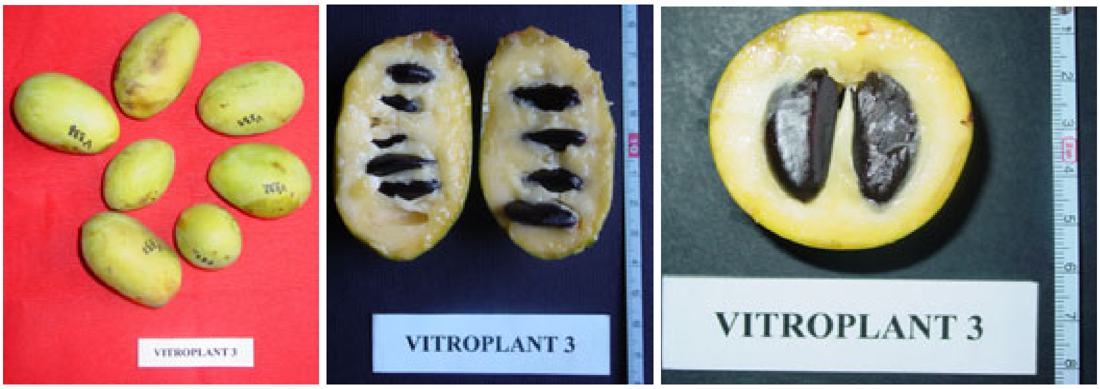


Fig. 2 Fruits from *Vitroplant 3* selection

Lucrări ştiinţifice U.S.A.M.V.B., Seria B, Vol. XLVIII, 2005

THE INFLUENCE OF PESTICIDES ON THE GROWTH OF FUNGUS *HAINESIA LYTHRI* (DESM.) HÖHN

Cristina CRISTESCU

Key words: ***Hainesia*,** pesticides

ABSTRACT

The influence of different pesticides used in strawberry cultivation on the growth of the fungus *Hainesia lythri*, a natural pathogen of strawberry, was evaluated under the laboratory conditions. The fungicides studies were penconazol (Topas 100 EC), propiconazol (Sanazole 250 EC), tebuconazol (Orius 25 EW), triflumizol (Trifmine 30 WP), hexaconazol (Anvil 5 SC), miclobutanil (Systhane 12 E), mancozeb (Dithane 75 WG), dichlofluamid (Euparen 50 WP), procimidon (Sumilex 50 FRV), captan (Merpan 50 WP), folpet (Folpan 50 WP) and clorotalonil (Bravo 500 SC). Good results were obtained with penconazol, propiconazol, tebuconazol, triflumizol, hexaconazol, miclobutanil and mancozeb which inhibited growth of fungus.

INTRODUCTION

Hainesia lythri is a fungus described on leaves of a wide variety of hosts, including *Acer pseudoplatanus, Fragaria vesca, Calluna sp., Epilobium angustifolium, Rosa sentifolia, Rosa sp.* and *Rubus sp.*

In Romania this pathogen of strawberry has been described the first time by the Georgeta Teodorescu in 1997.

The aim of this study was to determine the *in vitro* effects of different pesticides on the growth of the fungus *Hainesia lythri*, a pathogen of the strawberry.

MATERIAL AND METHODS

The strain of *Hainesia lythri* used in this study was isolated from leaves and stems of *Fragaria vesca* from the plantation near Pitesti. The isolates were cultivated on media malt extract agar.

The pesticides studied were selected from the wide spectrum of pesticides commonly used in strawberry cultivation. The characteristics of the pesticides evaluated are presented in table 1.

Pesticides were added to sterilised medium, after cooling to approximately 40 ^{0}C. Plates were incubated at 24^{0} C. Colony diameter was measured every three days for 21 days.

RESULTS AND DISCUSSION

On the medium malt extract agar, three days after the initial culture, the colony diameter was 4.5 cm; after seven days an uniform growth was observed, the isolates had the colony diameter between 5.5-6.5 cm. The mycelium is white, later becoming brown with dark concentric zone. The conidiomata are sporodochium, superficial, separate, very pale brown, initially globose, later opening widely to become cupulate; they are distributed on the outskirt of mycelium. The conidiophores are hyaline, branched at the base and above, septate, in length up to 50 μ x 1-2 μ wide. The conidia are hyaline, aseptate, allantoid, ± guttulate, acute at each end, 5-9 x 1.5-2 μ.

Penconazol (Topas 100 EC), propiconazol (Sanazole 250 EC), tebuconazol (Orius 25 EW), triflumizol (Trifmine 30 WP), hexaconazol (Anvil 5 SC), miclobutanil (Systhane 12 E) and mancozeb (Dithane 75 WG) completely inhibited the growth of *Hainesia lythri*. These active ingredients suppressed mycelial growth.

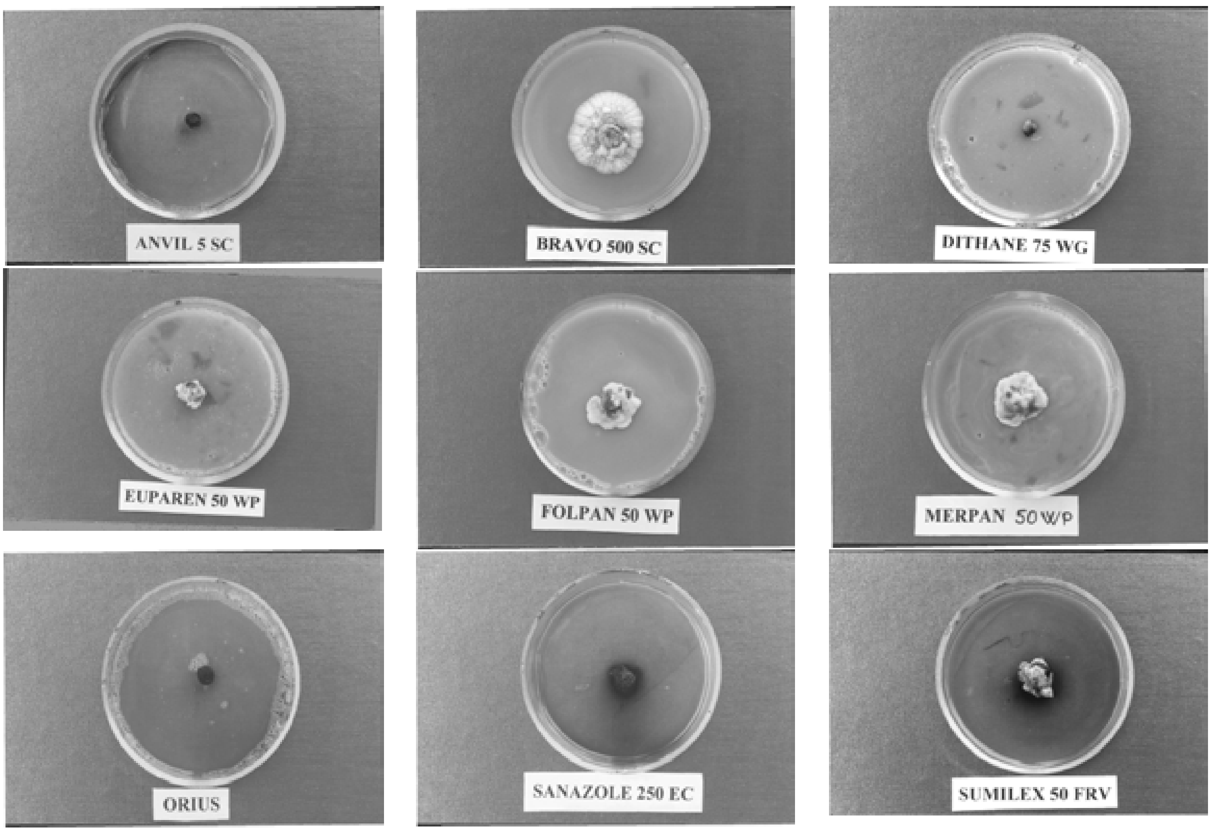
The dichlofluamid (Euparen 50 WP) and procimidon (Sumilex 50 FRV) less toxic to the fungus. The captan (Merpan 50 WP) and folpet (Folpan 50 WP) does not significantly affected the growth of the mycelium.

The clorotalonil (Bravo 500 SC) was considerably less toxic, fungal growth being approximately equal to the control.

Table 1

Pesticides used in experiments

Commercial name	Active ingredient and content (% or g/l)	Active ingredient (in g or ml per litre of medium)
TOPAS 100 EC	penconazol 100 g/l	0,05
SANAZOLE 250 EC	propiconazol 250 g/l	0,02
ORIUS 25 EW	tebuconazol 250 g/l	0,05
TRIFMINE 30 WP	triflumizol 30 %	0,03
SYSTHANE 12 E	miclobutanil 125 g/l	0,05
ANVIL 5 SC	hexaconazol 50 g/l	0,04
SUMILEX 50 FRV	procimidon 50 %	0,15
DITHANE 75 WG	mancozeb 75 %	0,2
MERPAN 50 WP	captan 50 %	0,2
BRAVO 500 SC	clorotalonil 500 g/l	0,25
FOLPAN 50 WP	folpet 50 %	0,2
EUPAREN 50 WP	dichlofluanid 50 %	0,25



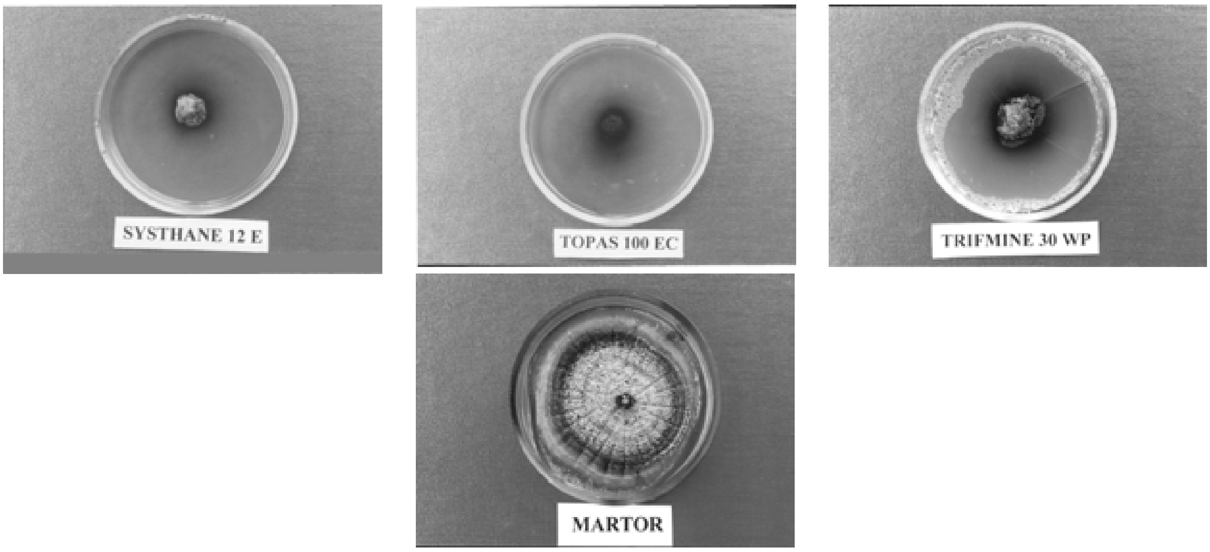


Figure 1. Growth and development of the *Hainesia lythri* on medium with different pesticides

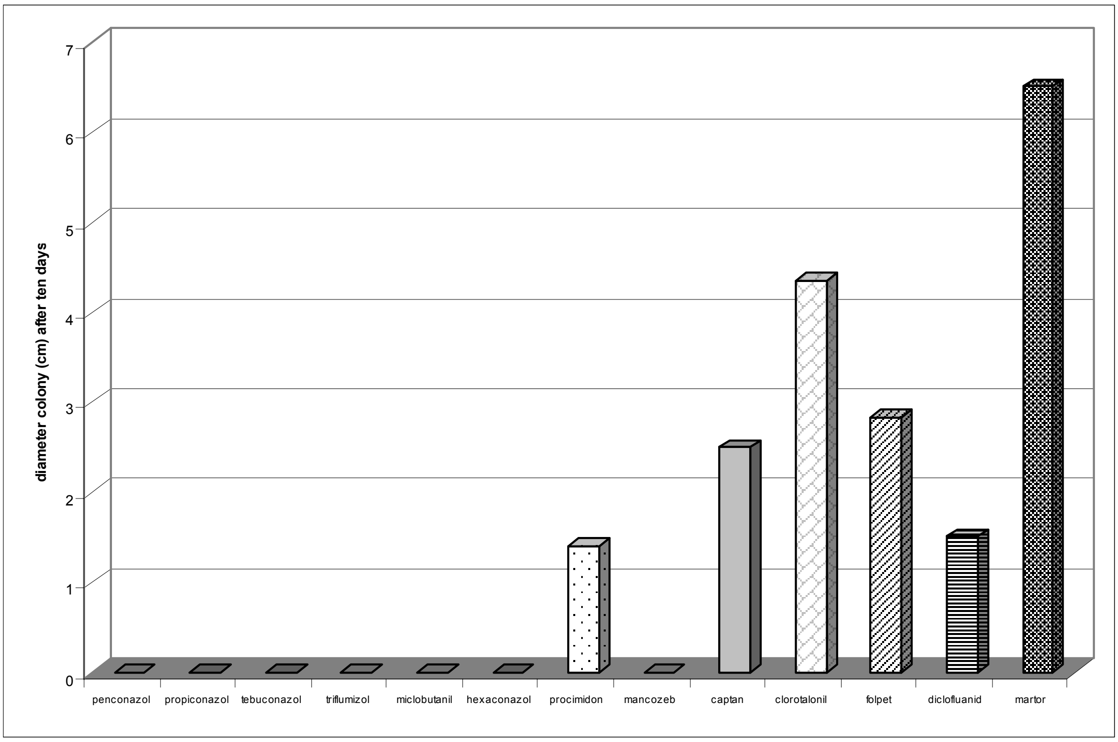


Figure 2. The dynamic of growth of *Hainesia lythri*

CONCLUSIONS

1. On the medium malt extract agar, after seven days the mycelium growth was greater.
2. Of the pesticides tested, penconazol (Topas 100 EC), propiconazol (Sanazole 250 EC), tebuconazol (Orius 25 EW), triflumizol (Trifmine 30 WP), hexaconazol (Anvil 5 SC), miclobutanil (Systhane 12 E) and mancozeb (Dithane 75 WG) inhibited fungal growth the most.
3. The clorotalonil (Bravo 500 SC) was considerably less toxic fungal growth approximately equally witness.

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Lucrări ştiinţifice U.S.A.M.V.B., Seria B, Vol. XLVIII, 2005

THE OPTIMIZATION OF THE PEACH AND APRICOT CULTURE BY INTRODUCING OF SOME IMPROVED TECHNOLOGICAL MEASURES

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Keywords: fertilization, foliar, phytosanitary, pruning

ABSTRACT

The technology of the trees culture has to become friendly with the environment but to allow obtaining big and constant harvests with unpolluted and qualitative fruits. Thus, it were realized more intervention variants in the frame of the technological sequences at the peach and apricot, concreted by choosing the moment of the pruning, setting of the peach bearing by short and long pruning, foliar fertilizations applications in condition of associating with the rest of the technological links. For summer pruning of the apricot, it was obtained significant increased production comparatively with the winter pruning, at peach, short pruning had recorded increased productions; the long variant registered a lower production in the unapplied manual thinning condition. By using foliar fertilization, it were also obtained different increased productions depending on the variety and the fruits presented a lower content in azoth, sodium and nitrites comparatively with the control, the phosphor, potassium and calcium being in generally bigger.

INTRODUCTION

In the trend of the assurance of big and qualitative productions at the peach and apricot culture, the main measures which are claimed are the proper application of the technology and the assurance of minimum production costs for obtaining qualitative fruits but with competitive prices on the market. In the present time, it is desired a cultural technology capable to maximum capitalize the biological potential of some new varieties and to reduce at minimum the pollution of the environment and fruits through the agency of the fertilizers and phytosanitary substances. The researches in the field support these wishes by modifying of some technological measures as follows: assurance of a just bearing setting by pruning and eventually fruit thinning, assurance of a phytosanitary protection integrated with the reduce of the environment pollution, optimization of the water consumption, assurance of the optimum nutrition of trees by phase fertilization with complex fertilizers foliar applied.

MATERIALS AND METHODS

The biological studied material was composed by many apricot and peach varieties planted in the Bucharest area, in the frame of the Didactic-Experimental Field of the Pomiculture Desk. The experience was carried out in the 2003-2005 period. The methodology applied was specific of the field and lab and consisted in observations and field measures, quality analyses done in the lab with known methodology. Phytosanitary treatments and foliar fertilization were handy made with the Nitrophoska, Murtonik and Agrolife products. At apricot, the variants were consisted by the moment of the intervention, respectively summer pruning after the fruit setting V1, summer pruning after harvest V2, the control consist in the winter pruning. At peach, the two pruning variants were the short one and the long one. It were realized another three experimental variants depending on the different way of technologically application, respectively V1 only protection, V2 protection and foliar fertilization, V3 protection, foliar fertilization and row herbicide application.

RESULTS AND DISCUSSION

The obtained peach production was influenced by the variety, technology and climatically conditions, in the 2004 year the spring frosts affected a part of the flowers, reducing the number of fruits.

Only at the Catherine variety, the productions was constant enough because of the fact that the variety is a rustic one, has a very good setting and tolerate the cold in the spring. For the other varieties, the production increase between 6,2-31,5% (Table 1).

The interventions on some technological sequences have benefic effects on the production and the quality of the fruits. Thus, between the three moments of the apricot pruning which were tested, the summer pruning proved be better, the dates shown that at the spring pruning after fruit setting, it is obtained a production increase of 13,2% comparatively with the winter pruning, at the pruning after the harvest, the difference richen at the 29,3% (Table 2).

The summer pruning could counterbalance eventually looses caused by the frost, leaving on tree all the bearing branches, in the normal bearing limit. The pruning after harvest is special recommended for the years with frost in spring, which produce buds and flowers lost. It is need to be made a fruit thinning in order to achieve a good quality and to maintain the integrity of the trees. Without the thinning of the fruits, the trees are heavy and many branches break. For a good capitalization of the manpower, in the large plantations, it is recommended the application of the all three moments of pruning on the different lots, attenuating the frozen risk and the tendency of heaviness of the trees or the inconvenience to need a lot of workers in short term for the summer pruning (Table 3).

The phase fertilization with complex fertilizers extra ridiculer applied assured good tree nutrition, materialized in moderate growths (the too long ones does not make bear buds enough for a good harvest), big production and qualitative fruits. All the three used products, complex with macro and microelements fertilizers had not recorded big differences between them concerning the production, but all were better comparatively with the control fertilized with the ammonium azoth ground applied.

It could be observed that at the product level, it were recorded differences between the varieties caused by the biological features of them, the production increase about 21,9% at the apricot fertilized with Agrolife and respectively 23,6% at the peach fertilized with the same product (Table 4). In plus, the foliar fertilization assured a better resistance of the trees at the stress (dry, diseases, insects etc), induce a normal differencing of the bear buds and the fruits have less azoth residuum.

By foliar fertilization application, it was demonstrated that it is assured an equilibrate nutrition of the trees with reducing or even disappearance of the chlorotical condition at the leaves level in the most unfavourable environment conditions (cold and wet).

Through the lab analyses, at both species it is observed that at the fruit level, the content in azoth, sodium and nitrates is lower at the fruits fertilized with the complex fertilizers comparatively with the control and the phosphor, potassium and calcium are generally bigger.

The just phytosanitary protection reduce the yield lost and assure an healthy leaves of the trees, capable to feed the fruits and to assure a good differencing of the bear buds.

At all variants, the production was better than control, in the frame of the variant, production having an increasing tendency from 2003 to 2005, less in 2004, an year with loses caused by the frost. Remarkable is the big difference between the variant V3, the most complex one (assure phytosanitary protection, stimulate the setting and growing of fruits and avoid the weed concurrency) and control (Table 5).

CONCLUSIONS

The spring pruning of the apricot induced an increase of 13,2%, the pruning after the fruit setting and about 29,3% at the summer pruning, after the harvest.

At the peach, the short pruning recorded increase of production of 3,5-8% and at the long variant, the production was lower.

The foliar fertilization determined an increase of production, about 12,9% at the Nitrophoska product, 15,7% at the Murtonik and 23,6% at the Agrolife, depending on variety.

The phytosanitary protection realized in the frame of the programme with different complexity shown that the phytosanitary production associated with the growth stimulating substances, foliar fertilizers and the soil herbicide application assured increased production about 15-18% with similar costs or little bigger than the classic technology.

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Table 1. The evolution of the peach production (t/ha) (2003-2005)

Variety	2003	2004	2005	Difference 2005-2003 (%)
Redhaven	15,21	12,34	18,2	19,6
NJC 89	14,90	11,27	16,5	10,7
Catherine	15,80	14,26	16,1	1,9
Filip	14,25	13,47	17,2	20,7
Florin	15,23	13,28	16,9	10,9
NJF 2	13,47	11,64	14,3	6,2
A 292	6,43	8,70	12,4	31,5
Costin	11,45	6,25	13,2	15,3
NJC 108	12,87	11,45	14,5	12,7
VTHNO3	9,14	7,89	11,4	24,7

Table 2. The influence of the moment of pruning on the apricot production (t/ha)

Winter pruning (Control)	Spring pruning alter fruit setting (V1)	Summer pruning alter harvest (V2)	Difference V1-Control (%)	Difference V2-Control (%)
12,6	14,5	17,9	13,2	29,3

Table 3. The influence of the pruning on the peach production (t/ha)

Variety	Control	V1 (short pruning)	Difference V1 - Control (%)	V2 (long pruning)	Difference V2 - Control (%)
Redhaven	13,7	14,8	108	13,5	98,5
Florin	14,2	14,7	103,5	13,9	97,9

Table 4. The effect of the foliar fertilization on the apricot and peach production (t/ha)

Variety	Control	Nitrophoska	Murtonik	Agrolife	Difference comparatively with the control (%)		
					Nitrophoska	Murtonik	Agrolife
Dacia	8,5	9,6	9,4	9,8	12,9	10,5	15,2
Comandor	11,4	12,5	13,2	13,9	9,6	15,7	21,9
Favorit	10,2	11,1	11,8	12,1	8,8	15,6	18,6
Redhaven	18,2	19,8	20,1	22,5	9,2	10,4	23,6
Florin	17,2	18,5	18,6	19,3	7,5	8,1	12,2
Filip	16,9	17,4	18,1	18,2	2,9	7,2	7,6

Table 5. The influence of the protection variant on the apricot and peach production (t/ha)

Variant	Control	V1			V2			V3		
		2003	2004[1]	2005	2003	2004[1]	2005	2003	2004[1]	2005
Sulmona	9,5	9,9	8,4	13,4	11,1	8,9	14,9	11,5	9,4	15,2
Sirena	8,9	9,2	7,6	12,8	10,8	7,8	13,6	11,1	8,2	14,3
Sulina	9,4	9,4	8,1	12,4	10,3	7,6	13,8	10,9	8,0	14,1
Redhaven	8,4	9,2	7,5	11,9	9,9	8,2	14,5	10,3	10,4	15,2

[1] - year with frost in the blossom time

Lucrări ştiinţifice U.S.A.M.V.B., Seria B, Vol. XLVIII, 2005

RESEARCHES REGARDING THE MICROPROPAGATION RESULTS OF DWARF PEACH HIBRIDS

PETICILĂ A.G.

Keywords: Dwarf peach, nutrient medium, plant disinfecting.

OBJECTIVES

- Finding out the virus free plants.
- Finding out the protocol for micro propagation of dwarf peach hybrids.
- Finding out the best nutrient medium type to decrease the necessary time to obtain ready plants for planting in the field.
- Studying the effect of different solution concentrations in the disinfection treatment.

INTRODUCTION

Persica vulgaris is a specie who's origin is in Asia, more precisely in China region, were it was signalized in the crop area around 2000 years ago. Like yield and area production is situated in the third place after the apple and citric.(Ghena N. 2003). The Chinese people consider that peach are fruits which determine long and healthy life. If the fruits are consumed fresh they stimulate gastric secretion and make the digestion more easy. The pectins belonging fruits make normal the alimentation tract.(Cociu V. 1993).

The specie is considered to be a polymorph one, and in the growth area there are many types differentiated by shape, skin and pulp colour and flavour.

The dwarf peach was introduced in crop area in our country by prof. Dr. Vasile Cociu at SCPP Constanta. In this moment, in that research station, the germoplasm fond contains 2000 dwarf tree, with 1700 simple hybrid F1 and F2.

MATERIALS AND METHODS

The experiences were conducted in the Micropropagation Laboratory of Faculty of Horticulture, from University of Agronomical Sciences and Veterinary Medicine, Bucharest.

In this experimental study there were used 2 artificial mediums for the *in vitro* culture: Murashige and Skoog (MS) and Quoirin Lepoivre (QL).

The varieties used in this experience were:

FLORIA is a variety of dwarf, ornamental peach with involved red flowers and small fruit.

GENETIC DWARF – is a variety of dwarf peach with round fruit, pubescent skin, yellow pulp with same infiltration around the seed. The medium weight is 145 g.

V.T.84-G-08-Cecilia – is a variety of dwarf peach with elliptic fruit, medium pubescence, red basic colour, yellow pulp and 105-110 g average weight.

The meristems were prelevated from young branches and stimulated in climatic room.

To sterilize the vegetal material there was used sodium hipoclorit with the commercial name Domestos. The study variants exceled regarding the Domestos concentration and the different times for disinfection.

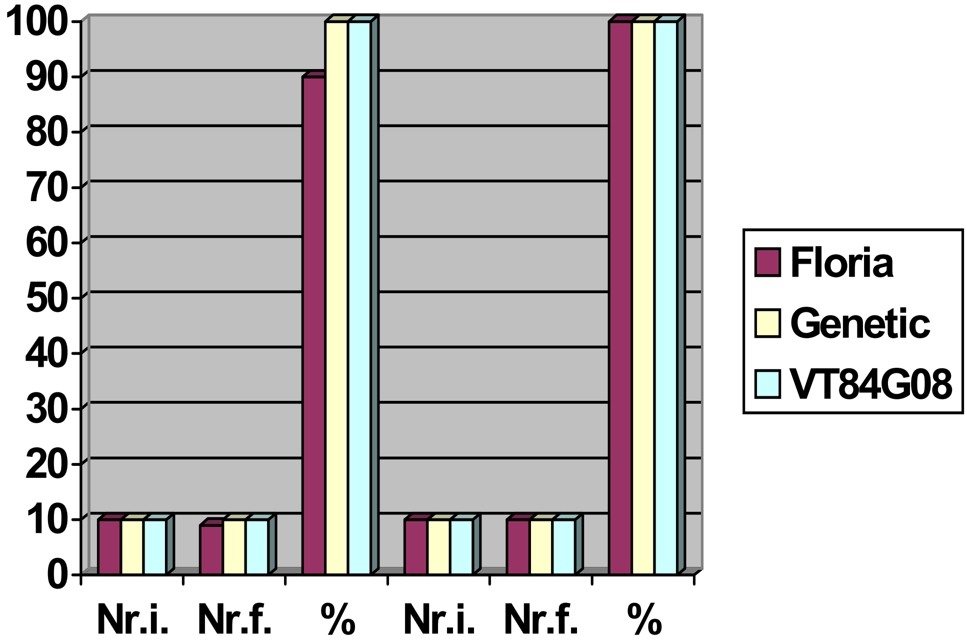
The first variant was 20% Domestos with a 15 min duraton and the final one was 5% Domestos for 4 min, this one providing the highest percent of viable explants.

RESULTS AND DISCUSSION

Following the results we observed that the first variant (Domestos 20%, 15 min) gave only necrosed explants.

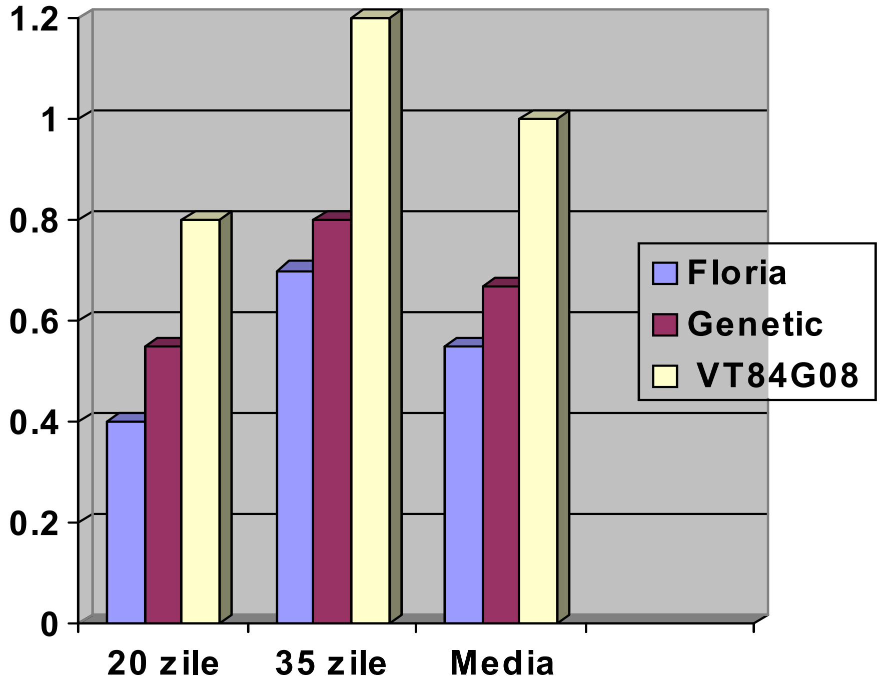
The best possibility/ way to disinfect the explants, before inoculation, was the one using 5% Domestos for 4 minutes.(Fig.1).

Fig. 1



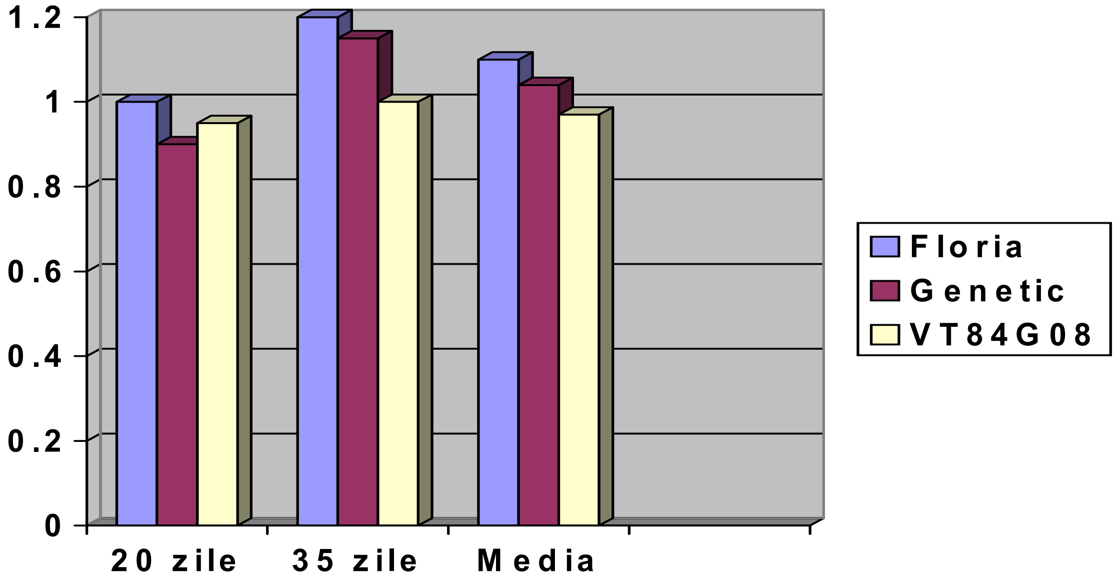
As for the explants growth and build-up, QL medium for initialisation offers better conditions than the MS medium for initialisation, but the ones growing on the MS medium registered a bigger number of leafs (Fig. 2).

Fig. 2



QL medium gave the best results also regarding the multiplication culture, where after 35 days of observation the growth average was bigger than that of the explants growing on MS medium (Fig.3).

Fig. 3



CONCLUSIONS

- A good disinfection of the vegetal material can be realised using 5% Domestos for 4 minutes.
- The explant growth can be obtained in good conditions using for initialisation but also for multiplication Ql medium .
- Among the studied varieties, Floria and Genetic Dwarf gave the best results having meaningful increases on those mediums.

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CONDUCTING THE DIFFERENTIATION PROCESS TO IMPROVE EFFICIENCY OF THE `*IN VITRO*` REGENERATION IN *FICUS CARICA*

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Keywords: Explants, culture media, photoperiod, hormonal balance, organogenesis

ABSTRACT

The advantages of ”in vitro” culture determine that a big number of species to be tested for the culture. Ficus carica is a species more and more required for people’s gardens in latest time. The experiment organized at the Research Institute for Fruit Growing Piteşti-Mărăcineni has had in view the establishment of optimal parameters that make efficacious some culture for Ficus carica. The media tested M & S and Lepoivre showed that answer different regarding to the need of macro and microelements for this species. The regeneration percent was influenced by uses of different auxins NAA or IBA and by different quantities of citokinin BAP = 0,1 mg/l; 0,5 mg/l and giberelic acid GA_3 = 0,3 mg/l; 1 mg/l.

INTRODUCTION

”In vitro” morphogenesis requires the inducing of some autoregulate phenomena that are autonomous and depend on new heterothrophe conditions that were created. In conformity with literature (Boxus and Druart, 1989) the explants has minim (limit) size for manifested cells totipotentiality under ”in vitro” conditions.

Other factor for successful of ”in vitro” culture is represented by media compound. This is typical for every species or cultivars, the requests are different even depending on the explants used (Isac, 1983). Together with basic culture media, the current methods used to ”in vitro” culture for in order to induct and sustain of organogenesis have as practical and theoretical base the hormonal balance concept. Dilley (1969) showed that the influence of hormones was manifested as their single action and through the change of ratio between stimulator hormones and inhibitor hormones.

Starting from this aspect, this work has had in view to determine some solutions for efficacious ”in vitro” culture for Ficus carica through optimizing of the parameters depending on the differentiation phase.

MATERIALS AND METHODS

Biological material: was represented by meristem from types A – meristematic dom with 2-3 leaves with total size2-3 mm obtained from axilary buds from annual branches and type B – only meristematic dom with total size 0.8-0.9 mm.

Disinfections: of biological material consists of washing with water+ liquid detergent + Tween 80 = 5 min; immersion in alcohol 96^o for 15 min and immersion in sodium hypoclorite for 10 min, washing with distilled and sterile water 3 x 10 min.

Culture media were represented of M &S and Lepoivre media on more treatments that were constituted from different quantities: NAA or IBA = 1 mg/l; BAP = 0.1 mg/l or 0.5 mg/l; GA_3 = 0.3 mg/l or 1 mg/l. The organic carbon source was assured using sacharose (30 g/l) and agar like gelifiant agent (6 g /l).

The explants were put in glasses to laminar air hood. Culture conditions consisted of temperature = 22-23^0 C photoperiod: 16 hours light (2000-2500 lx) and 8 hours dark.

The observations were made for 20 viable explants for every treatment.

RESULTS AND DISCUSSION

Especially, following the particularity of culture media, one can observe the influence of compound with macro and micronutrients and hormonal balance. The culture media here answered different, depending on the nutrition requests of the fig tree in the differentiation phase. So, from the treatments tested only 4 for every base media M &S or Lepoivre gave the positive results:

- V1 = M & S + 1 mg/l IBA+ 0,1 mg/l BAP + 0,3 mg/l GA_3
- V2 = M & S + 1 mg/l IBA+ 0,5 mg /l BAP + 1 mg /l GA_3
- V3 = M & S + 1 mg/l NAA + 0,5 mg/l BAP + 0,3 mg/l GA_3
- V4 = M & S + 1 mg/l NAA + 0,5 mg /l BAP + 1 mg /l GA_3
- V1 = Lepoivre + 1 mg/l IBA+ 0,1 mg/l BAP + 0,3 mg/l GA_3
- V2 = Lepoivre + 1 mg/l IBA+ 0,5 mg /l BAP + 1 mg /l GA_3
- V3 = Lepoivre + 1 mg/l NAA + 0,5 mg/l BAP + 1mg/l GA_3
- V4 = Lepoivre + 1 mg/l NAA + 0,5 mg /l BAP + 1 mg /l GA_3

From data of fig. 1 is ascertained that the culture media are different the best results recording M & S media with minimal values 77,77 % and maximal 93,33 % unlike Lepoivre media with minimal values 33,33 % and maximal value 60 % explants differentiation. The explants that are on M &S medium are more vigorous than explants from Lepoivre medium (photo 1).

Analysing only M & S culture media the influence of hormonal balance we can infer that the more contribution of giberelic acid (GA_3 = 1 mg/l in V 4 unlike GA_3 = 1 mg/l in V 3 led to an improvement of a degree differentiation. The presence of NAA auxine in V 4 gave superior values (93,33 % differentiation), unlike V 2 (80 % differentiation) that had IBA.

Another aspect was the regeneration power depending on explants type. The results from the best media treatments showed that explants A recording after 3 weeks to 0,55 cm length and 60 % explants differentiation. After 5 weeks recording 93,33 % explants differentiation with 1,76 cm length media. The last observations for this phase were after 7 weeks the culture establishment and showed that the explants had 2,40 cm.

The B explants represented only by meristematic dom had a low behaviour (table 1). After 3 weeks only 10 % explants differentiation occurred like after 5 weeks. After 7 weeks they presented necrosis and the culture given up. The length of explants was 0,3 cm.

CONCLUSIONS

1. *Ficus carica* is a species that preferred the culture media rich in mineral elements, for example M & S media recording superior results versus Lepoivre media.
2. The hormonal balance needs more quantity from giberelic acid and preferred NAA auxine.
3. The explants differentiation happens especially in first 3 weeks after this period the number of differentiation is lower and after 5 weeks the undifferentiated do not differentiate explants.

4. The explants represented by meristematic dom with 2-3 leaves have a superior capacity for regeneration depending on meristematic dom.

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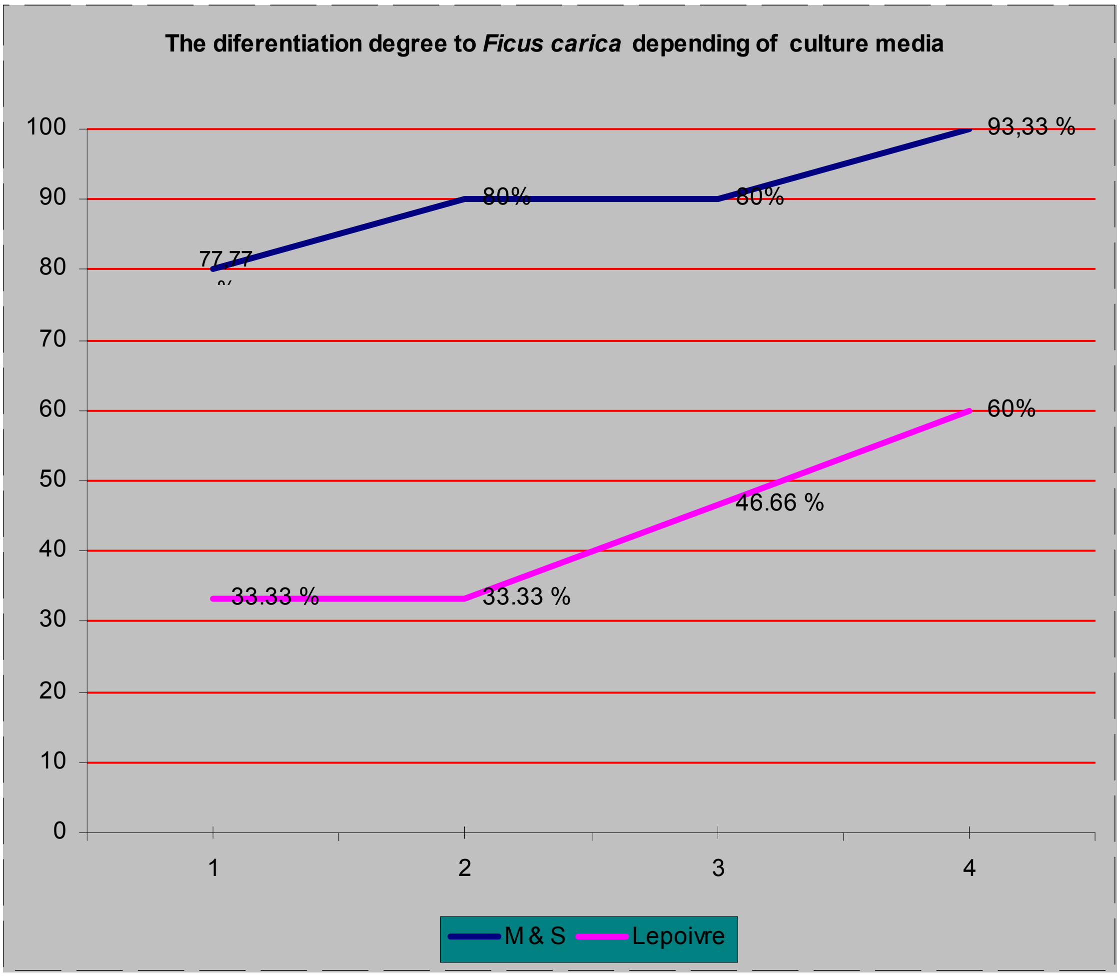

Fig. 1

Table 1. Evolution of the A and B explants *"in vitro"* culture to *Ficus carica*

No.	**Specification**	**Media on M & S culture media**	
		Nr. expl. Differentiation (%)	**Media length realised**
I. Evolution after 3 weeks			
1.	Explants A	60	0,55
2.	Explants B	10	0,3
II. Evolution after 5 weeks			
1.	Explants A	93,33	1,76 cm
2.	Explants B	10	0,3
III. Evolution after 7 weeks			
1.	Explants A	93,33	1,76 cm
2.	Explants B	10*	0,3*

* Because the evolution was negative this culture was abolished in this phase

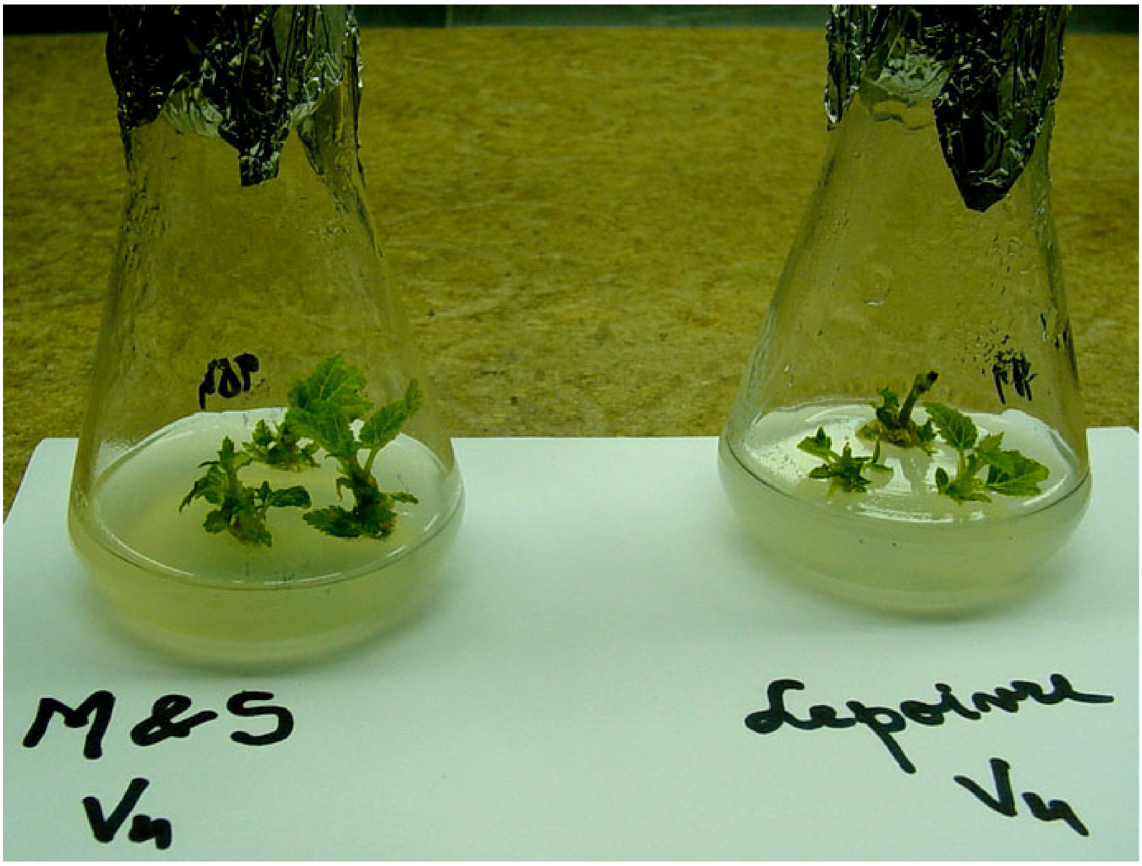

Photo 1. The inequality between vigorous of the explants
in depend of culture media

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GROWING AND FRUCTIFICATION OF SOME KAKI VARIETIES IN THE ROMANIAN`S PLANE CONDITIONS

Iuliana STANCIU and N. CEPOIU

Keywords: fructification, ripening period, biochemical content.

INTRODUCTION

The studied species is *Diospyros kaki* grafted on *Diospyros lotus*. The trees were propagated throw grafting.

The kaki fruit is a berry; it looks like a tomato, except the calyx which is completely different. The fruit is climacteric.

The aims fallowed in this research were:

- The adaptation of some kaki varieties in the Romanian Plane;
- The pomological characterisation;
- The knowledge of the biochemical content of the fruits;
- The establishment of the optimum period of the fruits harvesting.

MATERIALS AND METHODS

The biological materials used were trees between 2-7 years and the varieties studied were: Rojo Brillante, Hana Fuyu, Tamopan and ANPL.

Experimental conditions: solitary trees and planted trees at 4/3 m. The soil was mentained as land in tillage. There were just 2 locals fertilization with complex fertilizer and 2-3 irrigations. There are no needs for sanitary treatments.

RESULTS AND DISCUSSIONS

From the date regarding the pomological characteristics of some kaki varieties, presented in table 1, results that the shape of the kaki fruit has the fallowing limits: round-oval (Rojo Brillante) to round-aflattened (Tamopan) or round (ANPL).

The average weight was between 21.2 g (ANPL) and 219.2 g (Rojo Brillante), the fruits being very large (Rojo Brillante) or just large (Hana Fuyu and Tamopan) and small (ANPL). The fruits diameter was between 3.3 cm (ANPL) and 7.6 cm (Rojo Brillante).

Regarding the biochemical content of the fruits (table 2) - the total dry substance was between 15.86 % (Hana Fuyu) and 27.75 % (ANPL). The sugars content varied between 13.28 % (Hana Fuyu) and 19.22 % (ANPL). The water content was smaller at ANPL (75.25 %) and bigger at Rojo Brillante (84.14 %).

Total acidity had the same value for all varieties 1%.

The vitamin C content was smaller to Rojo Brillante (17 mg/100 g fruit) and bigger to ANPL (79 mg/100 g fruit) and the ash content (mineral substance) had the biggest value to ANPL (3.10 %).

CONCLUSIONS AND RECOMMENDATION

The ripening period was between 5 and 31 October (ANPL being the first fruit maturated), 10-22 October (Rojo Brillante), 14-26 October (Hana Fuyu) and 14-30 October (Tamopan).

The ANPL (North American Local Population) is recommended in industry because it had a dry substance content of 24.75 %. For fresh consumption we recommend the following varieties: Rojo Brillante, Hana Fuyu and Tamopan, which are very tasteful.

The biggest vitamin C content was observed in ANPL and in Hana Fuyu (79 mg and 43 mg/100 g fresh fruit).

Table 1

The pomological characteristics of some kaki varieties

Variety	Fruit shape	Fruit colour	Fruit diameter (cm)	Average weight of the fruit (g)	Ripening period
Rojo Brillante	round-oval	red bright	7.6	219.20	10–22 Oct.
Hana Fuyu	round	orange	6.7	160.50	14-26 Oct.
Tamopan	round- aflattened, broad oblate, somewhat 4-sided; indented around the middle or closer to the base	orange	6.7	155.40	14-30 Oct.-
ANPL*	round	Orange-dark mauve	3.3	21.20	5-31 Oct.
X			6.08	139.08	10-27 Oct.
Limits of variation	From round-oval to round-aflatened	Red bright-orange-mauve	3.3-7.6	21.20-219.20	5-31 Oct.

ANPL* – North American Local Population

Table 2

The biochemical content of the fruits to some kaki varieties with different origin

Variety	Total dry substance %	Sugars %	Water content %	Total acidity % (expressed in malic acid)	Vitamin C content (mg/100 g fruit)	Ashes content (mineral substance) %
V (Mt)	19.69	18.59	80.32	0.38	7	0.33
Rojo Brillante	15.86	13.28	84.14	1.00	17	2.44
Hana Fuyu	17.08	13.28	82.92	1.00	43	1.22
Tamopan	18.89	13.59	81.11	1.00	32	1.18
ANPL*	24.75	19.22	75.25	1.00	79	3.10
X (media)	19.25	15.59	80.75	0.88	35.60	1.65
Variation Limits	15.86-24.75	13.28-19.22	75.25-84.14	0.38-1.00	7-79	0.33-3.10

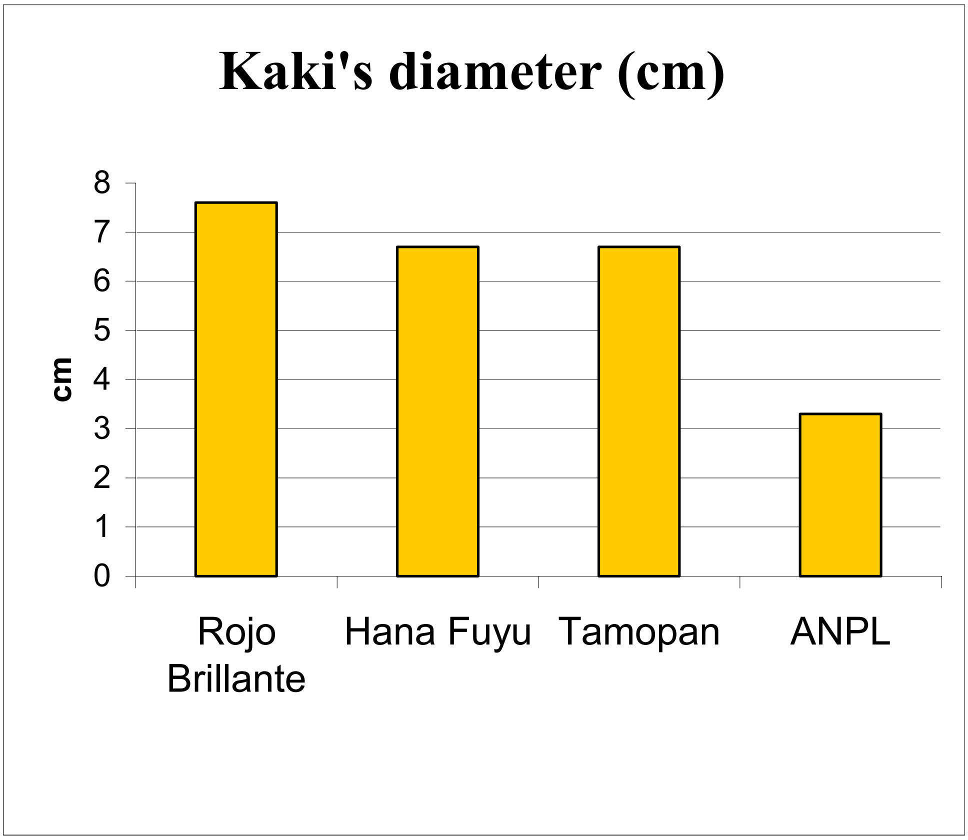
ANPL * – North American Local Population

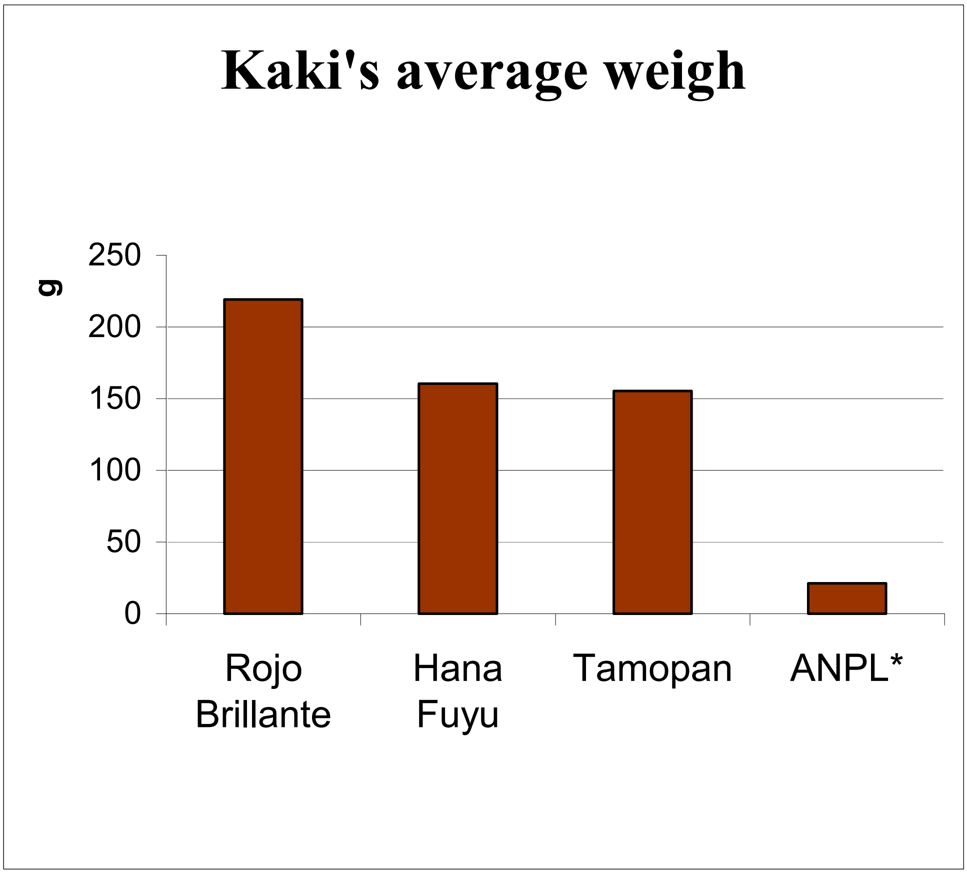
Rojo Brillante

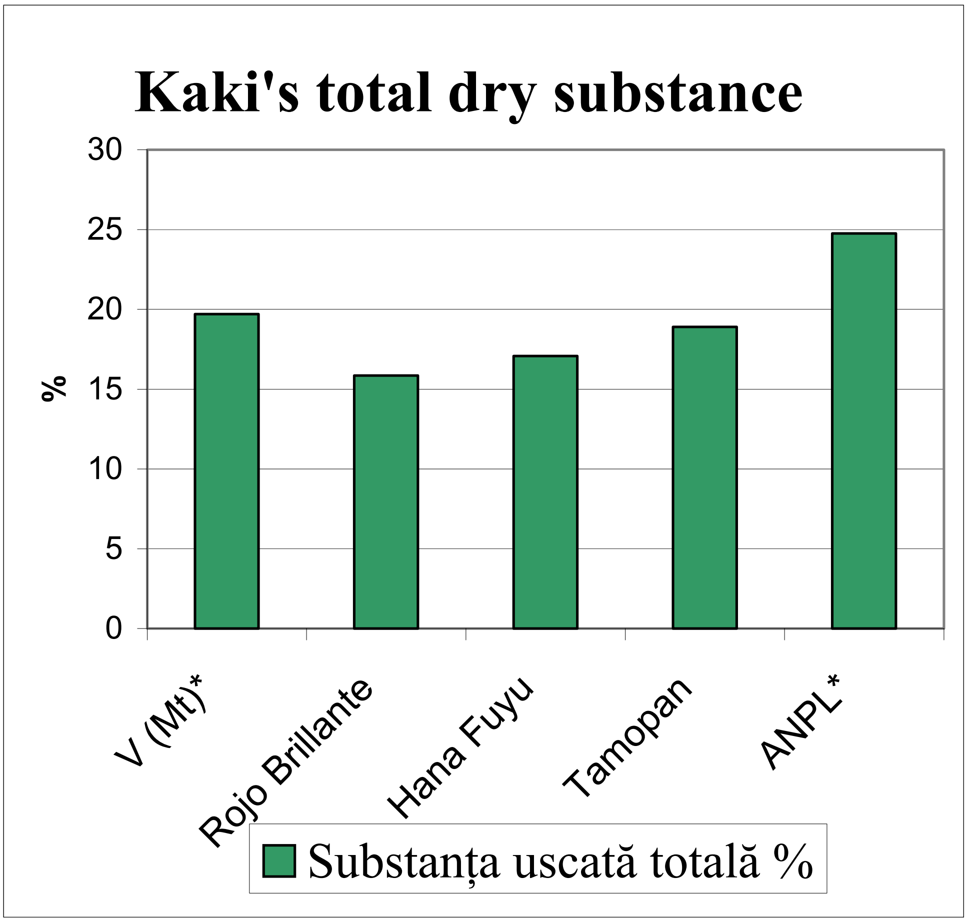
Tamopan

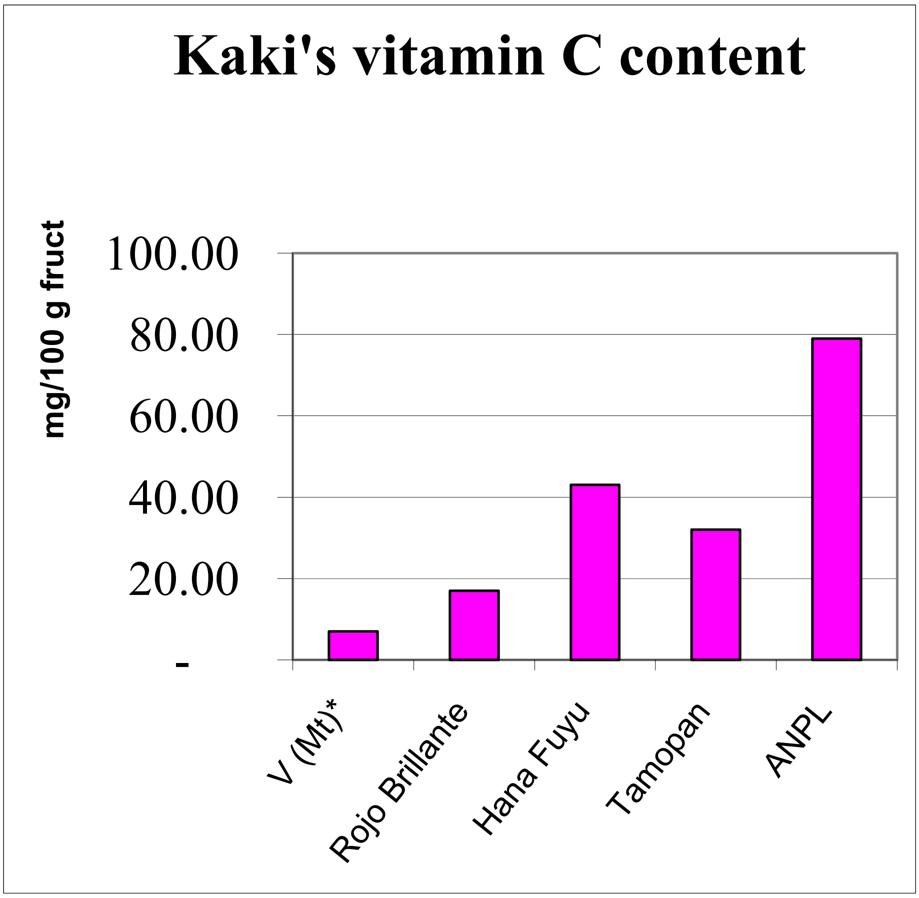
Hana Fuyu

ANPL* fructification


Kaki's diameter (cm)
cm
8
7
6
5
4
3
2
1
0
Rojo Brillante
Hana Fuyu
Tamopan
ANPL


Kaki's average weigh
g
250
200
150
100
50
0
Rojo Brillante
Hana Fuyu
Tamopan
ANPL*


Kaki's total dry substance
30
25
20
15
10
5
0
%
V (Mt)*
Rojo Brillante
Hana Fuyu
Tamopan
ANPL*
Substanța uscată totală %


Kaki's vitamin C content
mg/100 g fruct
100.00
80.00
60.00
40.00
20.00
-
V (Mt)*
Rojo Brillante
Hana Fuyu
Tamopan
ANPL

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INTEGRATED FRUIT PRODUCTION AND THE NECESSITY OF EUROPEAN INTEGRATION

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Keywords: European regulation, environment friendly technology, traceability, marketing

PRINCIPLES OF INTEGRATED FRUIT GROWING

- Use of new resistant varieties to pests, diseases and abiotic stress factors;
- Chose of species, varieties and rootstocks adapted to specific areas and micro areas of fruit production;
- Development of the fruit trees ecosystem biodiversity thorough the creation of biological systems based on the use of the antagonists organisms in pests and disease control.

NORMS IN INTEGRATED FRUIT PRODUCTION

- **new plantations only in vocational areas** recognized for their high favorability for fruit growing;
- **the chose of the biologic material** (species, varieties, rootstocks) with genetic resistance;
- **the use of the most efficient tree canopy** at the bioconversion of the solar energy;
- **grass covered orchard soil maintenance** by reducing the number of the mechanical tillage;
- **the use of the irrigation as an efficient tool** for tree vegetative and productive regulation;
- **organic fertilizing** and recycling by composting of the organic materials;
- **integrated pests and disease management** and protection of the auxiliary organisms in the orchard.

Pluses of the Integrated Fruit Production in Romania:
- existence of a wide assortment of disease resistant varieties;
- low level of the soil and water pollution;
- promotion of new technologies based on the reduction of the inputs;
- possible financial European support;
- certificated integrated fruit production can be easily exported on the E.U market.

Minuses of the Integrated Fruit Production in Romania:
- lack of coherent strategies for the promotion and extension of integrated fruit production;
- low level of information and professional preparation of the small farmers;
- lack of strong fruit growers associations;
- low number of literature for spreading the IFP knowledge.

Certification organisms in Italy:
- CMI Bologna,
- Check fruit Bologna for integrated fruit growing
- CCPB Bologna, for organic fruit growing.

- For peaches, nectarines, kiwi, pears since 2004 an EUREP GAP certification.
- For peaches, nectarines, kiwi, pears - IGP mark (Protected Geographical Identification)

Annually 15-20 % of the fruit production is verified in he field and laboratory.

75-80% of the OROGEL Group fruit production comes from IFP. For strawberry production the percentage raised over 95%. The trade mark for this production of OROGEL Group is „SOLO SOLE” (photo 1).

About 5-10 % of the production is represented by „SOLO SOLE BIO” trade mark for organic production.

Photo 1 – Trade marks for the integrated fruit production - SOLO SOLE

Labeling systems are necessary to satisfy the traceability requests for a fast identification of the producer and orchard plot (photo 2) .

Photo 2 – Label with EAN codes used at the fruit storage entrance

Every where, commercial slogans on labels and fruit case underline the fact that the products are safe, clean and good for human health (photo 3).

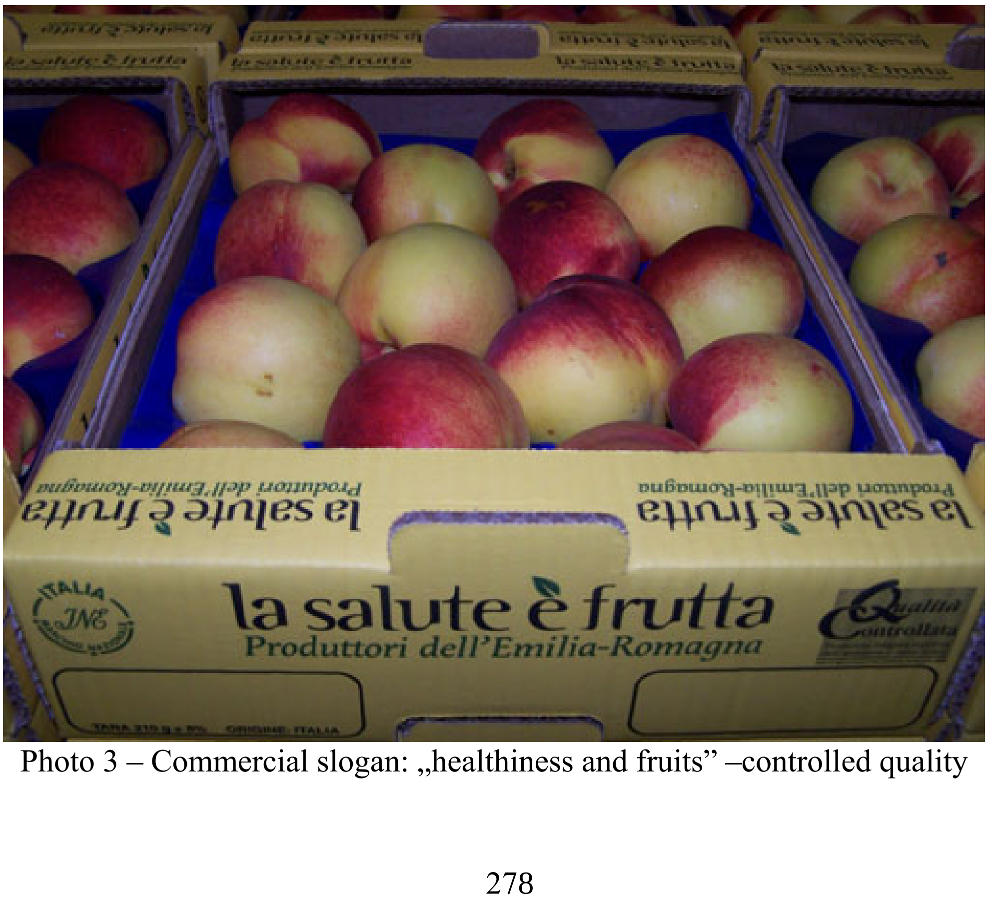

Photo 3 – Commercial slogan: „healthiness and fruits" –controlled quality

New fruit species as *Asimina triloba* (northern banana) can be an alternative source of safety fruits from integrated and organic production, with an extremely high content in vitamins, minerals and flavors.

Photo 4 – *Asimina triloba* fruits of Sunflower variety

Photo 5 – Self pollinating variety Prima 1216, obtained in Italy by Domenico Montanari

Photo 6 – New asimina orchard in integrated production system

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INFLUENCE OF PRUNING ON GROWTH AND FRUITING IN SOME APPLE RESISTANT CULTIVARS

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Keywords: pruning, apple resistant cultivars

ABSTRACT

All new cultivar/rootstock combinations are evaluated in order to establish the differentiated technologies. This paper proposes the study of different pruning in some apple resistant cultivars (Pionier, Prima, Generos, Florina). The moderate pruning of semiscaffold and/or shoots (with ½ of length) induced a small vigor and a higher production than the strong pruning (with 2/3 of length) treatments.

INTRODUCTION

The knowledge of the growth and fruiting characteristics in different species and cultivars makes possible application of differentiated pruning on groups of cultivars and even on each cultivar (Sumedrea et al., 2000). The new foreign and inland cultivars ask for studies in order to check up and spread the best of them in the new orchards (Cociu, 1981).

The purpose of this paper is to determine influence of pruning on growth and fruiting in some apple resistant cultivars: Pionier, Prima, Generos, Florina.

MATERIALS AND METHODS

The experiment was established at the Research Institute for Fruit Growing Pitesti, Maracineni, in an orchard planted on April, 1995. This was organized with the following research factors: A - apple cultivars: a_1 Pionier, a_2 Prima, a_3 Generos, a_4 Florina; B – tree density: b_1 2777 trees/ha (3.6 X 1.0 m), b_2 5555 trees/ha (3.6 X 0.5 m); C – different pruning of semiscaffold and/or shoots: c_1 pruning of the semiscaffold with ½ from length (T1), c_2 pruning of the semiscaffold and shoots with ½ from length (T2), c_3 pruning of the semiscaffold with 2/3 from length (T3), c_4 pruning of the semiscaffold and shoots with 2/3 from length (T4). The experiment was organized in 3 replicates with 3 trees in each replicate plot.

The following observations and measurements were taken: the trunk cross sectional area (TCSA), length of the shoots, fruit yield and its structure on fruiting branches type, yield quality, number of flower buds differentiated for next year.

RESULTS AND DISCUSSIONS

1. Vegetative growth. The vigour of trees was determined as the increase in trunk cross sectional area (TCSA) growth (table 1). on average, in the study period the T4, T3 and T2 treatments induced the best increase in TCSA growth (2.47 cm^2, 2.28 cm^2 and 2.26 cm^2, respectively), and these data were significantly different versus the value obtained in the T1 treatment (1.94 cm^2).

The highest sum of annual shoot growth was obtained in T4 treatment (table 2) with a stronger pruning (678.3-921.7 cm) followed by T3 treatment (606.5-636.3 cm, depending on year). The highest average length of shoots induced by the strongest pruning (T4, 33.7-48.5 cm, depending on year). The above values were significantly different versus the values recorded in the other treatments (table 3).

Generally, for all cultivars, the moderate pruning (T1 and T2 treatments) induced the highest yield (10.23 kg/tree and 10.68 kg/tree, respectively, on average in the study period). The lowest yield, which was obtained in T3 and T4 treatments (table 4), can be explained by stimulation of growth due to the strong pruning, with 2/3 from length of semiscaffold and/or shoots.

2. Fruiting elements. The T1 and T 2 treatments had the highest yields on the short fruiting branches type (61% in T1 and 48% in T2 treatments). On T3 and T4 treatments, due to the strong pruning long fruit branches were obtained. Thus, in the T3 and T4 treatments most of yield was obtained on the long fruiting branches (63% in T3 and 73% in T4 treatments, respectively).

Generally, in T1 and T2 treatments, all cultivars (especially Prima and Generos cvs.) formed numerous short fruiting branches in the middle and lower third of the semiscaffold.

The T3 and T4 treatments induced the best average fruit weight (134 g in T4 and 123 g in T3 treatments, respectively, during the study period). These can be explained by the lower number of fruit/tree obtained in T3 and T4 treatments.

On average, in the study period the highest average of flower buds/tree (200.8 in T1 and 239.2 in T2, respectively) were obtained in the T1 and T2 treatments

CONCLUSIONS

The strong pruning treatments with (T3 and T4 with pruning of the semiscaffold and/or shoots with 2/3 from length) induced the highest vigour versus the moderate pruning performed in the T1 and T2 treatments.

Although, the biggest average fruit weight was obtained in the strong pruning (T3 and T4), we recommend the moderate pruning treatments, especially the T2 treatment that was obtained the highest yield.

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Table 1. Average of tree vigour as increase in TCSA growth, on cultivars, densities and treatments

	Increase in TCSA growth (cm^2)			
	2002	**2003**	**2004**	**Average 2001-2003**
CULTIVAR				
Pionier	1,00* c	1,08 b	0,57 d	0,88 c
Prima	3,15 a	2,59 a	3,72 b	3,15 a
Generos	1,80 b	1,49 b	1,77 c	1,70 b
Florina	2,52 a	2,51 a	4,67 a	3,23 a
DENSITY				
2777 tree/ha	2,66 a	2,03 a	3,38 a	2,69 a
5555 tree/ha	1,58 b	1,81 b	1,98 b	1,79 b
TREATMENT				
T_1	1,46 b	1,40 b	2,96 a	1,94 b
T_2	2,34 a	1,84 ab	2,60 a	2,26 a
T_3	2,08 a	2,26 a	2,50 a	2,28 a
T_4	2,59 a	2,16 a	2,67 a	2,47 a

*Values within a column fallowed by the same letter were not significantly different at the 5% probability level (by Duncan's multiple range test).

Table 2. Average of shoots length sum, on cultivars, densities and treatments

	Average of shoots length sum (cm)		
	2002	**2003**	**2004**
CULTIVAR			
Pionier	735,0* a	680,3 a	775,6 a
Prima	570,9 b	566,3 b	501,6 b
Generos	561,0 b	459,7 b	418,4 b
Florina	632,5 a	672,8 a	913,0 a
DENSITY			
2777 tree/ha	768,3 a	686,8 a	706,7 a
5555 tree/ha	481,3 b	502,6 b	597,6 b
TREATMENT			
T_1	510,7 b	486,9 b	513,2 b
T_2	597,6 b	607,3 a	567,0 b
T_3	636,3 ab	606,5 a	606,7 ab
T_4	754,8 a	678,3 a	921,7 a

*Values within a column fallowed by the same letter were not significantly different at the 5% probability level (by Duncan's multiple range test).

Table 3. Average of number and length of shoots, on cultivars, densities and treatments

	Average length of shoots (cm)			Average number of shoots (no.)		
	2002	**2003**	**2004**	**2002**	**2003**	**2004**
CULTIVAR						
Pionier	31,9 a	24,3 b	35,3 a	23 b	28 a	22 b
Prima	21,2 b	23,6 b	23,9 b	27 a	24 b	21 b
Generos	20,8 b	19,9 c	18,2 c	27 a	23 b	23 b
Florina	28,8 a	39,6 a	33,8 a	22 b	17 c	27 a
DENSITY						
2777 tree/ha	30,8 a	28,1 a	29,4 a	25 a	24 a	24 a
5555 tree/ha	20,6 b	25,5 a	26,2 b	23 a	20 a	23 a
TREATMENT						
T_1	20,4 c	18,0 c	24,4 b	25 ab	27 a	21 b
T_2	22,1 bc	23,4 bc	21,0 b	28 a	26 a	27 a
T_3	26,5 b	26,4 b	23,3 b	25 ab	23 ab	26 a
T_4	33,7 a	42,4 a	48,5 a	21 b	16 b	19 b

*Values within a column fallowed by the same letter were not significantly different at the 5% probability level (by Duncan's multiple range test).

Table 4. Average fruit yield (kg/tree), on cultivars, densities and treatments

	2002	**2003**	**2004**	**Average 2002-2004**
CULTIVAR				
Pionier	9,30 a	7,17 b	10,42 b	8,96 b
Prima	9,31 a	10,33 a	12,29 a	10,64 a
Generos	9,55 a	10,35 a	7,91 c	9,27 ab
Florina	8,70 a	13,37 a	6,02 c	9,03 ab
DENSITY				
2777 tree/ha	11,00 a	14,41 a	11,92 a	12,44 a
5555 tree/ha	7,44 b	6,21 b	6,40 b	6,68 b
TREATMENT				
T_1	8,28 b	10,58 ab	11,82 a	10,23 a
T_2	10,41 a	12,03 a	9,60 ab	10,68 a
T_3	10,10 a	9,02 b	7,68 b	8,93 b
T_4	8,07 b	8,59 b	7,54 b	8,07 b

*Values within a column fallowed by the same letter were not significantly different at the 5% probability level (by Duncan's multiple range test).

Table 5. Yield structure on fruit branches, like average on cultivars, densities and treatments

	Yield structure on fruit branches (%)			
	SFB[1]	**LFB[2]**	**LFB[3]**	**CFB[4]**
CULTIVAR				
Pionier	12	40	43	5
Prima	58	19	12	11
Generos	53	19	11	17
Florina	23	32	36	9
DENSITY				
2777 tree/ha	36	29	31	10
5555 tree/ha	37	26	30	11
TREATMENT				
T_1	61	15	16	8
T_2	48	22	20	10
T_3	24	30	33	13
T_4	13	43	33	11

1) SFB – short fruit branches
2) LFB - long fruit branches, with one flower bud in top
3) LFB - long fruit branches, with flower buds in top and lateral
4) CFB – complex fruit branches (multianual)

Table 6. Average fruit weight, on cultivars, densities and treatments

	Average fruit weight (g)			
	2002	**2003**	**2004**	**Average 2002-2004**
CULTIVAR				
Pionier	113	124	106	114
Prima	118	117	98	111
Generos	148	122	132	134
Florina	139	119	127	128
DENSITY				
2777 tree/ha	130	119	122	124
5555 tree/ha	129	122	110	120
TREATMENT				
T_1	138	120	108	122
T_2	121	98	105	108
T_3	117	133	120	123
T_4	142	131	130	134

Table 7. Average flower buds, on cultivars, densities and treatments

	Average flower buds/tree			
	2002	**2003**	**2004**	**Average 2002-2004**
CULTIVAR				
Pionier	201,3 a	117,6 b	289,3 a	202,7 a
Prima	163,7 a	182,4 a	285,5 a	210,5 a
Generos	173,1 a	179,9 a	129,5 b	160,8 a
Florina	183,7 a	217,5 a	109,4 b	170,2 a
DENSITY				
2777 tree/ha	226,7 a	241,7 a	240,8 a	236,4 a
5555 tree/ha	134,3 b	107,1 b	166,0 b	135,8 b
TREATMENT				
T_1	171,7 ab	229,3 a	201,3 ab	200,8 a
T_2	223,8 a	241,2 a	253,6 a	239,2 a
T_3	188,4 ab	120,8 b	180,5 b	163,2 ab
T_4	137,9 b	106,2 b	179,3 b	141,1 b

*Values within a column fallowed by the same letter were not significantly different at the 5% probability level (by Duncan's multiple range test).

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THE BEHAVIOUR OF THE GRAFTED PLUM TREE ON DIFFERENT MOTHER PLANTS IN THE NORTH-WEST PART OF THE COUNTRY – AT S.C.D.P BIHOR

Aurora VENIG and Iulian STEFAN

ABSTRACT

The results refer to the behaviour of the plum tree on seven mother plants studied, under the conditions from the North-West part of the country, at S.C.D.P. Bihor.

Notice the fact that after the made researches and the obtained results for the Stanley species, the best mother plants are C.P.C., created at I.C.P.C. Pitesti – Maracineni, and the Scoldus mother plant, which reaches superior values of the sectioned trunk surface and bigger fruit productions – 21-22kg / tree.

INTRODUCTION

The plum tree is an important species, especially from the economical point of view, because it gives huge yields of fruits, which are used a lot under different forms (gels, jams, compotes, etc).

The establishing of the most important mother plant for each region leads to efficient cultivation of this species (I. Dutu, 1992; I. Stefan, 1994).

THE MATERIAL AND THE WORKING METHOD

The material used consists of 7 mother plants, all of them created in Romania. The variety used was Stanley, a well-known variety; the planting distance was 5/4m. The research method was that of randomized blocks. The number of repetitions was 4, and the number of repeated trees was 16. The research started in 2000, the trees being in the 5th year from plantation.

THE WEATHER CONDITIONS IN WHICH THE RESEARCHES TOOK PLACE

In 2000, when the research started, the average temperature was 11,1 Celsius degrees, in comparison with a multi - yearly average of 10,2 Celsius degrees and a sum of precipitations of 537,4 m.m. In the 5th year after plantation, in 2004, the average yearly temperature was 10,3 Celsius degrees, in comparison with a multi- yearly average of 10,2 Celsius degrees and a sum of precipitations of 737,5 m.m, in comparison with 620 m.m. which was the multi-yearly average. The soil of the plantation was brown clay – alluvial of Ao – Bt – C type with a 5,8-6 ph.

NOTES AND OBSERVATIONS

1. The development of the growing and fructification phases.
2. The average growing of the offshoots.
3. The section surface of the trunk.
4. The fruit production.

THE OBTAINED RESULTS

The development phases of the crops, during the studied years, took place generally in the first decades of April. The first phase of the growing organs – the burgeon (see Chart 1) is taking place in the last years and in the third decade of March. The other two phases – the finishing of the burgeon and the growing of the offshoots took place in the first and second decade of April.

Chart 1

THE DEVELOPMENT OF THE GROWING PHASES AND THE FRUCTIFICATION

a. Nr.
b. Kind/mother plant c. The fruit organs d. The growing organs
c. The appearance of the bud/the beginning of the flowering/the flowering
d. the burgeon/the finishing of the burgeon/the appearance of offshoots

At the average growing of the offshoots (Chart 2) we saw that the biggest growing were during the years after plantation. The biggest average growing of the offshoots was made by the witness variant, and all the other variants had smaller values.

Chart 2

a. Nr.
b. Kind / Mother plant
c. The average growing of the offshoots – cm

In the third year after plantation, things change, so that the witness variant had the smallest value (36,9 mm), and the biggest value was registered at the green Renclod mother plant.

The section surface of the trunks, analyzed in Chart 3, reflects the fact that the highest value of the sectioned surfaces are made on CPC mother plant, of 52,5 cmp, in comparison with the witness, which is 34 cmp. The conclusion is that this is a vigorous mother plant. The smallest value of the sectioned surfaces was registered on Porumbar of Iasi mother plant, of 30 cmp. So this is a less vigorous mother plant.

THE SECTION SURFACE OF THE TRUNK

a. Nr.
b. Kind / mother plant
c. The average growing of the offshoots – cm
d. Differences

The production of fruits, kg/grafted tree, presented in Chart 4m reflects the fact that the biggest production of fruits is made of CPC mother plant (the most vigorous one), in 22 kg/tree; and the Scoldus mother plant, with 21 kg / tree, with bigger distinctive differences in comparison with the witness variant, the Albe mici mother plant with 17 kg/tree.

THE PRODUCTION OF FRUITS IN THE 4TH YEAR AFTER PLANTATION

a. Nr.
b. production of fruits kg/tree
c. relative production
d. differences to Mt
e. differences

The smallest production of fruits was made by Porumbar de Iasi mother plant, which has the smallest value of the sectioned surface of the trunk.

In conclusion, after our research, the CPC mother plant behaved the best, being examined at I.C.P.P. Baneasa, and the Scoldus mother plant. The weakest was the Porumbarul de Iasi mother plant.

CONCLUSIONS

After the researches made by S.C.D.P. Bihor in the North-West part of the country, the conclusions were the following:

1. In the research period, the phases of the fruit organs take place in the first two decades of April.
2. The phases of the growing organs, the first phase which is the burgeoning, during the year, take place in the third decade of March. The other two phases, the finishing of the burgeoning, and the appearance of the offshoots take place in the first two decades of April.
3. The average growing of the offshoots have bigger values in the first years of growing, the biggest values being reached by the witness variant, while the other variants have smaller values.
4. In the third year from plantation, things change, and the witness variant records the smallest values (36.9cm), and the biggest value of the offshoots growth is registered on Green Renclod mother plant (64 cm).
5. The section surface of the trunk registers the biggest values on CPC mother plant, so this being the most vigorous.
6. The smallest value of the sectioned surface of the trunk is made on Porumbarul de Iasi mother plant.
7. The fruit production ahs registered the highest values on CPC and Scoldus mother plants, and the smallest on Porumbarul de Iasi mother plant.

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CHARACTERISTICS OF LONG TERM DWARF AND SEMI-DWARF ROOT STOCKS PROPOSED FOR HOMOLOGATION, FOR PEACH AND ALMOND SPECIES, AT BIHOR COUNTY RESEARCH AND DEVELOPMENT FRUIT TREE GROWING STATION

Aurora VENIG and Iulian ŞTEFAN

ABSTRACT

The results of this study are regarding to three root stocks, two of them semi-dwarf:Oradea-1 X Stark Sumburst Dwarf and De Balc X Stark Sumburst Dwarf and one dwarf: Stark Sumburst X Tuono, and to the analysis of their behavior as small height root stocks for peach and almond species, in the nursery and in the first years in orchard. It is remarkable that, due to analysis and determination and due to results obtained, we can confirm that Stark Sumburst Dwarf X Tuono is a dwarf stock (with small height) and that it gives to the trees grafted on it a smaller growing capacity in nursery and orchard, in terms of trunk section surface and tree height. The growing capacity indicator determined by the rind to wood ratio gives the same conclusion by being 0,41 given to 0,47-0,52 for the other 2 stocks that were part of this study.

INTRODUCTION

The importance worldwide and in our country of peach tree culture is well known due to economic value of this species, which is the second in cultivation after the apple tree culture. Almond tree, as well, finds in North-Western part of our country very good agricultural conditions.

The dwarf and semi-dwarf root stocks we are referring at in our work here, might represent a new way to improve the technology of peach tree growing in our country. In Romania, the results on this matter are very few if not inexistent (I. Stefan 1990, 1992, 1999).

MATERIALS AND METHODS

The material that we used consists of dwarf and semi-dwarf types obtained in F2 hybrid generation, a s a result of severance of dwarf and semi-dwarf characteristics into 3 hybrid combinations: Oradea – 1 X Stark Sumburst Dwarf; De Balc X Stark Sumburst Dwarf and Stark Sumburst Dwarf X Tuono. The material is also a result of homogenization of dwarf and semi-dwarf characteristics due to repetitive self-fecundation up to F4 and F5 generation and also selection of grafts and finally their study during the contest culture in the nursery and during the first years in the orchard.

Within the nursery the research method we used was the line blocks ranged in 4 repetitions. In nursery there were set up divided plots with 25 trees per repetition. The planting distance was 40 cm between rows in nursery and 80/20 cm in the tree school. Within the orchard, the planting distances were 4/3 m; the peach variety was *Redhaven* and the almond variety was *Banantine*. We used as research method for orchard the blocks method and the number of repetitions was 3.

THE CLIMATE CONDITIONS IN WHICH THE RESEARCH HAS BEEN DEVELOPED

The annual average temperature was between 10,3 C in 1999 when the study started and 10,6 C in 2003, and multi-annual average temperature was 10,2 C. The sum of rainfall was 760 mm in 1999 given to multi-annual average of 610 mm, and it was 501,1 mm in 2003, given to 620 mm multi-annual average. The soil is brown clay loam, characterized by a profile A0 – Bt – C. The pH is 5,8 – 6,3 and it contains 1% humus down to a depth of 115 cm.

RESULTS AND DISCUSSIONS

The examinations and determinations are referring at:
- biological value and the behavior in the nursery of dwarf and semi-dwarf stocks that were studied;
- behavior of stocks in the grafting field and in the field of grafted trees;
- analysis of the development of the root system;
- the strength of growing capacity of peach and almond dwarf and semi-dwarf stocks that were subject of this study and were proposed for homologation. The strength was determined through rind to wood ratio.

RESULTS

Table no 1 shows-referring to biological value of dwarf and semi-dwarf stocks that we studied – that their kernels have a high percent of capacity to spring: 67-70% and also great production of standard saplings: 405-482 thousand pc /ha.

In regard of the behavior of the stocks we studied in the forming and grafting fields, table no 2 shows that, at peach tree, the grafting procedure is good and buds are vegetating in 87-100%. The thickness of the graft at 1 m height from ground is between 5 and 7,1 mm, the height of the graft is between 139-144 cm and finally, the production of standard grafted trees is between 40.000 thousands pc for Stark Sumburst Dwarf X Tuono stock and 48.000 pc/ha for De Balc X Stark Sumburst Dwarf stock.

Regarding the almond species, the result of grafting and vegetation of buds is between 88-100%, the thickness of the graft at 1 m height from ground is between 5,6-7,5 mm, the height of the grafts is between 100-132 cm, and, finally, the production of grafted trees is 39.000 trees/ha for Oradea-1 X Stark Sumburst Dwarf stock and 46.000 trees/ha for Stark Sumburst Dwarf X Tuono stock.

Table no 3 shows the analysis of rooting system. We can see that the smallest number of total roots at peach tree is 13 for Stark Sumburst Dwarf X Tuono stock and the biggest number of total roots is 16 for De Balc X Stark Sumburst Dwarf stock, corresponding to total length of the root, which was 320 cm for the first case and 510 cm for the second case.

Regarding the almond species, things are the same as for peach, which is that for Stark Sumburst Dwarf X Tuono stock the number of roots is 11 and for De Balc X Stark Sumburst Dwarf stock is is 16.

The total length of the root in the first case is 155 and in the second case it is 285 cm.

The study of the behavior of dwarf and semi-dwarf stocks in the first years in orchard, up until the third year from planting, shows – table no 4 – that Stark Sumburst Dwarf X Tuono stock has the smallest trunk section surface – 3,92 cm and the smallest height too: 1,60 m.

Last indicator that we studied – the growing capacity of dwarf and semi-dwarf stocks proposed for homologation – determined through rind to wood ratio (table no 5) shows that the smallest growing capacity belongs to Stark Sumburst Dwarf X Tuono stock: 0,41 and the greatest growing capacity belongs to De Balc X Stark Sumburst Dwarf stock:0,52.

CONCLUSIONS

Consequently the analysis and the results that we obtained, we can state that:

1. All the stocks proposed for homologation that were included in this study have a high percent of kernel spring: 67-70% and also a good standard grafted tree production: 405-482 thousand pc./ha.

2. The behavior is superior for the studied stocks in the grafting and forming fields, for peach and almond as well – the attachment percent is 87-100 and the standard grafted tree production is high: 39-48 thousand pc./ha.

3. Analysis of the rooting system of the studied and proposed for homologation stocks, shows that total number of roots as well as the total length of the root have small values in case of Stark Sumburst Dwarf X Tuono stock, at peach and almond as well: 11-13 roots: 320-155 cm, given to 14-16 and 15-16 roots and 475-510 cm and 260-285 cm for the other 2 stocks we studied.

4. Regarding the characteristics of the stocks we studied and we proposed for homologation, in the first years in orchard, we can see that the smallest trunk section surface correspond to Stark Sumburst Dwarf X Tuono: 3,92 sq cm and 1,60 m height given to 4,58-4,96 sq cm and 1,69-1,75 m height of the other stocks.

5. The smallest growing capacity shown by rind to wood ratio belongs to Stark Sumburst Dwarf X Tuono: 0,41.

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Table 1. The biological value and the behavior in the nursery of dwarf and semi-dwarf stocks proposed for homologation

No	The root stock	No of fruit (per kilo)	Fruit production	No of kernels (per kilo)	Percent of kernel pring	Production and no of grafted (trees/ha)
1.	Oradea-1 X Stark Sumburst Dwarf	19	7,5	252	70	450.000
2.	De Balc X Stark Sumburst Dwarf	17	5,0	238	67	482.000
3.	Stark Sumburst Dwarf X Tuono	27	6,3	305	68	405.000

Table 2. Behavior of dwarf and semi-dwarf stocks proposed for homologation in the forming and grafting fields

No	Strain	Attach-ment at grafting (%)	Vegetation of buds (%)	Thickness of grafts at 1 m height from ground (mm)	Height (cm)	Production of grafted trees (pc)
PEACH REDHAVEN						
1.	Oradea-1 X Stark Sumburst Dwarf	95	100	6,0	144	45.000
2.	De Balc X Stark Sumburst Dwarf	99	100	7,1	143	48.000
3.	Stark Sumburst Dwarf X Tuono	87	100	5,0	139	40.000
ALMOND BALANTINE						
4.	Oradea-1 X Stark Sumburst Dwarf	88	100	7,5	132	39.000
5.	De Balc X Stark Sumburst Dwarf	93	100	6,0	130	42.000
6.	Stark Sumburst Dwarf X Tuono	100	100	5,6	100	46.000

Table 3. Analysis of rooting system in plot ii for dwarf and semi dwarf stocks proposed for homologation

No	Strain	No of main roots (pc)	No of secondary roots (pc)	Total no of roots (pc)	Length of main root (cm)	Length of second root (cm)	Length total root (cm)
PEACH REDHAVEN							
1.	Oradea-1 X Stark Sumburst Dwarf	3	11	14	155	320	475
2.	De Balc X Stark Sumburst Dwarf	4	12	16	170	340	510
3.	Stark Sumburst Dwarf X Tuono	3	10	13	130	190	320
ALMOND BALANTINE							
4.	Oradea-1 X Stark Sumburst Dwarf	3	12	15	100	160	260
5.	De Balc X Stark Sumburst Dwarf	3	13	16	120	165	285
6.	Stark Sumburst Dwarf X Tuono	4	7	11	85	70	155

Table 4. Behavior of and semi-dwarf stocks proposed for homologation, in the orchard in 3 rd year from panting

No	Strain/root stocks	Trunk section surface (Sq cm)	Height of trees (m)
PEACH REDHAVEN			
1.	Oradea-1 X Stark Sumburst Dwarf	4,58	1,69
2.	De Balc X Stark Sumburst Dwarf	4,96	1,75
3.	Stark Sumburst Dwarf X Tuono	3,92	1,60

Table 5. Growing capacity value of dwarf and semi dwarf stocks proposed for homologation, for peach and almond trees on self roots, fourth year from planting

No	Root stocks	Growing capacity rind/wood
1.	Oradea-1 X Stark Sumburst Dwarf	0,47
2.	De Balc X Stark Sumburst Dwarf	0,52
3.	Stark Sumburst Dwarf X Tuono	0,41

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PRELIMINARY RESULTS REGARDING THE POT PRODUCTION OF THE APPLE PLANTING MATERIAL

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Keywords: *Malus domestica*, table grafting, grafting wax.

ABSTRACT

The pot production of the apple tree planting material can influence the existing nursery structure in our country thorough the elimination of some technological chains. The paper present the influence of different factors involved in the nursery production: grafting compatibility of some new apple varieties on different rootstocks, forcing temperature, grafting method, etc. on the percentage of the grafting success. Application of table grafting technology may offer an efficient alternative to the standard technology being simple, more economic and faster.

INTRODUCTION

The pot production of the planting material is a reality in many European countries mainly for ornamental woody species. The method can be used also for fruit trees and can bring several advantages: extension of the planting period, reduction of the planting losses, etc.

In Romania, since the 70 ties was realized a technology for the pot production of the fruit trees seedlings. The method was proper mainly for stone fruits giving the possibility to reduce with one year the duration of the planting material production, to better use the handwork, to reduce 4 times the seed quantity and to eliminate the seedling field (Parnia et all.).

Unfortunately, the method was not extended to peppin species and there were not any trials for the production of the pot grafted fruit trees.

Some of the advantages of this method are:

- grafted material can be forced by temperature and humidity control;
- it can be choose the proper substrate for pot culture, according to the rootstock type;
- ensure the successful transplanting in the field;
- the time of transplanting can be extended all over the year, excepting the frost period;
- the grafting period is made during the winter time when there is not a strong request of labour;

The purpose of this work is to introduce and promote in our country this new fruit tree production technology.

MATERIALS AND METHODS

As biological material were choose six genetic resistant apple varieties, respectively: Rebra; Romus 3; Romus 4; Romus 5; Baujade and Enterprise.

As rootstocks material were used M 9, M 26 and MM106 rooted layers.

The Chip Budding grafting method was used for the manual grafting and for the mechanical grafting way (by Praktika 3 grafter) Chip Budding and Omega methods were used.

Till the grafting moment the rootstocks were stored in a cool place, covered by wood flakes. 48 hours before grafting the rootstocks were hydrated by water immersing.

The grafted point was tied using Flexiband (elastic strip made in biodegradable rubber) and the upper side of scion was covered with Plastigreffe grafting wax pearls at 70 ºC.

The grafted plants were forced for three weeks at 28-30ºC and dark conditions. After this period the plants were planted in 2 litter pots and were fertilized with OSMOCOTE EXACT 2g/l substrate.

Results of this experiment were expressed in successful grafting percentage and average of scion shoots length.

RESULTS AND DISCUSSIONS

The grafting success was significant influenced by the scion variety/rootstock association and by the grafting method as follow:

Regarding the influence of variety, the best results were registered to the Romus 4 variety with 93.59 % successful grafting percentage instead of Rebra variety that registered 70% successful grafting percentage (Table 1).

There were not registered big differences regarding the rootstocks influence. So, the highest successful grafting percentage was shown by the M9 rootstock with 84.57 % and the lowest grafting percentage by the M 26 rootstock with 75.84%.

The influence of the grafting method was expressed in 87.65% successful grafts to the mechanical Chip Budding method comparatively with 77.68% successful grafts percentage to the Omega method.

The shoots growing evaluation after 14 days from the planting moment showed that Enterprise variety shoots grow faster and more vigorous comparatively with Romus 5 variety that registered the lowest shoots growth.

Regarding the rootstock influence on shoots growing, the best results were obtained on M 9 rootstock with 4.85 cm shoot length instead of MM 106 rootstock which registered an average of 2.50 cm shoot length (Table 2).

For the mechanical Chip budding grafting is recommended a moderate rootstocks hydration to ensure a good bark contact to the wood.

Omega grafting method requires a uniform material (scion and rootstock diameter) and proper tie of the grafting point to stick the two partners together.

CONCLUSIONS

Table grafting, followed by the pot plantation of the fruit trees is a rapid and efficient method for the introduction and the extension on territory of the new valuable apple varieties.

Rootstock quality has a radical influence on grafting success and scion growth after the forcing.

For the mechanical grafting methods there are requested vigorous rootstocks with more than 10 mm diameter.

The temperature during the forcing period must to be lower than 28-30°C.

The grafted material after forcing must be planted in pots with at least 5 liters capacity.

The use of the fertilizers with slow release is necessary to obtain a high quality planting material.

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Tables

Table1. Influence of scion, rootstock and grafting method on grafting success (%)

Variety/ rootstock	Chip-budding manually			Chip-budding mechanical			Omega mechanic		
	M 9	**M 26**	**MM 106**	**M 9**	**M 26**	**MM 106**	**M 9**	**M 26**	**MM 106**
Romus 3	90.00	90.00	68.97	90.00	-	-	20.00	63.64	-
Romus 4	100.00	100.00	100.00	83.33	90.00	-	10.00	81.82	-
Romus 5	100.00	-	-	92.31	-	-	100.00	-	-
Rebra	90.00	30.00	50.00	100.00	80.00	-	80.00	-	60.00
Baujade	66.67	63.64	81.25	80.00	100.00	-	70.00	50.00	-
Enterprise	90.00	100.00	100.00	100.00	66.67	-	70.00	90.00	-
Average	**89.44**	**76.73**	**80.04**	**90.94**	**84.17**	**-**	**73.33**	**71.36**	**60.00**

Table 2. Scion shoot growth, 2 weeks after the planting in pots (cm)

	Chip-budding manually			Chip-budding mechanical			Omega mechanical		
	M 9	M 26	MM 106	M 9	M 26	MM 106	M 9	M 26	MM 106
Romus 3	3.00	4.48	1.95	4.06	-	-	2.75	3.57	-
Romus 4	9.25	1.14	1.10	5.72	5.80	-	6.83	5.67	-
Romus 5	2.70	-	-	4.25	-	-	1.90	-	-
Rebra	1.31	3.33	2.06	8.27	5.85	-	6.50	-	4.67
Baujade	1.75	2.06	0.39	6.69	3.75	-	5.07	3.80	-
Enterprise	3.78	2.60	0.75	7.19	7.00	-	6.29	8.22	6.61
Media	**3.63**	**2.27**	**1.04**	**6.03**	**3.90**	**-**	**4.89**	**4.25**	**1.88**

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VITICULTURE & OENOLOGY

ANALYSIS OF THE POTENTIAL ECONOMIC ADVANTAGES ASSOCIATED WITH THE USE OF ENZYMES, SELECTED YEASTS AND FERMENTATION ACTIVATORS IN WINEMAKING

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Keywords: enological materials, modern winemaking, small producers, economic analysis

ABSTRACT

The paper presents the potential economic benefits achieved by shifting from traditional winemaking procedures to a modern winemaking that makes use of enological materials such as pectolytic enzymes, selected yeast and fermentation activators. These adjuvants help in obtaining wines of increased quality which can be traded at better prices. The analysis shows that for white wines the application of enological materials can lead to an estimated benefit of 62.9 EUR/1000 l if the wine is sold in bulk or 162.9 EUR/1000 l when it is sold bottled. The benefits for red wines are estimated at 113 EUR/1000 l for the wine sold in bulk and 143 EUR/1000 l for the bottled one.

INTRODUCTION

In the opinion of many specialists the Romanian viticulture and enology, after a 15 year recession period, seems to be on the way of recovery. The signs of recovery are more evident in the case of the large viticulture exploitations, due to their considerable financial power, coming mostly from foreign investors which understood the significant potential for development in this field and acted accordingly. There are reports of more and more new or recovered plantations, organized on modern concepts and principles and there are more and more winemaking facilities endowed with the newest technology. Moreover, the wines we can find on the shelves of the shops, as well as the wines that we export, are of increased quality, competing well with the imported products of the sort and being valued at almost the same price.

Unfortunately, the situation is not so optimistic when it comes to small producers, farmers owning small surfaces of vine plantations, many of them lacking even the basic equipment for winemaking. Some of them have no option but to sell cheaply their grapes; some others produce table wines of low quality, difficult to sell on the market, ending up with low incomes that sometimes do not cover the cost of the investments. In order to improve this situation the small farmer has to join a producers association where he can use the equipment in common with others, or to try on his own to increase the quality of his wine. One way to reach the latter goal is by using modern enological materials for winemaking. The main idea of this approach is that a better quality wine is selling for better prices.

MATERIALS AND METHODS

In order to increase the wine quality by using some enological materials we produced some white and red wines by fermenting the grapes in the presence of pectolytic enzymes, selected yeasts and fermentation activators. The tests were performed on the grapes harvested in the autumn of 2004 in the Vrancea county, in the farms of two small producers that accepted to participate in this demonstration.

The following analysis focuses on the evaluation of the costs and benefits to be expected by a farmer in case he applies for winemaking some commercially available enzymes, yeasts and a simple fermenting activator. We assume that the results can be extrapolated to any commercial products similar to the ones used in this trial, therefore we will not indicate the brands of the materials used here.

The analysis presents step by step the economic calculations that could be followed by any farmer. At each step we explain the observations and hypotheses made in order to perform the calculations.

Although the tests were made with various amounts of grapes or must, for the easiness of the calculations and for the reason of clarity we report the data for a volume of 1000 l of wine.

As expected, the yields vary in accordance with the variety, the pressure applied to separate the must from the crushed grapes and the required quality for a certain wine. Even so, it is possible to average and generalize the calculations for white wines (for which the yield is usually lower) and, respectively, for red wines (for which the yield is higher due to a better pressing of the macerated crushed grapes).

From the applied research performed during this study it has been demonstrated that in the traditional winemaking for the white wines the obtained yield is quite low, due to the obsolete pressing equipment used by the farmers. As a result, the quantity of grapes necessary to obtain 1000 litres of white wine is larger than that necessary for red wines (Table I and IV).

RESULTS AND DISCUSSIONS

For white wines

In order to evaluate the costs of winemaking Table I presents the average values of the quantity of grapes necessary for the production of 1000 l white wine and the volume of crushed grapes that results after crushing and destemming. The volume of the crushed grapes was evaluated taking into account the amount of grapes used and the average value of their density, which is 1.16 kg/l.

The goal of our study was to apply the principles of modern winemaking in such a way as to allow the farmers to obtain either higher yields of must or crushed grapes or wines of a higher quality. This kind of result could be obtained if we treated the raw material with various enological materials. The dosage of these materials was established for each wine under laboratory conditions and then applied in the wine cellars.

As presented in Table I the treatment with a certain adjuvant should be done on a volume of 1293 l in the case of those enological materials which are to be added in the crushed grapes (for instance, the pectolytic enzymes) or on a volume of 1000 l in the case of adjuvants which are applied to the must (such as selected yeasts and fermentation activators). For the final calculations of the enological materials quantities the losses resulted from racking, clarifying and conditioning operations were neglected. The values representing the costs of the enological materials for the production of a 1000 l white wine are shown in Table II.

In the last column of Table II we can see the cost of the enological materials which adds to the costs of production by traditional winemaking for 1000 liters of white wine. Consequently, in order for the usage of modern enological materials to be economically efficient, the wines produced should bring more profit, especially due to the increase in the quality of the resulted wine.

The analysis of the benefits resulted following the application of the enological materials, based on two modalities of trading, is presented in Table III. The value reported for a liter of wine produced by a Romanian farmer with the traditional technology is based on the actual price on our national market. Many small farmers consider that their wines should receive a better price, and unless something changes they will go bankrupt because they cannot even cover the costs of the raw materials. At present, many of the small producers have no option but to sell their wines to a larger winemaking company, receiving a price of 0.03 EUR for 1% of alcohol a liter, this value being established by the buyer in accordance with its own general quality level. A table wine, obtained in the household of a small producer, by traditional vinification processes, can reach a content of 10% v/v alcohol, generally this being considered a good result. Consequently, the producer can expect to receive for his wine a price of 0.3 EUR/l (0.03 EUR/% alcohol x 10 % = 0.3 EUR).

As for the prices that might be obtained for the wines produced with enological materials, we should make some assumptions regarding the trading procedure. For this analysis we considered two possibilities as follows:

- ***Variant no. 1.*** For this situation we consider that the resulted table wine is sold to a large company, in similar conditions as when the winemaking was done without enological materials. However, we should take into consideration that, by using enological materials, and especially selected yeasts and fermentation activators, the alcoholic concentration in a wine increases comparing to the control wine. Therefore, we assume that the wine obtained has 11% v/v alcohol. In the same time, our trials and other reported studies showed that the application of the modern enological materials also leads to an increase in the overall quality of wine, especially when it comes to the color, limpidity, taste and aroma. In this situation, it is safe to assume that the producer can negotiate with the buyer a slightly better price. For this analysis we considered the price for this better wine of 0.036 EUR per 1% alcohol and liter. Consequently, the resulted value for a liter of this wine is 0.4 EUR/l (0.036 EUR/1% alcohol/l x 11 % = 0.396 EUR/l).
- ***Variant no. 2***. For this case we assume that following the application of the enological materials the farmer obtains a quality wine and that he is not forced to sell it in bulk as before, but he is able to trade it as a bottled wine. Under these circumstances, even in the worst case scenario, we can consider a minimum price for the bottled wine at 0.5 EUR/l (of which we took out the costs related to bottling).

For red wines

A similar calculation could be applied for the red wines, but taking into considerations some specific technological aspects. For the red wine, the amount of grapes required for the production of 1000 l wine is smaller than in the case of the white wines and, for this reason, the crushed grapes mash in which we introduce the enological materials has less volume. Table IV shows the values of the amount of grapes required for the production of 1000 l red wine and the volume of the crushed grapes resulted after the crushing and destemming of these grapes. For the calculation of the crushed grapes volume we used the average density of 1,16 kg/l.

In this case the treated wine volume is only 1121 l, and because for the red wines all the above mentions enological materials are introduced in the crushed grapes mash, this volume is the same for all applied adjuvants. The values regarding the costs involved in the modern winemaking of 1000 l red wines are presented in Table V.

Using an analysis on the basis of the same assumptions used for white wines, for the wines we have again two possibilities. The calculated benefits that a farmer should expect to obtain following the application of enological materials are presented in Table VI. However, because the red wines reach higher alcoholic concentrations than whites, the prices taken as basis for the calculations are a little different, as follows:

- the control wine, resulted from a traditional winemaking process, with 11% v./v. alcohol: 0.33 EUR/l (0.03 EUR/% alc. x 11% = 0.33 EUR).
- ***Variant no. 1***, wine resulted from a modern winemaking process, of a higher quality and with 12% v./v. alcoholic concentration, sold in bulk: 0.48 EUR/l (0.04 EUR/% alc. x 12%= 0.48 EUR).
- ***Variant no. 2***, wine resulted from a modern winemaking process of a higher quality and with 12% v./v. alcoholic concentration, sold bottled: 0.51 EUR/l.

CONCLUSIONS

The efficiency of modern enological materials was tested in practice on the occasion of the demonstrations performed in the wine cellars of some farmers in the Vrancea and Buzău counties in the framework of the Projects 2521/2003 and 1921/2003 financed by the Romanian Ministry of Agriculture and Forestry and the World Bank. The increase in the overall quality of the wines following the application of the enological materials was proven by the results obtained by those wines at the regional Wine Contest “Vinul Podgoreanului” in 2004 and 2005, organized in Odobeşti and Focşani, respectively.

The cost analysis shows that the application of enological materials, such as pectolytic enzymes, selected yeasts and fermentation activators, can lead to significant economical benefits. Therefore, the usage of enological materials for the production of white wines can lead to an estimated benefit of 62.9 EUR/1000 l if the wine is sold in bulk and 162.9 EUR/1000 l when sold as bottled wine. The benefits for the red wines are estimated at 113 EUR/1000 l for the wine sold in bulk and 143 EUR/1000 l for the bottled one.

We have to underline that this economic effect is readily available for each farmer, since the application of the substances is very easy, does not require additional workers or equipment and does not imply the modification of the winemaking process. Moreover, the cost of the materials is affordable for any small farmer.

Tables

Table I. Amount and volume of the grapes and crushed grapes required to obtain 1000 litres white wine is obtained

Parameter	**Value**
Wine volume	1000 l
Amount of necessary grapes	1500 kg
Crushed grapes volume	1293 l

Table II. Enological materials necessary for the production of 1000 l white wine

Material	**Applied dose (g/hl)**	**Treated volume (hl)**	**Amount necessary (g)**	**Price (EUR/kg)**	**Cost (EUR)**
Pectolytic enzyme	4	12.93	51.72	350	18.10
Selected yeast	20	10	200	75	15.00
Fermentation activator	50	10	500	8	4.00
				Total cost	**37.10**

Table III. Estimation of the benefits expected as a result of the application of enological materials in the production of white wines

	Traditional winemaking	**Winemaking in the presence of the enological materials – *Variant no. 1.***	**Winemaking in the presence of the enological materials – *Variant no. 2.***
Price/litre	0.3 EUR/l	0.4 EUR/l	0.5 EUR/l
Total income for 1000 l of wine	300 EUR	400 EUR	500 EUR
Additional income for 1000 l of wine in the case of winemaking with enological materials		100 EUR	200 EUR
Additional net income (after the deduction of the cost of enological materials)		62.90 EUR	162.90 EUR

Table IV. Amount and volume of the grapes and crushed grapes out of which 1000 litre red wine is obtained

Parameter	**Value**
Wine volume	1000 l
Amount of necessary grapes	1300 kg
Crushed grapes volume	1121 l

Table V. Enological materials necessary for the production of 1000 l red wine

Material	**Applied dose (g/hl)**	**Treated volume (hl)**	**Amount necessary (g)**	**Price (EUR/kg)**	**Cost (EUR)**
Pectolytic enzyme	4	11.21	44.84	350	15.69
Selected yeast	20	11.21	224.2	75	16.82
Fermentation activator	50	11.21	560.5	8	4.48
				Total cost	36.99

Table VI. Estimation of the benefits expected as a result of the application of enological materials in the production of red wines.

<table>
<tr><th></th><th>Traditional winemaking</th><th>Winemaking in the presence of the enological materials – Variant no. 1.</th><th>Winemaking in the presence of the enological materials – Variant no. 2.</th></tr>
<tr><td>Price/litre</td><td>0.33 EUR/l</td><td>0.48 EUR/l</td><td>0.51 EUR/l</td></tr>
<tr><td>Total income for 1000 l of wine</td><td>330 EUR</td><td>480 EUR</td><td>510 EUR</td></tr>
<tr><td colspan="2">Additional income for 1000 l of wine in the case of winemaking with enological materials</td><td>150 EUR</td><td>180 EUR</td></tr>
<tr><td colspan="2">Additional net income (after the deduction of the cost of enological materials)</td><td>113.01 EUR</td><td>143.01 EUR</td></tr>
</table>

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COMPARATIVE ASPECTS REGARDING THE BIOLOGICAL CYCLE OF GRAPE MOTHS UNDER THE CONDITIONS OF THE ŞTEFĂNEŞTI-ARGEŞ VINEYARD

Daniela BĂRBUCEANU

Key words: *L. botrana, E. ambiguella*, biological cycle, comparative aspects

SUMMARY

Between 1998-2003, *Eupoecilia ambiguella* Hb. and *Lobesia botrana* Den. et Schiff. were observed by means of pheromone traps set in the Ştefăneşti-Argeş vineyards. Situated in South-Central part under the meridional Carpathian Mountains, these vineyards are characterized by a temperate climate. Under these local and annual climate conditions the flight of the two species is highly synchronized. Nevertheless, *L. botrana* displays an earlier coming out of butterflies and a phased flight, without a well marked peak, as in the case of the other species. *E. ambiguella* displays a shorter first flight, up to 4-5 weeks, while the second flight lasts till September. A third flight of *L. botrana* can be observed in the second half of August and September, this third generation having a partial development.

INTRODUCTION

Grape moths, *Eupoecilia ambiguella* Hb. and *Lobesia botrana* Den. et Schiff. have been known as important pest for most of vineyards. According to Bovey (1966), a more or less synchronizations of the two species period and time of flight was observed in the areas where they cohabit. In the northern areas the differences in the flight development are obvious.

MATERIALS AND METHODS

Between 1998 - 2003, *Eupoecilia ambiguella* Hb. and *Lobesia botrana* Den. et Schiff. were identified and observed at *Aligote* (*L. botrana*) and *Chasslas* (*E. ambiguella*) varieties in the Ştefăneşti-Argeş vineyards, on surfaces of 5 ha for each species. These vineyards are situated in the South-Central part under the Meridional Carpathians which is characterized by a temperate climate.

There were used pheromone traps of *atraMBIG* and *atraBOT* types (1 trap/ha) in order to make the first butterflies coming out obvious, the flight peak, the flight ceasing and the number of generations (Isac, 1989). The sum of effective temperature was calculated (Săvescu and Rafailă, 1978).

RESULT AND DISCUSSION

- ***Biology***

During the observation period, according to the local and annual climate conditions, facts showed that *L. botrana* butterflies are yielded 2-11 days earlier than *E. ambiguella* (Table 1). In 2003, for instance, the first *L. botrana* butterflies appeared on April 24th, after a 1°C accumulation in the sum of effective temperature, while the *E. ambiguella* butterflies appeared on April 29th after a 9.1°C accumulation in the sum of effective temperature.

Table 1
Data regarding the first *L. botrana* and *E. ambiguella* butterflies appearances in the pheromone traps, at Ştefăneşti-Argeş

Year	Appearance date of first butterflies		Sum of effective temperature until appearance of first butterflies (°C)	
	L. botrana	*E. ambiguella*	*L. botrana*	*E. ambiguella*
1998	20.04	28.04	39	42.8
1999	28.04	30.04	17.2	23.6
2000	14.04	21.04	11.9	51.8
2001	11.04	22.04	7.4	9.6
2002	18.04	20.04	21.3	27.8
2003	20.04	29.04	1	9.1

The *E. ambiguella* first flight, yielded in May, is shorter than the *L. botrana* flight, and is followed by a 2-3 weeks period when the flight ceases. The highest flight peak is reached at the middle of May with both species. The *L. botrana* flight takes longer and the winter generation flight superposes upon the first generation flight (see Fig. 1). The first generation of the two species, generally develops in May, June and beginning of July.

The *E. ambiguella* second flight is performed in July reaching a maximum peak in the second decade of this month, and continuing to lower intensity until September. The *L. botrana* second flight is phased in July and the first half of August.

High summer temperatures set in advantage *L. botrana* species which will have a faster development than *E. ambiguella*.

During the six years of observation, the flight curves made a third flight obvious at *L. botrana* species. This third flight developed in the second half of August and in September, having a partial development of its generation. There was no third flight of the *E. ambiguella* species.

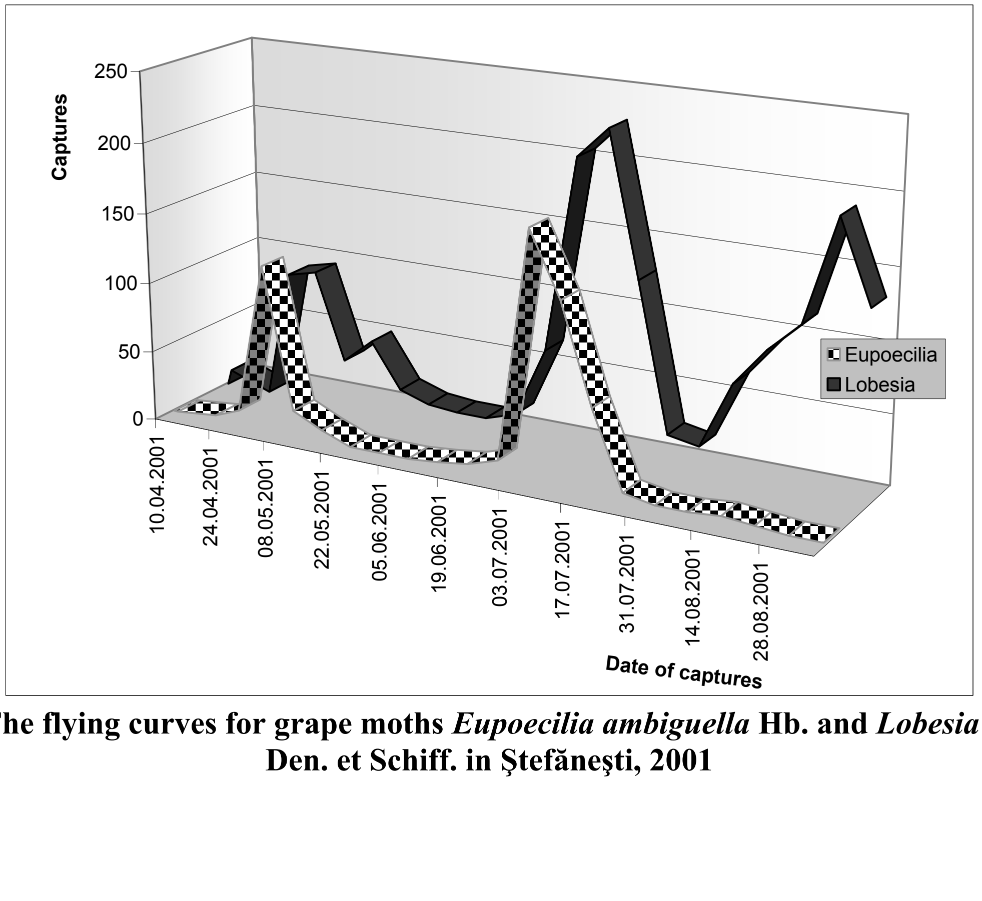

Fig. 1. The flying curves for grape moths *Eupoecilia ambiguella* Hb. and *Lobesia botrana* Den. et Schiff. in Ştefăneşti, 2001

In opposition to *L. botrana, E. ambiguella* has a slower development, its biological cycle being phased within a longer period of time: Luca (1986) states that a 455^{o}C sum of effective temperature is necessary for a generation to develop.

Theoretically, this involves a relatively reduced adaptation potential which means that, during unfavorable seasons, the species may no longer have time to recover its diminished population to the level permitted by the ecosystem under normal conditions. From this point of view, *L. botrana* proves, by its faster development cycle (K = 384^{o}C i. a. w. Săvescu and Rafailă, 1978) to have a higher adaptation potential due to which its population can recover faster after a period of unfavorable climate.

- ***Zonal cohabitation***

Another remarkable comparative aspect which was observed during the research period, stays the fact that the two species were rarely encountered in the same vineyards, at the same time when the climate was favorable for both species activity. Practically they exclude each other on large areas of the same cohabitation region.

Without considering the fact rigorously demonstrated, we assume that this zonal separation of the two species is due to their common way of attack and feeding which leads to an interspecific survival competition and makes of the species mutual exclusion the direct consequence.

CONCLUSIONS

In conditions of vineyards Ştefăneşti-Argeş grape moths, *L. botrana* and *E. ambiguella,* present a pronounced synchronization of its biological cycle of development.

In oppositions to *E. ambiguella, L. botrana* has an earlier coming out of butterflies and a phased flight. It remarks that the species *L. botrana* present the third flight, but the third generation has a partial development.

The first flight of the *E. ambiguella* is shorter and the second flight lasts till September.

In the favorable years to activity of both species, interspecific survival competition leads to the species mutual exclusion on occupied area.

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THE INFLUENCE OF THE HYDRIC CONDITIONS ON THE EVOLUTION OF CERTAIN PHYSIOLOGICAL PROCESSES OF GRAPEVINE

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Keywords: hydric deficit, photosynthesis, transpiration, grapevine varieties

ABSTRACT

Grapevines are multiannual plants, hence the significant importance of the influence of the annual ecological offer over production, especially its quality. The knowledge of physiological particularities determined by the pedoclimatic conditions is important for elaborating and supporting the viticultural technical activities. In this papers studies were focused on the influence of the hydric variable regime on physiological processes (photosynthesis, transpiration) for 6 grapevine varieties.

INTRODUCTION

Given the fact that there are limited counterattack possibilities against the climatic changes and the effect of the hydric deficient periods, in order to reduce the major negative impact on the viticultural production, research studies monitoring grapevine reactions to water deficit are required, with view to finding methods to stimulate the physiologo-biochemical mechanism increasing the tolerance of plants to water. In order to perform durable viticulture, studies were made trying to identify the reaction mechanisms of grapevine under conditions of environmental stress; amongst the most representative at national at world levels are those made by the followings: Burzo I., Toma S., Olteanu I, Dejeu L., Delian Elena, Hoza D (1999), Costea D C (2005), Fregoni M (1997), Georgescu M, Dejeu L., Ionescu P (1991), Jouira Ben et colab (2004), Jones, G V (2003) Olteanu I (2000), Olteanu I, Cichi Daniela, Costea DC, Maracineanu L.C. (2004) Schultz, H. R (2000), Tonietto J. (1999),

MATERIALS AND METHODS

In accordance with the research topic proposed, the observations and determinations were focused on: monitoring the climatic factors (mostly the hydric supply) for the evaluation of the favourableness of the years studied (by using individual, binary and trinary climatic indicators; studying the influence of the varied hydric supply regime characteristic to the years studied on photosynthesis, transpiration and stomatal conductance.

The determinations for monitoring the influence of the hydric deficit regime on physiological processes were made for Fetească albă, Riesling italian, Sauvignon, Fetească neagră, Cabernet Sauvignon and Merlot varieties, during 2000-2003 in the viticultural centre of Banu Maracine, the Dealurile Craiovei Vineyard.

The variation of the climatic profile during the period studied was monitored by using the data received from the Weather Station located in the vineyard, as well as those from the Agroexpert Station to be later interpreted by using the Adcon Telemetry advantage program and later by using climatic indexes.

The influence of the conditions of suboptimal environmental factors over the physiological processes was assessed by observations made with the Lci equipment that can determine 18 indicators simultaneously by non-destructive methods.

RESULTS AND DISCUSSION

The classification of the years under study by using climatic indicators places Banu Maracine viticultural centre in the category of the areas benefiting from wet climate with very low water deficit during the active vegetation (see Table 1).

The Thornwaite method was used to study the climate synthetically, by combining the rainfall with the potential evapotranspiration (PET). When PET is exactly balanced by precipitations over the year and water is available, there is neither deficit (d) nor surplus (s) of water. Thornthwaite defined the total moisture index (MI) as the first basis for his climate classification: MI = 100*(s-d) / PET.

It follows that, when precipitations are lower than PET (s = 0 and d >0), MI is negative and the climate is dry; when precipitations are higher than PET (s > 0 and d=0), MI is positive and climate gets humid. Another index was defined on the basis of the periods of the year with water surplus or deficit and of the relative amount of water surplus (index of dryness, DI=100* d/PET) or water deficit (index of humidity (HI=100*s/PET) (see table 2).

During the years of experiments, one should point out the year 2003, a sub-wet year, with moderate hydric deficit during summer and the year 2000, semi-arid, with high water deficit during the vegetation period.

The determinations made during the years 2000-2003 were focused on pointing out the evolution of the photosynthesis and transpiration processes in their annual dynamic. For this purpose, during the second decade of each month, on clear, sunny days, the determinations were made at noon, in two days and the results shown in the charts point out their average value.

For the year 2000 (see Figure 1), one should notice the low values of the intensity of transpiration and photosynthesis, as result of the suboptimal hydric supply. Values closer to normal were recorded only in July, a month with low hydric deficit. Low values of transpiration were recorded in Riesling Italian, while the red-wine varieties, namely Cabernet Sauvignon and Merlot, showed the highest values of all of the varieties studied.

In 2001, high transpiration intensity was noticed in June, as result of the heavy rainfalls, while lower values were found in Riesling Italian. In case of red-wine varieties, the transpiration and photosynthesis intensity was higher compared to white-wine varieties (Figure 2). The evolution of the two physiological processes took place according to a curve with two minimum values, namely low intensities in May during the intense growth phenophase of shoots and in September at maturation and a maximum value in June (in case of transpiration) and July (in case of photosynthesis).

The suboptimal hydric conditions of the first part of the vegetation period of 2002 may be found in the low values of transpiration and photosynthesis (Figure 3). The partial closing of stomatas following the intense hydric deficit and the high temperatures determined low values of the transpiration intensity, as well as of the May and June photosynthesis, which were below the average of that period.

The improvement of the hydric supply regime as result of the heavy rainfalls of the second part of the vegetation period, namely July – September, determined normal intensity of photosynthesis; as for the transpiration values, they were above the average of that period.

In 2003, as result of a proper hydric supply in the early vegetation period (April, May), the transpiration and photosynthesis were normal for such phenophase (i.e. 5-5.5 for phtosynthesis and 4-4.5 for transpiration). The period with significant hydric deficit in late

May determined low values (below normal) of the physiological processes in early June (Figure 4). Nevertheless, one may notice that, due to the lack of such successive canicular temperatures of over 40 ^{0}C that were recorded in 2000, as well as due to the better hydric supply, in 2003, the values of the photosynthesis and transpiration were higher compared to 2000.

CONCLUSIONS

Amongst the white wine varieties studied, in case of Sauvignon, higher values of transpiration were recorded in all the phenophases under study, followed by the Feteasca albă and Riesling italian varieties. The small differences existing between the intensity of the transpiration of red-wine varieties do not allow a certain classification of varieties; nevertheless, higher values of transpiration were noticed in case of Merlot and Cabernet Sauvignon under conditions of water deficit, while the Fetească neagră variety showed higher values during several determinations under favourable conditions.

The photosynthesis process is less intense during blooming time, it then passes to the intense growth phenophase, it slightly goes down during grape ripening and then significantly drops at maturity. In case of white grape varieties, higher values of photosynthesis, both under conditions of optimal hydric supply and suboptimal humidity, were recorded in Sauvignon, followed by Fetească albă and Riesling Italian. In case of black-grape varieties, under conditions of favourable vegetation, the photosynthesis process was stronger in Fetească neagră, and under suboptimal humidity conditions, in Merlot and Cabernet Sauvignon.

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Table 1. Climatic Indexes Used for the Characterisation of the Climatic Resources at Dealurile Craiovei Vineyard

Climatic Indexes	**2000**	**2001**	**2002**	**2003**
Amount of precipitation during the vegetation period mm)	222.5	472.5	420.5	348.5
Precipitation index	1.22	2.59	2.28	1.90
Hydro-thermic index IHT	0.60	1.41	1.23	0.99
Hydro-helio- thermic index IHH	7.73	6.16	6.48	6.46
Hygro-hydro-thermic index IHHT	2.25	6.96	7.96	4.00
Helio-thermic index (Ih)	3.49	2.65	2.55	2.85
Bioclimatic index **(**IBCV)	16.1	6.24	6.66	9.57

Table 2. Thornthwaite Indexes Used for the Characterisation of the Climatic Resources at Dealurile Craiovei Vineyard

Index / **Year**	**THORNTHWAITE INDEX**			
	Annual (MI)		For the vegetation period (Di and Hi)	
	Value	Significance	Value	Significance
2000	-38.95	D	-45.81	s2
2001	21.82	B1	6.04	r
2002	23.83	B1	-4.05	r
2003	5.05	C2	-21.68	s

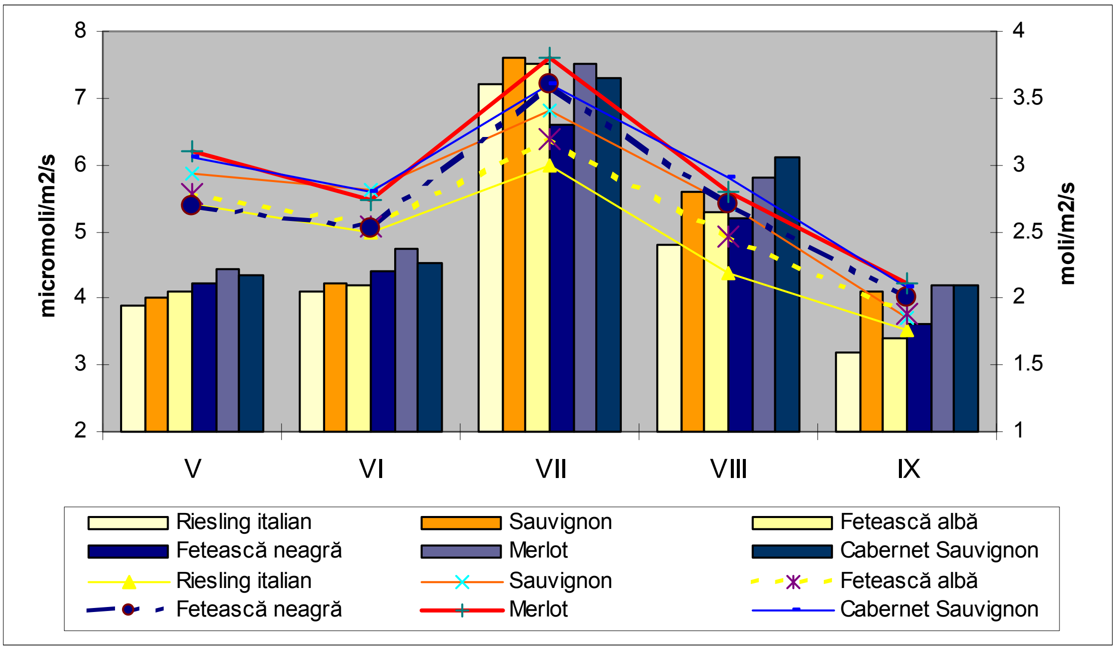

Figure 1– The dynamic of the photosynthesis and transpiration evolution during the vegetation period of 2000

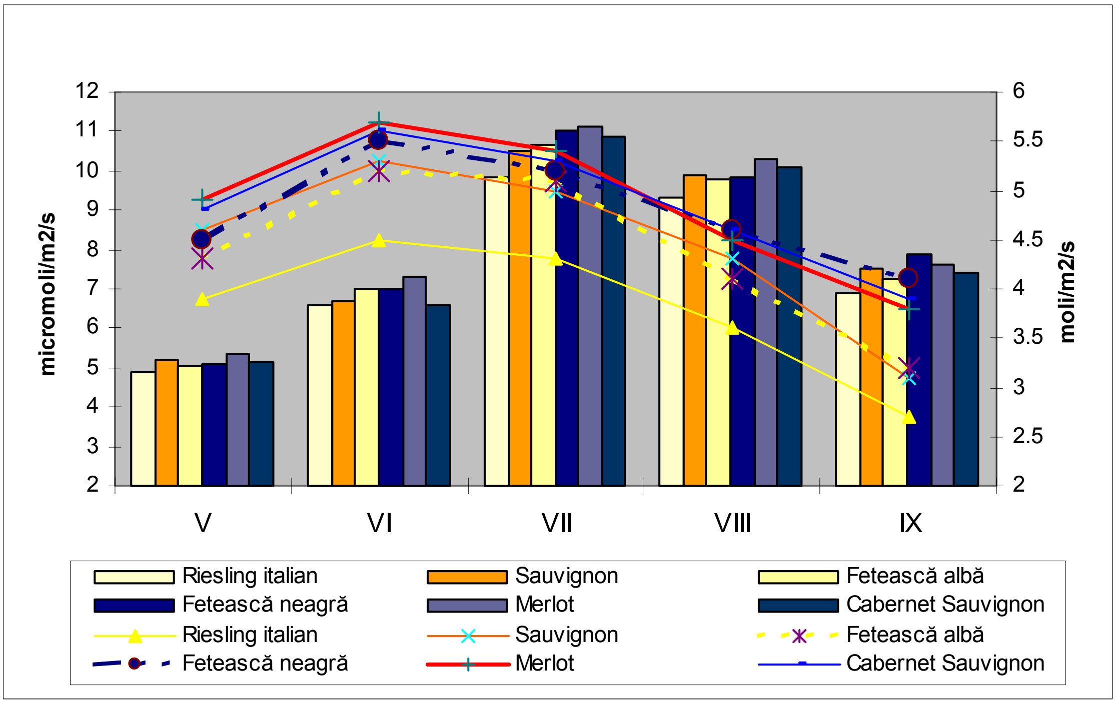

Figure 2 – The dynamic of the photosynthesis and transpiration evolution during the vegetation period of 2001

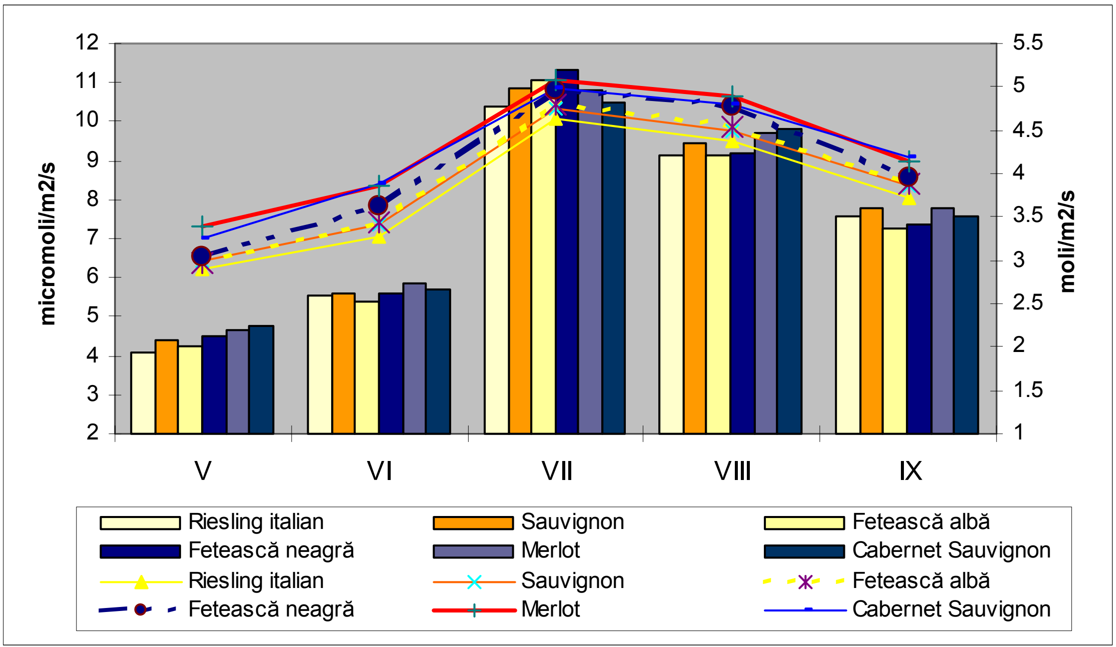

Figure 3 – The dynamic of the photosynthesis and transpiration evolution during the vegetation period of 2002

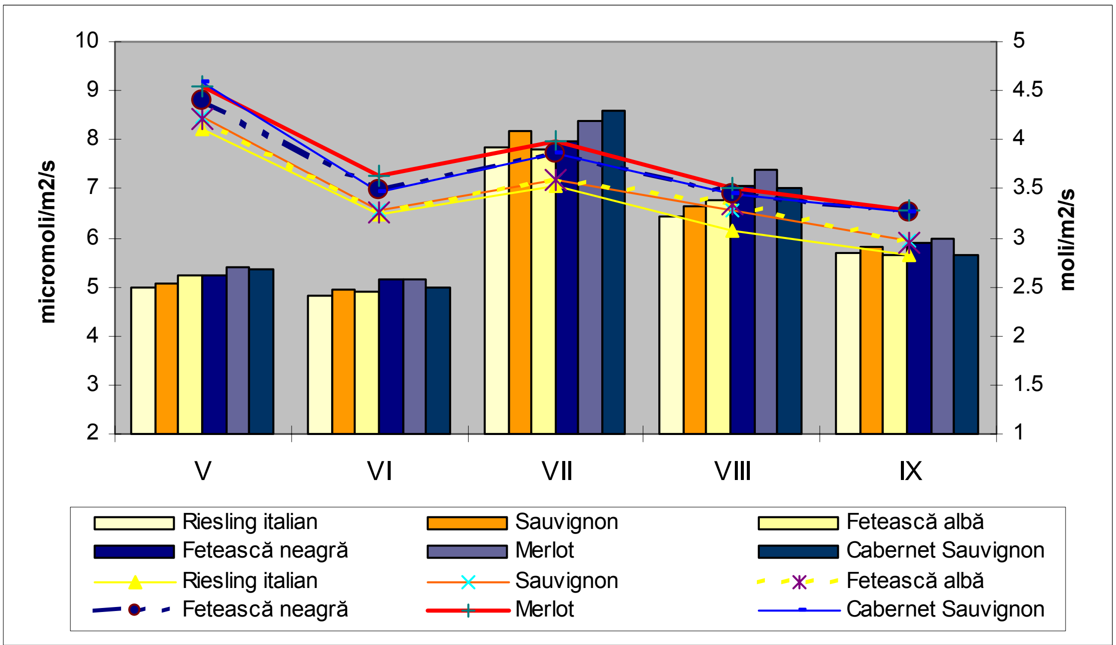

Figure 4 – The dynamic of the photosynthesis and transpiration evolution during the vegetation period of 2003

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FROST RESISTANCE OF SOME GRAPE CULTIVARS IN THE WINTER 2004/2005

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Keywords: grapevine, frost damage, cultivars, cold resistance, recovering capacity

ABSTRACT

The low winter temperatures (down to -23ºC in the air and -27ºC at soil surface, registered in Bucharest-Băneasa meteorological station in February 2005) affected buds of grapevines. A great difference between the 45 tested *Vitis vinifera* cultivars was noticed; the viability of primary buds was comprised between 3% (Muscat timpuriu de Bucureşti) and 88% (Burgund mare). At frost resistance cultivars Burgund mare, Columna, Furmint, Traminer roz, Riesling italian, Oporto, Muscat Ottonel and Cabernet Sauvignon), the percentage of primary bud viability was comprised between 80-88. They proved to be very cold tender cultivars: Crâmpoşie, Cardinal, Sauvignon, Victoria, Băbească neagră, Zghihară de Huşi, Cadarcă, Timpuriu de Pietroasa, Italia, Muscat timpuriu de Bucureşti, with a viability comprised between 3-30%. There were noticed differences between the types of pruning and the bud loads given at pruning regarding frost resistance and the recovering capacity of the grapevine.

INTRODUCTION

In the conditions of Romania's continental temperate climate, the low temperatures in winter influence the cultivars, training systems of grapevine and other cultural practices.

The frequence of the minimum temperatures in winter, which affects aerial part of grapevine, is relatively big. During the last century, critical frosty winters for grapevine were registered at intervals of 2-20 years, ocurring on average once in 10 years.

Grapevine frost resistance was studied under various aspects: *morphoanatomic* (Arestova, 2001); *genetic* (Gagea et al., 1991; Hajdu and Gabor, 1997; Aliev and Kostrikin, 1999; Zhdamarova and Zhdamarova, 2002; Rekika et al., 2004; Pardatscher, 2005; *physiological* (Dobreva et al., 1995; Wolf and Miller, 2001) and *biochemical* (Koussa et al., 2001; Bădulescu Valle, 2002).

Grapevine adaptation to the action of frost temperatures is realized by accumulating reserve substances and by raising the concentration of the solution from the cells.

Frost resistance appears only after the plant has passed through a period of acclimatization, while, in the first phase, there takes place an accumulation of reserve sugars, and in the second phase, there takes place the starch hydrolysis.

The factors which determine grapevine frost resistance are: cultivar, rootstock, the yield obtained the previous year, vigor of the vine, maturity of wood, level of minimum temperature, its duration, the moment it occurs, site, cultural practices (Burzo et al., 2005).

The weather in January 2005 was unusually warm for this period and has contributed to the deacclimation of the vines. The bud mortality was caused by critical temperatures of -23º C in the air and -27ºC at soil surface covered by a layer of 10 cm of snow, registered at meteorological station Bucureşti-Băneasa on February, 9th, 2005. The same day, at the meteorological station Bucureşti-Filaret, the lowest temperature in the air registered -16,6ºC, and that of soil surface registered -24,5ºC.

These values of the temperature provided an excellent opportunity to evaluate winter bud hardiness. The purpose of this study is to ascertain the winter bud injury suffered by some *Vitis vinifera* cultivars after exposure to low winter temperatures.

MATERIALS AND METHODS

Winter hardiness was followed at a number of 45 *Vitis vinifera* cultivars, the most widespread in Romania, for wine and for table grapes, as well as at some new varieties.

Ten 15-bud cane were randomly collected from mature vines of each cultivar from the collection-plantation of the Viticulture and Enology Department of University of Agronomic Sciences and Veterinary Medicine Bucharest. The buds sections were performed on the live wood of uniform size suitable to be retained at pruning for the next season. All the 150 buds were cut and a count of the primary and secondary bud viability was recorded. Viability was recorded if the tissue in the bud center was green; in case of mortality, the tissue was brown or black.

There were analyzed both primary buds (P) and secondary ones (S), on segments of cane of 1-3 buds, 1-6 buds, 1-12 buds and 1-15 buds, corresponding to the length of the fruiting elements used at pruning.

At Fetească regală cultivar there was determined the winter bud viability at three types of pruning (multiple Guyot, Cazenave cordon and spur-pruned cordon) with three levels of bud loads imposed at pruning in the previous years (10, 15 and 20 buds/m^2).

RESULTS AND DISCUSSIONS

As a result of testing bud viability, a great difference was noticed between the varieties which were studied; the viability of the primary buds was comprised between 3 % (at Muscat timpuriu de Bucureşti) and 88 % (Burgund mare), and the viability of the secondary buds between 8 % (Muscat timpuriu de Bucureşti) and 94 % (Rkațiteli).

All the 45 varieties studied were grouped, after their frost resistance, into 4 classes of resistance, according to the viability of the primary buds (table 1):

a) hardy cultivars, with viability of primary buds between 80 and 100% (Burgund mare, Columna, Furmint, Traminer roz, Riesling italian, Oporto, Muscat Ottonel, Cabernet Sauvignon);
b) moderately hardy cultivars, with viability of primary buds between 50 and 80% (Rkațiteli, Steinschiller, Şarba, Tamina, Muscat Hamburg, Frâncuşă, Pinot noir, Grasă de Cotnari, Augusta, Merlot, Fetească regală, Chardonnay, Fetească neagră, Aligoté, Coarnă neagră selecționată, Sauvignon, Plăvaie, Timpuriu de Cluj, Creață, Chasselas doré);
c) cold tender cultivars with viability of primary buds between 30 and 50% (Novac, Azur, Fetească albă, Galbenă de Odobeşti, Kişmiş alb, Tămâioasă românească, Afuz Ali);
d) very cold tender cultivars, with viability of primary buds between 0 and 30% (Crâmpoşie, Cardinal, Sauvignon, Victoria, Băbească neagră, Zghihară de Huşi, Cadarcă, Timpuriu de Pietroasa, Italia, Muscat timpuriu de Bucureşti).

Figure 1 presents the viabilities of the primary and secondary buds of winter eyes at Fetească regală cultivar, at Guyot multiplu type of pruning, according to the position of the buds on the cane. We can notice that the secondary buds are more viable than the main ones, the differences being comprised between 10 and 30%. The more reduced viability of the buds, both main ones and secondary ones, was noticed at the eyes on the basis of the cane (position 1-3, 1-6). This can be explained by the fact that these ones are positioned very close to the soil surface, where the lowest temperature was lower than 4ºC, as compared to the temperature in the meteorological shelter situated at 2 meters high.

At the vines which were given a bud load of $10/m^2$ the previous years, there was noticed an almost normal viability of the secondary buds on the length of 1-15 eyes, this allowing a recovery of the vegetative part of vines and of the productive capacity.

At the vines which were given a bud load of $15/m^2$, but mostly of $20/m^2$ there was noticed a decrease of the buds viability. The overloading of buds in the previous years made them more vulnerable when faced to winter frost.

Considering the distribution of the viable buds mainly in the middle and the upper parts of the cane, the compensation of the bud load was realized, at this type of pruning, keeping some longer fruiting elements, of up to 15 buds.

As a result of affecting the primary buds viability, in spring there was noticed the appearance, in a higher or lower proportion, of the secondary shoots, coming from the secondary buds, and of the water shoots, coming from the latent buds.

At Cazenave Cordon there was noticed a relatively reduced presence of the main shoots (61-68 %) but a more increased presence of the water shoots (26-32 %) and of the shoots coming from secondary buds (9-11 %) (figure 2), as compared to the results obtained in normal years.

At spur-pruned cordon, to which it was applied a big load of 20 buds/m² last years, it was noticed the more reduced presence of the main shoots (53%) and, also, the highest presence of the shoots coming from the secondary buds (32%), as compared to the other types of pruning and of bud loads (figure 3).

CONCLUSIONS

From the tests applied on 45 varieties which belong to *Vitis vinifera* cultivars, regarding their behaviour in winter 2004/2005, we can draw the following conclusions:

- the low temperatures of -23ºC in the air and -27ºC at soil, registered in February 2005 affected, at different levels, all the *Vitis vinifera* cultivars;
- at these low values of the temperature, an increased resistance, appreciated on the basis of the primary and secondary viable buds, presented the varieties: Burgund mare, Columna, Furmint, Traminer roz, Riesling italian, Oporto, Muscat Ottonel, Cabernet Sauvignon;
- the cultivars Crâmpoşie, Cardinal, Sangiovese, Victoria, Băbească neagră, Zghihară de Huşi, Cadarcă, Timpuriu de Pietroasa, Italia, Muscat timpuriu de Bucureşti proved to be very vulnerable when faced to low temperatures.

Winter buds viability tested at Fetească regală cultivar was also affected by the bud loads given at pruning the previous years.

Function of the damage caused by frost, in spring there appeared more water and secondary shoots, recovering vegetative and productive capacity of vines.

We recommend a territorial repartition of the varieties in function of their frost resistance and the application of different types of pruning and bud loads according to their viability.

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Tables

Table 1. Grapevine winter bud hardiness data following the winter 2004-2005

Cultivar	Percent of winter bud viability:	
	Primary	**Secondary**
1. Hardy cultivars (80 – 100 % viability of primary buds)		
Burgund mare	88	91
Columna	87	93
Furmint	86	91
Traminer roz	86	89
Riesling italian	85	93
Oporto	83	90
Muscat Ottonel	81	87
Cabernet Sauvignon	80	89
2. Moderately hardy cultivars (50 – 80 % viability of primary buds		
Rkaţiteli	79	94
Steinschiller	76	88
Şarba	74	85
Tamina	74	83
Muscat Hamburg	71	85
Frâncuşă	70	87
Pinot noir	70	83
Grasă de Cotnari	69	78
Augusta	68	71
Merlot	67	80
Chardonnay	66	79
Fetească regală	66	79
Fetească neagră	66	75
Aligoté	65	71
Coarnă neagră selecţionată	64	77
Sauvignon	63	74
Plăvaie	62	71
Timpuriu de Cluj	61	74
Creaţă	59	67
Chasselas doré	51	64
3. Cold tender cultivars (30 –50 % viability of primary buds)		
Novac	49	62
Azur	48	51
Fetească albă	38	56
Galbenă de Odobeşti	35	56
Kişmiş alb	33	50
Tămâioasă românească	32	68
Afuz Ali	31	46
4. Very cold tender cultivars (0 – 30 % viability of primary buds)		
Crâmpoşie	30	44
Cardinal	29	45
Sangiovese	28	50
Victoria	28	43
Băbească neagră	27	64
Zghihară de Huşi	15	55
Cadarcă	12	28
Timpuriu de Pietroasa	12	17
Italia	3	29
Muscat timpuriu de Bucureşti	3	8

Figures

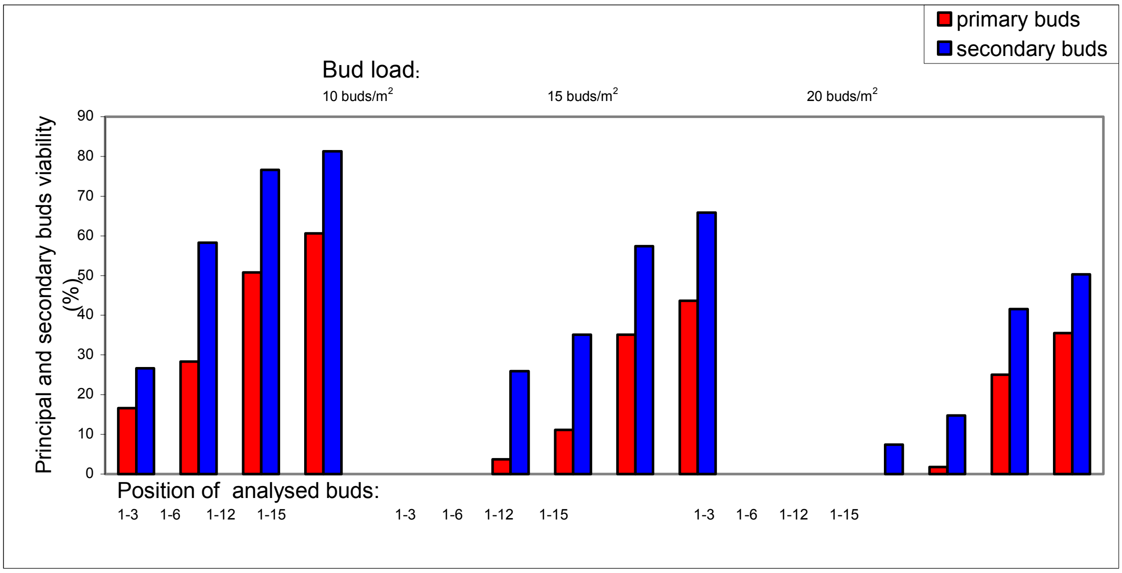

Fig. 1. Percentage of viable principal and secondary buds at Guyot pruning type (march, 2005)

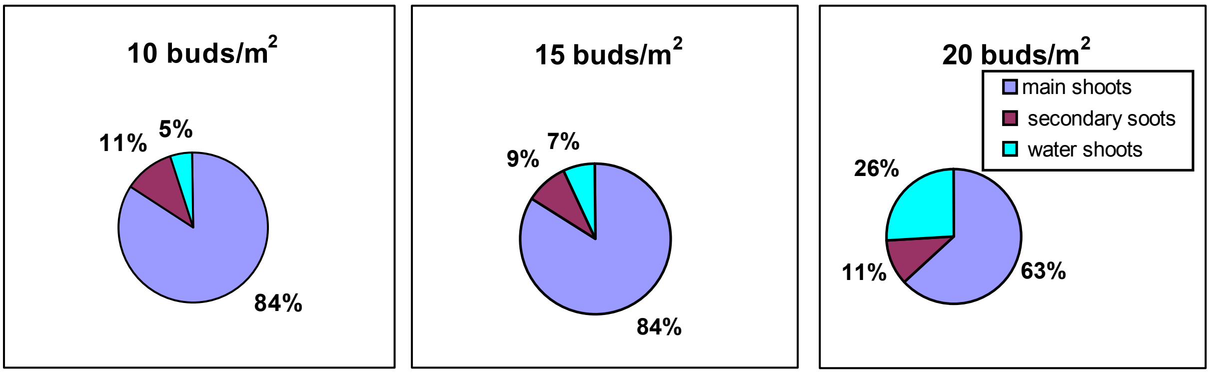

Fig. 2. Distribution of different shoot classes at Cordon Cazenave pruning type (2005)

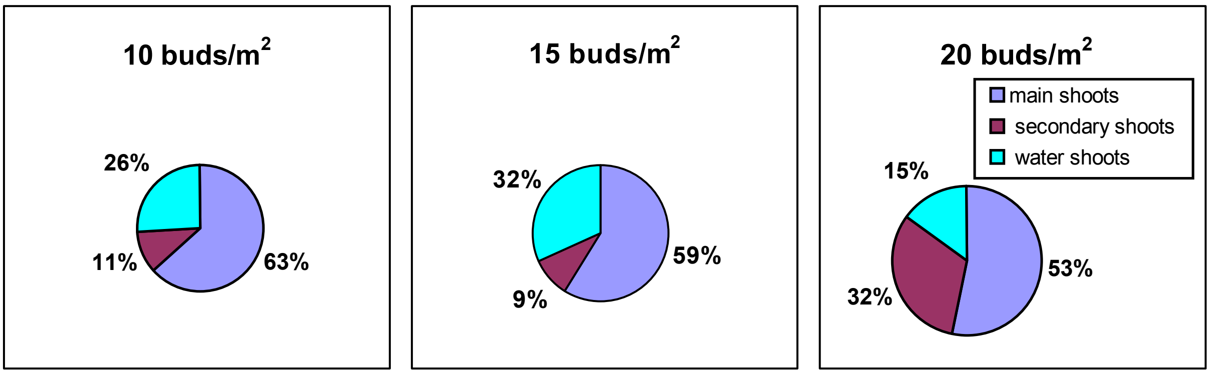

Fig. 3. Distribution of different shoot classes at spur-pruned cordon (2005)

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RESEARCH ON LEAF AREA PRODUCTIVITY OF GRAPEVINE

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Keywords: grapevine, leaf area, leaf area to fruit weight ratio, leaf area to sugar production ratio, fruit weight to pruning ratio.

ABSTRACT

The research was carried out in Bucharest (N 44º25', E 26º6') in an vineyard of Fetească regală cultivar grafted on Kober 5 BB. Vines were spaced 2.20 x 1.20 m by using five types of pruning (multiple Guyot-low training); Guyot with periodically renewed arms, Guyot on demi-high stem; Cazenave cordon and spur-pruned cordon); three levels of bud load were imposed at pruning: 10, 15 and 20 buds/m^2. The balance between grapevine vegetative growth and crop load was determinate by the ratio of total leaf area to grape yield. The greatest sugar accumulation was obtained at 12-14 cm^2 leaf area to fruits weight ratio, beyond which the sugar content das not benefit of the ratio's raising. Meanwhile, the yield to pruning weight ratio is well correlated to leaf area to sugar production ratio (cm^2/gramme ratio). At normal grape yield to pruning weight ratio (between 2,5 and 7,0) the leaf area necessary for producing one gramme of sugar in the fruit is 25-75 cm^2 leaf area per 1 gramme of sugar. These results show that maintenance of proper leaf area to fruit weight ratio is able to optimize the quality of grapes.

INTRODUCTION

Leaf area development and canopy structure are important characteristics affecting yield and fruit quality of grapevines. Growth and development of grapevines require efficient configuration of the vine canopy to achieve optimal radiation absorption by foliage.

In order to obtain a high quality grape production it is necessary to ensure an optimal sunny leaf surface (Bravdo, 2004; Nuzzo, 2004). The grapevine leaf area depends on many factors: variety, rootstock, planting density, phenological stage, bud load, soil fertility, fertilization, irrigation (Burzo et al., 2005; Fregoni, 2005).

Along with determining the leaf area, many parameters are used in viticulture, such as: leaf area index (LAI), leaf area density (LAD), leaf area necessary to produce a gramme of fruit (cm^2/g) and leaf area necessary to produce a gramme of sugar (cm^2/g sugar), (Redl, 1997; Vasconcelos and Castagnoli, 2000; Howell, 2001; Cavallo et al., 2001; Keller et al., 2004; Kliewer and Dokoozlian, 2005).

The purpose of this study was to determine the leaf area productivity, considering both the quantitative aspect (cm^2/g fruit), as well as the qualitative one (cm^2/g sugar).

MATERIALS AND METHODS

The experiment was conducted during the 2003 and 2004 growing seasons in a vineyard of the University of Agronomic Sciences and Veterinary Medicine Bucharest, Department of Viticulture and Enology (N 44º25', E 26º6'), using 9-year old Fetească regală grapevines, clone 21 Bl, grafted on Kober 5 BB. The spacing was of 2.2 m between rows and 1.2 m between vines. Rows were oriented north west-south east.

Five training systems have been studied: multiple Guyot (low training); Guyot with periodically renewed arms, Guyot on demi-high stem; Cazenave cordon and spur-pruned cordon and three bud loads (10; 15 and 20 buds/m^2).

The determination realized considered the quantity of wood removed at pruning (kg/vine), the grape yield (kg/vine), the sugar concentration at grape harvest (g/l), the leaf area (m^2/vine).

Dividing the leaf area to the grape yield, it was obtained the leaf area (cm^2) which is necessary to a gramme of fruit.

The total sugar production per vine (g) was determinate as the product of sugar concentration (g/l) x yield per vine (kg) x 0.72 (l/kg), after Martinez de Toda and Sancha (1998).

Considering the qualitative side of the yield, leaf area productivity may also be considered as the amount required to accumulate a gramme of sugar (cm^2 leaf area/gramme sugar). Dividing the leaf area to the sugar production obtained at the vine, it was obtained the leaf area (cm^2) which is necessary to a gramme of sugar accumulation.

RESULTS AND DISCUSSIONS

Given the fact that the leaf area has a special importance in forming and accomplishing the yield and its quality, there were proposed many studies which tried to correlate this one with the accumulation of sugar in the fruit, at maturation (figure 1).

This way, in 2004, the parabolic correlation between the 2 parameters was established; the highest sugar accumulations were registered at leaf area of 2,0-4,0 m^2/vine. The sugar accumulation lowers at values of more than 4,0-4,5 m^2 leaf area/vine.

In 2003, a very favourable year for the quality viticulture when Fetească regală cultivar registered values of more than 210 gramme of sugar/liter, the existance of a distinctly significant correlation ($r = 0{,}54^{**}$) was noticed between the values of the ratio „cm^2 leaf area/gramme fruit“ and the sugar content, as it results from figure 2.

According to the parabolic regression evinced, the highest sugar accumulations in the fruit were registered under the conditions in which the leaf area to fruit weight ratio registers values between 11 and 17 cm^2/g fruit. As we move off this optimal period, the sugar accumulation gets more and more reduced.

In 2004, a less favourable year for the quality of the grapes, the sugar accumulations in the fruit were smaller with about 40 g/l. Despite this fact, the relation between the two parameters (cm^2 leaf area/gramme fruit and the sugar content) was of the same type (figure 3).

The values of 12-14 cm^2/g fruit may be considered as a turning point beyond which the sugar content as a quality factor did not benefit any more from increasing the leaf area to berry weight ratio. A furter increase in leaf area to fruit weight ratio is considered as a waste and may lead to a reduced fruit quality due to vegetative sink competition and increasing risk of shading effects.

Following the qualitative side of the leaf area productivity expressed in cm^2 leaf area to sugar ratio (cm^2/g sugar), it was noticed its decreasing simultaneous with the decrease of the fruit weight to pruning weight ratio (figure 4).

According to the correlation expressed in a power function, one may notice that to the most balanced yield to wood pruning ratio (with values between 2,5 and 7) corresponds a leaf area of 25-75 cm^2 for the accumulation of each gramme of sugar in the fruit. The smallest values of the fruit weight to pruning weight ratio can be obtained under the conditions of smaller yield and of a high vigour which determines a delay in the maturation and the reduction of the quality in the conditions in which the accumulation of a gramme of sugar needs a bigger leaf area (100-300 cm^2).

CONCLUSIONS

The results show that leaf area was correlated with sugar content of fruits at harvest.

The greatest sugar contents were registered al leaf areas between 2,0 and 4,0 m^2/vine, resulting optimum values of leaf area index of 0,7-1,5.

The sugar accumulation has dropped significantly at vigorous vines with the leaf area over 4,0 m^2/vine.

The leaf area to fruit weight (cm^2/gramme fruit) was the parameter which correlated to the sugar content.

It has been noted a high sugar accumulation while the leaf area to fruit weight increased until values of 12-14 cm^2 leaf area/gramme fruit.

A post priory growth of leaf area to fruit weight ratio may determine a decrease of fruit quality mostly due to excess of vegetation and shading effects.

The results also indicate that to the most balanced yield to wood pruning ratio (between 2,5 and 7) corresponds a leaf area of 25-75 cm^2 for one gramme of sugar accumulation in the fruit.

The data indicate that leaf area/fruit weight ratio between 12 and 14 cm^2/g fruit, crop yield/pruning weight ratio within the range of 2,5 to 7, and leaf area/sugar ratio between 25 and 75 cm^2 for the accumulation of each gramme of sugar in the fruit are good indices of vines well balanced between the amount of crop and foliage leaf area for Fearească regală cultivar.

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Figures

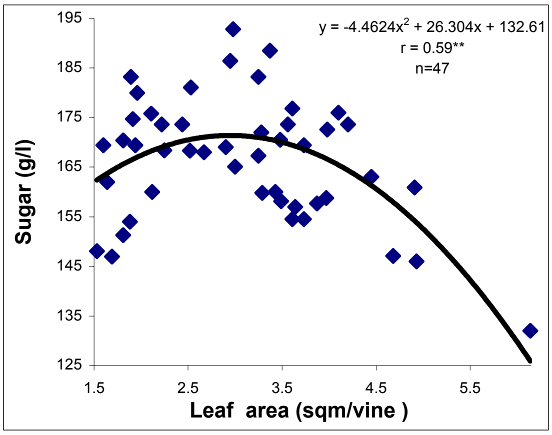

Fig. 1. Correlation between the leaf area(m^2/vine) and the sugar accumulations in the fruit (g/l) (2004)

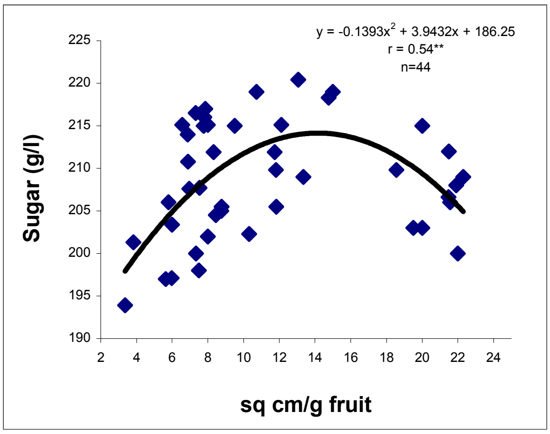

Fig. 2. Correlation between cm^2 leaf area/g fruit and the sugar accumulations in the fruit (g/l) (2003)

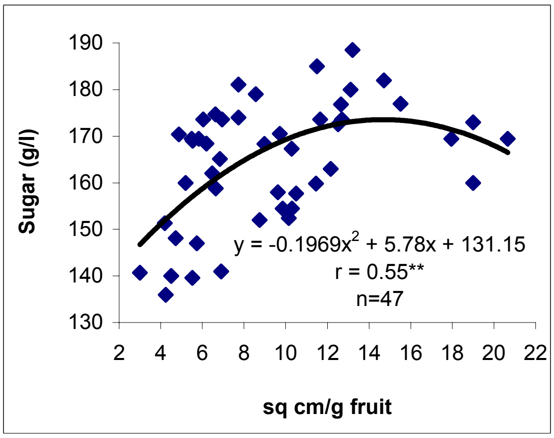

Fig. 3. Correlation between cm^2 leaf area/g fruit and the sugar accumulations in the fruit (g/l) (2004)

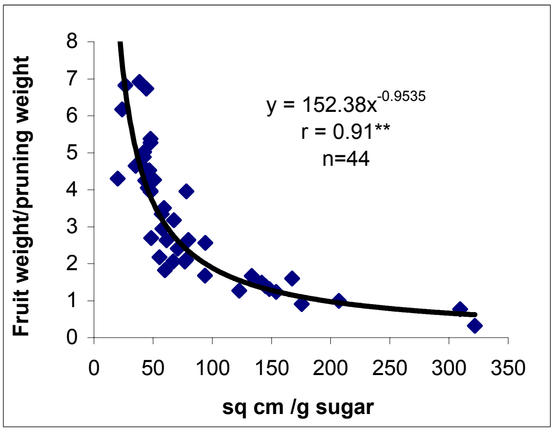

Fig. 4. Correlation between leaf area/g sugar and fruit weight to pruning weight ratio (2003)

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OBTAINED RESULTS IN THE VINE PRODUCTION DOMAIN REGARDING THE ECOLOGICAL PREVENT AGAINST DISEASES ON THE CONDITIONS OF EXCESSIVE HUMIDITY

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Key words: viticulture ecosystem, ecological treatments, warning, phenological phase.

ABSTRACT

The year 2005 shows an accentuated abnormality character. In order to establish the treatment scheme it takes into account the last knowledge that came out regarding this domain in the last decade, as well as the international tendencies.The variety on which were done ecological treatments was Chardonnay. Regarding the mildew attack, it became manifested for 15 generations and it warned 7 treatments. For manna it warned 10 treatments because it produced 6 primary infections and 37 secondary infections. During the vegetation period it can be possible 1-4 primary infections and, up to 50-60 secondary infections. The year 2005 is characterized by a strong manna attack.

INTRODUCTION

In order to the efficient prevent against diseases and pests of the vine plantations, during the vegetation period, it applies in average 6-7 treatments, mostly with chemical insectofungicides, toxic for useful fauna of the vine ecosystem and with real risks to pollute the grapes and the wine.

The solution for removing these drawbacks of the practical viticulture domain represents the integrated protection, which harmoniously combines the results of all prevent means (physical, chemical agrophytotechnical and biological) and which has as a final goal the minimization of the treatments number.

The year 2005 shows an accentuated abnormality character. Knowing that the thermal necessary for flourishing is minimum 15^{o}C, and in the May of this year the minimum air temperatures was, excepting the last four days, much under the biological limit, recording even 5^{o}C, it can be estimate in which conditions the blossom has developed this year.

The thermal necessary for the phenological phase of seeds growing, until grow ripe is 20^{o}C. The medium temperature in June 2005 was only 18.4^{o}C, so this didn't ensure the minimum level required for seed growing. The June minimum didn't reach this level not a day, recording even 5.5^{o}C in the soil and 6.9^{o}C in the air. In July the soil minimum was 8^{o}C and in the air, 12^{o}C.

The rainfalls of May was 196 mm related to 67.7 mm. In June were registered rainfalls of 119 mm, related to 78 mm – normally, in July of 148 related to 72, in August 178 related to 54 mm.

The analyze which it imposes for the characterization of the year 2005 is a multicriterial one, because not only the rainfalls are the causes of the abnormal character, but the temperatures.

MATERIALS AND METHODS

In order to establish the treatment scheme it takes into account the last knowledge that came out regarding this domain in the last decade, as well as the international tendencies.

The variety on which were done ecological treatments was Chardonnay.

It was taken into account the following corroborated actions:

- application of a differentiated agrotechnics, beginning with the dry cutting, proceeding with the application of a copse cultivation, special works for soil maintenance;
- disease and pest control by an integrated system of vine protection, which contains as well the fight against weeds;
- weather forecast, the meteorological dates registered at the meteorological station, the effectuation of observations regarding diseases appearances, all corroborated, leaded to the decision of treatments realized at warning, which it means the decrease of the treatments number to the essential, as well as the diseases and pests prevent at the most effective moment, the surpassing of the critical moments during the annual cycle of vine;
- establishing a program for integrated diseases, pests and weeds prevent upon phenological phase, in order to decrease the treatments number.

RESULTS AND COMMENTS

The low temperatures (10-15^{o}C) and the absence of rainfalls didn't allow the manifestation of the first generation of mildew and nor start of the first manna infection in the first two decades of April (fig. 1).

In the third decade of the month (April 26) started the first generation of mildew as a result of low temperatures and the rainfalls of 15 mm in April 22nd.

In the first decade of May, after 32 mm of rainfalls and as a result of lower temperatures than standard ones, it became manifest the second generation of mildew (fig. 2).

In the second decade, appeared the third generation of mildew and it warned the first treatment. Until the end of the month it appeared a new generation of mildew (the fourth).

Also in the first decade, the low rainfalls (46 mm) started the first manna infection (May 11th). The second primary infection was recorded after other rainfalls (117 mm) on May 24th and it was warned the second treatment. There were showed up, during the month, 7 secondary infections, promoted by the 196 mm rainfalls.

In the second decade of June it became manifest the fifth generation of mildew and it was warned the third treatment. The sixth generation appeared about the 20th of June and, at the end of the month, on 28th started the seventh generation and it was warned the fourth treatment (fig. 3).

The third primary manna infection started after an amount of 53 mm rainfalls in the first decade of the month, warning the third treatment against manna, then fourth on 16th, and fifth on 26th and during the month, it produced 10 secondary infections as a result of the rainfalls which continued to fall.

The rainfalls was kept on in July (fig. 4) and it realized four mildew generations, warning the fourth treatment in the middle of the month, and the fifth, at the end of the month.

It started the fourth primary manna infection after 30 mm of rainfalls, fell at the beginning of the month and it warned the sixth treatment on July 5th. After others 63 mm fell in the second decade it started the fifth primary infection and it warned the seventh treatment on July 15th, and then eighth, on July 26th. During the month it was produced 10 secondary infections.

During the whole month of August (fig. 5) it appeared the next generations of mildew: twelfth, thirteenth, fourteenth, fifteenth and it warned two treatments, one at the middle of the month and the other at the end of the month.

The rainfalls of the month (178 mm) exceeded the three times the standard and permitted the start of the sixth primary infection (after 97 mm of rainfalls) and the tenth secondary infection. It was warned the last two treatments: the ninth and the tenth.

In 2005 the minimum level of humidity was exceeded by 33% in April, by 39% in May and by 30% in June (fig. 6).

In 2005 the excessive hydric stress recorded during the entire vegetation period, but mostly after the start of the ripe phase, determined significant crop losses and decreased its quality.

The realized treatments were those presented in the table 1.

The ecological treatment costs 31 millions lei per 1 hectare.

The efficiency of treatments was 98%.

CONCLUSIONS

The excessive rainfalls in 2005 situated the momentary water provision of the soil over the limit of 50% from I.U.A., both on the depth of 0-60 cm, area in which is located the majority of the vine roots, and on the depth of 0-100 cm.

Regarding the mildew attack, it became manifested for 15 generations and it warned 7 treatments.

For manna it warned 10 treatments because it produced 6 primary infections and 37 secondary infections. During the vegetation period it can be possible 1-4 primary infections and, up to 50-60 secondary infections. (Toma, A., 1981)

The year 2005 is characterized by a strong manna attack.

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Table 1. The treatment – ecological variant - 2005

No. treatment	Specification phenophase	Product	Concentration	Price /kg, l	Price total/ treatment
1	On soil	Actigrains N+ Actigrains P+ Biofalgue	0,4 l/ha 0,4 l/ha 4 litri/ha	71 euro/litru 71 euro/litru 9,2 euro/itru	28,4 euro 28,4 euro 36,8 euro
2	Before budding rossette pfenophase and at 2-3 leaves Soufre biofa	Sulph and calcium solution + Soufre biofa	5 l/ha 7 kg/ha	18.000 lei/l 2,64 euro/kg	90.000lei 18,48 euro
3	Until flowering	Ulmasud + Soufre biofa + Kanne + Biofalgue	4 kg/ha 6-8 kg/ha 4 l/ha 1 l/ha	8,72 euro/kg 2,64 euro/kg 3,44 euro/l 13,2 euro/l	34,88 euro 21,12 euro 13,76 euro 13,2 euro
4	Until flowering	Ulmasud + Soufre biofa + Kanne + Biofalgue	4 kg/ha 6-8 kg/ha 4 l/ha 1 l/ha	8,72 euro/kg 2,64 euro/kg 3,44 euro/l 13,2 euro/l	34,88 euro 21,12 euro 13,76 euro 13,2 euro
5	Until flowering	Algocuivre + Rumanian sulphur	70% 30%	1,72 euro/kg 9.000lei/kg	60,2 euro …lei
6	Butting forth buds	Algocuivre + Rumanian sulphur	70% 30%	1,72 euro/kg 9000 lei/kg	60,2 euro 135.000 lei
7	15 days after putting forth buds	Algocuivre + Rumanian sulphur	70% 30%	1,72 euro/kg 9000 lei/kg	60,2 euro 135.000 lei
8	15 days after treatment 8	Salt + water + powder milk	30 g/l 500 l/ha 15 g/l	4000 lei/kg - 180000 lei/kg	60 000 lei 1350000 lei
9	Berries` compactness due to powerful attack of mildew	Copper sulphate solution + soufre biofa + mouillant biofa + Salt + water +powdwe milk	5 kg/ha 8 kg/ha 1 l/ha 2 l/ha 30 g/l 500 l/ha 15 g/	70000 lei/kg 2,64 euro/kg 6,15 euro/l 26 euro/l 4000 lei/kg - 180000 lei/kg	350000 lei 21,12 6,15 euro 52 euro 60 000 lei 1350000 lei
10,	Berries` compactness due to powerful attack of mildew	Copper sulphate solution + soufre biofa + mouillant biofa + SILIBRIX	5 kg/ha 8 kg/ha 1 l/ha 2 l/ha	70000 lei/kg 2,64 euro/kg 6,15 euro/l 26 euro/l	350000 lei 21,12 6,15 euro 52 euro
11	Berries` compactness due to powerful attack of mildew	Copper sulphate solution + soufre biofa + mouillant biofa Salt + water +powdwe milk	5 kg/ha 8 kg/ha 1 l/ha 2 l/ha 30 g/l 500 l/ha 15 g	70000 lei/kg 2,64 euro/kg 6,15 euro/l 26 euro/l 4000 lei/kg - 180000 lei/kg	350000 lei 21,12 6,15 euro 52 euro 60 000 lei - 1350000 lei
12.	Berries` compactness due to powerful attack of mildew	Copper sulphate solution + soufre biofa + mouillant biofa + Salt + water +powdwe milk	5 kg/ha 8 kg/ha 1 l/ha 2 l/ha 30 g/l 500 l/ha 15 g	70000 lei/kg 2,64 euro/kg 6,15 euro/l 26 euro/l 4000 lei/kg - 180000 lei/kg	350000 lei 21,12 6,15 euro 52 euro 60 000 lei - 1350000 lei
	TOTAL				31 mil. lei

Figures

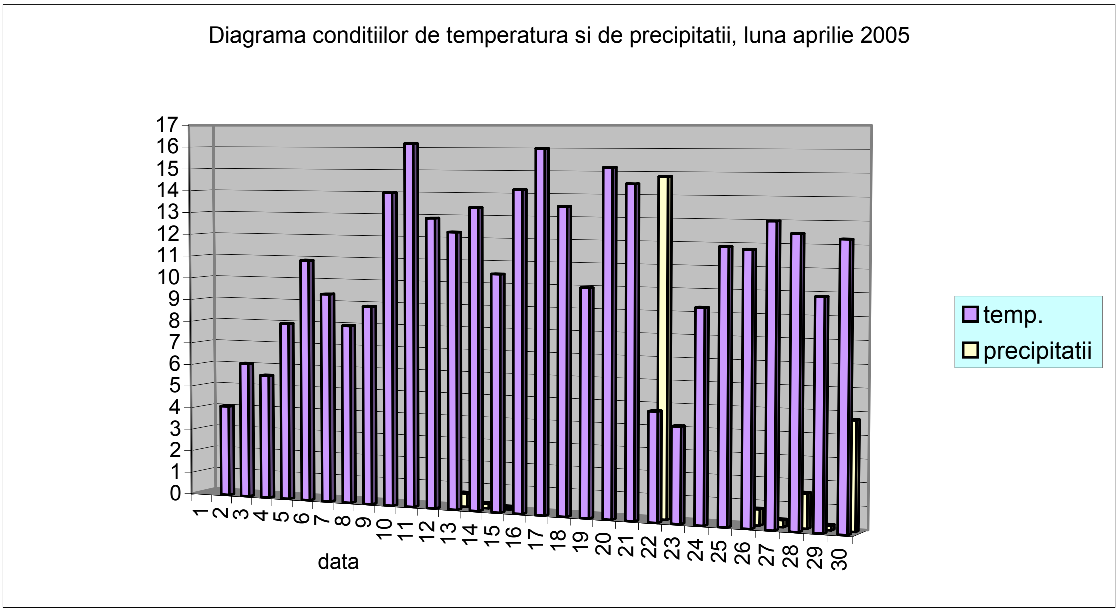

Fig. 1. The diagram of temperature and precipitations conditions April 2005

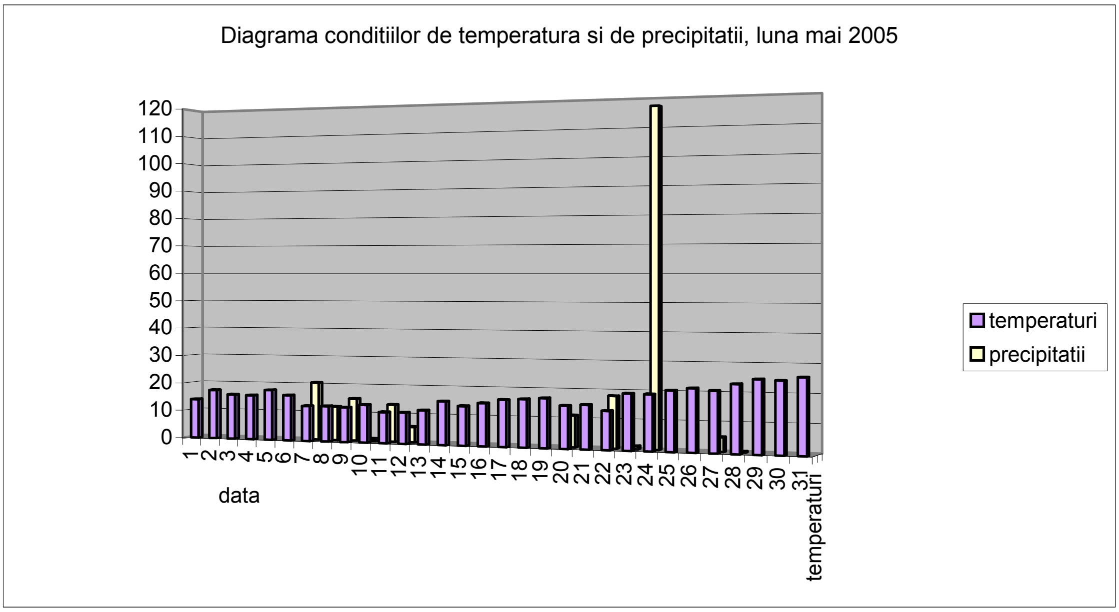

Fig. 2 The diagram of temperature and precipitations conditions May 2005

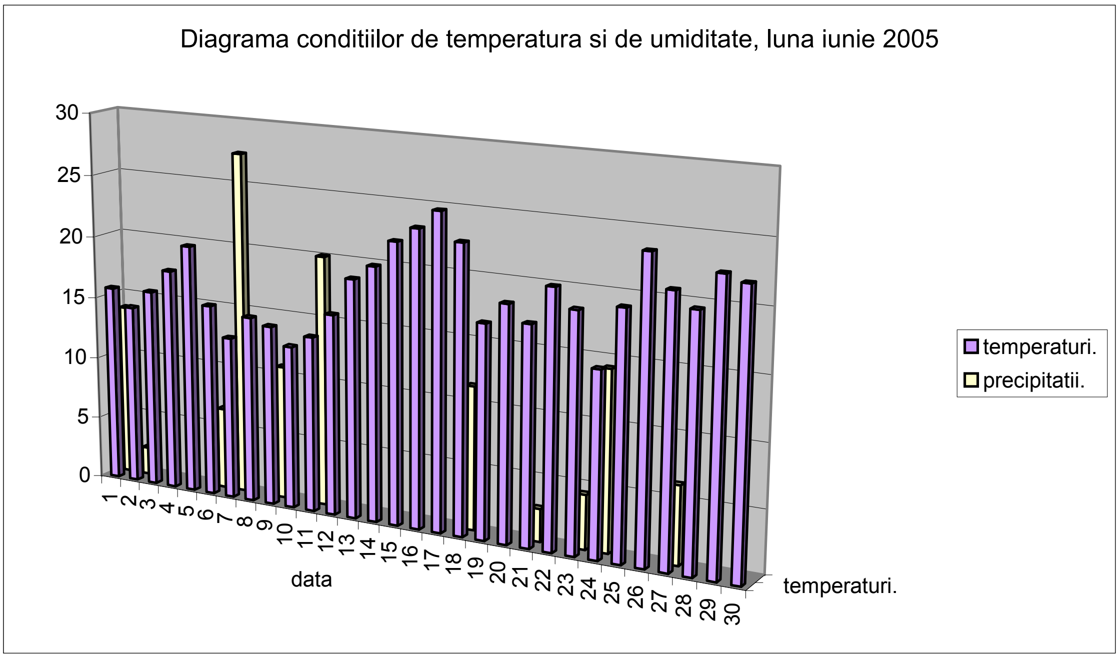

Fig. 3 The diagram of temperature and precipitations conditions June 2005

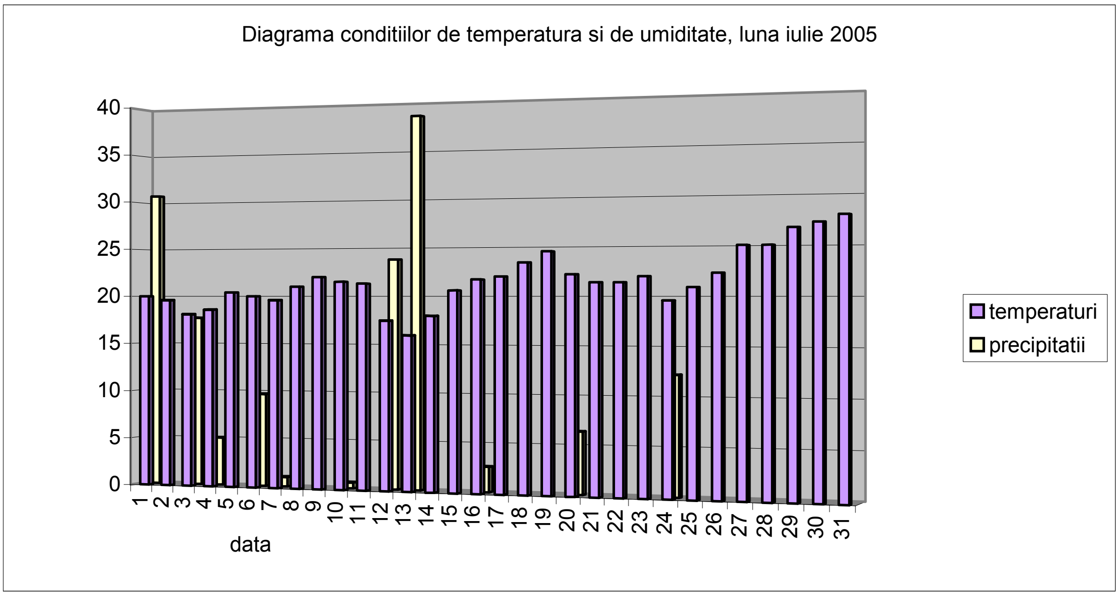

Fig. 4 The diagram of temperature and precipitations conditions July 2005

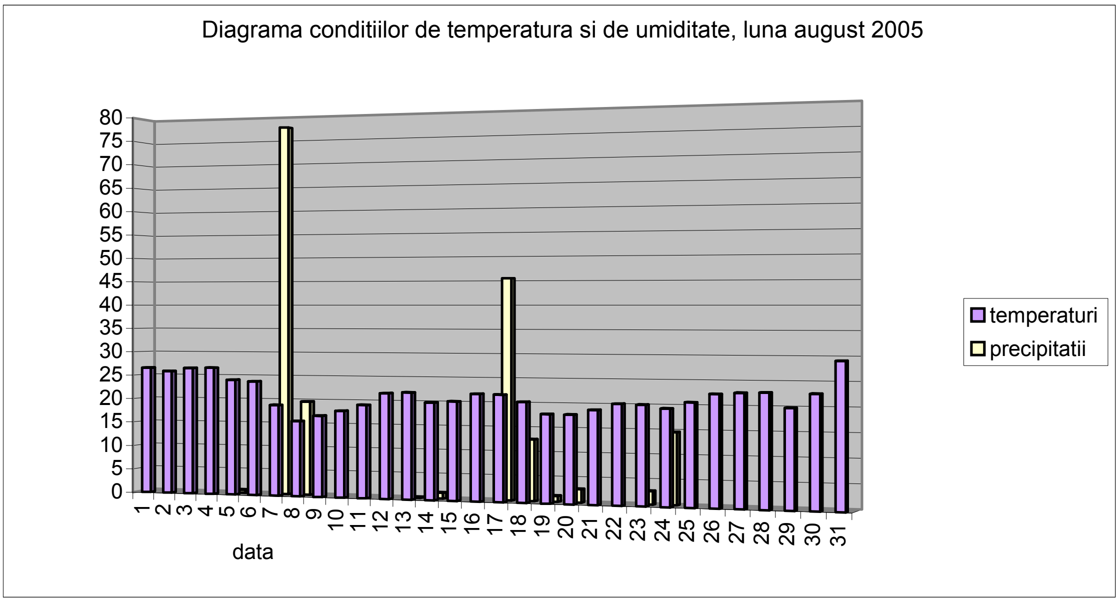

Fig. 5 The diagram of temperature and precipitations conditions August 2005

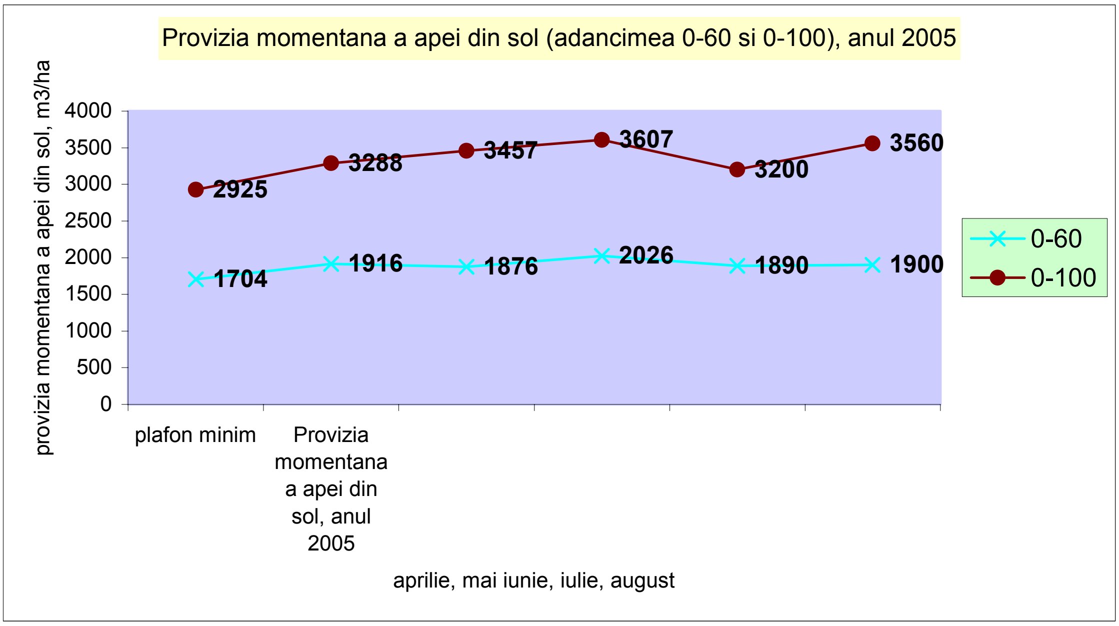

Fig. 6. The momentary provision of water from soil 2005

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RESEARCHES RELATED TO THE HYDRIC STRESS CONDITIONS OF PIETROASA WINE CENTER, USING THE HYDROPHYSICAL SOIL INDICES

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Keywords: physical and hydro-physical indices, provision momentary of the soil, hydric stress

ABSTRACT

The climatic modifications of the last decade consisted in the global warming as well as in the accentuation of some negative phenomena that affected the growth and the normal fructification of the vineyard. Thus, the noxious minimum temperatures became more frequent in wintertime (2002/2003; 2004/2005), as well as the long severe droughts (2001/2002; 2002/2003). 2005 can be characterized by excessive precipitations with very unfavourable consequences.

The hydrophysical indices of the soil have been calculated on the basis of the observations made during the above-mentioned dry years and in 2005 which can be characterized as excessively rainy.

INTRODUCTION

The hydric stress appears during the periods of drought and heigh humidity. Even if the vineyard is considered to be a plant resistent to the hydric stress, the long pedological drought can affect to a large extent the vegetation of the vine and their productivity. On the other hand, the excessive humidity can have negative effects.

MATERIALS AND METHODS

The researches were carried on at S.C.D.V.V.Pietroasa, during some tests made in the superior third of the slope, on a black earth soil which contained carbon and had a clay texture in the first layer of 0-60 cm and argilaceous earth in the layer at 60-100 cm (Al. TOMOIU, 2000, unofficial data).

RESULT AND DISCUSSIONS

The physical and hydro-physical indices of the soil are presented in table 1 and were revealed, for CC following the indirect method, depending the content of clay, fraction 0.002 mm, which at Pietroasa has values between 36 and 47%.

The hydrophysical indices of the soil (CO, CC) show that the soil can store a volume of active water (I.U.A.) of 2034 m3/ha.

The water stock in the soil went down under the minimal limit of the soil's humidity, at the depth of 0-60 cm (1704 m3/ha) in the period between the blom and the ripenning (fig.1), tending towards the wilt coefficient of the plants under hydric stress.

In 2004, at the beginning of the vegetation, one did not ensure this limit (fig.2) which is 7% smaller. Same situation for the month of May. June and July were very dry, the minimum limit of the soil's humidity is 9% smaller, and in July 11% smaller, which means hydric stress conditions.

The pluviometric characteristics of 2003-2004 showed that the lack of precipitations was noticed in the period between the bloom and the rippening which influenced the growing of the grapes. Moreover, the quality of the grapes diminished (table 2).

In 2005 the minimum limit of humidity was exceeded with 33%, in April with 39%, and in June with 30% (fig.3).

In 2005, the excessive hydric stress, revealed during the vegetation process, especially after the ripping, led to important loss in harvest (table 3).

CONCLUSIONS

1. The hydric stres caused by the long drought between 1999 and 2004 is revealed by the values of the water stock in the soil, which were under the capacity in the field (CC) and very close to the wilt coefficient (CO).
2. Even if the vineyard can adapt easily to extreme conditions of xerofilie, the pedological and atmospheric drought leads to critical periods from the physiological point of view, materialized in the grapes production and their quality.
3. The excessive precipitations of 2005 showed that the water stock in the soil is overlimit with 50% of I.U.A., on the depth of 0-60 cm, where most of the vineyard roots are, as well as on the depth of 0-100 cm.
4. The excessive humidity diminished the quality.

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Tables

Table 1. Physical and hydro-physical indices of the soil for the profile 0-100 cm

Depth (cm)	**Da* t/m.^{3}**	**Wilt coefficient (CO)**		**Capacity field (CC)**		**I.U.A.**		**Minimum limit**	
		%	**m^3/ha**	**%**	**m^3/ha**	**%**	**m^3/ha**	**%**	**m^3/ha**
0-20	1.38	12.03	333	29	800	16.97	468	20.50	566
20-40	1.35	13.02	352	28	756	14.98	504	20.51	554
40-60	1.44	10.50	389	27	778	13.50	389	20.27	584
Media 0-60	1.40	12.85	1073**	28	2334**	15.15	1261**	20.28	1704**
60-80	1.54	13.50	416	25	770	11.50	354	19.25	594
80-100	1.55	13.48	418	27	837	13.52	419	20.24	628
Media 0-100	1.46	13.10	1907**	27	3941**	13.86	2034**	20.03	2925**

*Appearance density – test made on site, in a natural horizon
**Sum of the water quantities for the profile 0-60 cm and 0-100

Table 2. Quantity and quality of the grapes production for the Tămâioasă românească in the periods of drought

Production (kg/vine)	Sugars (g/l)	Acidity (g/l H_2SO_4)
0,900	210	5,75

Table 3. Quality of the grapes production for the Tămâioasă românească in the periods of drought

Sugars (g/l)	Acidity (g/l H_2SO_4)
200	9.05

Figures

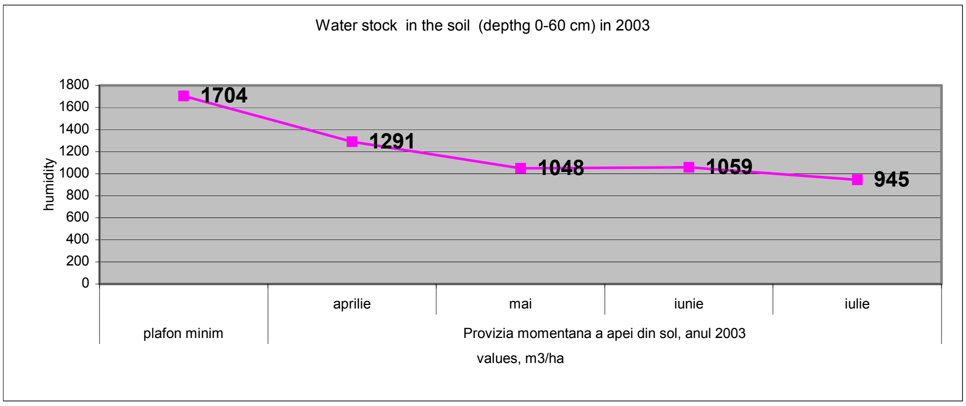

Figure 1. The water stock in 2003

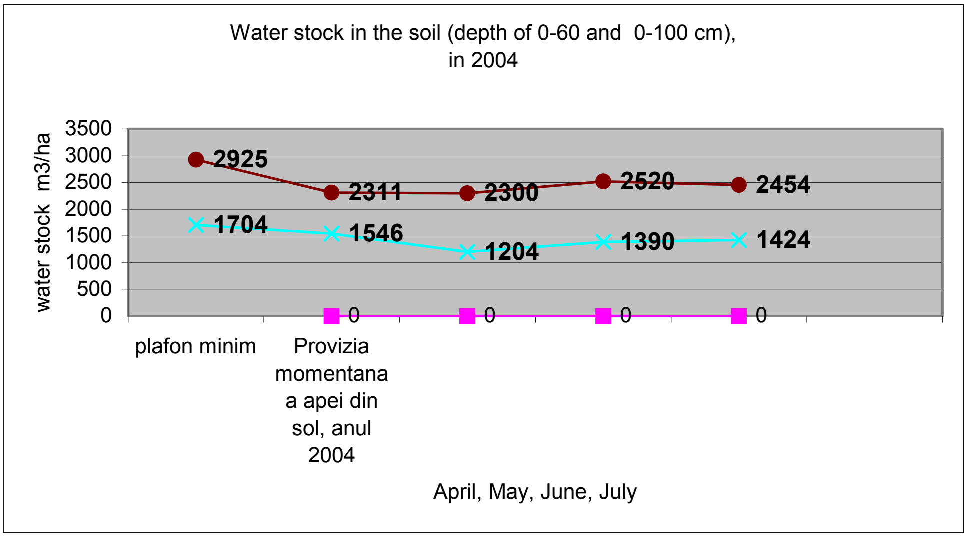

Figure 2. Water stock in the soil in 2004

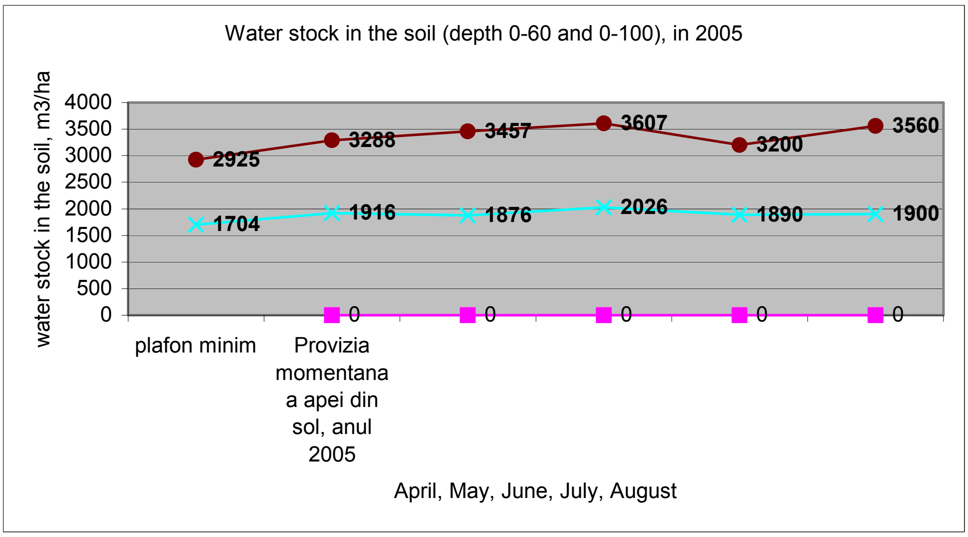

Figure 3. Water stock of the soil in 2005

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THE FERROFLUIDS – BIOSTIMULATORY OF CALLUSOGENESIS PROCESS IN GRAPEVINE CULTURE

Daniela GIOSANU, Mircea BĂRBUCEANU

Key words: ferrofluids, callusogenesis, grapevine

SUMMARY

In this study it was observed the influence of ferrofluids upon callusogenesis in grapevine culture. The use of magnetically fluids determined the apparition of some differences between the treated lot and the control. These differences regard the form, colour and the type of callus formatted. It remarks a negative correlation between callus mass and the concentration of ferrofluids from culture medium. But, the use of magnetic fluid determined an initialization of callus with 2-3 days before the callus forming from control lot. In conclusion, we can say that the presence of magnetic fluid in medium culture had a positive influence upon the evolution callusogenesis.

INTRODUCTION

Preparate for the first time to NASA in 1960, the magnetic fluids are coloidale ultrastable suspension of fero-or ferimagnetical particles, in multiple liquids (water, oil, oleic acid). They have many applications in acoustics, technology, medicine and agronomy.

The effects of ferrofluids on *in vitro* culture were studied since 1992 (Butnaru and Corneanu G.C., 1992; Corneanu M. and colab., 1995) on different species. It observed that, in very well established concentrations for each variety and explant type, these ferrofluids are biostimulators for the callusogenessis and rhysogenesis processes. For example, if the culture media MS was supplemented with 1,87 x 10^{-3}g/cm^3 ferrofluids in *Lycopersicon esculentum* culture, the initialization of callusogenessis was 3-5 days earlier, comparative with the witness lot (MS without ferrofluids). Although the callus volume was higher, the callus mass was diminished (71,5 %) comparative with witness lot. So, it remarks a negative correlation between the ferrofluid concentration and the obtained biomass (r = - 0,82) (Perciuleac, Butnaru G. and Jacotă A. Gh, 1995).

In *Vitis Vinifera L,* the rhisogenesis was stimulated when it used ferrofluids in water, (100 Gs 0,5 %) (Goian and Sala F., 1998). Thus, Kalashyan and colab. (1998) remark the posibility to prevent or to diminish the infection with GVLF on grapevine using ferrofluids (3,75 x 10^{-3} g/cm^3).

Taking into account the important role of the magnetically fluids action on callusogenesis, the aim of this paper is to present a study about the action of the ferrofluids on grapevine culture.

MATERIALS AND METHODS

The research was performed on four grapevine variety: Cabernet-Sauvignon, Avgustovsky, Muscat de Ialoveni and Negru de Ialoveni.

The experiments were done in the national Institute of Genetics, Chisinau, Moldavia.

In technology of in vitro culture, an important step is the election and preparation of convenient culture medium. We used MS – 1962 like basic culture medium, supplemented with 2,25 mg/l BAP, 0.2 mg/l AIA and 2 mg/l 2,4 D (diclorofenoxiacetic acid). The influence of ferrofluids on callusogenesis was studied by the supplement of this basal medium with ferromagnetic particles dissolved in distillate water, in different concentration. Its obtained the following experimental variants (see table 1).

Table 1

The experimental parameters

Variants	k (control)	I	II	III	IV
ferrofluid concentration (mg/l)	0	$33x10^{-2}$	66×10^{-2}	$99 \text{ X } 10^{-2}$	$132 \text{ X } 10^{-2}$

The magnetically particles derived from Technical University, Timisoara.

RESULTS

The use of ferrofluids determined the apparition of some differences between the treated lot and the control. These differences regard the form, colour and the type of callus formatted (see table 2)

Table 2

Types of callus obtained when the culture media is supplemented by ferromagnetics fluids

Concentration of magnetically fluid in culture media (mg/l)	**Type of explants**	**Type of callus**
control (witness)	internodal segments	white, crumbled, reduced volume, without embriogenesis points
33×10^{-2}	internodal segments	white, pink, crumbled, with embriogenesis points
66×10^{-2}	internodal segments	white, dense, with embriogenesis points
99×10^{-2}	internodal segments	pink, green, big volume, with embriogenesis points
132×10^{-2}	internodal segments	green, dense, glomerular, with embriogenesis point

We can see from table 2 that the obtained callus is better developed in the experimental lots with magnetic particles, comparative with control lot. The embriogenesis points appear from 33×10^{-2} mg/l ferrofluid added in culture medium.

The type of callus was different for each sort of vineyard. The use of ferrofluids shows that Cabernet Sauvignon sort are characterized by a higher ability to forming the callus comparative with the other studied sorts: Negru de Ialoveni, Muscat de Ialoveni şi Avgustovski.

It was remark that the volume of obtained callus is direct dependent to the concentration of magnetic fluids presented in culture medium. Although the volume of callus was higher by supplemented the culture medium with ferrofluids, the callus mass was significantly diminished, for all the studied sorts (table 3).

Table 3

The variation of callus mass with the concentration of magnetic fluid in culture medium

Concentration of magnetic fluid (mg/l)	**Cabernet-Sauvignon (mg)**	**Muscat de Ialoveni (mg)**	**Avgustovski (mg)**	**Negru de Ialoveni (mg)**
0 (control)	129,03	120,08	120,42	121,73
33 x 10^{-2}	115,16***	114,65**	115,40**	116,06**
66 x 10^{-2}	115,91***	118,57	115,24**	119,06
99 x 10^{-2}	120,21**	119,27	120,47	116,30**
132 x 10^{-2}	117,05***	118,50	118,52	117,37*

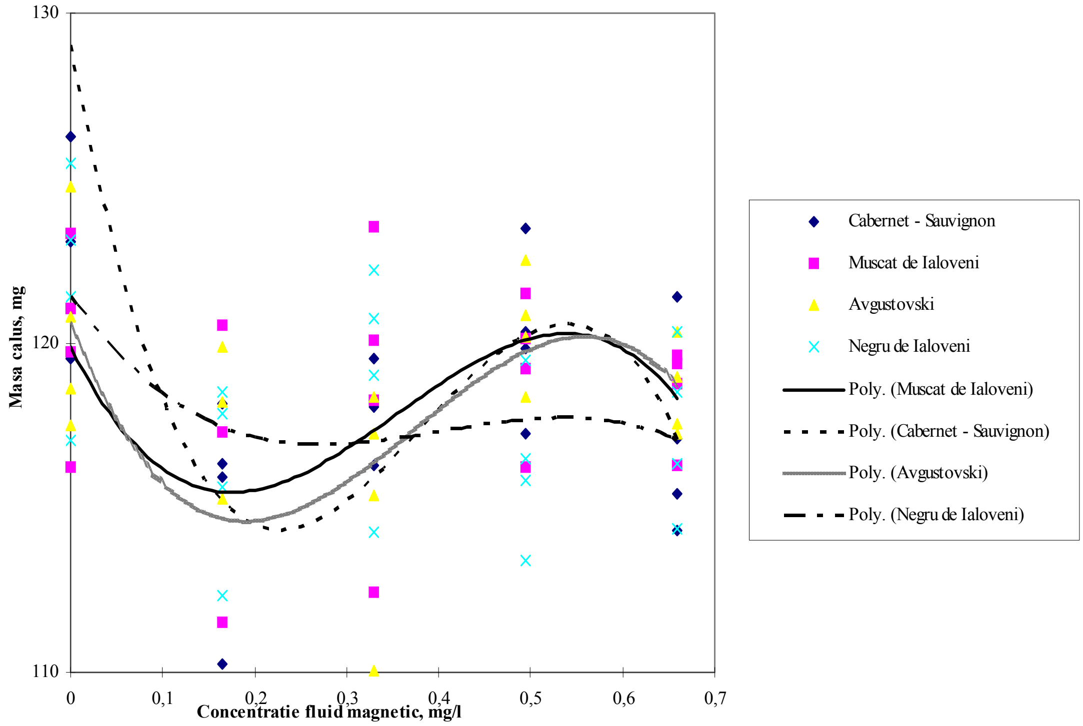
Note: *, **, ***, are significant differences for: DL > 5 %; DL > 1 %;DL > 0,1 %.

Table 3 proved a negative correlation between callus mass and the concentration of ferrofluids from culture medium. But, the use of magnetic fluid determined an initialization of callus with 2-3 days before the callus forming from control lot (without magnetically fluids).

The correlation between callus mass and the concentration of ferrofluids from culture medium, for each studied sort, is represented in figure 1. The correlation curves were polynomes of three degree. Their equations are significant differences between the control and the other experimental lots.

Figure 1

The correlation between callus mass and the concentration of magnetic fluid, for each studied sort

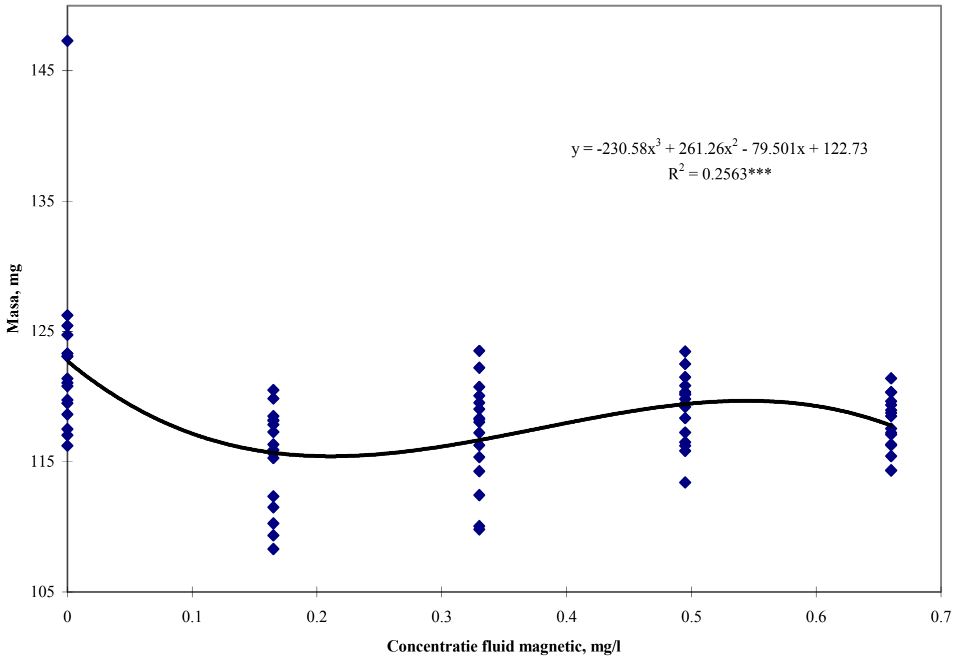


It remarks that the Muscat de Ialoveni and Negru de Ialoveni sorts present significant differences comparative with the control lot, but only the Cabernet Sauvignon sort are ***very*** significant different regard the correlation between callus mass and the concentration of ferrofluid. At the same time, the Cabernet-Sauvignon sort is the strongly influenced by treatment with ferrofluids (67 %), comparative with the other studied sorts: Negru de Ialoveni şi Muscat de Ialoveni (24 % respectively 22%).

In figure 2 is presented the correlation between callus mass and the concentration of ferrofluid from culture medium, for all studied sorts. In this case, the interpolare curves is a polynom of three degree, too, but the use of ferrofluids effect on callus mass is only 25 %.

Figure 2

The correlation between callus mass and the concentration of ferrofluid, for all studied sorts



CONCLUSIONS

- Different concentration of ferrofluid from culture medium demonstrated a selective influence on callusogenesis process, depending by grapeyard studied sort; for example, the Cabernet-Sauvignon sort was strongly influenced by the use of ferrofluid (%).
- After the supplemented the culture medium with ferrofluids, the callus mass was diminished, but the callus initialization was earlier with 2-3 days, comparative with control lot.

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RESEARCH REGARDING A COMPARATIVE STUDY OF SOME PHYSIOLOGICAL INDEXES OF GRAPEVINE LEAVES OBTAINED *IN VITRO* CULTURE AND A GRAPEVINE LEAVES OBTAINED FROM FORCED CUTTING IN CONTROLLED ENVIRONMENT

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Keywords: *vitis,* rootstock, cultivars, micropropagation, explants.

ABSTRACT

The aim of this paper is to determinate some physiological indices (dry substances contents, proteins and glucid contents, mineral elements contents) of the grapevine leaves obtained *in vitro* and the grapevine leaves obtained from forced cutting in controlled environment

INTRODUCTION

The purpose of this paper were to present the research resultants of dry substances contents, proteins and glucid contents, mineral elements contents of the grapevine leaves obtained *in vitro* and the grapevine leaves obtained from forced cutting in controlled environment

MATERIALS AND METHODS

For this experiment it was study two variants of leaves noted with V1 and V2. The determinations were made on leaves of two cultivars of *Vitis vinifera* (L.) species *Chardonnay*, *Pinot noir* and a rootstock *Kober 5 BB*.

With V1 is noted the lives prelevated of grapevine plantlet micro propagated *in vitro* and with V2 is noted the leaves prelevated from forced cutting. The explants were kipped in controlled environment (temperature 23 ±1ºC and a photoperiod a 16 h light and 8 h dark).

The research was realized in laboratory of Plants Physiology within the Research Centre of Horti- Viticle products a Horticulture Faculty.

Determination a dry substance and water is realized weighing the fresh vegetal materials, drying for 24h at 105˚C, cooling in exicator and weighing again the dry materials. The results was exprimate expressed in procents (%).

Qualitative determination a minerals substance in leaves. After quantitative determination a contents of mineral substances, ashes is dissolved in 2 ml of nitric acid and this is put in balloon at 50 ml and is sign brought with bidistilate water. The result was reading a spectrometry with plasma inductive coupling, expressed in mg/ 100g f.m.

Dosing soluble proteins with burette methods. For dosing the soluble protein it was realized the protean extract thought grinding a 1 mg vegetal material, washing with 10 ml phosphate tampon, 0.1 M and pH 7.2, conservation in fridge and whizzing 15 min. at 6000 rpm. The protein extract is colorimeter a 540 nm. The concentration value is expressed in mg/g^{-1}f.m.

Dosing soluble glucid with antron. Method Scott and Melvin.

The glucid extract is dropper in to test-tube centrifuge with 7.2 ml TCA 5% and 0.8 ml sample, agitation, centrifuge at 15 min a 6000 rpm. 0.5 ml supernatant was treating with 2 ml antron reactive and incubation in water bath boiling for 10 min. After cooling the result is read to 620 nm optic density and was expressed in mg/g^{-1} f.m.

RESULTS AND DISCUSSIONS

The greatest content in water is registered in grapevine leaves of variant V1.

Mean value was to 1.1 greatest of grapevine leaves variant V1 then the leaves of variant V2 (Table 1)

In grapevine leaves is registered the greatest content in dry substance of variant V2: from 1.4 (*Chardonnay* cultivar) until 1.5 (*Kober 5 BB* rootstock and *Pinot noir* cultivar). Mean value it was of 1.5 greatest in leaves of variant V2 than variant V1 (Figure 1).

The greatest contents of leaves in glucid are register of variant V2. The leaves of rootstock *Kober 5 BB* (2.67 %) have been with 1.4 more glucid than leaves of variant V1. The leaves of cultivar *Pinot noir* contents glucid (3.60 %) with 2 more for variant V2 than the leaves of variant V1. The leaves of cultivar *Chardonnay* content at variant V2 with 3.4 more glucid than variant V1 (Table 2).

Mean value of leaves content in glucid has been with 2.1 greatest of variant V2 (3.24 %) faced of variant V1 (Figure 2).

The great content of protein in leaves was registered of variant V2. The leaves of rootstock *Kober 5 BB* was determinate with 3.7 more protein for variant V2 when contents of leaves of variant V1. The protein contents of *Pinot noir* cultivar was with 2 greatest of variant V2 (8.73 %) against the leaves of variant V1. In leaves of *Chardonnay* cultivars was contents with 2.7 more protein of variant V2 when in leaves of variant V1 (Table 3).

Mean value a leaves protein contents was with 2.6 greatest for variant V2 when variant V1 (Figure 3).

The mineral elements for two types of leaves were: aluminum, potassium, magnesium, manganese, phosphorus, zinc (Table 4)

The largest contents in magnesium were registered in leaves of variant V1 with 5.8 in leaves of *Kober 5 BB* rootstock, until 54 greatest for *Pinot noir* cultivar. In leaves of *Chardonnay* cultivar the magnesium element is found just in leaves of variant V1. The phosphorus greatest contents were found in leaves of variant V1. This was with 5 (*Kober 5 BB* rootstock), 8.2 (*Pinot noir* cultivar), 11.5 (*Chardonnay* cultivar) much more that the leaves of variant V2 (Figure 4).

The contents in potassium were greatest in leaves of variant V1. This was to 2.8 (*Kober 5 BB* rootstock), 3.8 (*Pinot noir* cultivar), 3 (*Chardonnay* cultivar) more than leaves of variant V2

The zinc element was registered from 3490 until 6792 largest in leaves of variant V2 (Figure 5).

The greatest contents in aluminum and manganese were registered in leaves of variant V1. The aluminiu element was from 4.52 *(Kober 5 BB* rootstock) – 34 (*Chardonnay* cultivar) more great in leaves of variant V1 than in leaves of variant V2

Manganese contents was with 4.2 (*Kober 5 BB* rootstock), 5.2 (*Pinot noir* cultivar) and 8.7 (*Chardonnay* cultivar) more for leaves of variant V1 than variant V2 (Figure 6).

CONCLUSIONS

In leaves of study grapevine the greatest content of water is registered of variant V1 and the greatest contents in dry substance is found in leaves of variant V2

The greatest contents in glucids and proteins were found in leaves of variant V2.

Content in aluminum, potassium, magnesium, manganese, phosphorus registered in leaves of study grapevine the greatest value of variant V1.

The greatest zinc element was determinate from 3490 until 6931 in leaves of variant V2.

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Tables

Table 1. Influence a type of leave about content of water and dry substance.

Nr crt.	Cultivar/Rootstock	Water (%)	Dry substance (%)	Water (%)	Dry substance (%)
		V1	V1	V2	V2
1	Kober 5 BB	84,00	16,10	76,20	23,80
2	Pinot noir	84,92	15,08	77,29	22,71
3	Chardonnay	85,77	14,23	79,78	20,22
Mean		84,90	15,14	77,76	22,24

Table 2. The influence a type of leave about glucid content

Nr crt.	Cultivar/Rootstock	Glucid (%)	
		V1	V2
1	Kober 5 BB	1,90	2,67
2	Pinot noir	1,77	3,60
3	Chardonnay	1,01	3,46
Mean		1,56	3,24

Table 3. Influence a type of leaves about protein contents.

Nr crt.	Cultivar/Rootstock	Protein (%)	
		V1	V2
1	Kober 5 BB	1,80	6,73
2	Pinot noir	4,20	8,73
3	Chardonnay	2,35	6,29
Mean		2,78	7,25

Table 4. Influence a type of leaves about mineral elements contents.

Nr.crt.	Mineral elements	Cultivar/Rootstock					
		Kober 5 BB		Pinot noir		Chardonnay	
		V1	V2	V1	V2	V1	V2
1	Aluminum	0.59	0.00	1.00	0.22	1.38	0.04
2	Potassium	197.91	69.56	336.91	89.48	268.96	86.21
3	Magnesium	16.24	2.79	10.35	0.19	15.83	0.00
4	Manganese	0.98	0.23	2.35	0.45	1.91	0.22
5	Phosphorus	43.72	8.77	80.40	9.79	63.04	5.47
6	Zinc	0.10	679.23	0.17	593.37	0.19	678.64

Figures

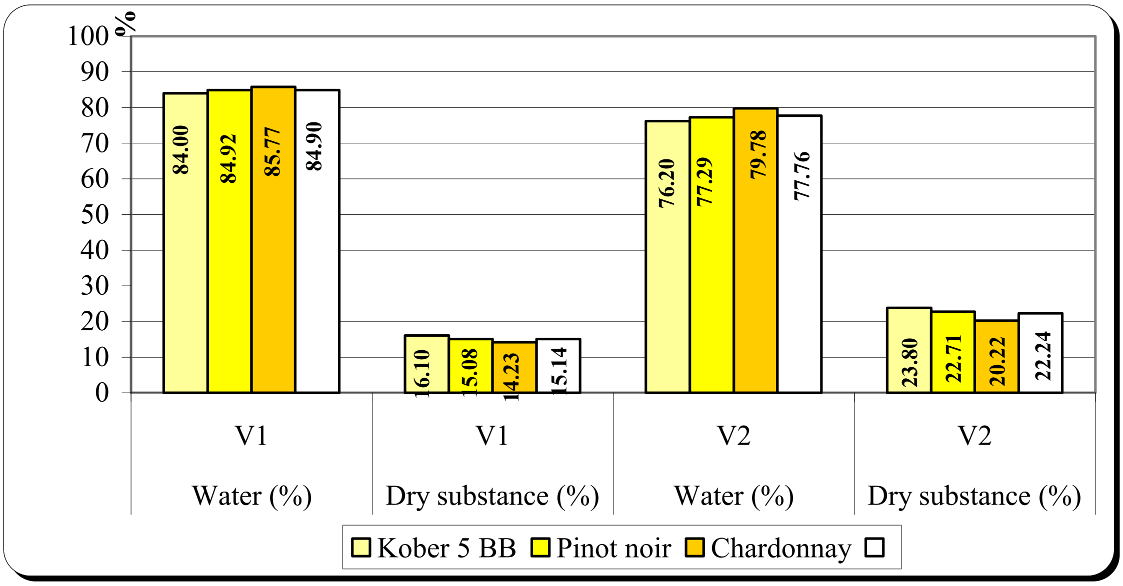

Figure 1. Influence a type of leave about content of water and dry substance.

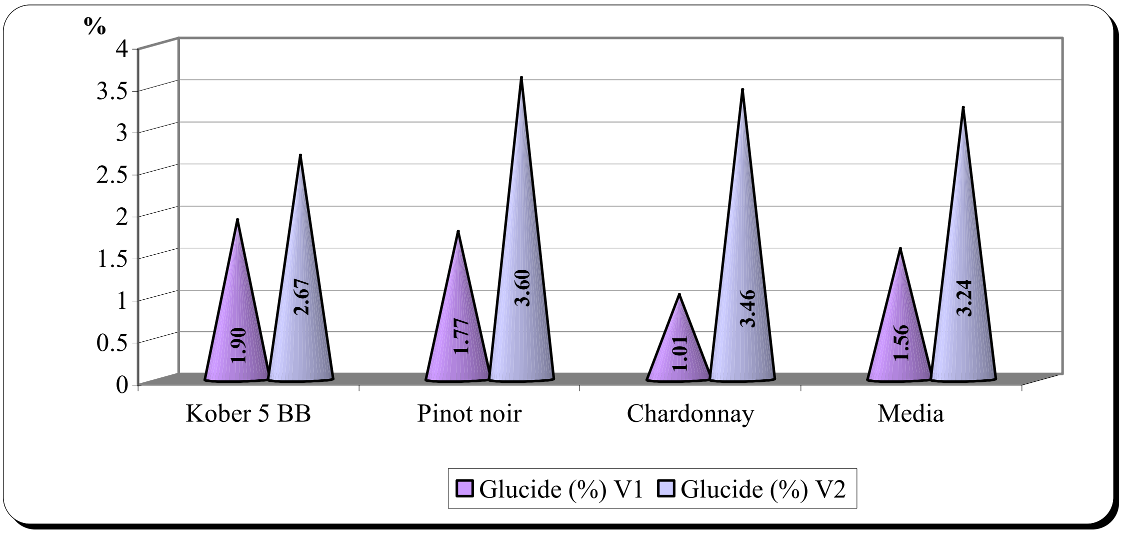

Figure 2. Influence a type of leave about glucid content

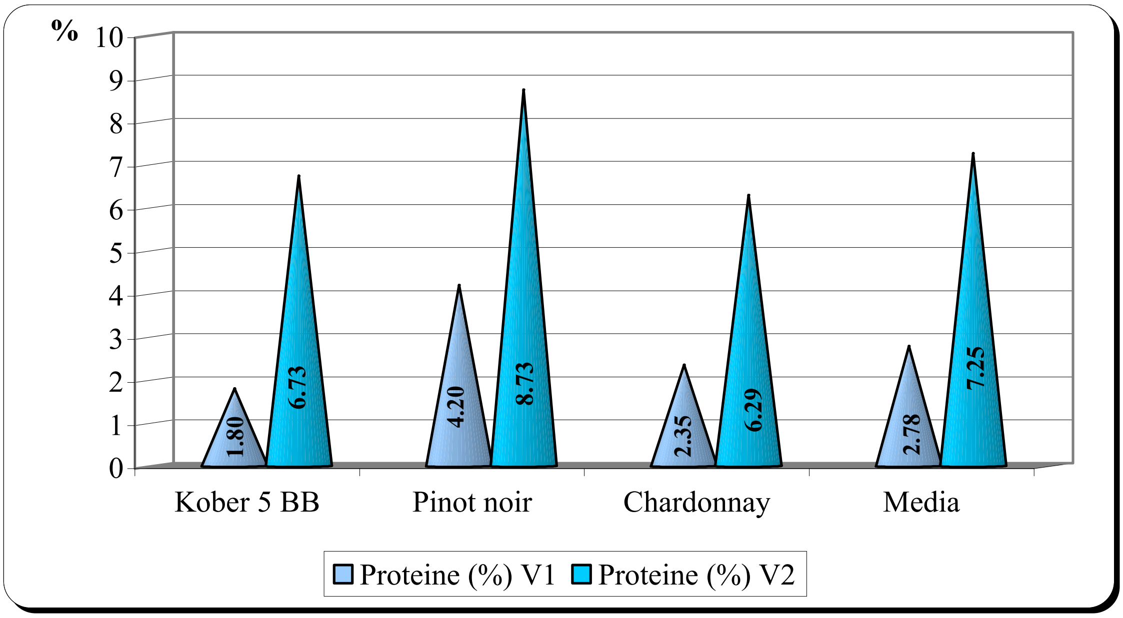

Figure 3. Influence a type of leaves about protein contents

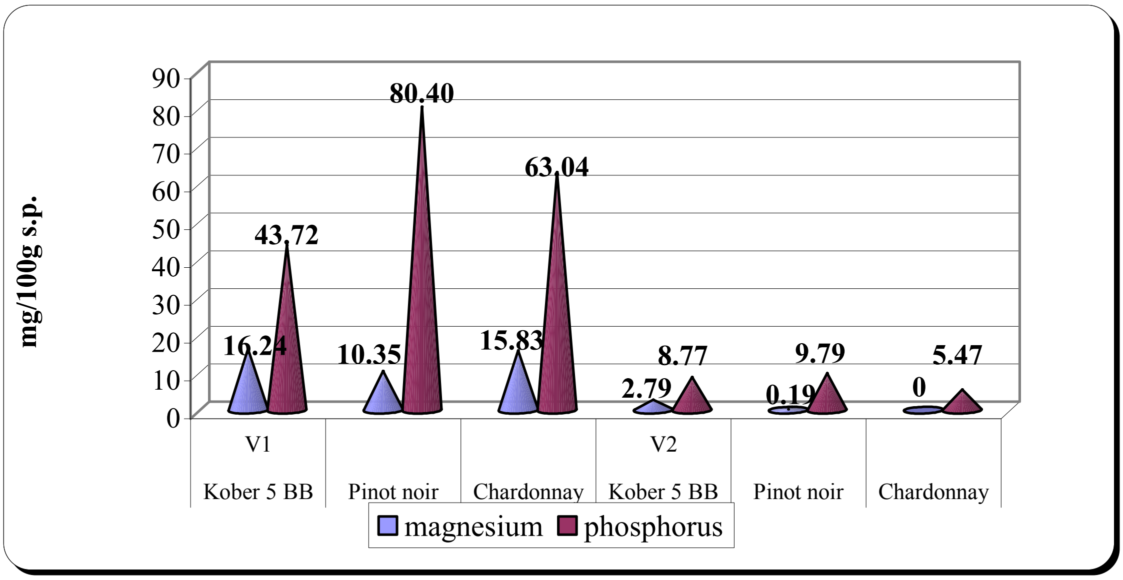

Figure 4. Influence a type of leaves about contents a magnesium and phosphorus.

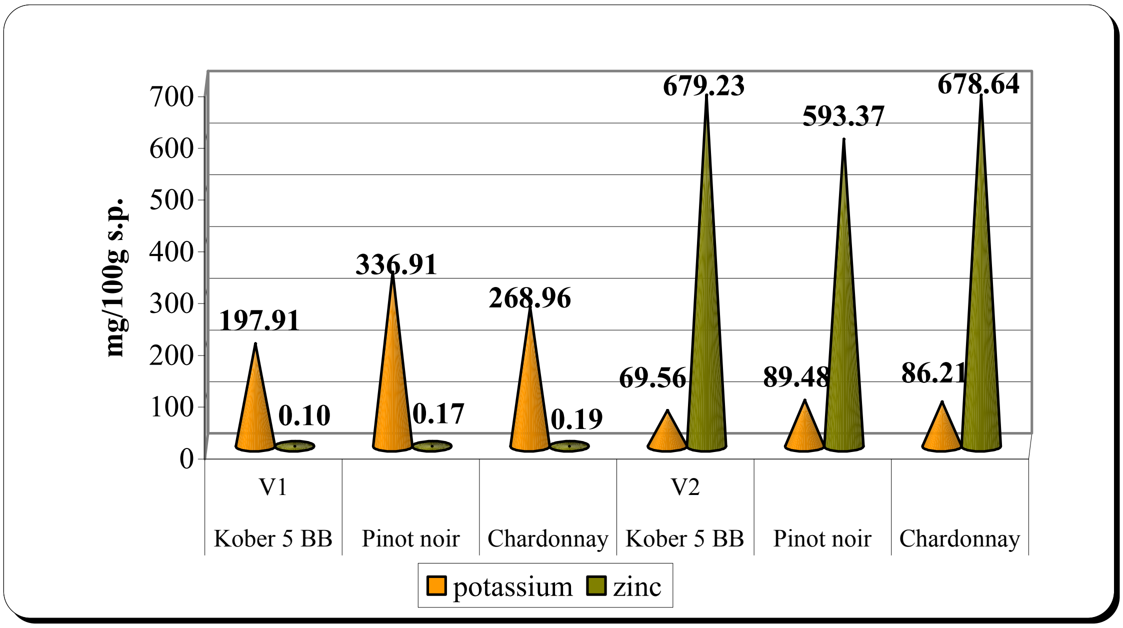

Figure 5. Influence a type of leaves about contents a potassium and zinc.

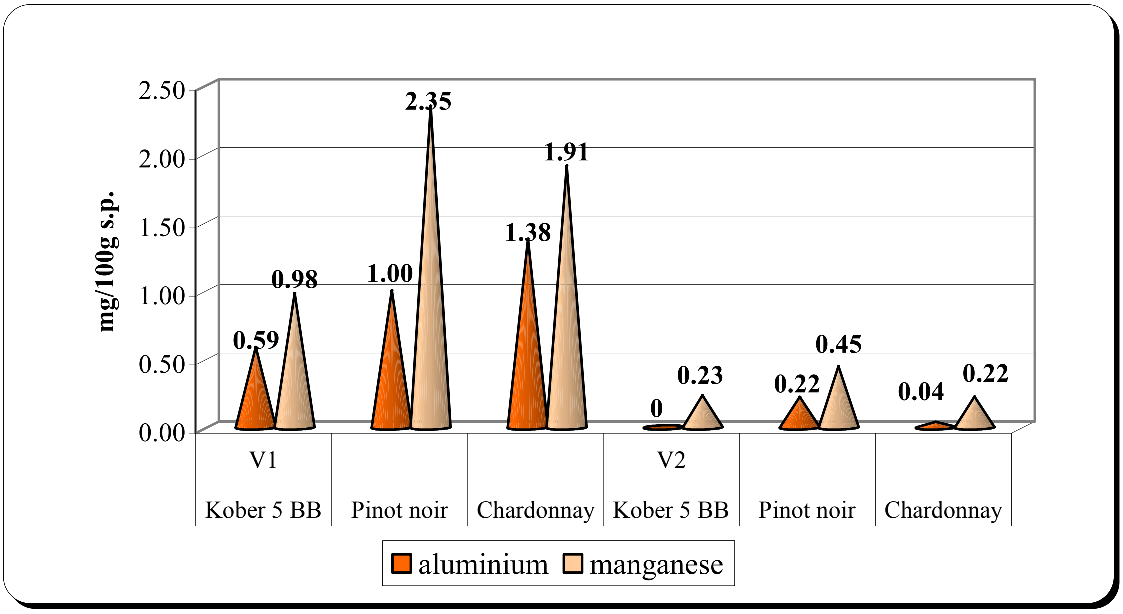

Figure 6. Influence a type of leaves about aluminum and manganese contents.

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CONTRIBUTIONS TO THE STUDY OF MICROCLIMATE FROM PIETROASA WINE CENTRE

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Keywords: correlations, differentiations, variations, biological limit

ABSTRACT

This study makes a correlation between precipitations and average temperatures, taking into consideration that they influence, to a large extent, the quality and the quantity of the grapes`production. This correlation is linked to the climat variations between 1975 and 2005, as compared to the multianual average, calculated for 59 years. This study also contributes to the analysis of the effects of 2005 over the vineyard of Pietroasa.

INTRODUCTION

The rechearches carried out during the last decades show a change in the quantity of precipitations that will affect the future of the viticulture both on national and global scale. A raise of the level of the average temperatures has been registered.

According to some researches, the average temperatures rose with 0.25 up to 0.5°C in Europe, during the last decade of the last century. Because of the high humidity in the air, the precipitations also rose up to 20% in the north and west part of the continent, white in the mediteranean zone, central and eastern Europe. They dropped until 2005, when the situation was exactly the oposite in the above-mentioned regions. In Romania, the raise of the multianual average temperature is obvious, the average of 2000 was 1.8°C higher than the multianual average registered all over the country during the last 50 years. In 2000 the quantity of precipitations dropped with a third as compared to the normal value. This led to the greatest drought in the last half-century.

In order to analyse the weater data of this study, we find it necessary to remind you that the vegetation of the vineyard starts growing in springtime, when the average temperature in theair reaches and even zero for this plant. The optimal temperature for the bloom is 20-25°C white the minimal temperature is 15-17°C; the grapes grow at 25-28°C and min. 20°C. The maturations of the grapes needs a temperatures of 17-19°C in September and over 12-14°C in october.

The climat modifications of the last decade consisted of the negative phenomena that affected the growth and the normal fruit bearing of the vineyard. Thus, the frequency of the noxius minimal temperature in wintertime rose (2002/2003; 2004/2005), as well as the frequency of ther long severe droughts (2002/2002; 2002/2003).

MATERIALS AND METHODS

The classes of temperatures established when the aanual average temperature varied ascompared to the normal values can be seen in the table below, according to the criteria of Helmann, used by the National Weather Agency of Bucarest (N. Topor, 1964), (table 1).

RESULTS AND DISCUSSIONS

The months of the analysed years, as for as the average temperatures are concerned (table 2 and diagram 1), are presented as follows:

- January – only 6 years had normal values (diagram 2);
    - 7 years this month was warm, 10 years hot and 2 years very hot;
    - 19 years out of 31, registered values higher than the normal value;
    - the months with the biggest temperatures variations.
- February – same tendency for warming, 12 years this month is hotter than normally, only 8 years registered normal values (diagram 3);
- March- same tendency.
- April – 12 years with normal values, 15 years with temperatures smaller than the normal values;
- May -13 years cold; the month of bloom;
- June - 13 years cold;
- July, August, September, October - cooling tendency and the no of years with normal values is higer than the other months (12-15 years). These months should have ensured a good growth of the grapes, the conpaction of the grapes and sugars stoks in the grapes. Tendency for cooling.
- November and December same tendency for cooling, especially in November wich in 20 years have values under the normal one and in 3 years, can be described as „very cold". This drop in temperature leads to the frost of the soil as the vines are not hardened enought. The sudden drop of temperature causes the frost at cellular level. The ice cristals can penetrate the cellular membranes. Consequently , the effects are desastrous (I. Burzo, L. Dejeu, A. Şerdinescu, Liliana Bădulescu, 2005).

The adaptation of the vineyards to the frost is made through the accumulation of substancees and concentration of solution in the cells. Ramira şi Tonutti (1989), quoted by I. Burzo (2005) emphasized the fact that the resistence to frost is genetically controlled and shows only acclimatization period of the plant. In this period, the quantity of free water in the tissues drops and the osmotic pressure raises. This protects the cells against the intracellular frost.

According to Pogosyan M. (1975) quoted by Burzo (2005) the resistence to negative temperatures is a long and complicated process, that starts before the first frost and whicy depends on the biological characteristics and on modifications during the prehibernation. As the tendency of the average temperatures indicates an excessively continental character of the climat. Thus, there are only 2 seasons instead of 4. A consequence, the preparation for winter cannot be done in normal conditions.

The pluviometric classes have been established for these months according to the same criteria whicy relies on the total precipitations (Table 3 and 4).

Depending on the precipitations, the months can be characterized as follows:

- January none of the 31 years analyzed registered normal values; only 2 years registered the classes „less rainy" and „less dry"; 20 years were dry rather, 15 years were „extremely dry".
- February – same tendency; 11 years „extremely dry".
- March – 10 years „extremely dry", 16 years rather dry, only 2 normal.
- April- 16 years rather dry.
- May- 10 years – this month is extremely dry, 16 years out of the 31 is „dry", 6 years „normal".

- June - 12 years rather dry; 14 years very rainy; 5 years normal. May and June, proper for blooming at Pietroasa, registered variations in precipitations during 15 years (table 4 anddiagram 4).
- July – variations tend towards drought: 17 years; 2 normal, 11 rainy, 8 years with extreme variations „extremely dry” , „extremely rainy”.
- August- equal variations, to wards drought bat also excessif precipitations: 5 years „extremely dry”, 5 „extremely rainy”.
- September – known at Pietroasa as dry, allowing a good maturation of the grapes. In the 31 analyzed years, the tendency is „extremely rainy” in 13 years: rainy in 3 years; 1 year normal.
- October, which should have allowed the accunukation of sugars, registered normal temperature only 3 years, 7 were „extremely raing”, 10 „extremely dry”. This led to the wilt of the grapes, rather than to a normal accumulation of sugars.
- November- „extremely dry” in 8 years, „extremely rainy” in 6 years, 3 normal.
- December – should have 37.8 mm precipitations but is tends to drought; the classes „very dry” and „very rainy” were registered in 15 years, that is half of the studied years.

The year 2005 was rather abnormal as compared to the 31 years. The normal temperature for bloon is minimum 15^0C. May registered minimal temperatures below the normal value, even 5^0C.

The necessary temperature for growing is 20^0C. The average temperature of the month, in 2005 is only 18.4, so the minimal temperature for growing was not reached. The minimal temperature of June doesn`t reach this value. One registered even 5.5 ^{o}C at the level of the ground and 6.9 ^{o}C in the air. The minimum temperature at the level of the ground is 8^o C and in the air 12^oC.

The precipitations of May are 196 mm as compared to 67.7 mm. June registered 41 l above the average.

CONCLUSIONS

- From the pluviometric point of view, the tendency of all months goes to expremes, „extremely dry”, or „extremely rainy”. The no of years with normal values is very small. This characteristic follows the global tendency to pass suddenly drought to flood, according to the weather forecast at the global scale.
- From the point of view of temperatures, the no of normal years is very small in wintertime; the winter`s months tend to be warm and the summer`s months cold.
- The winter months were classified as „very hot” , the summer months „cold” most of the years.
- November is cold most of the years and negatively influence to resistence to frost, as the acclimatization could take place.
- November and December registered the lowest temperature ai Pietroasa, not January and February, according to the normal values, calculated for 50 years.
- The temperatures very less than the precipitations; the classes „extremely hot” and „extremely cold” do not exist.
- 2005 was characterized on the basis of multi-criteria analysis, because not only precipitations led to abnormality, vut also temperatures.
- The climat of the wine center follows the global tendency for extremely continental character. There are only 2 seasons: summet and winter.

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Tables

Table 1. Temperature classes

extremely hot	Over or equal to 10 ^{o}
very hot	5-9.9
hot	2-4.9
warm	1-1.9
hot normal temperature	"-0.9 to +0.9"
cool	"-1.9 to -1"
cold	"-4.9 to -2"
very cold	"-9.9 to -5"
extremely cold	At least -10 ^oC

Table 2. Frequency of years from the temperature point of view and classification of months

Classes	Month											
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**	**XI**	**XII**
extremely hot	0	0	0	0	0	0	0	0	0	0	0	0
very hot	2	2	1	0	0	0	0	0	1	0	0	0
hot	10	5	4	0	5	1	4	1	3	3	0	5
warm	7	5	6	4	6	9	1	3	3	2	1	3
normal	**6**	**8**	**9**	**12**	**7**	**8**	**13**	**15**	**12**	**15**	**9**	**12**
cool	3	5	2	5	10	9	7	7	7	5	8	0
cold	3	5	3	10	3	4	5	2	4	5	9	9
very cold	0	1	4	0	0	0	0	0	0	0	3	1
extremely cold	0	0	0	0	0	0	0	0	0	0	0	0

Table 3. Pluviometric classes

normal	**When the precipitations vary with......as compared to plurianual average quantity**	**"+ 10 to -10"**
less rainy	„	"10 to 20%"
rainy	„	"21 to 30%"
very rainy	„	"31 to 50%"
extremely rainy	„	over 50%
less dry	„	"-10 to -20%"
dry	„	"-21 to -30%"
very dry	„	"-31 to -50%"
extremely dry	„	" over or equal to 50%"

Table 4. Frequency pf years from the pluviometric point of view and classification of months

	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**	**XI**	**XII**
extremely rainy	4	6	8	9	4	6	8	5	13	7	6	4
very rainy	2	2	3	2	2	5	1	1	2	2	2	3
rainy	3	0	0	0	3	1	2	2	0	0	3	0
less rainy	2	1	0	1	0	2	0	4	1	3	0	1
normal	**0**	**5**	**2**	**2**	**6**	**5**	**2**	**3**	**1**	**3**	**3**	**3**
less dry	1	0	1	6	1	3	6	1	0	0	1	2
dry	2	1	1	2	2	6	1	1	3	2	4	2
very dry	2	5	4	5	3	2	2	7	2	3	3	6
extremely dry	15	11	10	3	10	1	8	5	8	10	8	9

Figures

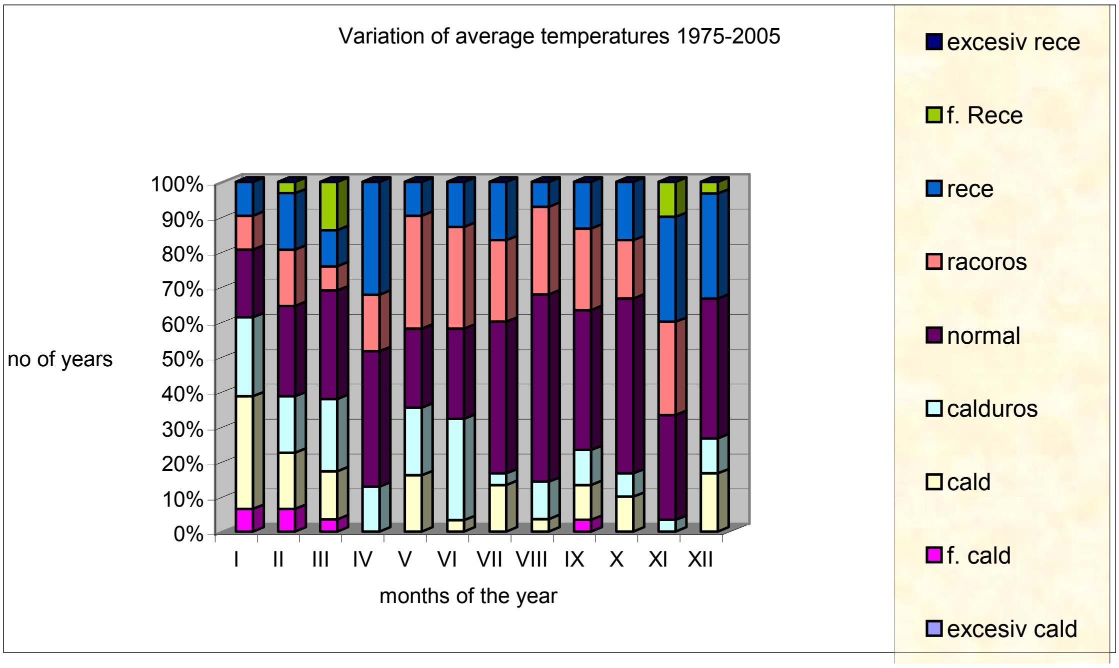

Diagram 1. Variation average temperatures 1975-2005

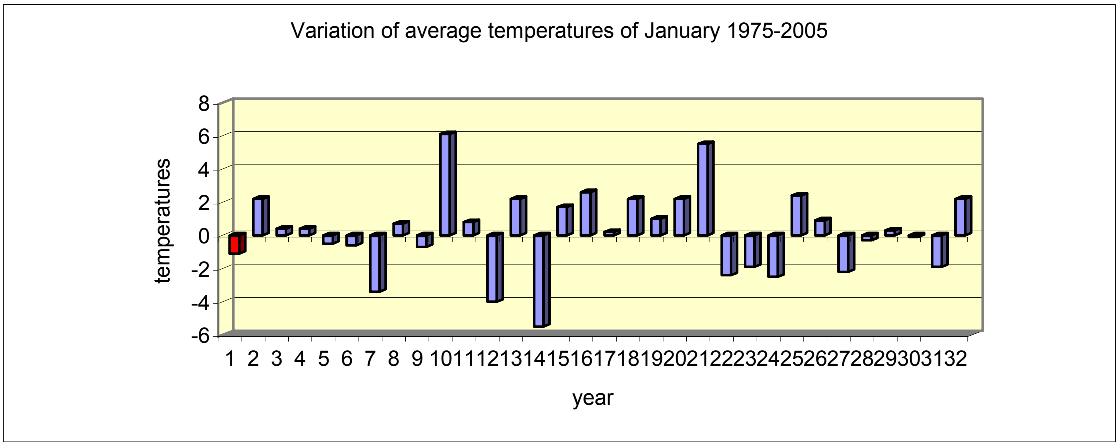

Diagram 2. Variation of average temperatures of January 1975-2005

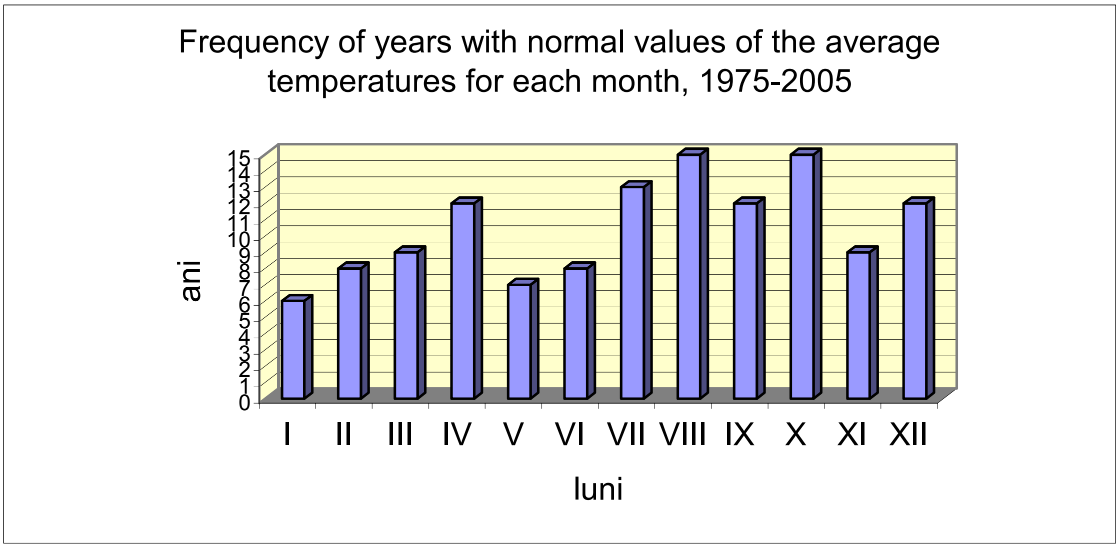

Diagram 3. Frequency of years with normal values of the average remperatures for aecy month, 1975-2005

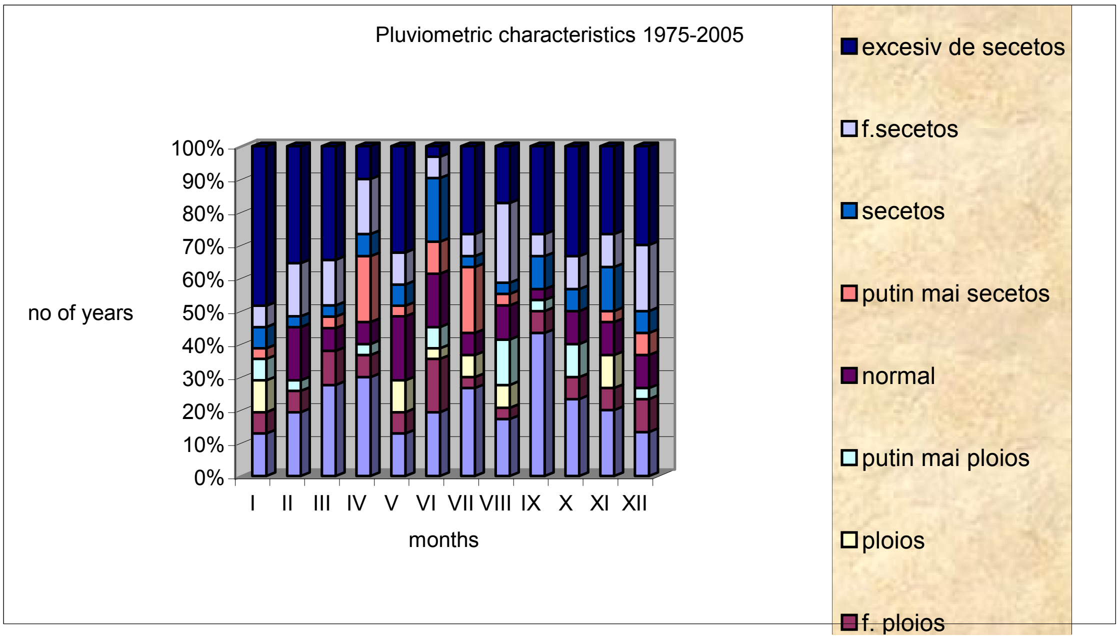

Diagram 4. Pluviometric characteristics 1975-2005

BEHAVIOUR OF *CABERNET SAUVIGNON* VARIETY IN VITICULTURAL ECOSYSTEM TOHANI FROM DEALU MARE VINEYARD

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Cabernet Sauvignon variety, considered "father" of red wines of superior quality can be find on *Dealu Mare* region were we can find sonny south slope and ground who contains enough *Fe, Ca* and *Mg*.

Well known wine-growing center *Tohani*, long time tradition in grape wine crop, meet special natural condition for black grapes variety destined to obtaining red wines of higher quality (I. Marin, 2003). Land characteristics and also the very good specialists give good hope for future design of local and world viticulture according to tendency of modern consumer who like more the red wines (I.Marin, 2003).

MATERIAL AND METHOD

We have use *Cabernet Sauvignon* variety port grafted *Berlandieri x Riparia Kober 5 BB*. Initial data regarding experimental plantation have been showed in *table 1*.

Table 1

Expérimental variants of *Cabernet Sauvignon* cultivar

Year	Variant	Number of eyes							
		Eyes/stem				Eyes/m^2			
I	Guyot of semi stem	28	40	52	64	13.5	19.2	25.0	30.8
	Guyot of stem	28	40	52	64	7.3	10.4	13.5	16.7
	Cordon Cazenave	36	40	42	48	17.3	19.2	20.2	23.1
	Cordon Lenz Moser	36	40	42	48	9.4	10.4	10.9	12.5
II	Guyot of semi stem	28	40	52	64	13.5	19.2	25.0	30.8
	Guyot of stem	28	40	52	64	7.3	10.4	13.5	16.7
	Cordon Cazenave	36	40	42	48	17.3	19.2	20.2	23.1
	Cordon Lenz Moser	36	40	42	48	9.4	10.4	10.9	12.5
III	Guyot of semi stem	28	40	52	64	13.5	19.2	25.0	30.8
	Guyot of stem	28	40	52	64	7.3	10.4	13.5	16.7
	Cordon Cazenave	36	40	42	48	17.3	19.2	20.2	23.1
	Cordon Lenz Moser	36	40	42	48	9.4	10.4	10.9	12.5
IV	Guyot of semi stem	28	40	52	64	13.5	19.2	25.0	30.8
	Guyot of stem	28	40	52	64	7.3	10.4	13.5	16.7
	Cordon Cazenave	36	40	42	48	17.3	19.2	20.2	23.1
	Cordon Lenz Moser	36	40	42	48	9.4	10.4	10.9	12.5

Distance of plantation/No stems/ha
Guyot of semi stem: 1.6/1.3 (4808)
Guyot of stem: 3.2/1.2 (2604)
Cordon Cazenave: 1.6/1.3 (4808)
Cordon Lenz Moser: 3.2/1.2 (2604)

RESULTS AND DISCUSSION

Qualitative and quantitative analysis of obtained results from realized experiments could be made after the correlation showed in figures 1-8.

For cutting type *Guyot on semi stem* the biggest value of the production have been recorded in 1992 (14,65 t/ha) in 30,8 eyes/m^2 variant, but in case were have been low accumulation of sugar (172 g/l).

For cutting type *Guyot of high stem* we can observe a decrease of average yield, this could be in the 4 years of study from 6,46 t/ha to 8,15 t/ha; the sugar accumulations has fastest decrease when we have the amplification number of eyes.

Number of eyes 17,3 eyes/m^2 showed, for *Cordon Cazenave* cutting variant, maximum of sugar accumulation (233,5 g/l) for a crop of 9,7 t/ha.

CONCLUSION

1. *Tohani* wine growing district, who belong to *Dealu Mare* vineyard benefit of the most favorable special ecological condition for red wine production of higher quality;
2. Cabernet variety realize the best wines in case for obtaining an average yield of 9-10 t/ha, yield who facilitate sugar accumulation more than 200g/l
3. To realize optimal production it been required of 10-13 eyes/m^2 applied to cutting type *Guyot of semi stem*;
4. Must total acidity have optimal values in case of all experimental variant and for all studied year.

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INFLUENCE OF CUTTING TYPE OVER MEAN PRODUCTION OF GRAPE AND THEIR QUALITY TO THE VARIETY FOR MAKING RED WINE IN *TOHANI* WINE GROWING DISTRICT

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In Romania, as in other countries with viti-vinicol tradition, the culture of black grape variety for red wines represent a subject for many research workers who tried to establish the factors who influence the quantity but especially the quality of grape production to this variety.

Tohani wine growing district dispose extraordinary ecopedoclimatic conditions for destined to grape vine culture, particularly for the variety destined to obtain important red wine: *Merlot, Feteasca Neagra, Cabernet Sauvignon* and *Pinot Noir*. Number of eyes influence and cutting type applied to grape vine represents an important factor of conducting for this variety, quantities and qualitative standpoint.

MATERIAL AND METHOD

We have been studying *Merlot, Feteasca Neagra* and *Pinot Noir* variety, all this variety been engraft on the *Berlandieri x Riparia Kober 5 BB* port graft. Experimental data for each type are showed in 1, 2 and 3 table, number of eyes influence and allocation of those on ligneous elements have been realized for each type of cutting.

Table 1

Number of eyes *Merlot* cultivar

Variant	Eyes/stem/eyes/m^2			
	k x eyes; c x no eyes			
Guyot of semi stem	**28/10.8**	**40/15.4**	**52/20**	**64/24.6**
2/1.3; 3846	*2 k x 12 + 2 c x 2*	*3 k x 12 + 2 c x 2*	*4 k x 12 + 2 c x 2*	*4 k x 14 + 4 c x 2*
Guyot of stem	**28/7.8**	**40/11.1**	**52/14.4**	**64/17.8**
3/1.2; 2777	*2 k x 12 + 2 c x 2*	*3 k x 12 + 2 c x 2*	*4 k x 12 + 2 c x 2*	*4 k x 14 + 4 c x 2*
Cordon Cazenave	**36/13.8**	**40/15.4**	**42/16.1**	**48/18.5**
2/1.3; 3846	*3 k x 10 + 3 c x 2*	*3 k x 12 + 2 c x 2*	*3 k x 11 + 3 c x 3*	*4 k x 10 + 4 c x 2*
Cordon Lenz Moser	**36/10**	**40/11.1**	**42/11.7**	**48/13.3**
3/1.2; 2777	*3 k x 10 + 3 c x 2*	*3 k x 12 + 2 c x 2*	*3 k x 11 + 3 c x 3*	*4 k x 10 + 4 c x 2*
Long of semi stem	**24/9.2**	**32/12.3**	**36/13.8**	**40/15.4**
2/1.3; 3846	*2 k x 10 + 2 c x 2*	*2 k x 14 + 2 c x 2*	*3 k x 10 + 3 c x 2*	*3 k x 12 + 2 c x 2*
Long of stem	**24/6.7**	**32/8.9**	**36/10**	**40/11.1**
3/1.2; 2777	*2 k x 10 + 2 c x 2*	*2 k x 14 + 2 c x 2*	*3 k x 10 + 3 c x 2*	*3 k x 12 + 2 c x 2*

Table 2

Number of eyes *Fetească neagră* cultivar

Variant	Eyes/stem/eyes/m^2			
	k x eyes; c x no eyes			
Guyot of semi stem	**40/17.1**	**52/22.2**	**64/27.3**	**76/32.5**
1.8/1.3; 4273	*3 k x 12 + 2 c x 2*	*4 k x 11 + 4 c x 2*	*4 k x 14 + 4 c x 2*	*6 k x 11+ 5 c x 2*
Guyot of stem	**40/10.4**	**52/13.5**	**64/16.7**	**76/19.8**
3.2/1.2; 2604	*3 k x 12 + 2 c x 2*	*4 k x 11 + 4 c x 2*	*4 k x 14 + 4 c x 2*	*6 k x 11 + 5 c x 2*
Cordon Cazenave	**42/17.9**	**52/22.2**	**54/23.1**	**66/28.2**
1.8/1.3; 4273	*3 k x 12 + 3 c x 2*	*4 k x 10 + 4 c x 12*	*4 k x 12 + 3 c x 2*	*4 k x 14 + 5 c x 2*
Cordon Lenz Moser	**42/10.9**	**52/13.5**	**54/14.1**	**66/17.2**
3.2/1.2; 2604	*3 k x 12 + 3 c x 2*	*4 k x 10 + 4 c x 12*	*4 k x 12 + 3 c x 2*	*4 k x 14 + 5 c x 2*
Long of semi stem	**24/10.2**	**32/13.6**	**36/15.4**	**52/22.2**
1.8/1.3; 4273	*2 k x 10 + 2 c x 2*	*2 k x 13 + 2 c x 3*	*3 k x 10 + 3 c x 2*	*4 k x 10 + 4 c x 3*
Long of stem	**24/6.2**	**32/8.3**	**36/9.4**	**52/13.5**
3.2/1.2; 2604	*2 k x 10 + 2 c x 2*	*2 k x 13 + 2 c x 3*	*3 k x 10 + 3 c x 2*	*4 k x 10 + 4 c x 3*

Table 3

Number of eyes *Cabernet Sauvignon* cultivar

Variant	Eyes/stem/eyes/m^2			
	k x eyes; c x no eyes			
Guyot of semi stem	**28/13.5**	**40/19.2**	**52/25**	**64/30.8**
1.6/1.3; 4808	*2 k x 12 + 2 c x 2*	*3 k x 12 + 2 c x 2*	*4 k x 12 + 2 c x 2*	*4 k x 14 + 4 c x 2*
Guyot of stem	**28/7.8**	**40/10.4**	**52/13.5**	**64/13.5**
3.2/1.2; 2604	*2 k x 12 + 2 c x 2*	*3 k x 12 + 2 c x 2*	*4 k x 12 + 2 c x 2*	*4 k x 14 + 4 c x 2*
Cordon Cazenave	**36/17.3**	**40/19.2**	**40/20.2**	**48/23.1**
1.6/1.3; 4808	*3 k x 10 + 3 c x 2*	*3 k x 12 + 2 c x 2*	*3 k x 11 + 3 c x 3*	*4 k x 10 + 4 c x 2*
Cordon Lenz Moser	**36/9.4**	**40/10.4**	**42/10.9**	**48/12.5**
3.2/1.2; 2604	*3 k x 10 + 3 c x 2*	*3 k x 12 + 2 c x 2*	*3 k x 11 + 3 c x 3*	*4 k x 10 + 4 c x 2*
Long of semi stem	**24/11.5**	**32/15.4**	**36/17.3**	**40/19.2**
1.6/1.3; 4808	*2 k x 10 + 2 c x 2*	*2 k x 14 + 2 c x 2*	*3 k x 10 + 3 c x 2*	*3 k x 12 + 2 c x 2*
Long of stem	**24/6.2**	**32/8.3**	**36/9.4**	**40/10.4**
3.2/1.2; 2604	*2 k x 10 + 2 c x 2*	*2 k x 14 + 2 c x 2*	*3 k x 10 + 3 c x 2*	*3 k x 12 + 2 c x 2*

RESULTS AND DISCUSSION

The influence of cutting type over medium production of grape and their quality is showed in tables 4, 5 and 6.

We can observe, to the Merlot variety, the biggest production have been obtained using cutting type Guyot *of semi stem* (11,63 t/ha) and the smallest in *"Long of high stem"* cutting case (9,28 t/ha. Concerning sugar accumulation in must it has been found that the biggest multi annual mean have been recorded to *"Long of high stem"* cutting case (215,43 g/l). the most constant production for each year have been recorded in case of *Cordon Cazenave* cutting type. To *Feteasca Neagra* variety it has been found that the biggest production have been obtained using cutting type *Guyot of semi stem* (14,23 t/ha), but with poor sugar accumulation of 209,5 g/l. We can notice that *Guyot of stem, Cordon Cazenave, Cordon Lenz Moser and "Long of semi stem and stem"* type realized sugar accumulation corresponding for obtaining of superior quality wine for export (between 221,2 and 231,8 g/l), in condition of suitable production (7,6 and 10,1 t/ha).

In case of Cabernet Sauvignon variety *Guyot* cutting type on semi stem offer the biggest medium production and optimal sugar accumulation.

Data analysis for all type of cutting used in experiments showed that the constant maintaining of the grape production simultaneously with sugar accumulation corresponding to high quality wines has been recorded to *Cazevane* cutting type.

Table 4

Influence of cutting type *Merlot* cultivar

Year	Cutting type											
	Guyot of semi stem		Guyot of stem		Cordon Cazenave		Cordon Lenz Moser		Long of semi stem		Long of stem	
	t/ha	g/l	t/ha	g/l	t/ha	g/l	t/ha	g/l	t/ha	g/l	t/ha	g/l
I	10.38	209	10.38	202	9.77	216	9.77	205	10.10	204	10.1	213
II	14.10	224	11.03	211	10.86	207	11.35	221	10.08	242	9.38	216
III	12.24	186	9.83	203	10.86	207	14.23	192	10.68	186	9.86	189
IV	9.81	227	9.96	204	10.35	218	9.4	225	8.73	229	7.73	202

Table 5

Influence of cutting type *Fetească neagră* cultivar

Year	Cutting type											
	Guyot of semi stem		Guyot of stem		Cordon Cazenave		Cordon Lenz Moser		Long of semistem		Long of stem	
	t/ha	g/l	t/ha	g/l	t/ha	g/l	t/ha	g/l	t/ha	g/l	t/ha	g/l
I	19.93	187	9.36	232	11.83	204	8.06	236	15.95	217	10.9	235
II	11.77	226	8.85	232	7.13	244	7.82	235	7.19	245	5.58	236
III	11.55	214	8.35	230	8.46	213	6.46	209	7.94	211	6.77	209
IV	16.68	209	9.43	231	9.23	223	7.98	234	9.38	224	7.40	232

Table 6

Influence of cutting type *Cabernet Sauvignon* cultivar

Year	Cutting type											
	Guyot of semi stem		Guyot of stem		Cordon Cazenave		Cordon Lenz Moser		Long of semi stem		Long of stem	
	t/ha	g/l	t/ha	g/l	t/ha	g/l	t/ha	g/l	t/ha	g/l	t/ha	g/l
I	11.69	181	7.14	191	9.47	211	7.45	187	9.81	181	6.18	191
II	9.46	217	6.46	206	9.70	222	7.11	202	6.36	217	4.29	206
III	9.47	196	8.15	194	10.36	201	9.37	197	7.76	196	6.93	194
IV	10.63	217	8.18	195	8.82	211	8.17	198	8.56	217	9.42	195

CONCLUSION

1. To *Merlot* variety, the best production results, with quality maintaining has been realized using *Cordon Cazenave* type; it has been recommended of 14 eyes/m^2 witch we can obtain production of 9-10 t/ha and sugar accumulation over 210 g/l;
2. To *Feteasca Neagra* cultivar optimal of 15 eyes/m^2 have been revaluate using *Guyot of stem* cutting type; in this way we can obtain suitable production of 8-9 t/ha with over 220 g/l sugar accumulation;
3. *Cabernet Sauvignon* variety realized the bet average production of 9-10 t/ha and sugar accumulation over 200g/l in case of 10-13 eyes/m^2 applied to cutting type *Guyot of semi stem.*

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COMPARATIVE EVALUATION OF RESVERATROL IZOMER FORMS FROM SEVERAL VINE VARIETY OF OLTENIA WINE-GROWING AREA, BY HPLC SYSTEM

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Keywords: phytoalexin, cis and trans, liquid chromatography, grapes.

ABSTRACT

Resveratrol (3,5,4- trihydroxystilben) is a natural phytoalexin produced by a wide variety of plants such as grapes (Vitis Vinifera), peanuts (Arachis hypogaea) and malberries as a response to the stress (termical and hydrical) injury, ultraviolet (UV), irradiation, fungal (Botrytis cinerea) infection and it exists in cis- and trans-forms.

The poliphenolic compounds present in grapes and wine has been reported to have health benefits including anticarcinom effects, protection against cardiovascular diseases and in red wines case they are responsible for the cholesterol-lowering effect.

This study implicates the detection of the two resveratrol isomer forms (cis- and trans-) from grapes by HPLC, their totalization, and also, a comparative evaluation in order to establish the synthesis potential of grape variety.

In the future, this determination will be used to extract the resveratrol and to use it in medical area.

INTRODUCTION

In the last time, the extending of resveratrol researches in the nutritional and biochemical areas is based on its anticarcinogenic and cardioprotector potential. The elementary researches show that resveratrol has health benefits, antiseptic, antioxidant and anti-inflammatory characteristics

As a result of this remarks, the resveratrol is considered one of the grape and red wine constituents that is excerpt in order to be used for different medicals.

The thorough study of resveratrol isomers stability has been done by P. JEANDET in 1991 and 1995 etc.

The health benefits of red wines had been intensively studied and it has been ascertained that the resveratrol is one of the main amenable elements. The resveratrol (trans – 3,5,4'- trihydroxystilbene) has been reported to have many biological effects such as the anti-inflammatory and anticarcinogenic effects for human body (JOE B. PARK- 2000). Recently, the trans- resveratrol has been attributed anti-mutagen and chemo-protective effects against cancer proliferation (KAREL MELZOCH and col. - 2001). It has also antiviral and anti-inflammatory activity, effects against acute microbial infection, viral hepatic diseases, etc.

MATERIAL AND METHODS

In the last years, many analytical procedures have been developed to study this compound. Most of these methods are based on HPLC with UV absorbance detection-used also in our study.

Cabernet Sauvignon, Merlot and Riesling Italian 2003-2004 grapes from Banu Maracine viticultural center and Negru de Dragasani, Petit Verdeaux and Novac grapes from Starmina viticultural center were used for analysis during the 2004-studying year.

In order to identified the two resveratrol forms (cis- and trans-) by HPLC it were used 50 grape berries and the resveratrol was extract with ethyl acetate. The ethyl acetate was removed in vacuum (40^o). The residue obtained was reddiseved in 5 ml 99,9 % methanol, followed by dry evaporation. After the dilution with 5 ml 50 % acetonytril, the sample was analyzed by HPLC, using C_{18}10 U, special for phenolic substances (250 mm x 4,6 mm) and acetonytril and water as aluant at a flow of 1 ml/min. Cis-resveratrol is detected at 280 nm absorbance and trans-resveratrol at 307 nm absorbance.

RESULTS AND DISCUSSIONS

The resveratrol cis- and trans- forms of grape varieties from Banu Maracine and Starmina viticultural centers had a descending curve during the maturation process, the maximal value being recorded during the ripeness for Negru de Dragasani variety (28,31 mg/g) in Starmina viticultural center. Studying the resveratrol dynamics from ripeness to maturity, it can be observed that for all grape varieties – the cis-resveratrol form is quantitatively more tham trans-resveratrol (21,82 mg/g than 17,13 mg/g for Cabernet Sauvignon variety from Banu Maracine viticultural center).

A comparative evaluation of the two-isomer forms of resveratrol of black and white grapes from Banu Maracine viticultural center shows a major difference between the cis-resveratrol and the tans-resveratrol.

Thus, the Merlot and Cabernet Sauvignon varieties storage a maximal value of cis-resveratrol (21,82 mg/g and respectively 25,3 mg/g) during the ripeness than Riesling Italian variety (with a 2,04 mg/g cis-resveratrol content in its peel) -Table 1. Also, it can be observed that to the end of maturity process, the trans-resveratrol form of Riesling Italian variety cannot be detected by HPLC system.

In Starmina viticultural center, Negru de Dragasani variety became conspicious by a high synthesis potential of resveratrol (28,31 mg/g cis-resveratrol and 24,12 mg/g trans-resveratrol) followed by Novac and Petit Verdeaux varieties. Also, at harvest time, the Negru de Dragasani variety has as resveratrol maximal content 3,77 mg/g – table 2. From the beginning of maturation a considerable decreasing of the two-resveratrol isomer forms took place; the phenomenon can explain the Botritis cinerea attack, priority during the grape maturity.

CONCLUSIONS

Resveratrol (cis- and trans-) is present at maximal concentration during the ripeness, after that follows a descending curve during the maturation.

As a result of chromatographic analysis, it can be observed that in Starmina viticultural center, the varieties have a higher synthesis potential than Banu Maracine varieties.

During the researching period, the resveratrol cis- form had been superior to the trans-form, following a descending curve with an appreciatively constant dynamic.

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Table 1. Resveratrol (cis- and trans-) determination from several grape varieties of Banu Maracine viticultural center during the 2004 - studying year

Viticultural center	Variety	Resveratrol (mg/g)	Climatical data							
			10.VII	20.VII	30.VII	09.VIII	19.VIII	29.VIII	08.IX	18.IX
Banu Maracine	Cabernet Sauvignon	cis	21,82	18,12	14,15	7,98	3,81	1,99	0,91	0,22
		trans	17,13	14,81	12,16	6,65	2,04	1,65	0,54	0,12
		total	38,95	32,93	26,31	14,63	5,85	3,64	1,45	0,34
	Merlot	cis	25,30	21,82	17,21	10,52	6,21	2,10	1,05	0,08
		trans	21,22	19,51	16,35	9,23	3,11	1,08	0,11	0,02
		total	46,52	41,33	33,56	19,75	9,32	3,18	1,16	0,1
	Riesling italian	cis	2,04	1,98	1,14	0,88	0,36	0,28	0,08	0,001
		trans	1,64	1,14	0,81	0,10	0,09	-	-	-
		total	3,68	3,12	1,95	0,98	0,45	0,28	0,08	0,001

Table 2. Resveratrol (cis- and trans-) determination from several grape varieties of Starmina viticultural center during the 2004 - studying year

Viticultural centre	Variety	Resveratrol (mg/g)	Climatical data							
			10.VII	20.VII	30.VII	09.VIII	19.VIII	29.VIII	08.IX	18.IX
Starmina	Negru de Dragasani	cis	28,31	24,23	16,16	12,66	11,41	7,25	4,12	2,13
		trans	24,12	18,50	12,40	9,98	9,35	6,34	3,12	1,64
		total	52,43	42,73	28,56	22,64	20,76	13,59	7,24	3,77
	Novac	cis	19,21	15,28	10,16	8,25	7,83	5,81	3,23	1,12
		trans	24,12	18,50	12,40	9,98	9,35	6,34	3,12	1,64
		total	36,66	29,49	18,32	14,48	13,65	9,03	4,37	1,98
	Petit Verdeaux	cis	14,62	10,14	7,32	4,25	3,95	1,94	1,12	0,84
		trans	11,26	8,25	6,21	4,00	3,71	1,63	0,91	0,23
		total	25,88	18,39	13,53	8,25	7,66	3,57	2,03	1,07

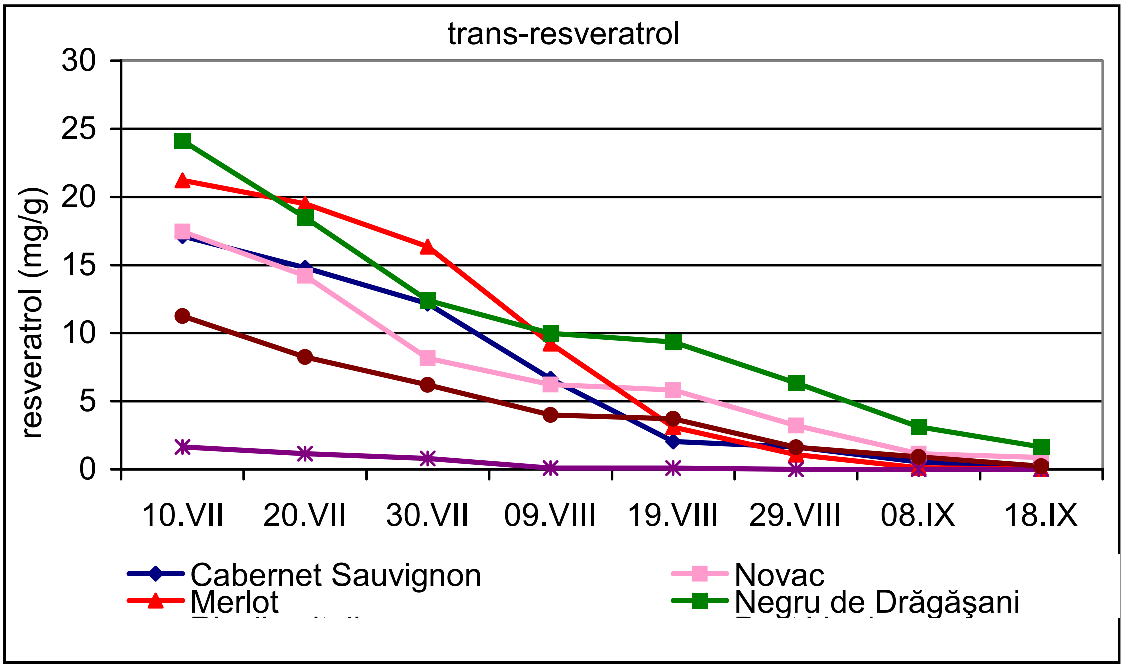

Figure 1. The resveratrol (trans-) dynamic from the grapes of several vine varieties during the 2004-studying year

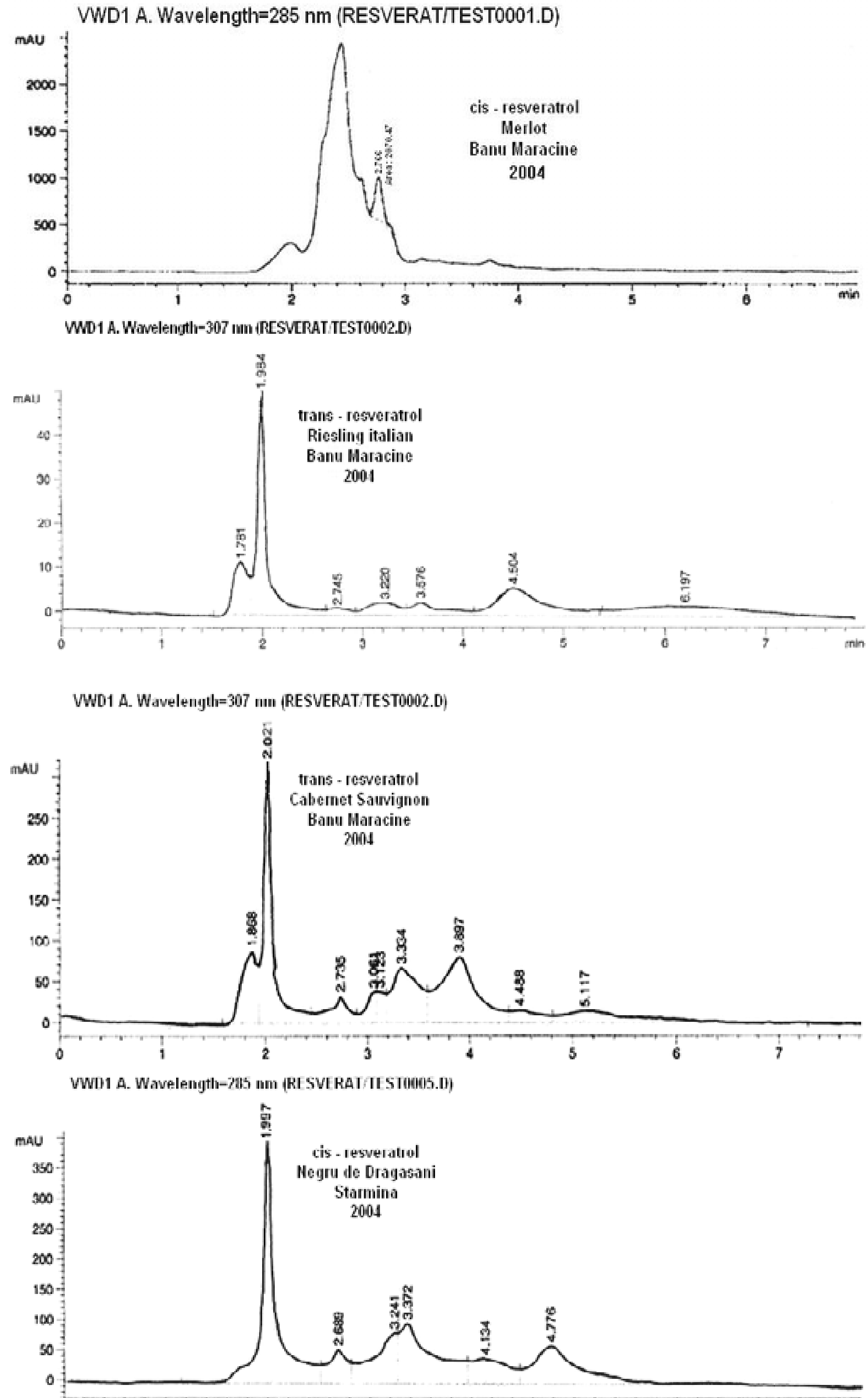

Figure 2. Resveratrol (trans) chromatographic determination from the grapes of several vine varieties during the 2004-studying year

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INFLUENCE OF SOME TECHNOLOGICAL LINKS ON CABERNET SAUVIGNON GRAPE YIELD AND QUALITY

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Keywords: *Vitis vinifera*, culture techniques, crop load, vine canopy, vine quality, vegetative-yielding indexes

ABSTRACT

The elaboration of some performant culture technologies for the grapevine able to create increased possibilities of expressing the yielding and quality characteristics of *vinifera* varieties implies a thorough knowledge concerning the effects of the different technological links applied upon the yielding capacity of the vines and the grape quality.

The research works performed inside the experiment aimed at studying the influence of the planting distances, training and pruning systems and crop loads considered in their interaction upon the Cabernet Sauvignon/Kober 5BB grape yield and quality. The results obtained evidenced that the small planting distances (2.0 x 1.0 m), the bilateral Cordon training system, the great crop loads (30 eyes/vine) and the diminished height of the canopy (60 cm) induced a better yielding of the vines, whereas the large planting distances (2.5 x 1.0 m), the double Guyot and high double Cordon training systems, the reduced crop loads (24 eyes/vine) and the great height of the canopy (140 cm) had a positive influence upon the quality indexes of the grape yield (high contents in sugar and anthocyanins, high values of the gluco-acidity index.

The grape yield may be managed under its quantitative and qualitative aspect by using several technological links which, when interacting, are able to achieve different structural patterns of grapevine vegetation.

INTRODUCTION

During the last decade, viticulture registered permanent preoccupations concerning the elaboration of different culture systems able to create increased possibilities for better expressing the efficiency and quality of *vinifera* varieties, and to reach quantitatively, but mainly qualitatively and economically adequate grape yields, by using the technologic inputs most efficiently (Smart R.E. et al., 1990; Carbonneau A., 1990; Calo A., 1992; Kliewer W.M., Dokoozlian N.K., 2000; Bravdo B.A., 2000, etc.).

The technological links considered the most accessible for such transformations, and which could greatly achieve the targets mentioned above, were the planting distances, the training and pruning systems and the crop load.

MATERIAL AND METHOD

The research works were approached inside a polyfactorial experiment where the factors taken into study were as it follows:

- Factor A – planting distance, with the following graduations:
  - a_1 - 2.0 x 1.0 m (5000 vines/ha)
  - a_2 - 2.5 x 1.0 m (4000 vines/ha)
- Factor B – training system, with the following graduations:
  - b_1 - Bilateral cordon on half-stem (h = 60 cm)
  - b_2 – unilateral Royat cordon (h = 60 cm)
  - b_3 – Double Guyot on half-stem (h = 70 cm)

b_4 – Double high Cordon (h = 180 cm)

- Factor C - crop load, with the following graduations:
  - c_1 - 24 eyes/vine
  - c_2 - 30 eyes/vine
- Factor D – height of the canopy, with the following graduations:
  - d_1 - 60 cm
  - d_2 - 100 cm
  - d_3 - 140 cm

The result was an experiment with 4 factors, of 2 x 4 x 2 x 3 type, including 48 variants The experiment was located in the field, according to the method of subdivided plots, in a 6-year-old plantation of Cabernet Sauvignon/Kober 5BB. Each variant was located in 3 replications, each replication including 10 control vines (30 control vines by variant).

The soil inside the experimental device was a vertic levigated chernozem (C1-vs) favourable for grapevine growing. The climatic conditions during the experimental period (2004-2005) were characterised on the whole by a moderate helyothermic regime (active Σ°t during the green season = 3444°C), on the background of rich hydric resources, mainly in 2005 when the multiannual means were exceeded in the summer months. The favourable meteorological conditions in September and October in both of the years ensured good maturation to the grapes.

In order to reach the targets established inside the experiment, assessments were made concerning the grape yield, its quality (weight of 100 berries, must concentration in sugars and total acidity, gluco-acidity index, berry skin content in anthocyanins) and the quality of the wines produced (acquired alcoholic strength, non-reducing dry extract, colour intensity, DO 280, anthocyanins).

A series of indexes were also calculated; they had a synthetic character expressing the vegetative-yielding balance of the vines, giving thus a more real and more correct background for the experimented technological solutions (Ravaz index, index of vegetative-yielding expression).

RESULTS AND DISCUSSION

When analysing the influence of the technological factors experimented concerning the vine yielding, it was noticed that the best yields were obtained in case of the small planting distances (2.0 x 1.0 m), of the bilateral Cordon and double Guyot training systems, in case of the greater crop loads (30 eyes/vine) and of the smaller heights of the canopy (60 cm) (Table 1).

Concerning the aspect of quality, the technological links which induced more intense photosynthetic and enzymatic activity at the level of the leaves determined a better accumulation of sugars and anthocyanins in grapes (Table 2).

The different quality of the grapes influenced also on the physical-chemical characteristics of the wines produced from the grapes harvested in 2004 (table 3).

The planting distances and the different height of the canopy significantly influenced on the alcoholic strength, colour intensity, as well as anthocyanin content of the wines. The training systems had an obvious influence only in case of the DO 280 colour intensity, whereas the crop load influenced only the colour intensity of the wines.

The different influence of the experimented technological links on the grape yield and its quality is evidenced by the two calculated vegetative-yielding indexes having a synthetic character.

Ravaz index (ratio - grape yield/wood removed at pruning) which emphasises the way in which there were directed the assimilates resulting in the photosynthesis process, respectively towards the grapes or towards the development of the vine shoots and of the canopy registered the highest values in case of the small planting distances (2.0 x 1.0 m), of the bilateral Cordon training system, of the crop load of 30 eyes/vine and of the diminished height of the canopy (Table 4).

In case of these technological links, the assimilates produced during the photosynthesis process where directed mainly towards the achievement of the grape yield and to a smaller extent towards the vegetative development of the vines.

The index of vegetative and yielding expression EVP (yield + wood removed at pruning) registered the highest values in case of the small planting distances and in case of bilateral Cordon and double Guyot training systems which induced also high yields and a well-balanced vegetative development (Table 5).

CONCLUSIONS

The results show that:

- The experimented technological links (planting distance, training system, crop load, height of the canopy) when interacting with each other had different influences upon the grape yield and its quality indexes;
- The small planting distances (2.0 x 1.0 m), the bilateral Cordon training system, the great crop loads (30 eyes/vine) and the diminished height of the canopy (60 cm) induced a better yielding of the vines, whereas the large planting distances (2.5 x 1.0 m), the double Guyot and high double Cordon training systems, the reduced crop loads (24 eyes/vine) and the great height of the canopy (140 cm) had a positive influence upon the quality indexes of the grape yield (high contents in sugar and anthocyanins, high values of the gluco-acidity index;
- The vegetative-yielding indexes having a synthetic character also evidenced the different influence of the experimented technological links, stressing upon the their effect on the yielding capacity of the vines or on their vegetative development;
- The grape yield may be managed under its quantitative and qualitative aspect by using several technological links which, when interacting, are able to achieve different structural patterns of grapevine vegetation.

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Table 1. Influence of the experimented technological factors on the vine yielding

Experimental factors	Graduation	Yield (kg/vine)	Average weight of a grape (g)	Absolute index of yielding	Relative index of yielding
Planting distance	2.0 x 1.0 m	3.65	114.1	181.6	154.6
	2.5 x 1.0 m	3.00	102.2	161.1	139.5
Training system	Bilateral Cordon	4.08	120.1	184.4	154.0
	Royat unilateral Cordon	3.14	108.8	168.3	146.1
	Double Guyot	3.91	110.7	177.1	150.9
	High double Cordon	2.24	92.9	155.6	130.1
Crop load	24 eyes/vine	3.04	103.3	162.0	139.4
	30 eyes/vine	3.61	113.0	180.7	151.2
Height of the canopy	60 cm	3.53	110.1	176.9	150.0
	100 cm	3.17	106.1	168.0	145.2
	140 cm	3.27	108.3	169.1	146.0

Table 2. Influence of the experimented technological factors on the quality indexes of the grape yield

Experimental factors	Graduation	Weight of 100 berries (g)	Sugars (g/l)	Total acidity (g/l) tartaric acid	Gluco-acidity index (g/l) tartaric acid	Antho-cyanins (mg/kg)
Planting distance	2.0 x 1.0 m	151.7	173.3	10.1	17.1	673.7
	2.5 x 1.0 m	149.5	193.4	8.7	22.2	730.4
Training system	Bilateral Cordon	158.7	174.6	9.6	18.2	686.6
	Royat unilateral Cordon	147.3	185.6	9.2	20.2	701.8
	Double Guyot	149.3	183.2	9.6	19.1	693.4
	High double Cordon	147.3	191.0	9.2	20.8	726.5
Crop load	24 eyes/vine	148.9	189.3	9.3	20.4	724.3
	30 eyes/vine	152.3	177.4	9.6	18.5	679.8
Height of the canopy	60 cm	152.1	177.0	9.6	18.4	681.8
	100 cm	148.0	185.8	9.3	20.0	692.8
	140 cm	151.7	187.3	9.3	20.1	731.7

Table 3. Influence of the experimented technological factors on the physical-chemical characteristics of the wines

Experimental factors	Graduation	Acquired alcoholic strenght (% vol)	Non-reducing dry extrect (g/l)	Colour intensity mm	DO 280	Antho-cyanins mg/l
Planting distance	2.0 x 1.0 m	10.58	26.28	0.8000	38.13	312.8
	2.5 x 1.0 m	11.91	27.86	0.7650	39.57	353.2
Training system	Bilateral Cordon	11.13	27.54	0.7475	40.58	326.2
	Royat unilateral Cordon	11.28	27.08	0.7620	36.66	337.3
	Double Guyot	11.13	26.16	0.9108	42.51	348.1
	High double Cordon	11.44	27.49	0.7092	35.66	320.4
Crop load	24 eyes/vine	11.27	27.02	0.7350	39.85	326.3
	30 eyes/vine	11.21	27.12	0.8298	37.85	339.7
Height of the canopy	60 cm	10.99	27.27	0.7517	38.43	330.1
	100 cm	11.26	26.78	0.7224	38.61	338.2
	140 cm	11.48	27.16	0.8731	39.51	330.6

Table 4. Influence of the experimented technological factors on the ratio grape yield (kg)/wood removed at pruning (kg)

Experimental factors	Graduation	Grape yield/removed wood
Planting distance	2.0 x 1.0 m	4.47
	2.5 x 1.0 m	3.70
Training system	Bilateral Cordon	4.66
	Royat unilateral Cordon	4.08
	Double Guyot	4.04
	High double Cordon	3.32
Crop load	24 eyes/vine	4.06
	30 eyes/vine	4.11
Height of the canopy	60 cm	5.32
	100 cm	3.82
	140 cm	3.44

Table 5. Influence of the experimented technological factors on the index of vegetative and yielding expression (EVP)

Experimental factors	Graduation	EVP
Planting distance	2.0 x 1.0 m	4.467
	2.5 x 1.0 m	3.810
Training system	Bilateral Cordon	5.198
	Royat unilateral Cordon	3.835
	Double Guyot	4.877
	High double Cordon	2.655
Crop load	24 eyes/vine	4.162
	30 eyes/vine	4.115
Height of the canopy	60 cm	4.193
	100 cm	3.999
	140 cm	4.219

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BOTANY & PHYSIOLOGY

HISTOLOGICAL ASPECTS CONCERNING THE SHOOTS OF SO4 ROOTSTOCK

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Key words: rootstock, *Berlandieri* x *Riparia*, wood maturation, anatomical areas

ABSTRACT

The SO4 rootstock displays a high affinity with many vine cultivars from Romania. The material which was harvested at three different moments in July 2004 was subjected to an anatomical analysis. The authors studied all anatomical parts of the shoot with emphasis on cortex, vascular bundles and pith. The results are presented in dynamics and can be easily followed in a synoptic table with biometrical figures, graphs and original photos.

INTRODUCTION

The present paper represents the result of a larger study concerning the histo-anatomy of shoot belonging to four nobile vine cultivars (Cabernet Sauvignon, Fetească neagră, Afuz Ali and cardinal) and four rootstocks (SO4, Kobber, Precoce and 140 Ruggeri). The research is adjacent to a contract whose objectives include the correlation between shoot histo-anatomy and vine grafting during vegetative period. This paper follows a first coverage presented in 2004 at the Scientific Conference held by the Faculty of Horticulture from U.S.A.M.V. Bucharest, which is about a survey in stem anatomy concerning four *Vitis vinifera* cultivars (Cabernet Sauvignon, Feteasca neagră, Afuz Ali, Cardinal).

MATERIALS AND METHODS

The material was collected in the field from Valea Călugărească Viticulture Research Station, in June 2004, at three different moments (1st, 15th and 28th). All anatomical data were obtained from observations of transverse free-hand sections made at different levels of stem. The sections were cleared with chloral hydrate (24h), stained in carmine alaunate (24h) and green iodine (5min.) and mounted in gelatinized glycerin. Numerical characteristics of stems were undertaken at ML-4M IOR microscope. The prepared material was viewed and photographed at MC-7 microscope with a Canon Digital Camera.

The authors described and measured eight anatomical areas and tissues that could be observed in transversal microscopic slides, which were separately prepared from four length segments of the shoot (40-80 cm, 80-120 cm, 120-160 cm and 160-120 cm). For each such length interval, we studied the anatomical features at the node area (both under and above, at 1.5-2 cm) and at the internode.

Oppenheim 4 Selection (SO4)[1] is a rootstock with the best matured wood in the climate and soil conditions of Romania, compared with other *Berlandieri* x *Riparia* hybrid rootstocks (Oşlobeanu M. et al., 1980). It was obtained by clonal selection from *Berlandieri* x *Riparia* Teleki 5A (Constantinescu G. et al., 1967). Its grafting behaviour is good (Hidalgo L.,

[1] SO4 was obtained at the Institute in Oppenheim, by means of clonal selection, from plantations of *Berlandieri* x *Riparia* Teleki 5A (415). P. Galet claims that it was selected by Rodrian, from Teleki no. 4 (175).

2002); it has good afinity with the majority of nobile vine cultivars, though it prefers Silvaner, Rhin Riesling, Traminer and Burgunder (Constantinescu G. et al., 1967).

The rate of shoot growing for SO4 is slow until flowering time, compared to the case of other rootstocks, then the rate is mantained at a high rate for a long period of time (Oşlobeanu M. et al., 1980). In Romania, at Crăciunel-Blaj, SO4 was awarded a 5th place on an afinity scale, after 125AA, Selection Crăciunel 2, Kobber 5BB and Riparia Gloire. The studied rootstock proved a good afinity with Italian Riesling, Aligoté, Muscat Ottonel and Fetească albă (Constantinescu G. et al., 1967).

RESULTS AND DISCUSSIONS

We chose for comparison purposes the shoot area from the middle of the internode, on the 80-160 cm length segment. The following tissues ant anatomical areas were photographed, measured and discussed: epidermis, cortex, cortex colenchyma, scleryfied pericycle, primary and secondary phloem, cambial area, the wideness of vascular bundles at secondary wood area, number and diameter of secondary wood vessels, thickness of primary wood area and number of primary wood vessels[2].

For the majority of the elements considered, it can be noticed an obvious quantitative growing, evolving almost proportionally with the date of sampling.

The epidermis thickness shows a growth from 6 µm at the beginning of the interval to 19 µm at the end. The size of the cortex goes up from 140 µm on the 1st of June to 164 µm on the 15th and to 272 µm on the 28th; this means a growing rate of 17% for the first interval and 66% for the second. As for the pericycle (Figure 4), its thickness records a smaller growth rate, of only 8.8%, from 250 µm to 272 µm, for the whole month. The thickness of phloemic area (Figure 4) of the vascular bundles measured 138 µm when the first observations were made, then increased to 281 µm, that is a rate of growth of 104%, at the middle of the interval, and at the end of June the mentioned dimension was 313 µm, corresponding to a rate of growth of 11%.

For the cambium area thickness, no significant variation could be noticed throughout June, 50-100 µm, proving a normal constant activity for that period of year.

Even though the wideness of the vascular bundles at secondary wood area (Figure 4) did not show any significant quantitative modification, it was noted that the number of secondary xylem vessels increased from 3-8 at the beginning of June to 6-12 at the end of June. In the primary wood, the first counts showed 1-2 vessels, whereas at the end of June we found 2-5 primary xylem vessels.

The diameter of the stem increased throughout the mentioned one-month period, from 5,300 to 5,700 µm, whereas the pith diameter decreased from aprox. 3,000 µm to aprox. 2,400 µm.

The biometry results on which we based our discussion are presented in Table 1.

We also considered the percentage in the distribution of various areas and tissues. It was noted that that the percentage of cortex thickness raised from 5.34% on June 1st to 9.71% on June 28th. The phloemic area in the vascular bundles also increased, from 5.22% to 11.66% in the same interval. On the contrary, the percentage of the pith diminished from 55.39% to 43.15% in the period of study. For obvious changes in the distribution of anatomical elements, please refer to figures 1, 2 and 3.

[2] By anatomical areas we mean epidermis, cortex and stele, whereas the cortex comprises, besides the external layers of cells, the endodermis as its last layer or tissue; the stele is made up by pericycle, vascular bundles displayed in one circle, interfascicular rays and pith.

CONCLUSIONS

There were described all anatomical areas of the stem in the SO4 rootstock shoot. The authors compared the anatomical structure of the shoot both at the node level (below and above) and at the middle of the internode. There are no significant anatomical differences regarding stem structure at the analysed levels. The areas and tissues with the greater extention in stem structure are the cortex, vascular bundles and pith.

The cortex has an accelerated growth in the interval June 15th-28th 2005, the growth rate being 66%. The phloemic area of the vascular bundles has its higher growth rate, of 104%, in the interval June 1st-15th 2005. Cambium area is more or less constant in thickness during June, measuring 50-100 μm, which denotes a less variable activity during the observation period. The good maturation of the wood, which is mentioned in literature, is obvious in our study in the xylemic area of the vascular bundles: its dimension are obviously growing, that being proved by the supplementary formation of secondary wood vessels (from 3-6 vessels on June 1st to 8-12 on June 30th). The presence of cork and hard phloem at the node area (below and above) and only of hard cork on the internode, except for the apical part of shoot (160-200 cm), is also a sign of good maturation.

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Tables and figures

Table 1. Intervals of variation and median value for the anatomical elements that were studied

CARACTERISTICI ANATOMICE	1 VI 2004 (μm)	15 VI 2004 (μm)	28 VI 2004 (μm)
Grosimea epidermei (40x)	6-13	13-19	6-14
Grosimea scoarței (10x)	125-156	144-187	187-356
Grosimea zonei de colenchim din scoarță (10x)	106-156 ÷ 130	62-169 ÷ 95	219-325 ÷ 270
Grosime periciclu sclerificat (înălțimea calotei periciclice) (10x)	219-281 ÷ 250	137-250 ÷ 190	187-356 ÷ 270
Grosime liber primar + liber secundar (10x)	106-169 ÷ 135	250-312 ÷ 280	219-406 ÷ 310
Grosime zona cambială (10x)	44-106	50-94	31-94
Grosime fascicul lemnos secundar (zona mediană) (10x)	125-312	219-437	219-312
Număr vase lemnoase în lemnul secundar	3-8	6-12	6-10
Diametru vase conducătoare în lemnul secundar: vase mari / vase mici (10x)	81-137 / 31-37	125-187 / 44-62	112-156 / 56-75
Grosime lemn primar (10x)	19-62	62-94	75-112
Număr vase lemnoase în lemnul primar	1-2	2-5	2-5
Diametru tulpină (6x)	5198-5381 ÷ 5290	5290-6110 ÷ 5700	4742-5472 ÷ 5110
Diametru măduvă (6x)	2827-3010 ÷ 2920	2645-2918 ÷ 2780	2098-2736 ÷ 2420

Note 1: the sign ÷ in Table 1 is followed by the median value of the interval of variation.
Note 2: The colors in the pie graphs below (Figures 1, 2 and 3) refer to the thickness of the following anatomical elements:
1. Epidermis thickness
2. Cortex thickness
3. Sclerified perycicle
4. Primary and secondary phloem and cork
5. Cambium
6. Secondary xylem area in the vascular bundle
7. Primary xylem
8. Half pith

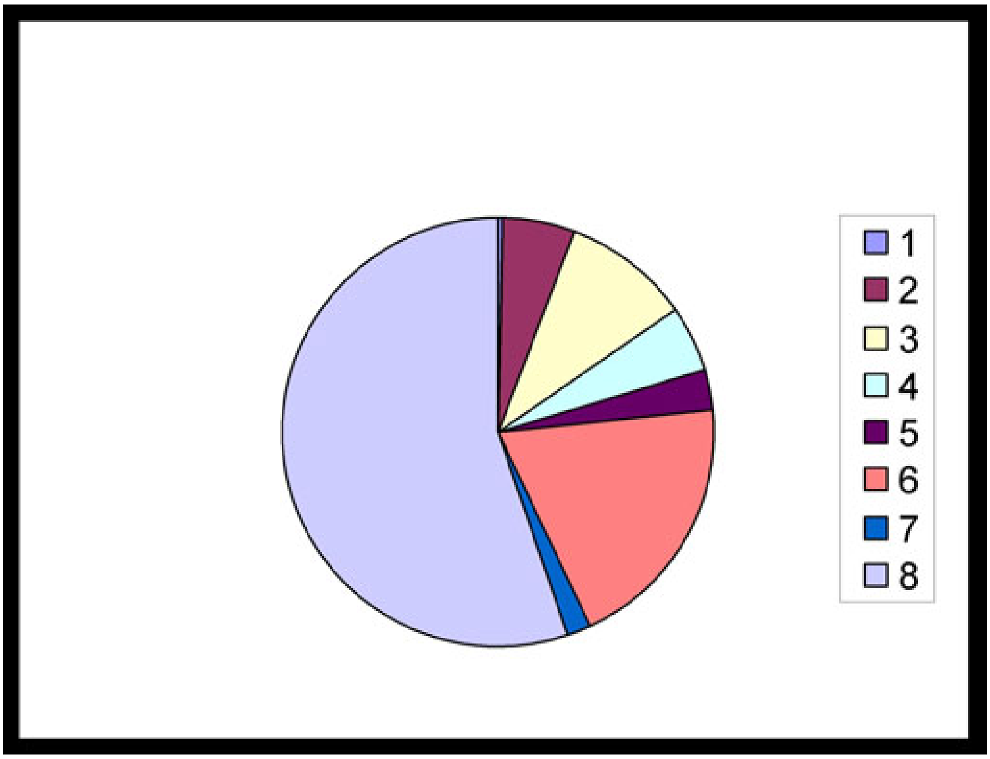

Fig. 1. Percentage distribution of anatomical elements of SO4 stem at internode on June 1st 2004

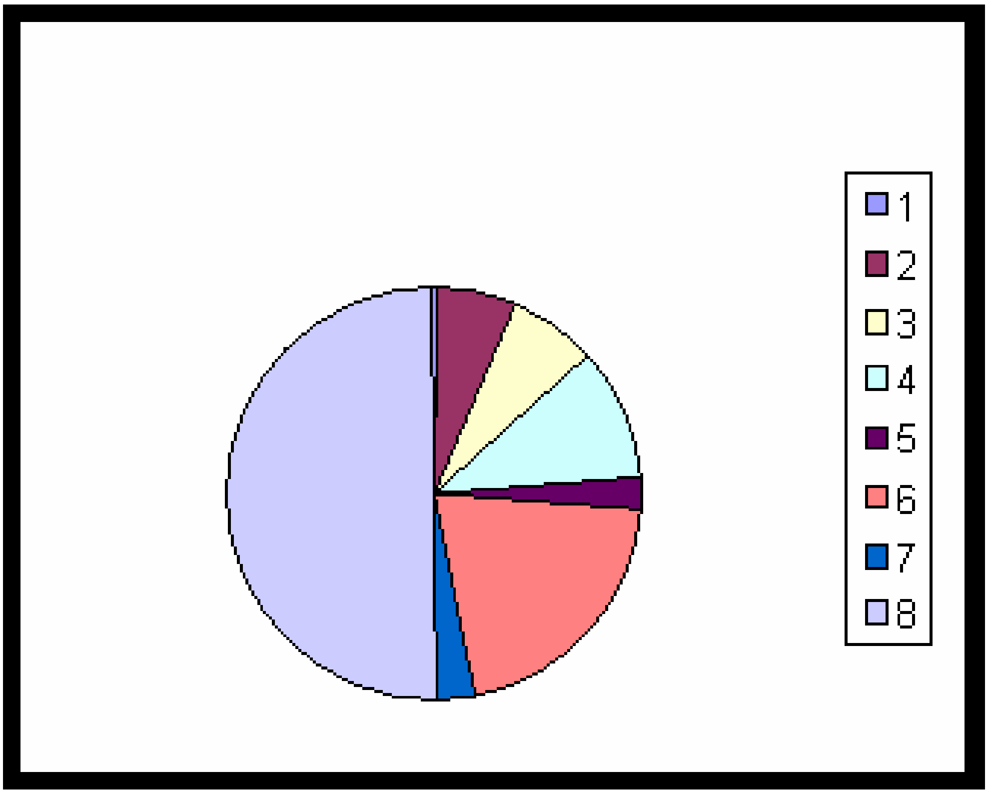

Fig. 2. Percentage distribution of anatomical elements of SO4 stem at internode on June 15th 2004

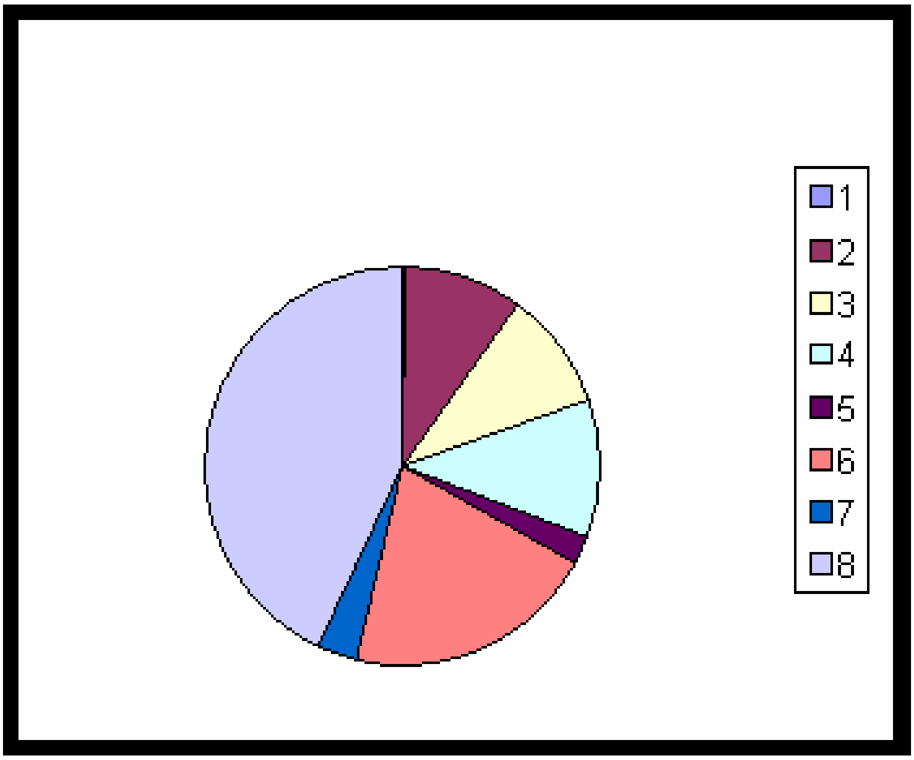

Fig. 3. Percentage distribution of anatomical elements of SO4 stem at internode on June 28th 2004

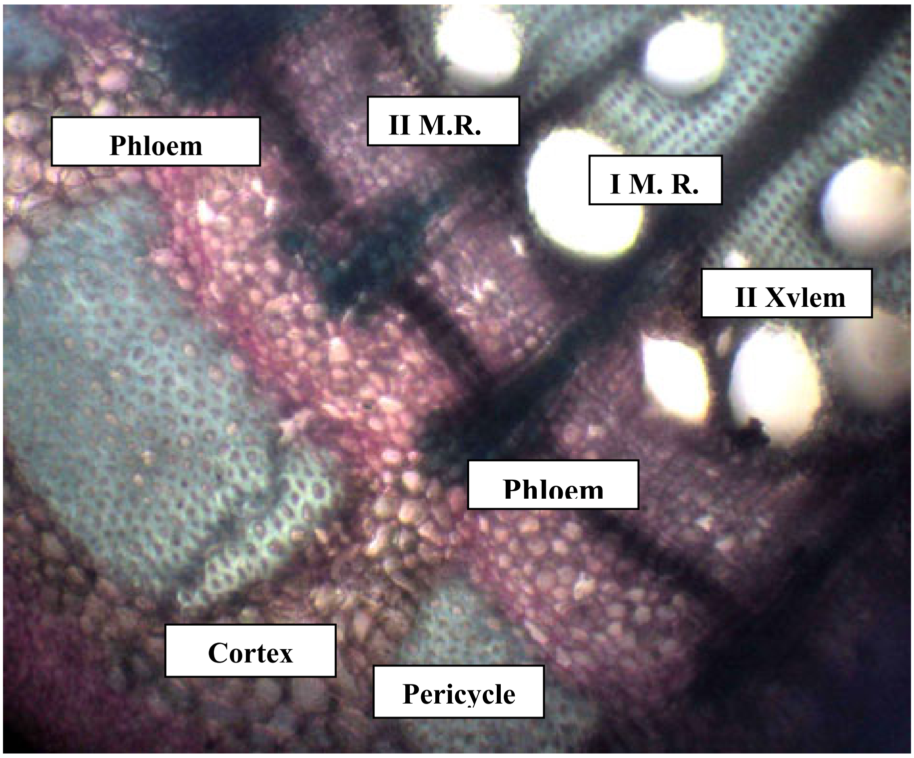

Fig. 4. Transversal section through SO_4 shoot (28.06.2004) [oc. 12,5x, ob. 10x]

Legend for Figure 4: I M.R. – Primary medullar ray; II M.R. – Secondary medullar ray; II Xylem – Secondary xylem.

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PRELIMINARY RESULTS CONCERNING THE ANTIFUNGAL ACTIVITY AND THE CHEMICAL COMPOSITION OF THE ESSENTIAL OILS FROM *PINUS SYLVESTRIS* L.

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Keywords: antimicrobial activity, pine, volatile oil

ABSTRACT

The essential oils as methanolic extract of *Pinus sylvestris* needles were examined for its antifungal activity against: *Aspergillus ochraceus*, *Botrytis cinerea*, *Fusarium oxysporum* f.sp. *vasinfectum* , *Phytium spp. and Penicilium expansum* plant pathogens. Also the chemical compositions of the essential oils has been analised by GS-FT-IR technich. The results of in vitro assays, revealed that the optimum concentration that induced the greatest visible inhibition of fungal growth varied according to the type of fungi. It was noticed that the most sensitive fungus to volatiles was *B. cinerea,* the first two concentrations (1%; 0,5%), assuring a inhibition percent of 100 %, while in the case of *F. oxysporum* f.sp. *vasinfectum*, the essential oil was found to be less efficient and the total micellium growth inhibition has been registered only at 1% essential oil concentration. In the case of the others fungus species it can be say that the essential oil had a fungistatic effect in some cases or just a lack of the antifungus activity, so no inhibition, such as the Phytium species situation. The qualitative and quantitative profiles of the essential oils from P. sylvestris revealed the presence of 11 compounds, and there were emphasized the abundance of α-pinene (83%), followed by others such as β-pinene, myrcene, β-caryophyllene and terpinolene.

INTRODUCTION

Traditional agricultural practices have utilized natural products for centuries. In recent years it has become evident, as a result of public opinion and environmental law, that new safer alternatives to conventional synthetic pesticides are both desirable and mandated. To address this need a number of natural products and plant extracts are being evaluated for their potential to control a variety of fungal pathogens and to develop promising candidates into commercial biopesticides (Locke, 2005). Recently, the essential oils have provoked interest as sources of natural products, and particularly, the antimicrobial activities have formed the basis of many applications, including row and processes food preservation, pharmaceuticals, alternative medicine and natural therapies (Guynot et. al., 2003; Tunaher et. al., 2003; Tepe, 2004; Akm et.Uslu, 2004; Kowaleczyk et al., 2004).

Pine was first investigated by Hippocrates, the father of Western medicine, for its benefits to the respiratory system and the needles, twigs and bark of all pine species contain a sticky, fragrant resin from which substances such as rosin, turpentine and essential oil are extracted (http:/www.naturedirect2u.com/Essential%20oils/pine.htm).

There are some papers concerning the analysis of essential oil composition from different *Pinus* species, results that emphasized the variability in function of area, time of sample collection, plant organ etc. (Ristic et al., 1993; Scheffer, 1993; Ochocka et al., 2002; Ghosn et al, 2004; Kurose et al., 2004; Stevanovic et al., 2005). The antifungal activity of essential oils from the some species of the genus *Pinus*, is presented by the recent results of Krauze-Baranowska et al. (2002).

Our present study explores the effect of *Pinus sylvestris* essential oil against five fungal plant pathogens and present the oil compositions of needles obtained by water distillation techniques.

MATERIALS AND METHODS

Cultures of test fungi *Aspergillus ochraceus*, *Botrytis cinerea*, *Fusarium oxysporum* f.sp. *vasinfectum*, *Phytium spp. and Penicilium expansum* were procured from Division of Mycology of Research and Development Plant Protection Institute, Bucharest (ICDPP) and maintained as a suitable medium until used.

Fresh needles of *Pinus sylvestris* L., were collected from old trees growing in the campus of University of Agronomical Sciences and Veterinary Medicine Bucharest (U.S.A.M.V.B.) (June, 2003). The essential oil was extracted by hydrodistillation for 8 h using a Clevenger type apparatus.

The crude oil was tested at different concentrations for antifungal activity against the test fungi, according to the method described by Krauze-Baranowska et. al.(2002). The essential oils have been disolved in MeOH and included in the potato-dextrose-agar (PDA) medium, at 1%, 0,5%, 0,25% and 0,125% concentrations. The fungi have been passed on these medium disposed in Petri dishes, and maintained at 18-20 ^{O}C for 14 days, when the diameter of colonies was measured, to evaluate the fungus mycelium growth.

The analysis of the essential oils was performed using the gas chromatography coupled with infrared spectroscopy (GC-FT-IR). GC condition: capillary column DB 5, length 25 m and diameter 0,25 mm; the mobile phase nitrogen the initial oven temperature 60^{o}C and it increased to 280^{o}C, with a gradient of 5^{o}/minute. To identify the compounds, the GC was coupled to a Fourier transform infrared spectrometer (FT-IR) Nicolet, and the quantitative analysis has been realized with a flame ionization detector, coupled in parallel. For FT-IR, the spectral domain as 4000-750 cm^{-1}, a resolution of 8 cm^{-1}; 7 scan/sec.; the transfer line being heated to 250^{o}C and MCT detector cooled with liquid nitrogen. Also, the essential oils have been analyzed at a GC-MS, in the same analytically conditions, using a mass domain 30-650, Varian Saturn II spectrometer, coupled with a GC 3400. To confirm the chromatographic exact picks position, there were used the Kovats retention indices, using as a reference a serie of n-alcans,

RESULTS AND DISCUSSIONS

Results of our *in vitro* assays show new data related to antifungal activity of pine needles essential oils revealed that the optimum concentration that induced the greatest visible inhibition of fungal growth varied according to the type of fungi (Figure 1). As we can see, when incorporated in the growth medium, *Pinus* oil maintained a fungicidal of fungistatic activity on all four fungi with a variation concerning the concentrations. It was noticed a fungitoxic extract effect for the first two concentrations, against *B. cinerea*, assuring a inhibition percent of 100 %, while in the case of *F. oxysporum* f.sp. *vasinfectum*, the essential oil was found to be less efficient and the total micellium growth inhibition has been registered only at 1% essential oil concentration.

In the case of the others fungus species it can be say that the essential oil had a fungistatic effect in some cases or just a lack of the antifungus activity, so no inhibition, such as the *Phytium* species situation.

GC-FT-IR analysis of oils demonstrated the presence of 11 substances and the abundance of α-pinene (83%) (Figure 2). The other compounds there are in amount less than 4% from the total chromatographic picks: myrcene, β-caryophyllene, terpinolene, as well as others such as: ocymene, bornyl acetate, terpinil-acetate, hidrocarvil-acetate and farnesole..

Of course, there are many factors that affect the constituents of essential oils, as an intra-specific variation (caused by differing of soil conditions, altitude, climatic conditions and environmental factors). In some cases, different chemotypes may occur and the classic example of oil with different chemotypes is Thymus vulgaris thyme oil, and there are at least 6 chemical variations within this species. Also, the constituents vary to an extent within the different conifer oils (Kubeczka et al., 1987; Ochocka et al., 2002; Tunaher et al., 2003; Kurose et al., 2004) and pine oil, for instance, Pinus palustris contain about 30% of the terpene β-pinene, while *P. sylvestris* contains only 2% (Veal, 1998). Antifungal activities of *P. sylvestris* oils could be atributed to the synergetic effects of the chemicals with each others. As regard to the mechanism terpene action, this is not completely understood, but Cowan (1999) appreciates that they involve the membrane disruption.

CONCLUSIONS

The results show that the optimum concentration of essential oils that induced the greatest visible inhibition of fungal growth varied according to the type of fungi. It was noticed that the most sensitive fungus was *B. cinerea*, while in the case of *F. oxysporum* f.sp. *vasinfectum*, the essential oil was found to be less efficient. In the case of the other fungus species it can be say that the essential oil had a fungistatic effect in some cases or just a lack of the antifungus activity, such as the *Phytium* species situation. GC-FT-IR analysis of the P. sylvestris needles oils demonstrated the presence of 11 substances and the abundance of α-pinene (83%). The other identified compounds were β-pinene, myrcene, β-cariophylen, terpinolene as well as ocimene, bornyl acetate, terpinil-acetate, hydrocarvil-acetate and farnesol. The biological activity of this essential oil is probably related especially to the presence of the monoterpene or diterpene hydrocarbons compounds.

ACKNOWLEDGMENTS

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Figures

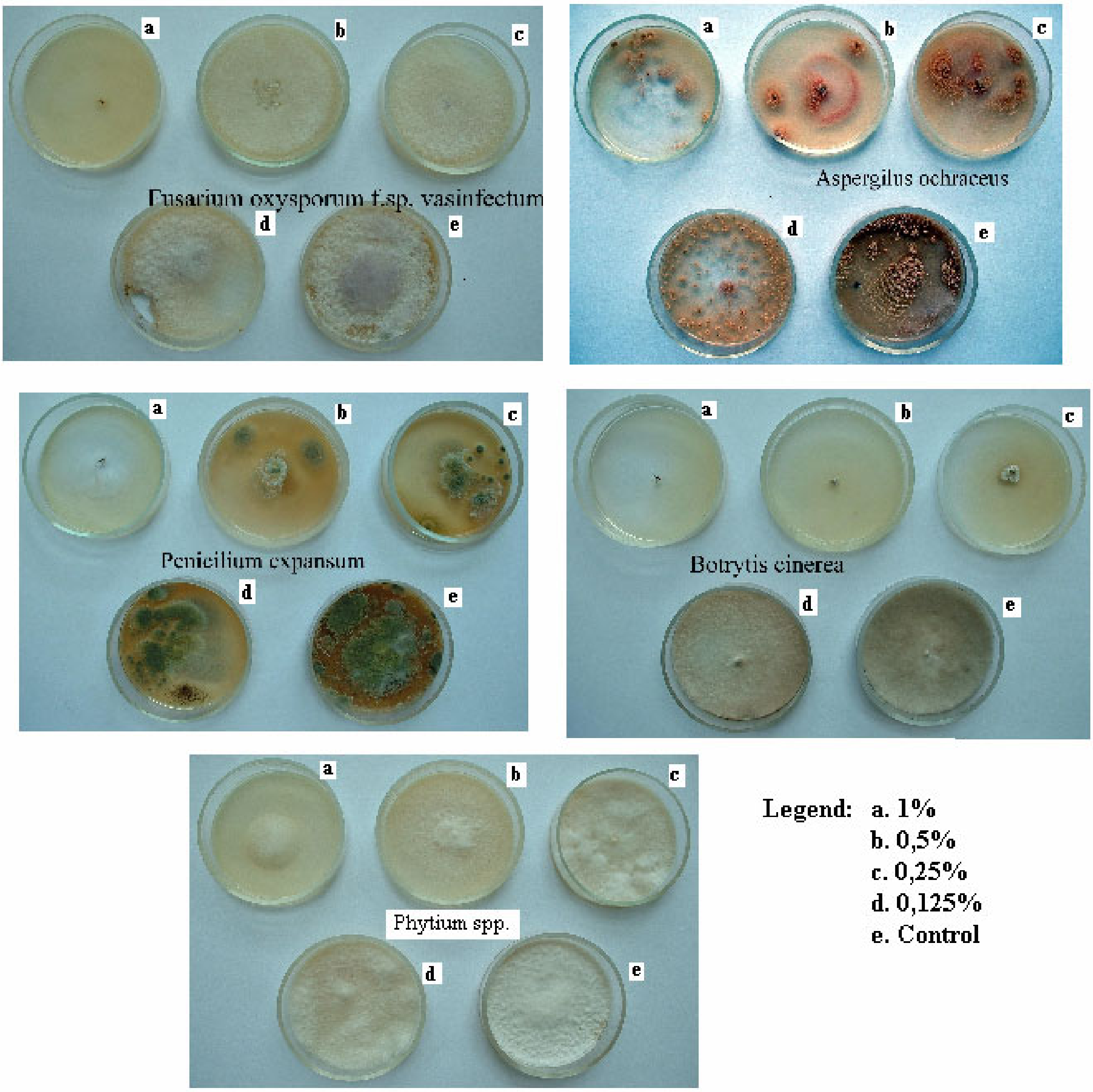

Fig. 1. The antifungal effect of *Pinus sylvestris* essential oil

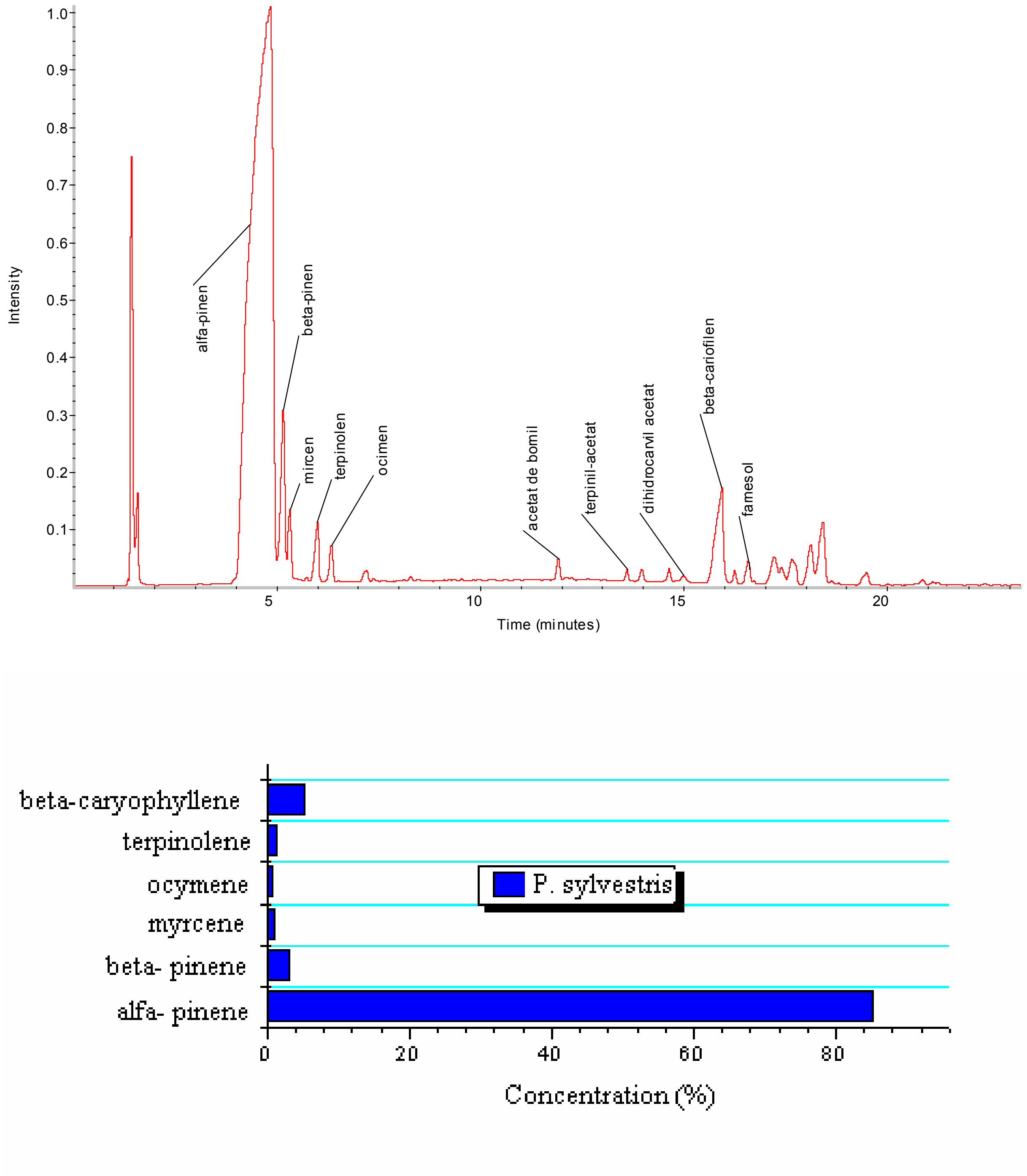

Fig 2. Qualitative and quantitative profile of *P. sylvestris* essential oils

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CHARACTERIZATION OF THE USEFUL FLORA WITHIN THE AREA LEORDENI COMMUNE (ARGEŞ COUNTY)

B. DRĂGHICI, C.M. DOBRESCU, M. FLOREA

Keywords : useful flora, medicinal plants,

This paper presents the useful flora within the area Leordeni commune (Argeş county): medicinal plants, plants used for tincture, melifery plants, flavour plants, tannant plants, plants used for nourishment, wooden plants, fodder plants, ornamental plants.

INTRODUCTION

Leordeni commune is situated at the very crossroads of the great relief areas namely hills preceding the mountains and the Romanian Plain, having a good geographical position, just proper for human activities.

It is situated in the East of Argeş county, 24 kilometers away from Piteşti town and 5 kilometres from away from Topoloveni town, on the national road no. 7 connecting the capital of the country with the headquarters of the country.

The 14 village making up this commune are differently situated. For instance, along the Glâmbocata stream valley there are the two villages Budişteni and Glodu while other villages are situated on the terraces in the Argeş River Meadows, such as the villages Cotu Malului, Baloteasca, Moara Mocanului or some others are to be found at the feet of the hills and this is the case of the villages Glâmbocata and Ciulniţa.

According to the pattern of using terrains, the surface of Leordeni commune is divided into three great categories: the agricultural area (3394 ha), the woods surface and other surfaces – terrains along with unproductive waters.

The agricultural terrains are to be found especially in the southern and central part of the commune and on the streams valleys.

The crops cultivated here (maize – 34%, corn – 13,7%) at the highest rate are used both for the nourishment of the man and of the animals.

An important domain of agriculture is represented by growing vegetables, which is favoured by the irrigations system.

The area covered with vegetables contains 250 ha. Vegetables are used for nourishing purposes and to some of the villagers they stand for a way of living one's life on the basis of selling such products.

They use to cultivate sunflower, white beet, tobacco, potatoes on smaller surfaces.

MATERIAL AND METHODS

These studies started in the year 2002 when a lot of terrain investigations have been undertaken in the area of Leordeni commune, in different zone sand settlements during the whole period of vegetation. On this occasion there have been drawn a series of observations referring to the place where we generally came across and encountered various species and also observations referring to the frequency of their appearance, etc. We have collected and inserted in the herbarium various species too, not only the useful ones.

Side by side with the practical activity of collecting, identifying and determining the species in the respective zone, we have read different works in this field in this specialty, too, mostly “The Flora in the RPR - RSR” volumes I to XIII, out of which we took out notes about the useful species in the Leordeni zone or in neighbouring zones and also about the ones that are common all over the country, in similar settlements, resembling the ones in the investigated zone.

On the basis of the data obtained on the spot in the terrain, on the basis of the collected plants and of the studied bibliography, we have made a systematic summary of the useful flora in the area.

The species are presented in a systematic order, starting with pteridofites, gymnosperms, angiosperms dicotiledonates and monocotiledonates.

Each species is presented in Latin, and the designation is accompanied by its author (authors), being followed by the following data: the popular name, the biomorphological type, the flora element, ecological features (humidity, temperature, the reaction of the soil), its expansion in the respective zone and its way of being used. According to the mentioned data, we made the cormoflora analysis for each species resorting to different aspects: botanical-systematical aspect, the bioforms aspects, the phytogeografical, ecological ones and resorting to the aspects connected with the different patterns of usage.

RESULTS AND DISCUSSIONS

The taxonomical analysis the useful flora

There have been verified 319 useful plant species belonging to 65 plant families that were selected from the researched and investigated territory, Leordeni commune.

Out of these plant families, two belong to the Pteridophyta linkage, one belongs to the Pinophytina underlink and 62 plant families belong to the Magnoliophytina underlink.

The family containing most representatives is the Poaceae that has 44 species, followed by the Fabaceae with 28 species, the Asteraceae family with 27 species, the Rosaceae family with 25 species, the Lamiaceae family – 20 species, Apiaceae – 15 species, Liliaceae – 15 species and Apiaceae – 12 species, the other families being slightly represented.

The Analysis of the bioforms

The greatest rate of distribution is the characteristic of the hemicriptophytes (H) that contain 90 species, followed by the annual terophytes (Th) - 74 species, the geophytes (G) - 31 species, the microfanerophytes (M) - 23 species, the geophytes – hemicriptophytes G(H) – 15 species, the MM megafanerophytes - 12 species, the biannual terophytes (TH) – 10 species, the other bioforms being slightly represented.

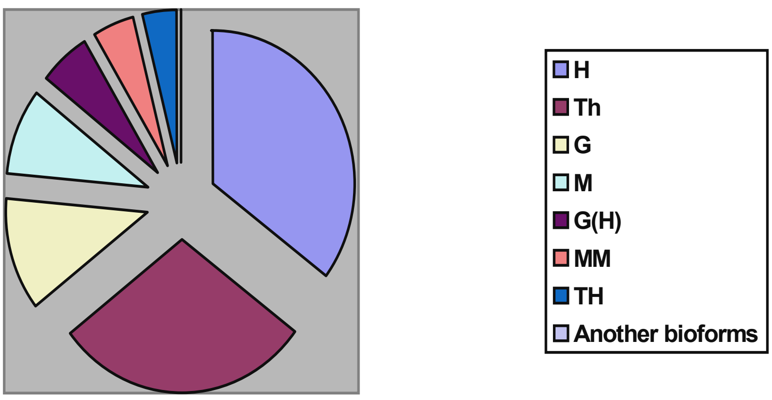

Fig. 1. The distribution of the bioforms

The Analysis of the geoelements

As far as the geoelements are concerned, the cormoflora of the researched zone is characterized by the following features: the Euroassian element or feature presents the highest rate, being known as Eua – 77 species, Eua(Med) – 42 species, Eur – 28 species, Eua(Cont) – 11 species. (Cosm) containing 32 species; Mediterranean species (Med) – 17 species; circumpoles (Circ.) – 12 species while the other geoelements are slightly represented.

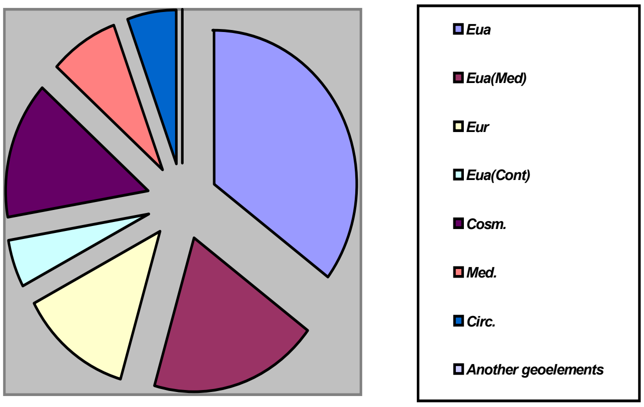

Fig. 2. The distribution of the geoelements

The Analysis of the ecological aspects

As concerns the humidity requirements, most species are mezophytes (U_3), mezoxerophytes ($U_{2,5}$) or xeromezophytes (U_2) here being included the wood's herbal plants, woods edging regions or margins (*Ficaria verna, Asarum europaeum*) as well as plants that grow in places where the humidity criterion is medium, such as *Chelidonium majus.* The species growing in place with greater humidity, such as mezohidrophytes (U_4) are relatively well represented in the area. Xerophythes and hidrophytes are slightlier represented.

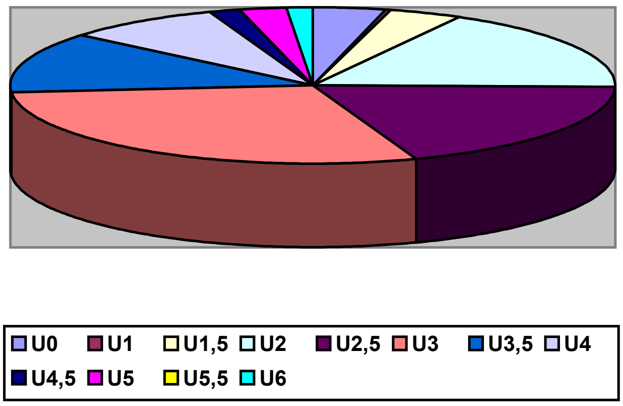

Fig. 3. The humidity index

Temperature indexes prove the fact that most species are mezotherms (T_3), moderate thermofiles (T_4) or mezothermofiles ($T_{3,5}$). Very well representedin the area are also the amphytolerant species (T_0). Not so well represented and distributed in the area are the following species: microtherms (T_2), micromezotherms ($T_{2,5}$) since they are to be found in smaller quatities, while the criofile species ($T_{1:}$ $T_{1,5}$) and thermofiles (T_5) are very rare.

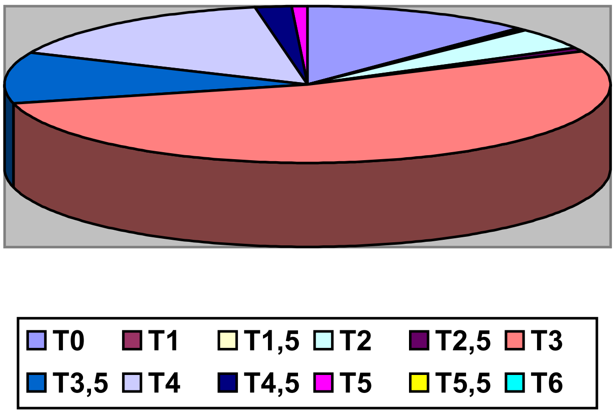

Fig. 4. The temperature index

The soil reaction index shows that most species are amphytolerant (R_0), slightly acid neutrofiles (R_4), acid neutrofiles (R_3).

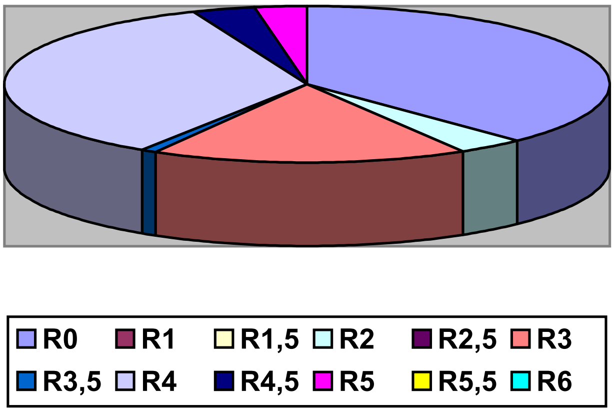

Fig. 5 The soil reaction index

The research area contains plants belonging to the spontaneous flora and they can be used according to the following usage groups:

Medicinal plants - *Achillea millefolium*, *Matricharia chamomilla*, *Taraxacum officinale*, *Chelidonium majus*, *Hypericum perforatum, Sambucus nigra*, *Plantago* sp., *Crataegus monogyna*, *Malva sylvestris, Centaurea cyanus*, *Equisetum arvense, Mentha longifolia*, *Rosa canina*, *Robinia pseudocacia*, *Carum carvi*, *Fragaria vesca*, *Leonurus cardiaca*, *Melilotus officinalis*, *Prunus spinosa, Cornus mas*, *Pulmonaria officinalis*, *Cichorium intybus*, *Capsella bursa pastoris* etc.

Plants used for tinctures - *Alnus glutinosa, Juglans regia, Salix alba, Allium cepa, Cydonia oblonga, Cornus mas, Sambucus ebulus, Syringa vulgaris, Taraxacum officinale, Hypericum perforatum, Berberis vulgaris*

Melifery plants - *Cornus mas*, *Salix* sp., *Populus alba, P. nigra*, *Tussilago farfara*, *Echium vulgare*, *Melilotus officinalis*, *Trifolium pratense*, *Tilia cordata.*

Flavour plants- belonging to the families: *Labiatae, Umbelliferae,* most of them being cultivated.

Plants used for nourishment - *Urtica dioica, Rumex crispus, Ficaria verna, Fragaria vesca, Rosa canina, Prunus spinosa, Cornus mas, Rubus caesius*, *Malus sylvestris, Pyrus pyraster.*

Tannants plants - Cele mai mari cantități de tananți se găsesc în lemnul de stejar, gorun (10 cm diametru), castan.

Wooden plants - *Quercus robur, Robinia pseudacacia, Fagus sylvatica, Populus alba, Carpinus betulus, Salix alba*

Fodder plants - *Poa bulbosa, Festuca pratensis, Agropyron repens, Dactylis glomerata, Trifolium pratense, T. repens, Medicago sativa, Lotus corniculatus, Vicia* sp.

Ornamental plants – *Paeonia officinalis*, *Rosa canina*, *Asparagus* sp.

CONCLUSION

The paper under consideration contains the results the botanical researches that we have undertaken in the area of Leordeni commune, between the years 2002-2005.

Using well-known methods and applying them in the flora research activity, resorting to own remarks and to the speciality or field literature data, we identified and discovered 319 species of cormophyta, which from the taxonomical point of view belong to 232 varieties or genres distributed in 65 families, very well represented being the following families: Poaceae, Fabaceae, Asteraceae, Rosaceae, Lamiaceae, Apiaceae, Liliaceae and Brassicaceae.

In a separate chapter there are presented different usage ways of the plants that use to grow in the area. All these are exemplified by the most frequent and best known species that make up a certain type of usage.

The most useful species are classified within the category of medicinal plants and these ones more often can be used by far much more than others.

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RESEARCH REGARDING THE PHYSIOLOGICAL AND BIOCHEMICAL CHANGES IN APPLE FRUITS DURING MATURATION AND SENESCENCE PROCESSES

Monica FLEANCU

Keywords: apple fruits, photosynthesis, respiration, maturation, senescence.

SUMMARY

The purpose was to identify the physiological and biochemical changes which take place in the apple fruits (Idared, Golden Delicious, Jonathan) during maturation and senescence processes.

It has been determinate photosynthesis rate, respiration rate, assimilation pigments, amount of the sugars, pectin, vitamin C, tanants substances.

INTRODUCTION

Maturation and senescence processes are characterized by changes in physiological, biochemical and morphological treats of the fruit, which determine the formation of qualitative characteristics of the cultivar, and finally their depreciation during senescence. The changes that take place in fruits serve as indicators for establishing their maturation degree and the moment for bringing in the harvest and consuming.

MATERIALS AND METHODS

The studies were conducted at I.C.D.P. Pitesti – Mărăcineni, between 2001 and 2005. As biologic material we used apple cultivars Idared, Golden delicious and Jonathan, trees planted in 1986. The apple-tree density was 2314 trees/ha (planting distance 3,60*1,20m).

The determination of the photosynthesis and respiration was realized by measuring the gas exchanges with The Warburg device (cm^3 $O_2/dm^2/h$). The illumination was of 8000 lux and the temperature was 20^oC**.**

The determination of the content in chlorophyll and carotenoid pigments was done spectrophotometrically. The results were in mg chlorophyll a, b and carotenoid pigments/1 g dry matter.

The biochemical determination realized at the fruit level were amount of the sugars, pectin, vitamin C, tanants substances.

For the statistic interpretation of the results we used SPSS 13.0 for Windows.

RESULTS AND DISCUSSIONS

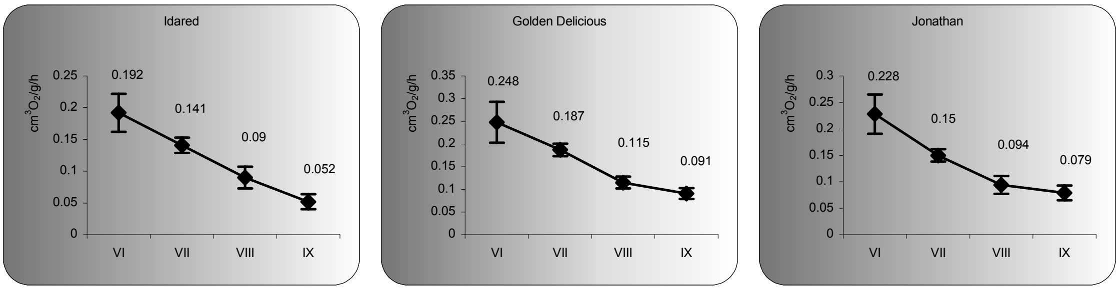
The photosynthesis process takes place in all immature fruits which contain chlorophyll and are exposed to light. The intensity of this process decreases during the fruit maturation, as the chlorophyll biodegrades and the carotenoid pigments biosynthesizes.

For the Idared, on June, the photosynthesis determined at the fruit level had a mean of 0,192 cm^3 $O_2/g/h$, and it lowers to 0,052 cm^3 $O_2/g/h$ at bringing in the harvest. The Golden Delicious apples presented, on June, a photosynthesis

The photosynthesis mean and its evolution for each cultivars (Golden delicious, Jonathan and Idared) during the whole year is presented in Figure 1.

Figure 1.

Photosynthesis rate in apple fruit (Idared, Golden Delicious and Jonathan cultivars)



The respiration process is an indicator for the fruit maturation degree, the physiologic state of the tissues and an indicator of the biodegradation rhythm of the supply substances. Figure 2 presents the results of the determination of the intensity of apple respiration during growth, maturation and senescence processes.

Figure 2.

Respiration rate in apple fruit (Idared, Golden Delicious and Jonathan cultivars)

Immature fruits have a high content of chlorophyll which gives them the characteristic green color. During maturation process of the fruits, the chlorophyll content decreases as a consequence of a process of biodegradation catalyzed by the chlorophyllase enzyme. In the first stage takes place the hydrolysis of the phytol, and in the second one, the porfirinic nucleus decomposes liberating magnesium.

In figure 3 are presented values obtained through determination of the quantity of the carotenoid pigments in fruits, in g/g d.m. during processes of fruit growth and maturation. The tendency of the values is to increase, at a $p<0.01$. At bringing in the harvest there have been observed significant differences between Jonathan and the other cultivars at a $p<0,05$.

During the maturation process, the taste of the fruits changes. In the period preceding the maturation, the taste is acid, astringent, as a consequence of the high level of organic acids and fenolic substances and the low content of sugars.. As the fruits approach the consume maturity the content of the organic acids and fenolic substances decreases and that of sugars contributing at the realization of the characteristic taste.

The fruit acidity is determined by the presence of organic acid in the fruit's vacuoles. (Figure 4)

Figure 3.
Determination of assimilator pigments in apple fruit (Idared, Golden Delicious and Jonathan cultivars)

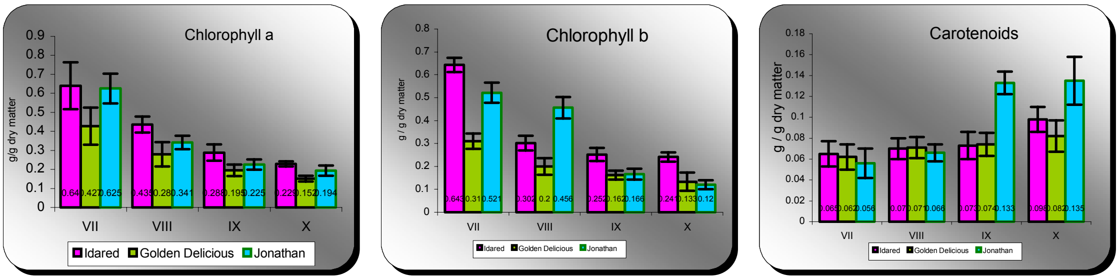


Figure 4.
Variation of apple fruits acidity (Idared, Golden Delicious and Jonathan cultivars)

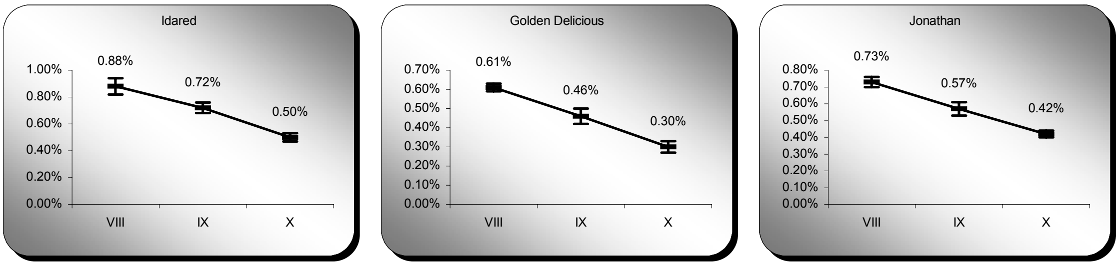


Table 1 shows the mean values of the quantity of pectic substances, tanant substances, total sugars and vitamin C determined at the apple (fruit) level.

Table 1.
Mean values of the pectic substance, tanant substance, sugars and vitamin C content in apple fruits (Idared, Golden Delicious and Jonathan cultivars)

Cultivar	Pectic substance	Tanant substance	Sugars	Vitamin C
Idared	0,45%	0,11%	11,81%	22,25%
Golden Delicious	0,28%	0,12%	10,24%	23,44%
Jonathan	0,24%	0,11%	10,45%	24,65%

CONCLUSIONS

During fruit growth and maturation for all the cultivars in the study, there is a decrease in the photosynthesis (determined at the fruit level) beginning with June and ending in October.

During growth and maturation, apples, included in the category of climacteric fruits, present the following characteristics of the respiration process: in the interval June – August the intensity of the respiration decreases (from values between 0,082 and 0,089 cm^3 O_2/g/h down to values of 0,052-0,068 cm^3 O_2/g/h), in the maturation stage it increases (up to 0,06-0,072 cm^3 O_2/g/h), it follows an accentuated decrease of the values corresponding the end of the maturation period (reaching values of 0,02-0,026 cm^3 O_2/g/h).

The maturation process of the fruits is characterized by biochemical changes which lead to the realization of the characteristic treats of taste, color, substance and aroma. Our research concluded that in the interval of July-September there is a decrease in the content of *chlorophyll a and chlorophyll b*, an increase of the quantity of carotenoid pigments, a decrease of the titratable acidity. Also, in apples pertaining the three cultivars, at the bringing of the harvest, was determined the concentration of the total sugars, pectic substances, tenant substances and vitamin C, finding that the highest values of pectic substances and total sugars at Idared, the highest quantity of vitamin C at Jonathan, and the tanant substances were around 0,11%-0,12% for the three cultivars.

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Lucrări ştiinţifice U.S.A.M.V., Seria B, Vol. XLVIII, 2005

LEAF ANATOMY AND STOMATA COMPLEX AT *TANACETUM BALSAMITA*, L. – COSTMARY (*ASTERACEAE)*

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Keywords: isolateral parenchima, palysadic tisue, amphystomatic, anomocytic

ABSTRACT

Tanacetum balsamita is a aromatic and medicinal plant with a high content in volatile oil. It was studied the anatomy of leaf, the density and the type of stomata. The leaf is amphystomatic, the type of stomata complex is anomocytic and the mesophyll is isolateral. In the both epidermis there are trichomes and glandular hairs. The density of stomata is 50-68/sq.mm. The length of stomata cells is 37-46 µm and the wide is 31-34 µm.

INTRODUCTION

Tanaceum balsamita is a perennial herbaceous plant originates from South-West of Asia. In Rumanian country don't know its, because it is locally grow in the country garden. It is needed to discover the strengths of this plant and to promote this. We didn't find a lot of data about costmary. The plant can be recognizing about the square stem and pubescent add-pressed, up to 100 cm and branched above the middle. The lower leaves are petiolates, ovat-lanceolate, crenate and softly-hairy. The upper ones are sessile, elptic-lanceolate, serrate, add-pressed pubescent. The inflorescence is a dens umbel-like head, made up of small, yellow flowers (fig. 1). There are not radial flowers. It is cultivated for its aromatic inflorescences and leaves with mint-like smell, used in folk medicine for their astringent, digestive, antiseptic and laxative properties. Because their contents are rich in volatile oils, it is used to aromatize wine and beer.

MATERIALS AND METHODS

For the observations there are used fresh costmary leaves from plants cultivated in Botanical Garden of Agronomical University from Bucharest. There was observed the internal structure of leaf and petiole in traversal sections. It was established the density of stomata per square millimeter. The sections were stained using carmine alaun and iodine green.

The measurements and observations were made by the optic microscope.

RESULTS AND DISCUTION

There are three areas observed in cross sections (fig. 2): upper epidermis (ad axial or ventral), mesophyll and lower epidermis (abaxial or dorsal).

The epidermis is composed by one epidermal cell layer. The epidermal cells compactly arranged have wavy anticlinal walls in surface view. The outer walls of epidermal cells are thicken and covered by the cuticle. The average height of the cells is 16.22 µm light in upper epidermis and 14.97 µm in lower epidermis. The cuticle attains 3.12 µm in thickness (table1). Stomata occur on both surfaces there are on amphystomatic leaf. There are also trichomes and glandular hairs.

The leaf is an isolateral type because the mesophyll is composed by a palisade parenchyma present on both sides and a thin spongy parenchyma in the middle.

The palisade cells are elongate in shape at right angle to the epidermis. These cells have a high content in chlorophyll. Beneath the upper epidermis the palisade parenchyma, made by two cell-layers here and there is 79.24 µm light. The lower palisade tissue is 51.6 µm light.

The spongy tissue situated in the middle of the mesophyll is composed by two rows of cells with an average of 43.68 µm light. Their cells are nearly isodiametric and there are conspicuous intercellular spaces between them.

There are also in the mesophyll a lot of collateral bundle with the xylem up to the adaxial epidermis and the phloem down to the abaxial epidermis.

The tissues of the petiole are the epidermis, the colenchyma and a round parenchyma (fig. 3). The collenchyma is angular composed by 2 or 3 cell layers. In the round parenchyma cells are multilayered with intercellular space. There are three vascular collaterals bundles in this parenchyma: one in the middle is bigger than two laterals. The collateral bundles of the petiole have the some orientation than leaf. Above and beneath them there are two arcs of sclerenchyma.

Stomata from both epidermises are made up from two guard cells kidney shaped in surface view and the subsidiary cells with the same form than the epidermal cells. In this case, the complex of stomata is anomocytic type (fig. 4).

The density of stomata in upper epidermis is $50/mm^2$ and $68/mm^2$ in lower epidermis. The guard cell are 37-46 µm length and 31.2-34.3 µm wide (table 2).

CONCLUSIONS

The isolateral mesophyll is in relation to xeromorphe leaf features.

The leaf is amphystomatic with anomocytic stomata.

The density of stomata per square millimeter is 50 in upper epidermis and 70 in the lower one.

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Table 1. The structural characteristics of costmary leaf

Check	Cuticle (µm)	Upper epidermis (µm)	Upper palisadic tisue (µm)	Spongious tisue (µm)	Lower paliadic tisue (µm)	Lower epidermis (µm)	Cuticle (µm)
Ceck 1	3.12	15.6	53.04	46.8	53.04	18.72	3.12
Ceck 2	3.12	15.6	78.0	40.56	49.92	12.48	3.12
Ceck 3	3.12	15.6	78.0	49.92	53.04	12.48	3.12
Ceck 4	3.12	18.72	96.72	40.56	56.16	15.6	3.12
Ceck 5	3.12	15.6	90.48	40.56	43.68	15.6	3.12
Average	**3.12**	**16.22**	**79.24**	**43.68**	**51.16**	**14.97**	**3.12**

Table 2. The structural caracteristics of stomata

Ceck	Upper epidermis			Lower epidermis		
	Stomata number /sq.mm	Lenght (µm)	Wide (µm)	Stomata number /sq.mm	Lenght (µm)	Wide (µm)
Ceck 1	50	46.80	34.32	60	34.44	31.20
Ceck 2	50	43.68	34.32	68	37.44	31.20
Ceck 3	50	40.56	31.20	75	40.56	31.20
Ceck 4	53	43.68	34.32	75	43.68	34.32
Ceck 5	50	43.68	31.00	75	37.44	34.32
Average	**50.6**	**43.68**	**33.08**	**70.6**	**38.71**	**32.44**

Fig. 1. *Tanacetum balsamita* L. inflorescence of costmary

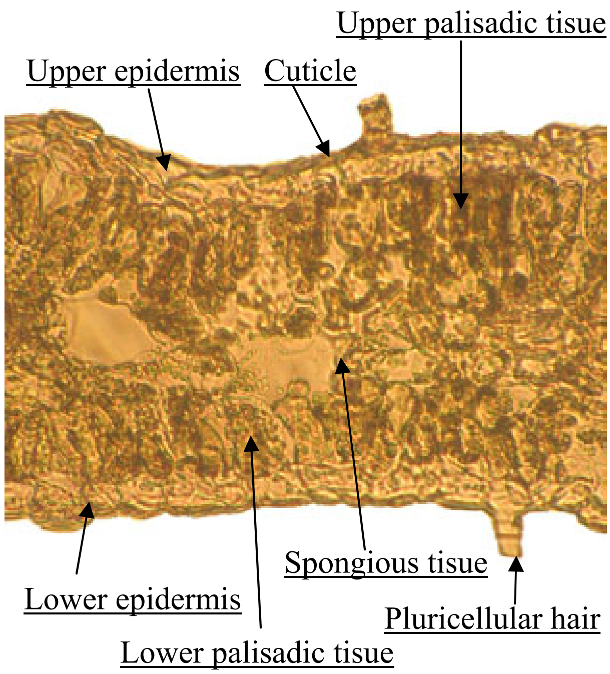

Fig. 2. Leaf structure- transversal section

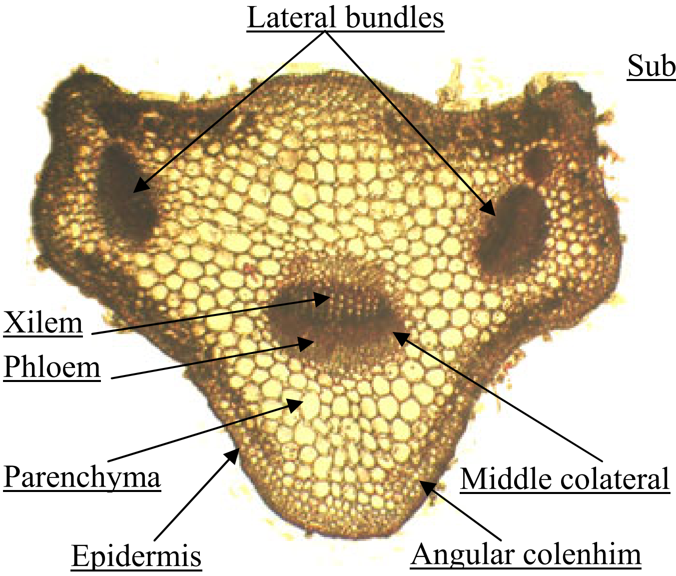

Fig. 3. Petiol structure - transversal section

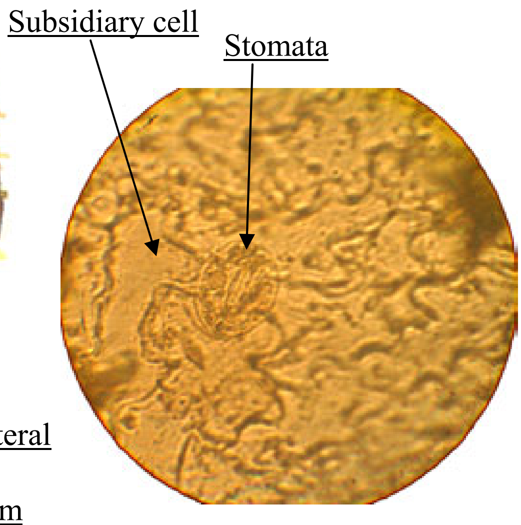

Fig. 4. Epidermal stomata

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OTHER FIELDS

THE ESTIMATION OF SOIL COVER AND LAND EVALUATION CAPACITY IN URZICENI AREA – S.C. "AGROINDUSTRIALA"

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Keywords: alkalization area, pedogenesis factors, biogeochemical processes, phreatic and surface waters

ABSTRACT

The „Agroindustriala" society land is located in the western-central part of Baragan Plain, in the area of Urziceni, Garbovi, Armasesti localities.

Soil cover knowing was necessary for establishing a land standard price, in order to start leasing and granting negotiations. The area belongs to chernozems and cambic chernozems domain, morphologically being influenced by gleic processes, alkalisation, high phreatic regime and alkaline pH.

The presence of Sarata rivulet, which springs from Buzau subcarpathians, a region enriched in salt resources, leaded to phreatic waters mineralization and soils alkalisation.

Land evaluation potential was estimated to be 4th Class (62 points), in classical system of evaluation, and 2nd Class in today system (according to the Law 18/1991). Agroeconomically, the value of one hectare of arable land in Urziceni area is about 55 million lei.

INTRODUCTION

In the last years, on the landed market, a lot of information regarding soil resources and their production potential is required. The interest comes from the commercial societies administration and the agrarian fields owners, both associated and individual.

If this kind of information was ordinary before L 18/1991 publication, today the interest goes far from ordinary, as many people want to invest in agriculture and have a quick profit.

No matter the situation, the material production, the agrarian space organization and the landed improvement work have, as a principal actor, the soil and its features. To obtain profitable and stable crops means to know, as good as you can, the natural potential, as well as the soils diversity.

MATERIALS AND METHODS

In order to know the landed resources, big scale chartings are made; based on those, soil maps and favourability studies result.

Our presence and research in Urziceni area was a reply to "Agroindustriala" unit solicitation and had, as a main objective, pedological areas limitation (and making of soil map), followed by the fields land evaluation.

RESULTS AND DISCUSSIONS

1. Location and administrative position. The farms belonging to "Agroindustriala" S.A. are located near Urziceni town, Ialomita county; we talk about Garbovi (Farm 8), Armasesti (Farm 7, 9, 14) and Urziceni (Farm 1, 2, 5, 6, 10).

Agrary space is crossed by some important communication lines, such as: Bucharest-Faurei and Urziceni-Ploiesti railway, Urziceni-Buzau highway and Urziceni-Pogoanele route.

Geographically, the area belongs to Baragan Plain, western-central sector. In the south, Ialomita brook is located (Urziceni-Barbulesti portion) and Cotorca and Sarata brooks, near by. "Sarata" comes from "salt" and the name is not a coincidence if we think that alkalization and salinization are present processes in the area.

2. Pedogenesis natural conditions. The process which leaded to soil formation was a long one and lasted from Romanian Plain exudation till the accumulation of the last layer of loess.

The natural pedogenesis factors were: the rock or the parental material, as a support for the whole pedologic edifice; the relief, uniform and without topographic accidents; the vegetation, where graminaes are prevailing and assure the necessary biomass for biogeochemical processes; the phreatic and surface waters, with their role of periodical interruption of pedogenesis rhythm.

Human being could not be absent in today's conditions, as the pedogenethical processes rhythm is influenced by the chemical and mechanical work and frequent changes of land using category are made. All these have modified features like: bulk density, total porosity, aeration porosity, penetration resistance, pH and humus quality. Like if this wouldn't have been enough, climatic modification processes in Baragan are added, processes which lead to aridity and organic matter mineralization, with significant consequences on humus quality.

If some factors remained stable (the rock and the relief, for instance), others like vegetation, climate and waters went through a transformation process, which had a huge influence on pedogenesis. The alkalization of soil is due to the salts from phreatic waters, which spring from the subcarpathians area. The humus mineralization is explained by the climatic modification and by the acidity processes from the Romania's south, from Dobrogea and Moldova's southern part. A contribution to this state is also due to maintaining soils uncovered with vegetation. More, the agrotechnical work didn't always respect the performance technology, thing which caused soil compaction.

3. Soils cover. Urziceni agrary area is characterized by the presence of Mollisoils (chernozems and cambic chernozems), which occupy 12 from 23 soil units.

As soil subtypes, most frequent are wet phreatic subtypes, gleyed subtypes and alkaline subtypes. The limitation of territory units was also made depending on the intensity of these processes (carbonatation, gleysation or alkalization), depending on texture and on the restrictions presence or absence, in the arable layer (A_t).

In the territory we have hydrogenic soil class, represented by humic gley soil and low humic gley soil.

Halomorphic soils and alkaline subtypes of chernozems and cambic chernozems appear because of Na^+ presence in the soil complex, an element which comes from phreatic water. Sarata brook, enriched in salty alluvial deposits has influenced the capillary rising, because phreatic waters have taken the soluble salts from the soil profile. The intensity is low (A.2.2.) for a 6-8% VNa content and increased (A.4.2) for the Garbovi humic gley soils (SU VIII), where VNa is over 16%.

A number of 5 units of soils are alkaline, in total, excepting the halomorphic soils. Halomorphic soils were identified in 2 area (SU I/II). Armasesti (Farm7, 9, 14) and belong to

Alkali soils and Saline soils. These soils appeared because of light phreatic level (1,5/0,5 m(and depression microrelief presence.

The alkaline landscape is completed by some indicators-plants in the area, like Salsola K, Suedia M. and Salicornia Sp.

Waters mineralization is over the critic level of 2 g/l, as something they reach 3,9/4,2 g/l.

For Alkali soils of Armasesti, a Btna horizon appears on the profile, with medium texture; the chemical and physical features are totally improper and require immediate improvement measures because otherwise, these soils night be taken off from the agrary circle. Same case for saline soils.

Chernozems and cambic chernozems, although very productive, present some restrictions at Urziceni, because of their morphological, physical and chemical features. Affected by gleization, alkalization, compaction, sometimes even eroded, they should be carefully managed.

Alluvial soils belong to unevaluated soil class and are located in Ialomita meadow, Urziceni and Armasesti farms. The subtypes are molic alluvial soils, typical alluvial soils, gleyed alluvial soils and alkaline alluvial soils.

The parental material is represented by alluvial deposits, with loamy or loamy-clay texture at the surface and loamy-sandy on the control section. They are affected by setting because of their fine texture in Ap and machinery passing.

4. Agrary fields evaluation. Trough land evaluation, the soil0considered UET (Uniform Ecologic Territory) – receives evaluation marks and is defined by favorability classes afterwards.

Before that, the soil features and environment elements were analyzed, using 17 evaluation indicators.

For Urziceni soils, the restrictions are: phreatic waters critical depth and mineralization, temperature degrees, alkalinity process and alkaline pH. Evaluation mark for different crops and different agrary using was obtained by multiplication of the coefficients. The calculation was made for the most representative soils and features. For instance, chernozems and cambic chernozems suffered restriction for annual medium temperature (coefficient 0,9), for alkalization indicator (coefficient 0,8-0,9), separate for wheat and maize) and for low alkaline pH.

Evaluation marks are the expression of favorability potential in this area, 65 points for wheat and 50 points for maize, respectively. The average for chernozems and cambic chernozems fields is 57 points, this means the 5th class of favorability.

The fields where alluvial soils appear are estimated at 43 points (6th class of favorability). Humic gley soils, Alkali soils and Salinic soils are estimated to belong to VIII and X-th classes of favorability, because of the hidromorphism and alkalization processes.

The evaluation marks are different for the agrary cultures : wheat has the evaluation coefficient 0,6 (penalty 40%) for alkalization, maize has the evaluation coefficient 0,4. so, the final mark is 34 points for wheat and 29 points for maize. The arable field obtained 31point (VIII-th class of natural evaluation).

Alkali and saline soils present severe restrictions because of alkalization and pH ; they belong to X-th class, respectively 5 points for wheat and 1 point for maize.

As a conclusion, Urziceni potential is saved by the chernozems and cambic chernozems presence, wet phreatic subtype. These soils do not have significant restrictions, as they are estimated at 83 points, II-th class of favorability.

General wean is 62 points (IV-th class of favorability) in the natural, classic system and II-th in present-day system (according to L 18/1991).

For land evaluation, different people collaborated, among then economists. In establishing land value, evaluation mark, product/point equivalent in kg, acquisition price, production expenses and the period in which a person works in agriculture were considered the calculation base.

According to calculation, the average production is 3320 kg/hectare for wheat, at a 4500 lei/kg acquisition price; the profit for 2004 is 14,9 million lei/hectare. Production expenses represented 85% profit, so the real profit is 2,2 million lei/hectare. The value of affable field, in this case, is 55 million lei/ha.

CONCLUSIONS

It is important to protect Romania's soil because, on the local market, the value of agrary fields is might sub evaluated, compared to the pedological potential. We stand for evaluation point transition to an international currency (dollar, EURO), increasing of land acquisition price and applying of high coefficients, where improvement works were made in the territory.

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Tables

Table 1: S.C. "AGROINDUSTRILA" S.A. URZICENI – Soil resources map and ecologically homogenous territory

Legend – Farms no. 7, 9, 14 – Armasesti village

I	Gleyic Solonchaks with clay loamy texture in A horizon/ clay loamy texture on control section
II	Sudosalic Solonetz, loamy texture in A horizon/ loamy texture on control section
III	Gleyic calcareous Fluvisols, loamy texture in A horizon/ silt loam on control section
IV	Gleyic calcareous Fluvisols, caly loamy texture in A horizon/ clay loamy texture on control section
V	Mollic calcareous Fluvisols, clay loamy texture in A horizon/ loamy on control section

Table 2: S.C. "AGROINDUSTRILA" S.A. URZICENI – Soil resources map and ecologically homogenous territory

Legend – Farm no. 8 – Garbovi village

I	Chernozem slightly calcareous with ground water supply, loamy texture in A horizon/ loamy texture on control section
II	Gleyic Chernozems slightly calcareous with clay loamy texture in A horizon/ loamy texture on control section
III	Gleyic hyposodic Chernozems, slightly calcareous with loamy texture in A horizon/ loamy texture on control section
IV	Gleyic phaeozems with loamy texture in A horizon/ loamy texture on control section
V	Gleyic phaeozems with loamy texture in A horizon/ clay loame texture on control section
VI	Gleyic phaeozems with loamy texture in A horizon (setteed)/ clay loame texture on control section
VII	Hyposodic gleyic phaeozems, clay loamy texture in A horizon/ clay loamy texture on control section
VIII	Hyposodic gleyic chernozems, loamy texture in A horizon/ loamy texture on control section

Table 3: S.C. “AGROINDUSTRILA” S.A. URZICENI – Soil resources map and ecologically homogenous territory

Legend – Farms no. 1, 2, 5, 6, 10 – Urziceni village

I	Calcic chernozems with ground water supply, loamy texture in A horizon/ loamy texture on control section
II	Vermic Phaeozems, loamy texture in A horizon (setted)/ loamy texture on control section
III	Eroded (e1) vermic phaeozem, loamy texture in A horizon/ loamy texture on control section
IV	Vermic Phaeozems with ground water supply, loamy texture in A horizon (setted)/ loamy texture on control section
V	Hyposodic chernozems with loamy texture in A horizon (setted)/ loamy texture on control section
VI	Calcaric Gleysols, loamy texture in A horizon/ loamy texture on control section, pasture land use
VII	Calcaric Fluvisols, loamy texture in A horizon/ loamy texture on control section
VIII	Sodic Calcaric Fluvisols, loamy texture in A horizon/ loamy texture on control section
IX	Calcaric Fluvisols, clay loamy texture in A horizon/ loamy sand on control section
X	Mollic calcareous fluvisols, loamy texture in A horizon/ loamy texture on control section

Figures

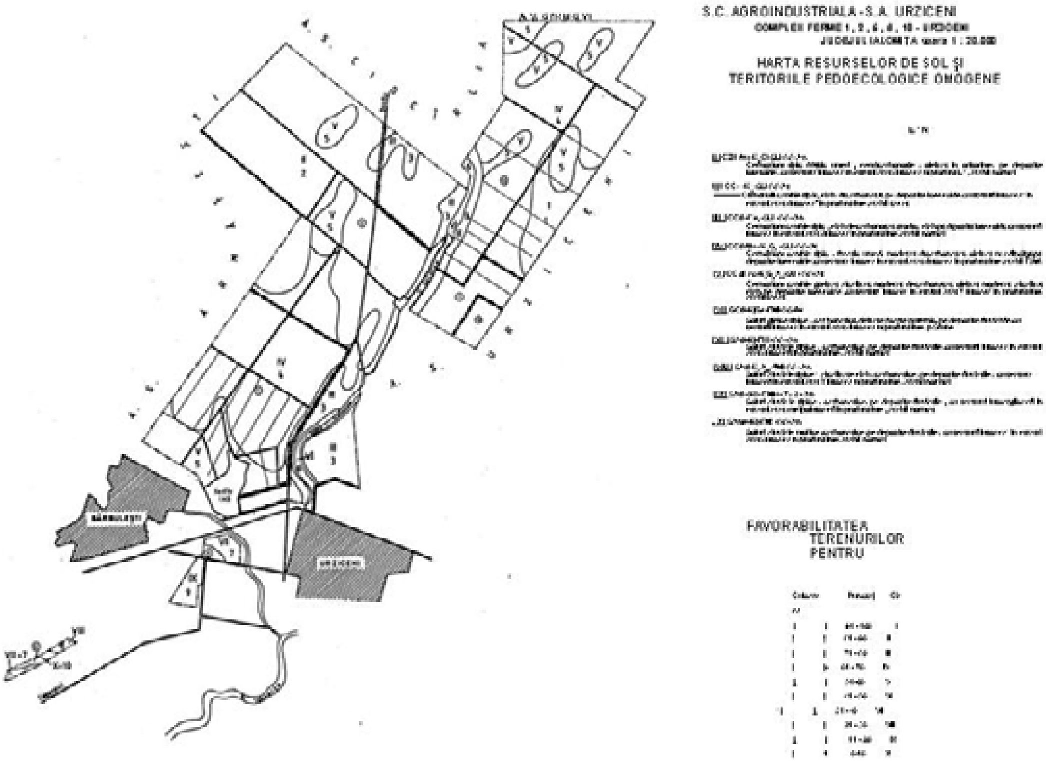

Fig. 1. Resources of soils map

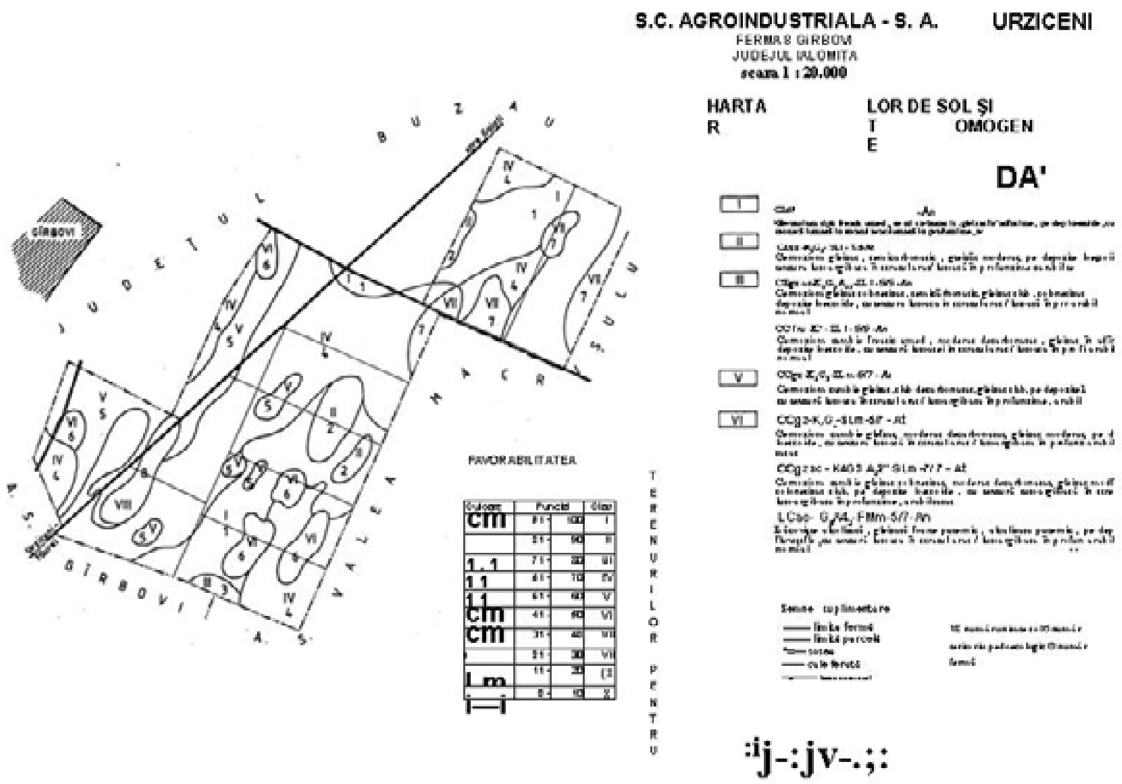

Fig. 2. Resources of soils map

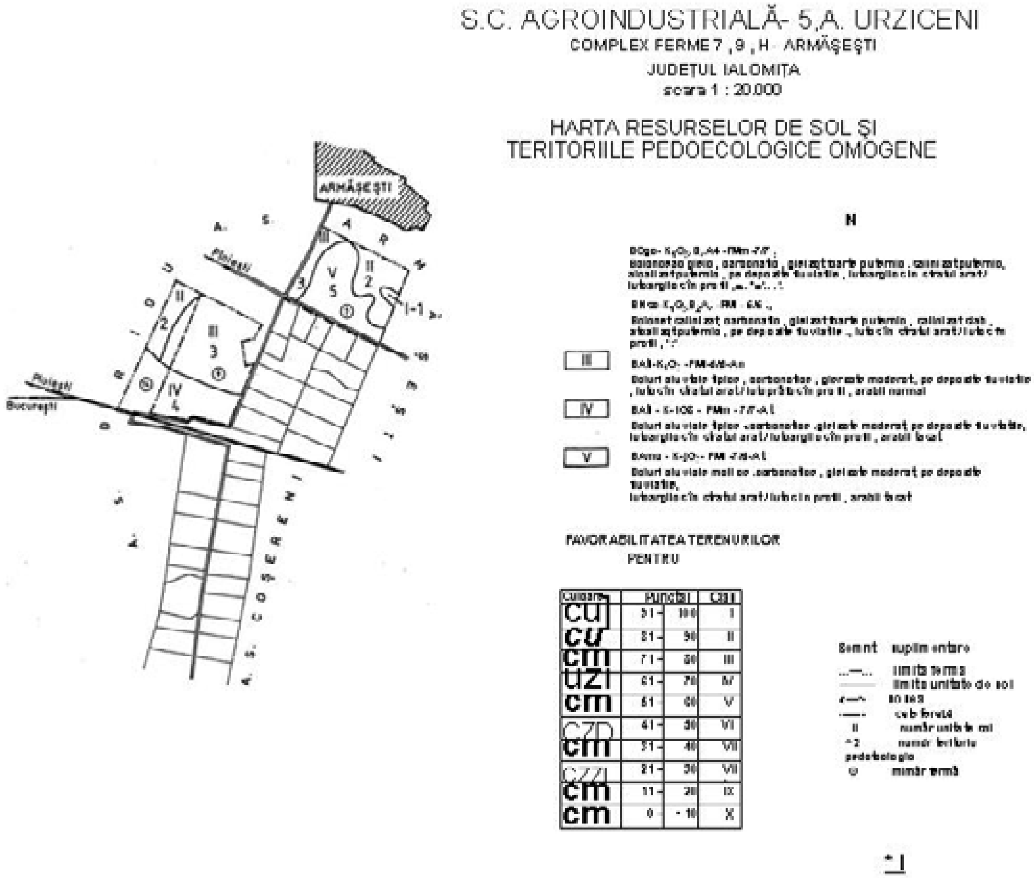

Fig. 3. Resources of soils map and homogenous pedological territories

Lucrări ştiinţifice U.S.A.M.V.B., Seria B, Vol. XLVIII, 2005

SOILS AND AGRARY FIELDS EVALUATION IN DARJOV BASIN – S.C. BRIAS S.A., OLT COUNTY

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Keywords: post-quaternary Lithologic deposits, vertisols, land, vertisols, land evaluations

ABSTRACT

Darjjov hydrographic basin drains north-central part of Boianu Plain, going from Brebeni to Lisa-Greci place. It includes four farms, representing 4.989 hectars of arable surface. The most frequent soils are red-brownish soils and vertisoils.

These soils physical and hydrophysical features impose restrictions for some indicators like: bulk density, total porosity, aeration porosity etc; this is explained by fine clayey texture of soils.

Regarding land evaluation, the most productive lands belong to 5th Class for wheat and 6th Class for maize.

This research study also contains Soil Resources Map and land evaluation tables.

INTRODUCTION

Present Brias S.A. represents the former State Agrary Enterprise (SAE) Brebeni and includes four farms: Coteana, Zorleasca, Mierlesti and Lupa, with 4984 hectares as total surface.

The agrary field starts from the village neighborhood; Lisa and Greci localities are situated in eastern and southern part; the Brebeni road crosses the land which belongs to Coteana farm. Geographically, the whole territory belongs to Boianu Plain which is located in Darjov basin limitrophe part.

MATERIALS AND METHODS

This study was based on different pedological materials which were published and reinterpreted before, in order to have on actual information.

The main cartographic material was Soils Resources Map, with uniform ecologic territories. A number of 5 sol types and 15-sools subtypes were identified.

RESULTS AND DISCUSSIONS

Natural conditions

Soils genesis is due to the geographic factors action which influenced the Boianu Plain territory. Getic Tableland exudation went, for Darjov basin area, a long period of post-quaternary evolution, in which some of the landscape components appeared, among which, the soils.

Being the most superficial cover, the soil has – in its morphology – traces of the way in which pedogenesis factors acted.

To describe pedogenesis factors represents a necessity in order to understand the pedogenetic mechanism and the soils features, inherited from a previous evolution stage.

1 a. Brebeni relief homogeneity is due to Boianu Plain litology. The plain is divided by some affluents located in Darjov left part (Bata Mare, Adancata, Soava valley, Zorleasca valley, Jidului valley. In Mierlesti and partial in Coteana area, the shattering of plain is due to some valleys presence (Baiomiru, for instance).

Darjov meadow in Brebeni is quite large, the land presents humidity excess and soils are characterized by hydromorphism.

On the terrace which corresponds to the high plain, the relief is uniform, horizontal and frequently affected by humidity excess, the explanation; the lithologic layer.

1.b. The lithologic deposits. Geologically the deposits belong to Ice Age. The rock on which the soils were born is represented by montmorillonitic clays, which makes them smolling clays. On such rocks, the vertisoils were formed, having some negative features which require improvement measures.

1.c. The climate. According to Pedoclimatic Microareas Map, the Brebeni region belongs to IS-BR area, close to II 0-VS, which means a droughty – warm climate, with reddish-brown soils and moderate-warm climate, with vertisoils.

Climate elements like winds, hoarfrosts or hails are different compared with the neighborhood areas. the Darjov valley has a depressionary aspect and presents a difference of height compared to the other plateau plains (over 30 m), that's why, in the cold season, the air stagnates here for a long period of time. The winds come from the north, on the Darjov brook valley. The smog is also present, especially in autumn and winter time. An ordinary phenomenon is temperature inversion: cold air is near the soil and warm air is on the plateau plain.

1.d. Underground waters. Surface waters network has only brook with permanent flow, the Darjov. Some secondary tributary waters shatter the arable field from Brias, their flows fluctuate as follows: they are high at the beginning of spring and extremely low during the rest of the year. The valleys are quite deep.

Anyway, the underground waters are located at high depth (more than 10 m on the plateau plain and between 0,5-1,5 m in Darjov meadow).

The soils. For Brias S.A., soil cover was described strictly from

landed evaluation point of view. Mollisoils are not present in Brebeni area. In this territory, reddish-brown soils appear, with 2 subtypes and 3 variants, and occupy 485 hectares as surface (9,7%). As subtypes we have: typical reddish-brown soils (58 hectares), pseudogleyied reddish-brown (301 hectares) and eroded reddish-brown (126 hectares), located in Darjov valley.

All subtypes have loess deposits as parental material, with loamy-clay texture. They are favorable for agriculture because of their proper chemical features; however, the physical features of these soils can be a problem from land fertility point of view: we refer to low permeability and aeration porosity and an increased bulk density, which create problems in agrary exploitation. Because of the humidity excess, it is hard to find the right moment in starting the tillage (cultivation of soil).

Forest brown soils occupy a 2,5 larger surface than reddish-brown (1157 hectares, aprox.23,2%). These soils are divided in three subtypes: typical forest brown soils, pseudogleyied forest brown soils and vertic forest brown soils. The typical forest brown soils are the spreadest, occupying 421 hectares. The pseudogleyied subtype represents only 170 hectares as surface.

The vertic subtype (formed an expansive clay) occupy 476 hectares (VII-VIII soil unity). The chemical features of forest brown soils aren't much more different than reddish-brown's (satisfactory humus reserve, neuter pH, moderate content in macroelements etc.(. the psychical features, in exchange, create problems)we refer to fine texture which requires same restriction in agrary exploitation; that's why an aeration porosity improvement is necessary, as well as applying organic fertilizers on amendments.

Vertisoils. They are the spreadest soils from Brias S.A. (60,9%). There are three subtypes of vertisoils: typical vertisoils, chromic vertisoils and pseudogleyied vertisoils. The surfaces occupied by these soils are: 2060 hectares for typical vertisoils, 175 hectares for chromic vertisoils and 600 hectares for pseudogleyied vertisoils. Vertisoils are affected by erosion on some surfaces in Mierlesti farm (about 236 hectares).

On the map, find vertisoils on IX-XIII position. Soil profile presents a superior dark horizon (10 YR 2/1), Amy, 15-20 thickness. On the profile, we also identify an ABy transition horizon, 15-20 cm thickness; this horizon represents the link between Amy and the next horizon, By; this one has 80-100 cm thickness and a marked brown color (10 YR 3/2). The last horizon, C, represents the parental material, appears under 140 cm depth and has a 10 YR 3/3 value, according to Munsell Table.

Clay content varies between 48-50%. The content in humus is moderate (3,4-3,8%) and decreases on the profile, under 1%. Total nitrogen is between 0,172% in the arable layer and 0,065% in the profile inferior layer.

Mobile phosphorus is about 5-7 mg and the accessible potassium between 20-25 mg in Ap horizon and 15 mg in the inferior layer. Degree of base saturation is 80-85% and soil pH is low acid.

The physical features require some special measures on these soils, as follows: deep loosening, manure and mineral fertilizers applying, cereal crops and deep drainage.

Vertisoils have a special feature, the mulching , which consists in natural remaking of structure for this king of soils.

The agrary land from Brias also has some Planosols and colluvial soils surfaces. The planosols are located in Coteana farm (XIV unity), occupying 274 hectares as surface, while colluvial soils are located at Lupa, occupying only 56 hectares.

Planosols belong to Argillic soils class, being considered as difficult soils , same reddish-brown soils or vertisoils. The textural contrast appears between Ap horizons and the horizons below, on 7-8 cm portion. Because of expansive clay presence, they present an increased adhesive capacity.

The improvement measures are similar with those for vertisoils.

Land evaluation

Land evaluation represents a synthesis of all observations regarding soils cover, their features and genesis factors. The results consist in obtaining of correct information about soil, as the principal mean of production in agriculture and profit.

Land evaluation was made for each farm and for each plat, as part of that farm. The marks were calculated only for natural condition of soils.

Evaluation classes go from First class (the best) to Ten class (the worst), between 100-0 points. There are 10 points per class, in the classic system and 20 points per class, in present-day classification system.

The marks were given for each farm, considering soil suitability for a number of 12 agrary cultures and separate, for arable land. By addition, the medium mark was obtained for arable land at Brias.

About the main agrary cultures, some observation can be done: wheat has 57 as evaluation mark (V class land); Coteana farm belongs to V-th class of evaluation, as well; Zorleasca farm is estimated to 63 points, white Mierlesti belongs to VI-th class of evaluation.

For maize, Brebeni fields have a lower potential (50 points) and demonstrate the idea according to which vertisoils are more proper for cereals. Zorleasca and Lupa farms belong to V-th class of evaluation, Coteana belong to VI-th and Mierlesti belong to VII-th class.

CONCLUSIONS

For other cultures, the evaluation is presented in the tables, where evaluation marks and farm wean is written.

Another type of land evaluation consisted in separation of the surfaces in evaluation classes, for these 2 crops. Wheat, for instance, has 3755 hectares (73,9%) of IV—th class. Some VIII-th class fields (199 hectares, 4,7%) are located at Coteana farm (164 ha), at Mierlesti (18 ha) and at Lupa (17 ha).

Maize has 3298 hectares (67,7%) of V -th class, 950 hectares (19,1%) of IV-th class and 247 hectares of VI-th class.

For arable fields, total calculation for the society indicates V-th class fields.

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Tables

Table 1. Feasibility natural land use on farms of "BRIAS" S.A.

Component TEOs and surfaces		GR	OR	PB	SO	FlS	Iu	If	SfZ	CN	CT	Lu	TR	A
		Crops												
		Feasability natural use grades												
Coteana farm														
Surface „ha"	**TEO**													
277,0	7	58	58	54	56	60	61	38	51	49	43	54	49	56
164,0	8	30	22	15	9	16	21	0	6	0	1	16	18	20
523,0	9	62	63	58	46	63	62	29	43	36	42	46	48	59
91,0	11	62	63	58	46	63	62	29	43	36	42	46	48	59
64,0	11	62	63	58	46	63	62	29	43	36	42	46	48	59
247,0	14	48	44	41	40	44	52	35	41	37	34	38	35	44
Farm surface 1366 ha Farm average		**57**	**52**	**47**	**41**	**52**	**54**	**27**	**38**	**32**	**34**	**41**	**41**	**50**
Zorleasca farm														
Surface „ha"	**TEO**													
58,0	1	65	57	63	66	68	69	51	61	65	55	64	58	64
214,0	2	65	57	63	66	68	69	51	61	65	55	64	58	64
118,0	3	57	56	51	53	55	64	46	48	52	41	52	45	53
421,0	4	68	69	70	72	73	71	60	68	68	62	67	64	71
170,0	5	61	62	62	60	67	66	45	59	56	51	56	55	61
90,0	6	60	59	56	58	61	63	44	54	51	47	54	50	58
95,0	9	62	63	58	46	63	62	29	43	36	42	46	48	59
-	12	62	63	58	46	63	62	29	43	36	42	46	48	59
Farm surface 1166 ha Farm average		**63**	**61**	**60**	**58**	**65**	**66**	**45**	**55**	**54**	**49**	**56**	**53**	**61**

Mierleşti farm Surface „ha” TEO													
Component TEOs and surfaces	**Crops**												
	GR	**OR**	**PB**	**SO**	**FlS**	**Iu**	**If**	**SfZ**	**CN**	**CT**	**Lu**	**TR**	**A**
	Feasability natural use grades												
18,0 8	30	22	15	9	16	21	0	6	0	1	16	18	20
990,0 9	62	63	58	46	63	62	29	43	36	42	46	48	59
236,0 13	45	41	35	31	39	37	15	0	0	18	30	25	37
Farm surface 1244 ha Farm average	**46**	**42**	**36**	**29**	**39**	**40**	**15**	**16**	**12**	**20**	**31**	**30**	**39**
Lupa farm Surface „ha” TEO													
- 1	65	57	63	66	68	69	51	61	65	55	64	58	64
87,0 2	65	57	63	66	68	69	51	61	65	55	64	58	64
8,0 3	57	56	51	53	55	64	46	48	52	41	52	45	53
17,0 8	30	22	15	9	16	21	0	6	0	1	16	18	20
452,0 9	62	63	58	46	63	62	29	43	36	42	46	48	59
175,0 10	62	63	58	46	63	62	29	43	36	42	46	48	59
415,0 12	62	63	58	46	63	62	29	43	36	42	46	48	59
56,0 15	74	75	73	70	76	77	64	70	63	76	68	70	73
Farm surface 1210 ha Farm average	**60**	**57**	**55**	**50**	**59**	**61**	**37**	**47**	**44**	**43**	**50**	**49**	**56**
TOTAL SURFACE „BIRAS” S.A. 4986 ha													
Average grades for natural land use per total „BRIAS”	57	53	50	45	54	55	31	39	36	37	45	43	52

Table 2. Surfaces of land evaluation class of wheat crop on „BRIAS" S.A.

ha

Farm	**Land evaluation classes**				
	III	**IV**	**V**	**VI**	**VIII**
Coteana		678,0	277,0	247,0	164,0
Zorleasca		958,0	208,0		
Mierleşti		990,0		236,0	18,0
Lupa	56,0	1129,0	8,0		17,0
TOTAL „BRIAS"	56,0	3755,0	493,0	483,0	199,0
4986,0 ha	1,7%	73,9%	9,9%	9,8%	4,7%

Table 3. Synthetic table of land evaluation class of maize crop on "BRIAS" S.A.

Farm	**Land evaluation classes**					
	III	**IV**	**V**	**VI**	**VII**	**IX**
Coteana			955,0	247,0		164,0
Zorleasca		863,0	303,0			
Mierleşti			990,0		236,0	18,0
Lupa	56,0	87,0	1050,0			17,0
TOTAL „BRIAS"	56,0	950,0	3298,0	247,0	236,0	199,0
4986,0 ha	1,1%	19,1%	67,7%	4,3%	4,1%	3,7%

Table 4. S.C. “BRIAS” S.A. – Soil resources map and ecologically homogenous territory
Legend

I	Rhodic luvisols with loamy texture in A horizon/ caly loamy texture on control section
II	Rhodic stagnic luvisols with loamy texture in A horizon/ clay loamy texture on control section
III	Eroded (e_2) rhodic luvisols with loamy texture in A horizon/ clay loamy texture on control section
IV	Hoplic luvisols with clay loamy texture in A horizon/ clay loamy texture on control section
V	Stagnic luvisols with clay loamy texture in A horizon/ clay loamy texture on control section
VI	Eroded (e_2) hoplic luvisols with clay loamy texture in A horizon/ clay loamy texture on control section
VII	Vertic luvisols with caly loamy texture in A horizon/ fine texture on control section
VIII	Eroded (e_2) vertic luvisols with caly loamy texture in A horizon/ fine texture on control section
IX	Pellic Vertisols
X	Chromic Vertisols
XI	Stagni-pellic-vertisols (W_2)
XII	Stagni-pellic-vertisols (W_3)
XIII	Eroded vertisols
XIV	Vertic stagni-planosols
XV	Fluvisols

Figures

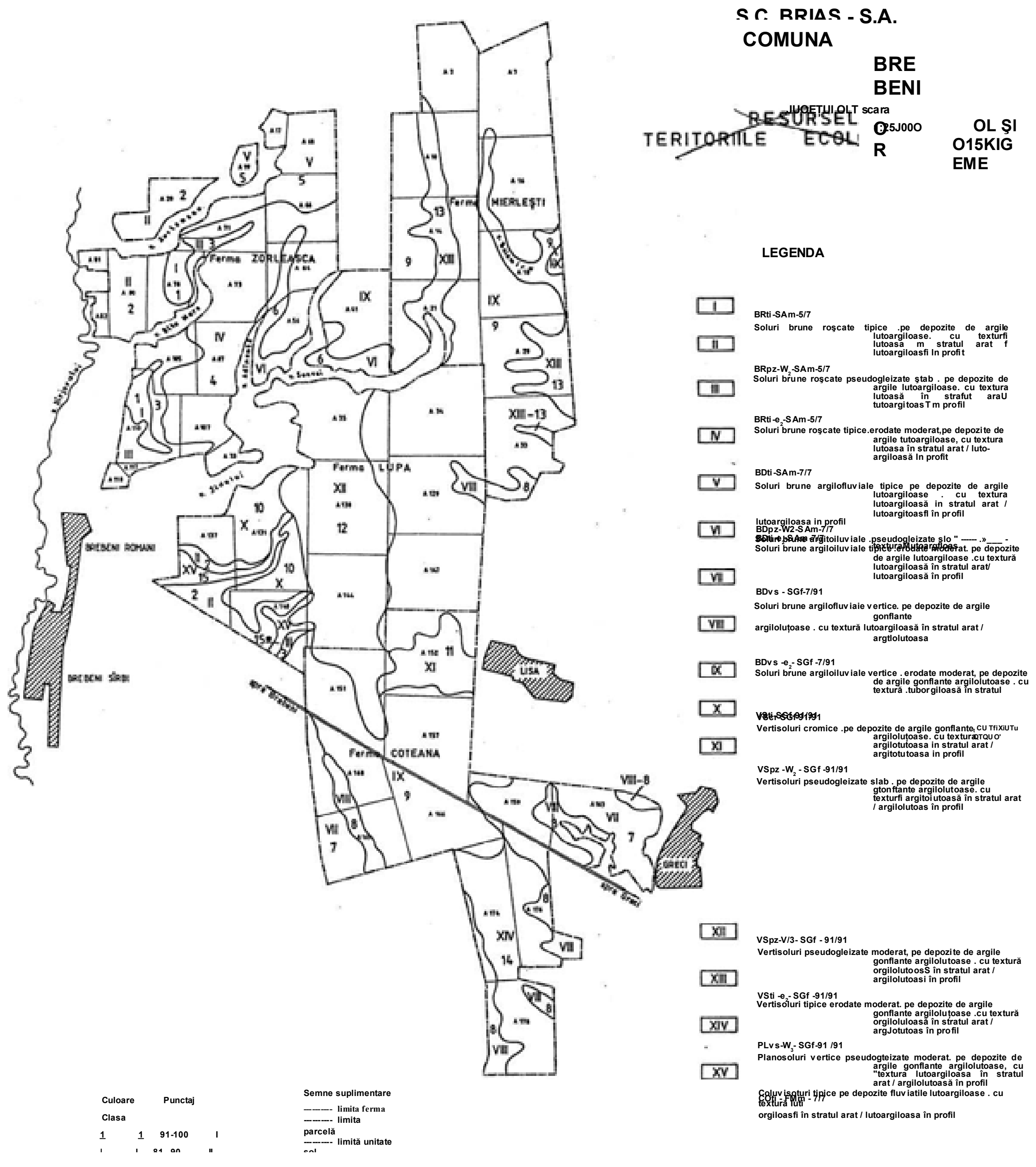

Fig. 1. Resources of soils map

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THE NECESSITY OF KNOWING LANDED RESOURCES FROM S.C. "REDIAS" S.A., OLT COUNTY, FOR LEASING AND GRANTING

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Keywords: resources of soils, pedogenesis, phreatic level depth

ABSTRACT

The making of studies regarding fields agroproductive capacity has become a current practice in today Romania's economy; this can be easily explained with two arguments: property form and land value.

S.C. "Redias" S.A. is organised in 3 units which belong to communal terirories Redea, Dobrosloveni, Falcoiu.

Geographically, the region is a part of Romanati Plain, a subunit of Oltenia Plain. Soil cover is largely occupied by Chernozems (cambic chernozems, especially); small surfaces are represented by red-brownish soils and alluvial soils. Evaluation coefficients for 12 agrary cultures and 2 agrary using belong to 4th Class and 5th Class for most cultures; some cultures have superior coefficients (2nd and 3rd Class).

Agroeconomically, the value of Redea land is, according to calculation, 56 million lei/hectare, over the local market, but lower than European area.

INTRODUCTION

The making of studies regarding fields agroproductive capacity has become a current practice in today Romania's economy: this can be easily explained with two arguments: property form and land value.

It is necessary, both for the specialists and for the agrary fields owners to have a correct information, because landed market is based on numerous transactions; sometimes, these transactions take place without a real information about soil potential or its value.

MATERIALS AND METHODS

In pedological research domain, the only domain able to offer reliable information about soil resources and land evaluation, many societies appear, having deceitful specialistswho harmed the commercial societies and agrary associations.

Our presence at some of the agrary units in Olt county has represented an ample action, initiated by Agrary and Development Direction, in order to appreciate the soil resources and their agroproductive capacity, for a better leasing and granting activity.

The former State Agrary Enterprise (SAE) "Redea" (S.C. "Redea" S.A.) is organized in 3 units who belong to communal territories Redea, Dobrosloveni and Falcoiu.

The total surface is 6285 hectares, hectares who are integrated to Stoenesti-Visina irrigation system, only partly in function.

Geographically, the whole region is a part of Romanati Plain, a subunit of the western border of Redea unit representing the conventional border between Olt and Dolj counties.

RESULTS AND DISCUSSIONS

The region is near some important thoroughfares, such as: Caracal-Craiova and Caracal-Corabia railway, the roads of same route and the county roads Caracal-Rotunda, Caracal-Celaru and Caracal-Dobrosloveni.

The present study was based on published pedological materials which were reinterpreted, in order to have an actual information, and on soil charting. The graphic presentation is at 1/25000 scale. The uniform ecologic territories (UET) consist of important parameters, like: pH, humus reserve, soil texture, porosity, slope, temperature, rainfalls, phreatic level depth etc. A number of 22 UET-es were identified; these UET-es belong to 12 soil units.

In the following, the natural conditions of pedogenesis and the land evaluation will be presented.

<u>Natural environment where soils genesis took place</u>

<u>Lithology</u>. The soils were born and evaluated on loess deposits, which were laid down at once with Romanian Plain exudation. The loess deposits played an important role in zone soil genesis (cambic and argic chernozems), as well as in accumulation of organic matter; this is explained by the loess mushy structure, which generates an increased capacity for water and air absorbtion.

There are places where argillic processes appear and the loess is gone; in these places we talk about fine texture and, of course, another type of soil (the cambic cherozems became ….). it seems that argillic process is an ample process for Redea region, since the argic chernozems are prevailing.

As we go to the Danube side, on Studena and Corabia fields, the parental material is exclusively represented by loess.

<u>Microrelief</u>. The agrary land from Redea is nothing else than a large terrace plain, covered by loess deposits. There are some insignificant slopes (2-12%), where vallies like Fantanii, Frasinet, Soare cross this unit. The inclined parts represent the place where soil erosion appears.

The pedological uniformity is a consequence of a little diverse microrelief existence.

<u>Climate</u>. There is steppe climate at Redea, a climate which can be characterized by the absence of a “coagulated” vegetal carpet. The cause: the substitution of natural vegetation with agrary cultures. Another climate characteristic is represented by the temperature stress and frequent climatic accidents. The annual temperatures mean is 11^0C (the maximum mean in July and the minimum mean in January).

Though, there are some microclimatic elements which make the difference in the area, having a bad influence on agrary cultures.

The rainfalls annual mean is 550-600 mm, with a uniform repartition, similar for the whole Romanian Plain, in fact. The higher level is during May-June, because afterwards a deficitary period begins.

The irrigations (through Stoenesti-Visina system) were a necessity for many years, considering theh way climate elements are presenting.

<u>Hydrology and hydrogeology</u>. Surface network is represented by some dry valleys with western-eastern flow. In their river beds, water accumulates only when high flow is registered; in such a moment, overflows are produced, with bad consequences for the agrary crops.

Hydrogeologically, the water activity seems reduced, because phreatic waters depth is more than 10 m on the plane field. However, there are parts of the territory where the level is 3-5 m (wet phreatic regime) or parts where brooks have a phreatic level between 1,5-2 m and humidity excess appear. The situation is similar for some bowls, near by.

Soils. When environment factors are mentioned, the soil cover can not be forgotten because: one, the soil represents the main geo-ecological cover, and, two, the soil is the main support for the agricultural production. These two argumens can be easily completed with new elements, in order to better understand the research or the applicative problems.

Regarding "Redias", soils cover was strictly studied from production capacity, physical and chemical features contribution and restrictions to fertility point of view.

According to pedological classification, the first soils from Redea are cambic chernozems (cc). they occupy a 75 hectares surface (approx. 1,3%) and consists of 2 subtypes (cambic chernozems CC_{cu} and wet phreatic cambic chernozems CC_{mp}) and 3 territory units. The difference between subtypes was based on texture and the nature of parental material. The wet phreatic subtype appears on humidity excess areas (water between 3-5 m). the subtype formed on clay presents a loamy-clay texture, both in A_p and soil profile.

Although the cambic chernozems aren't largely extended at "Redias", they are important because of their high fertility. The humus horizon is over 40 cm and the humus reserve, according to standards).

The blackish dark color (10 YR 2/2) proves that an increased organic matter is accumulated, which prolongs till transition horizon (A/B_V) and even to B_V horizon level.

An active fauna assures a permanent exchange of organic matter between superior and inferior horizons, which make the soil appear like a thermodynamic entity; the consequence: an increased biomass accumulation and high humus reserve. The chemical features of Redias soils are: low-acid-neutre pH (6,4-7,3), a moderate content in nitrogen (0,180-0,250%), medium-good soil content in P and K; the microelements relate to momentary fertility.

Regarding the physical features, only aeration porosity AP (%) and K (mm/h) are exclusively related to soil texture. Where the texture is clayey, the soil pores are very fine and the aeration goes difficult, as well as water permeability (under 6 mm/h). the deterioration of physical state for cambic chernozems, especially of A_P horizon (where hardpan appears), require agrary and pedological improvement measures, such as deep mellowing and soil scarifying.

Argic Cernozems. They are part of the same Mollisoils Class and occupy the largest surface of the Redias unity: 5716 hectares, 97% respectively. There are 3 subtypes of argic chernozems: typical argic chernozems, wet phreatic argic chernozems and low gleyed argic chernozems. Each one of these subtypes has its very own features, such as humus reserve, the texture, phreatic water depth and pH. Three areas of eroded chernozems were also identified in the territory, having a 276 hectares surface (UET 12-20).

The decisive role for this chategory of soil genesis went for the rock. The B_t horizon, with an excedent of clay (43-46%) is characteristic for chernozems. Where low or moderate ersion acted, the texture is loamy or sandy in the superior part.

Some of the physical and chemical features are similar to cambic chernozems (pH, nitrogen content etc). other features like aeration porosity or permeability are different because of grain size distribution. Porosity is medium-low (10-20%) and permeability low and very low (0,5-0,6 mm/h). these factors create problems for irrigation or soil drainage.

For these soils, the pedological improvement measures are necessary in order to create better aeration conditions; they are made once at 3-4 years (the work is made using plough or soil mellowing machine – SMM – at 40-50 cm depth).

Eroded subtype of argic chernozems is characteristic for those soils which present a decreased humus horizon; these soils appear on 2-5%, 5-8% or 8-12% inclined surfaces. As improvement measure, the antierosion technology is preferred, as well as fertilizers applying, in order to "recreate" the organic matter.

Other type of soils occupy insignificant surface at “Redea”; we mention only a few, such as reddish-brown soils (56 hectares; 0,8%) and alluvial soils (58 hectares; 0,9%); alluvial soils appear only on Dobrosloveni unit.

Agroeconomical land evaluation. The appreciation of soil production capacity represented the synthesis of this present study. Because of geological uniformity, the territory units are the UET-es at “Redea”.

As a result of land evaluation activity, complex information about soils were obtained; all these information were necessary for establishing the most adequate way in using the economical and technical means, in order to have a quality production.

Land evaluation was made for each farm and for each plot. All data was obtained only for soils natural condition. The improvement measures weren’t taken in consideration this time, because they would have modified the real information regarding natural soil potential. So, the base for profitable crops remains the soil natural condition.

Evaluation classes in the classic system are I-X between 100-0 points; in today’s system, there are five classes, I-V 20 points/class.

For a number of 12 cultures and 2agrary using (grazing fields and hayfields), the evaluation marks belong to 4th Class, for most of the crops. As an exception, we can mention some 5th Class UET-es (between 51-60 points). In the attached tables, the evaluation marks are presented for each farm, for a large number of crops and for wheat and maize, in a special situation.

The agroeconomical evaluation made for natural condition, took in consideration evaluation marks and economic data, such as: production costs (almost 85% of the profit), the price for wheat in 2004 and the product/evaluation point equivalent, in kg, according to L 18/1991; for calculation, the period in which a person works in agriculture (25 years) was also important.

The calculation base was wheat evaluation mark and product/evaluation point equivalent (40 kg/point, in this case). Using a specific calculation, a 15 million lei profit was obtained. According to calculation, the product costs were about 12,5 million lei/hectares, which leads to a 2241000 million lei profit/hectare. The value of field for 1 arable hectare is 56 million lei.

CONCLUSIONS

The price we established according to calculation, overtakes a few times the value of land transactions in the area. The situation is due to real value of field unknowing (the field is, however, subevaluated compared to European market).

The transition to “heavy leu” and to European currency (EURO) will require the methodology revising, which means to offer, for the evaluation point, the proper value in EURO or US dollar. This will be the moment when we shall really talk about a proper and correct agroeconomical land evaluation.

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<u>Tables</u>

Table 1.A. Land evaluation class – on farms and fields within crop rotation, „Redias" S.A. - Olt county. Wheat

Sole no.	Farm corresp to sole	Sole surface - ha -	Land evaluation calss 41 -50		51 - 60		61 - 70		71 - 80		81 - 90		91 – 100	
			Surfaces within the soles											
			ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
1.	Redea	406	-	-	-	-	42	10	232	57	132	33	-	-
2.	Redea	430	-	-	30	7	-	-	310	71	98	22	-	-
3.	Redea	438	-	-	-	-	-	-	200	46	238	54	-	-
4.	Redea	344	-	-	-	-	-	-	-	-	344	100	-	-
5.	Redea	250	-	-	-	-	-	-	106	42	144	58	-	-
6.	Redea	344	-	-	-	-	-	-	69	20	275	80	-	-
7.	Redea	468	-	-	-	-	-	-	34	7	434	93	-	-
8.	Redea	388	-	-	-	-	-	-	32	8	356	92	-	-
9.	Redea	406	-	-	-	-	-	-	32	8	374	92	-	-
10.	Redea	406	-	-	-	-	-	-	-	-	406	100	-	-
11.	Redea	338	-	-	-	-	-	-	62	18	276	82	-	-
12.	Redea	375	-	-	-	-	34	9	304	81	37	10	-	-
13.	Redea	419	-	-	-	-	34	8	340	81	45	11	-	-
14.	Dobrosloveni	430	-	-	-	-	101	23	329	77	-	-	-	-
15.	Dobrosloveni	455	12	3	62	14	55	12	326	71	-	-	-	-
16.	Chili	380	-	-	-	-	80	21	300	79	-	-	-	-

Table 1.B. Maize

Sole no.	Farm corresp to sole	Sole surface - ha -	Land evaluation calss 31-40		41-50		51-60		61-70		71-80		81-90	
			Surfaces within the soles											
			ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
1.	Redea	406	-	-	-	-	42	10	110	27	122	30	132	33
2.	Redea	438	-	-	30	7	-	-	-	-	392	89	16	4
3.	Redea	438	-	-	-	-	-	-	-	-	438	100	-	-
4.	Redea	344	-	-	-	-	-	-	-	-	344	100	-	-
5.	Redea	250	-	-	-	-	-	-	-	-	247	99	3	1
6.	Redea	344	-	-	-	-	-	-	-	-	63	18	281	82
7.	Redea	468	-	-	-	-	-	-	-	-	17	4	451	96
8.	Redea	388	-	-	-	-	-	-	-	-	32	8	356	92
9.	Redea	406	-	-	-	-	-	-	-	-	32	8	374	92
10.	Redea	406	-	-	-	-	-	-	-	-	-	-	406	100
11.	Redea	338	-	-	-	-	-	-	62	18	-	-	276	82
12.	Redea	375	-	-	-	-	34	9	231	62	73	19	37	10
13.	Redea	419	-	-	-	-	34	8	45	11	295	70	45	11
14.	Dobrosloveni	430	-	-	-	-	-	-	101	23	329	17	-	-
15.	Dobrosloveni	455	12	3	-	-	95	21	22	5	312	68	14	3
16.	Chili	380	-	-	-	-	80	21	110	29	190	50	-	-

Table 2. Ecologically homogenous territory and natural soil evaluation on principales crops

Surface ha	%	No. TEO	GR	OR	PB	SO	Fl.S	IN U.	IN F.	CN	Sf.Z	CT	LU	TR	A	Pş	Soil type - subtype
71,0	1,3	1	84	83	87	89	85	87	71	84	86	78	93	78	85	65	CCcu
4,0		2	85	85	88	90	87	88	72	86	87	79	94	79	87	65	CCcu-fru
582,0	97,0	3	72	76	72	75	73	77	62	69	73	66	71	68	72	60	CIti
1119,0		4	72	76	72	75	73	77	62	69	73	66	71	68	72	60	CIti
448,0		5	72	72	66	67	68	72	57	64	65	58	65	62	68	54	CIti
27,0		6	79	74	76	76	72	76	62	72	74	66	80	71	76	56	CIti
2180,0		7	88	92	88	90	89	93	78	85	89	85	79	84	88	76	CIfru
14,0		8	88	79	83	84	78	82	68	78	83	75	87	78	81	63	CIfru
122,0		9	79	78	82	83	77	81	67	77	82	74	86	77	80	62	CIfru
64,0		10	80	75	77	77	72	77	63	73	75	67	82	72	77	57	CIfru
904,0		11	83	87	80	72	84	85	58	78	83	67	70	78	81	70	Cigzs
32,0		12	66	67	60	64	64	66	49	55	61	54	61	55	63	50	CItil1
78,0		13	66	67	60	64	64	66	49	55	61	54	61	55	63	50	CItil1
16,0		14	52	51	44	47	43	54	36	36	37	34	47	46	46	48	CItil1
14,0		15	52	51	44	47	43	54	36	36	37	34	47	46	46	48	CItil1
45,0		16	67	68	61	65	65	67	50	56	62	55	62	56	64	51	CItil1
33,0		17	64	65	56	63	58	65	46	50	51	48	60	55	59	50	CItil1
22,0		18	67	68	61	65	65	67	50	56	62	55	62	56	64	51	CItil1
4,0		19	59	60	52	56	54	57	41	46	49	43	53	47	58	47	CItil2
12,0		20	49	48	39	44	68	49	31	31	30	26	44	43	42	45	CItil2
56,0	0,8	21	63	62	62	60	63	67	49	57	54	46	59	53	61	51	BRmo
58,0	0,9	22	56	57	54	51	60	56	43	48	49	49	58	51	55	38	SAti
Unity average			**83**		**81**		**83**								**77**		

Table 3. Soils surfaces on „Redias" S.A.-Olt county

Soil		Surface		Total on soil type level	
Type	**Subtype**	**Ha**	**%**	**Ha**	**%**
CC	cu	71,0	1,0	75,0	1,3
CC	fru	4,0	0,04		
CI	ti – $^5/_7$	1701,0	30,0	5716,0	97,0
CI	ti – $^7/_7$	475,0	8,0		
CI	fru - $^5/_5$	2316,0	40,5		
CI	fru -$^7/_7$	64,0	0,9		
CI	gzs	904,0	14,0		
CI	ti – e_1 – $^3/_5$	140,0	2,0		
CI	ti - e_1 – $^5/_7$	100,0	1,4		
CI	ti – e_2 – $^5/_5$	16,0	0,2		
BR	ti	56,0	0,8	56,0	0,8
SA	ti	58,0	0,9	58,0	0,9

CC – cambic chernozem
CI – argiloilluvial chernozem
BR – brown redish soil
SA – alluvial soil
cu – cumulic
fru – phreatic humid
gzs – weak gleyied
ti – typical
e_1 – weak eroded
e_2 – moderate eroded
5 – clayed textured
7 – clayed-argillic textured

Table 4. S.C. „REDIAS" S.A. – soil resource map and ecologically homogenous territory

Legend

I	Cumulic cambic chernozem with loamy texture in A horizon/ loamy texture on control section
II	Cumulic chernozem with ground water supply and loamy texture in A horizon/ loamy texture on control section
III	Typic phaeozem with loamy texture in A horizon/ clay loam texture on control section
IV	Typic phaeozem with caly loam texture in A horizon/ loamy texture on control section
V	Typic phaeozem with ground water supply, loamy texture in A horizon/ loamy texture on control section
VI	Typic phaeozem with ground water supply, clay loam texture in A horizon/ clay loam texture on control section
VII	Gleyic phaeozem with loamy texture in A horizon/ loamy texture on control section
VIII	Eroded typic phaeozem (e_1) with loamy texture in A horizon/ loamy texture on control section
IX	Eroded typic phaeozem with loamy texture in A horizon/ clay loam texture on control section
X	Eroded typic phaeozem (e_2) with loamy texture in A horizon/ loamy texture on control section
XI	Rhodic luvisols with clay loamy texture in A horizon/ clayloamy texture on control section
XII	Dystric fluvisols with texture in A horizon/ fine texture on control section

Figures

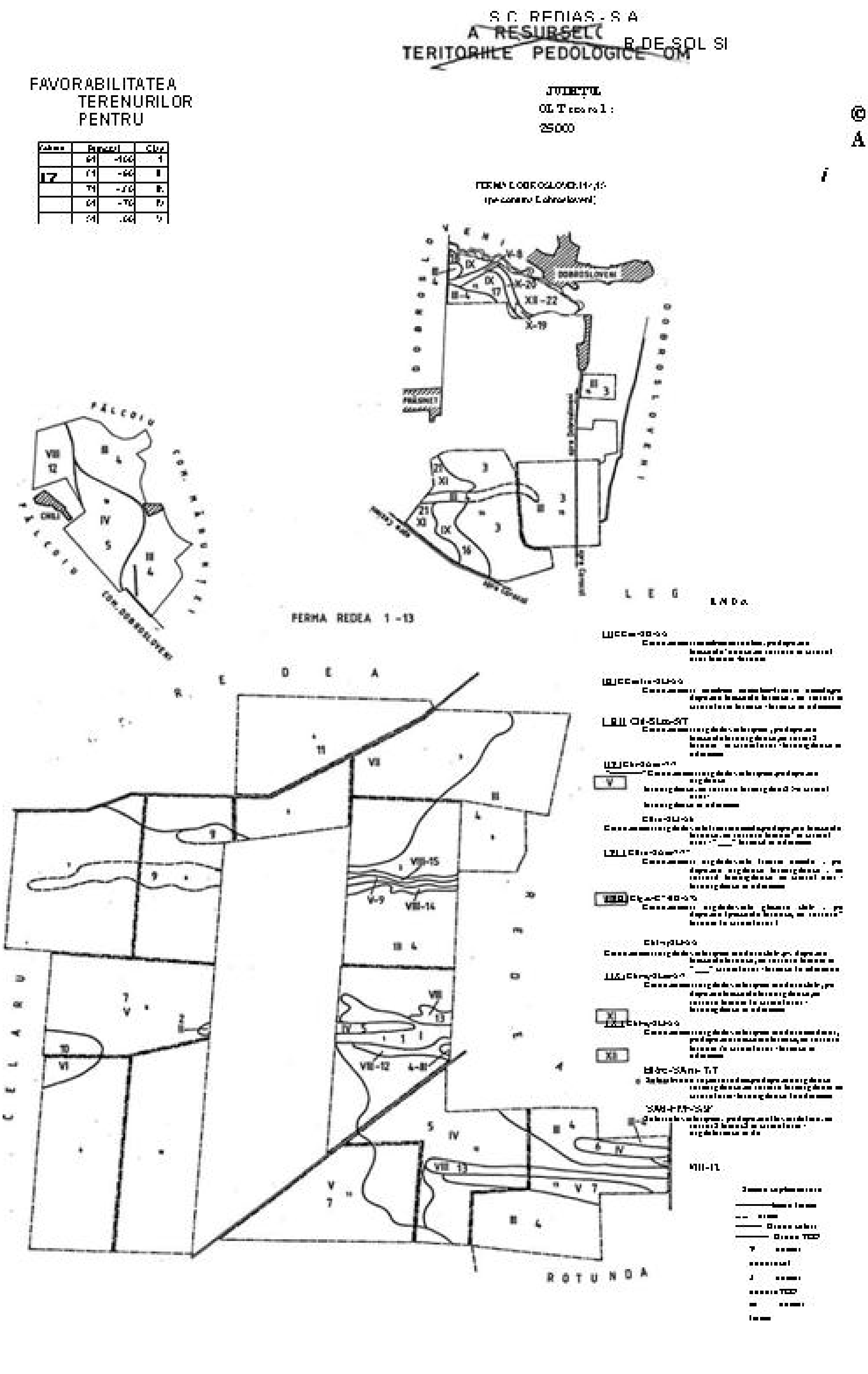

Fig. 1. Resources of soils map

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BRIEF CHARACTERIZATION ABOUT ROMANIA'S LAWNS FAVORABILITY

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Keywords: fields' favorability, bioclimatic floor, production capacity

ABSTRACT

The lawns in Romania occupy 4 467 000 ha surface, which is represented by 3 044 000 grazing fields hectares and 1 423 000 hayfields hectares. The lawns are largely extended in Romania, where they can reach 2500 m heigh. The favourability of this land category was established using land evaluation system, according to pedoclimatic districts; big scale pedological classification materials were used, as well.

The most extended lawns surfaces belong to 4th and 7th Class of favourability (between 31-50 points). Large surfaces are occupied by lawns belonging to 8th and 9th Class (between 11-30 points), located in Romania's north area, in Cernei and Mehedinti Mountains, in Poiana Rusca and Sureanu Mountains.

Last class of land evaluation, the 10th, has a very decreased favourability, lawns being located in high montaneous areas (Retezat, Parang, Rodnei Mountains). Regarding lawns capacity production, the average productivity was estimated at 2 tones dry substance/hectare, in mountains area, and 5 tones dry substance/hectare in mountaneous depressions.

INTRODUCTION

The lawns in Romania occupy 4467000 ha surface, which is represented by 3044000 grazing field hectares and 1423000 hayfields hectares. From this total surface, 1860000 hectares are permanent lawns (grazing fields and hayfields) in the mountain area, where mountain depressions are included. However, the lawns are largely extended from the sea level until 2500 m height, in different conditions (relief, soil, climate, hydrology).

They always occupy surfaces affected by different restrictive factors, which make them unprosper as arable fields. The influence of different stationary conditions on lawns vegetation is expressed through different evaluation classes and evaluation marks.

MATERIALS AND METHODS

Based upon the most important studies regarding lawns, the "Fields favorability for lawns Map" was drawn out, as well as "the Romania's geobotanical Map", more recently (1999 – St. Taina), both at 1/500000 scale.

The fields favorability for lawns was established through land evaluation, according to pedoclimatic districts and using 1/10000 classification materials, in the same time. The evaluation marks were calculated for grazing fields and for hayfields separately, and the final evaluation mark resulted from the arithmetical mean of the two marks.

RESULTS AND DISCUSSIONS

According to research, most surfaces belong to VI-VII Classes of favorability (between 31-50 points). Geographically, these lawns are located in Brasov Depression, in Rosia Mare Depression, in Semenic Mountains, western piedmonts, Beius and Ciuceni Depressions. From the counties repartition point of view, the lawns are mostly extended in Brasov (44%), in Maramures(42%), followed by Bihor (39%) and Harghita (36%).

These fields present moderate restrictions for lawns, due to sites inclination (12-18%) or low annual medium temperatures (4-6^{0}C) in mountain areas' sometimes, the restriction can be caused by acid pH or soil clayey texture, which provoke humidity excess on piedmont soils or depression soils.

Considerable surfaces are occupied by fields which belong to VIII-IX Classes of favorability (between 11-30 points); these fields are totally unfavorable for lawns and are largely extended in Metaliferi and Trascau Mountains, in Maramures Mountains, in Obcinele Bucovinene, in Cernei and Mehedinti Mountains, as well as Poiana Rusca and Sureanu Mountains. These fields represent 39% in Alba county, 31% in Maramuresi county, 33% in Suceava, 27% in Caras Severin and 29% in Hunedoara. For these fields, the restrictive factors are high slopes (18-25%), low temperatures (2-4^{0}C) and decreased loose volume of soil in mountain areas. this kind of fields appear, as well, in other parts of Romania, such as: the sides affected by erosion process or landslips in Tarnave Tableland, Moldova's subcarpathians, Getic piedmont, high inclined sides of plain valleys or plane fields where excess of humidity soils appear.

In high mountainous area, 10th Class fields are spread (0-10 points); they present a very low favorability for lawns; we refer to Retezat, Parang, Harghita, Ciucului, Gilau and Rodnei Mountains, which represent 31% of lawn surfaces in Hunedoara, 23% in Harghita, 28% in Cluj, 32% in Bistrita-Nasaud and 32% in Alba county. For these surfaces, the restrictive factors are: very low annual medium temperatures (under 2^{0}C), decreased loose volume of soil and soils high acidity. Locally, 10h Class of favorability fields also appear where salt or humidity excess soils are spread (Western Plain, Danube Delta, Calmatui Valley, Ialomita Valley etc).

Romania also has good favorability fields for lawns; these fields belong to 4-5 Classes of favorability (between 51-70 points) and are little extended: Targu Secuiesc Depression, Candesti platform, Almas Depression and Brasov Depression; these lawns represent 23% in Arad county total lawns, 20% in Brasov county total lawns, 27% in Covasna county, 27% in Dambovita county, 41% in Salaj and 24% in Valcea. These fields present insignificant restrictions for lawns; restrictions refer to sides inclination (under 12%) or some soil features like texture, pH, humus reserve etc.

The best fields for lawns – in terms of favorability – are 1-3 Class fields (between 71-100 points); they occupy small surfaces in Timis county (5000 ha), Argess county (4000 ha), Brasov (4000 ha), Satu Mare (4000 ha), Arad (3000 ha) and Covasna (3000 ha).

Regarding lawns productive capacity, the average productivity was 2 tones dry substance/hectare in mountain area and 5 tones dry substance/ha in mountain depressions. Hay nutritive value is decreased: 15000 u.n./ha in mountain area and 4000 u.n./ha in depressions.

The climate is one of the most restrictive factors because 200000 ha of pastoral "treasure" appear at over 1500 height, where air medium temperatures are decreased, under cereals biological threshold (Anghel, 1984).

An important component for lawns ecosystems is represented by soil, in a tight connection to lawns phytocenosis. Soil – the soil solution, more exactly – is the main factor in creating the phytocenosis system unity with the biotope (Alexandra Vasu, 1984).

Just by knowing soil features, the fields favorability and improvement measures can be established, in order to increase lawns productive capacity.

To each bioclimatic floor (agroecosystem in fact) corresponds a certain group of type of lawns and a certain soil association; the favorability and production capacity depend on these features.

According to Turca and colab., the following type of lawns were identified for mountain area: 1) ***Agrostis Tennuis* – *Festuca rubra*** lawns (900-1000 m height; soils are: grey browny, podzolic soils and albic luvisol; average production: 2-6 tones dry substance/hectare; good nutritive value); 2) ***Agrostis Tennuis* – *Nardus stricta*** lawns (until 1200 m, where beeches appear; the soils are: acid brown soils and eumesocambic soils; average production: 1-3 tones/hectare; decreased nutritive value because of Nordus stricta presence); 3) ***Festuca rubra commutate* – *Deschampia plexuosa*** lawns (they appear at 1600-1800 m height; the soils are: acid brown soils in association with podzolic soils; these lawns have a very decreased productivity: 0,5-0,8 tones/hectare and do not have nutritive value; because of the bioclimatic floor, it is hard to apply improvement measures); 4) ***Festuca ovina, subsp. Sudetica*** lawns (they are located at 1800-2000 m height; the soils are: podzols, podzolic brown soils, alpine meadow soils and lithosols; the productivity is decreased: 0,4-0,5 tones dry substance/hectare; low nutritive value, improper for improvement works because of their low efficiency); 5) ***Carex curvula* – *Juncus trifidus*** lawns (they are located in the alpine climatic floor, over 2000 m height; the soils are alpine meadow and lithosols; extreme low nutritive value and very decreased productivity).

CONCLUSIONS

The results show that the following characterization about Romania's lawns favorability. The fields present moderate restrictions for lawns. Considerable surfaces are occupied by fields which belong to 8-9 Classes of favorability (between 11-30 points). The best fields for lawns are 1-2 Class, located in Timis county, Arges county.

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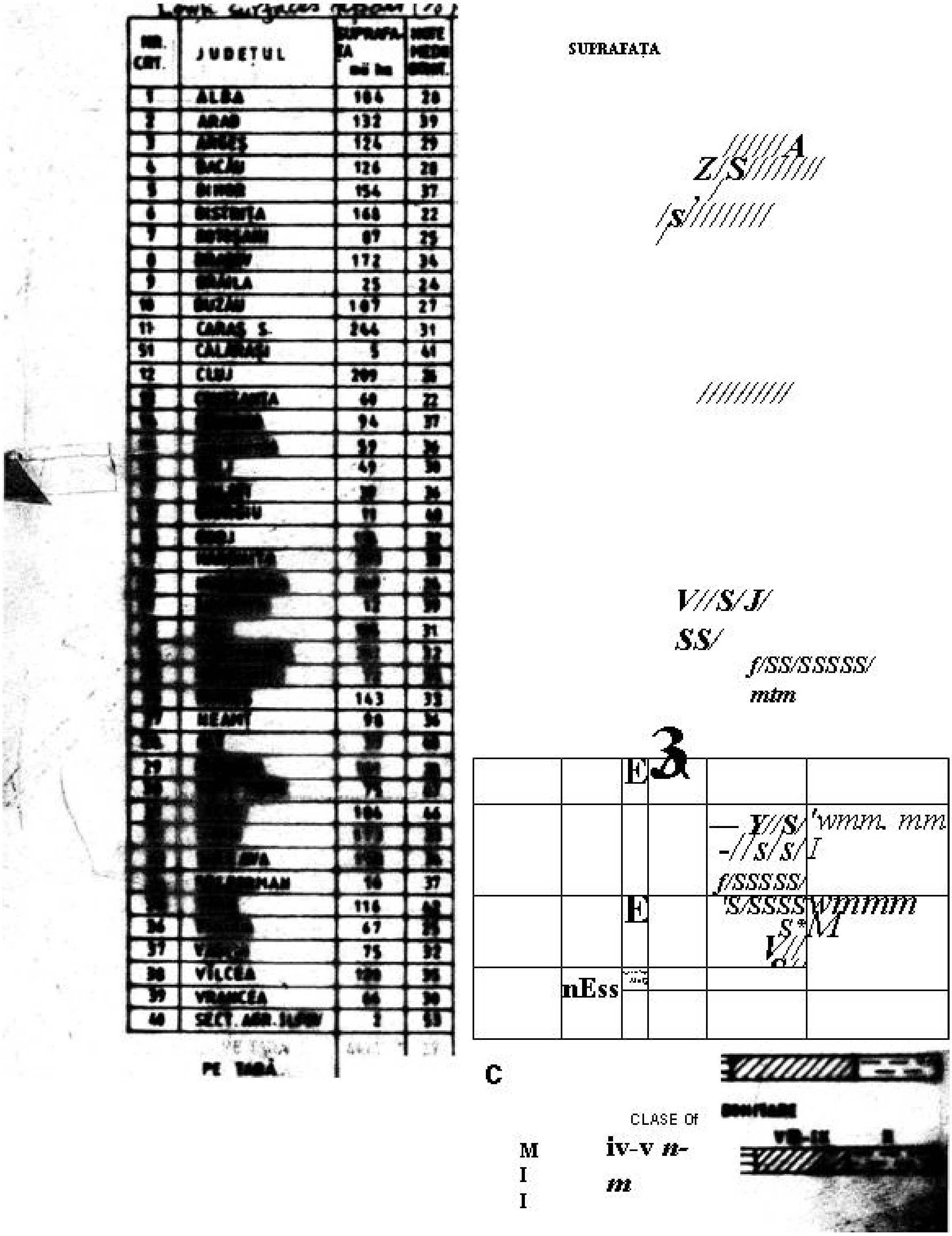
Figures



Lawn surfaces repair (%)

NR. CRT.	JUDEȚUL	SUPRAFAȚA mii ha	NOTE MEDII BONIT.
1	ALBA	186	28
2	ARAD	132	39
3	ARGEȘ	124	29
4	BACĂU	126	28
5	BIHOR	154	37
6	BISTRIȚA	168	22
7	BOTOȘANI	67	25
8	BRAȘOV	172	34
9	BRĂILA	25	24
10	BUZĂU	107	27
11	CARAȘ S.	244	31
51	CALĂRAȘI	5	41
12	CLUJ	209	[illegible]
[illegible]	[illegible]	60	22
[illegible]	[illegible]	94	37
[illegible]	[illegible]	59	36
[illegible]	[illegible]	49	30
[illegible]	[illegible]	38	36
[illegible]	[illegible]	11	40
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	36
[illegible]	[illegible]	[illegible]	30
[illegible]	[illegible]	[illegible]	31
[illegible]	[illegible]	[illegible]	32
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	143	33
[illegible]	NEAMȚ	98	34
[illegible]	[illegible]	[illegible]	[illegible]
29	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	106	46
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	35
[illegible]	[illegible]	56	37
[illegible]	[illegible]	116	[illegible]
36	[illegible]	67	25
37	[illegible]	75	32
38	VÎLCEA	[illegible]	35
39	VRANCEA	66	30
40	SECT. AGR. ILFOV	2	53

Fig. 1. Lawn surfaces repair (%) in Romania country

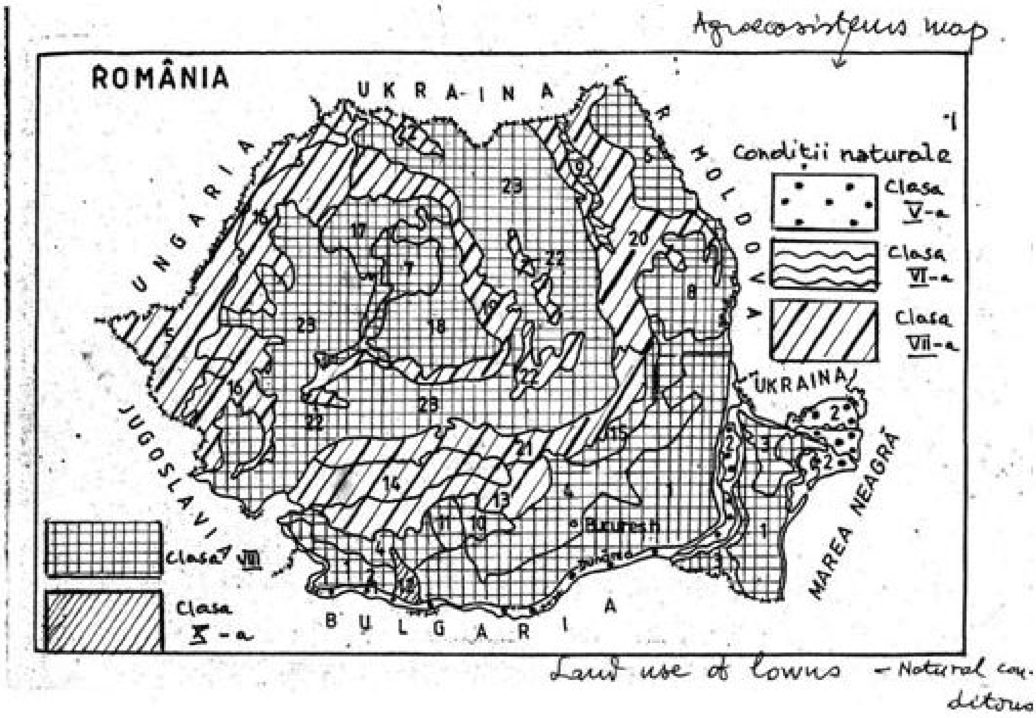


Fig. 2. Agroecosystems map; land use of lawns

EVALINFO 1.1

aplicatia conceptului de CARTE INTELIGENTA

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CARTEA INTELIGENTA

- carte pe suport magnetic
- beneficiaza de avantajele mijloacelor multimedia
- gandita sa interactioneze cu utilizatorul

SCOPUL NOSTRU

- Sa atragem atentia asupra **potentialului extraordinar** pe care il ofera domeniul cartilor inteligente in procesul de instruire.

- Sa oferim experienta noastra concretizata in programul **Evalinfo 1.1**

APLICATIA EVALINFO

- Este o aplicatie a conceptului de “carte inteligenta”
- S-a ales domeniul de “Evaluare a proprietatilor imobiliare” si s-a creat baza de date specifica.
- Poate fi folosita cu eficienta in procesul de instruire

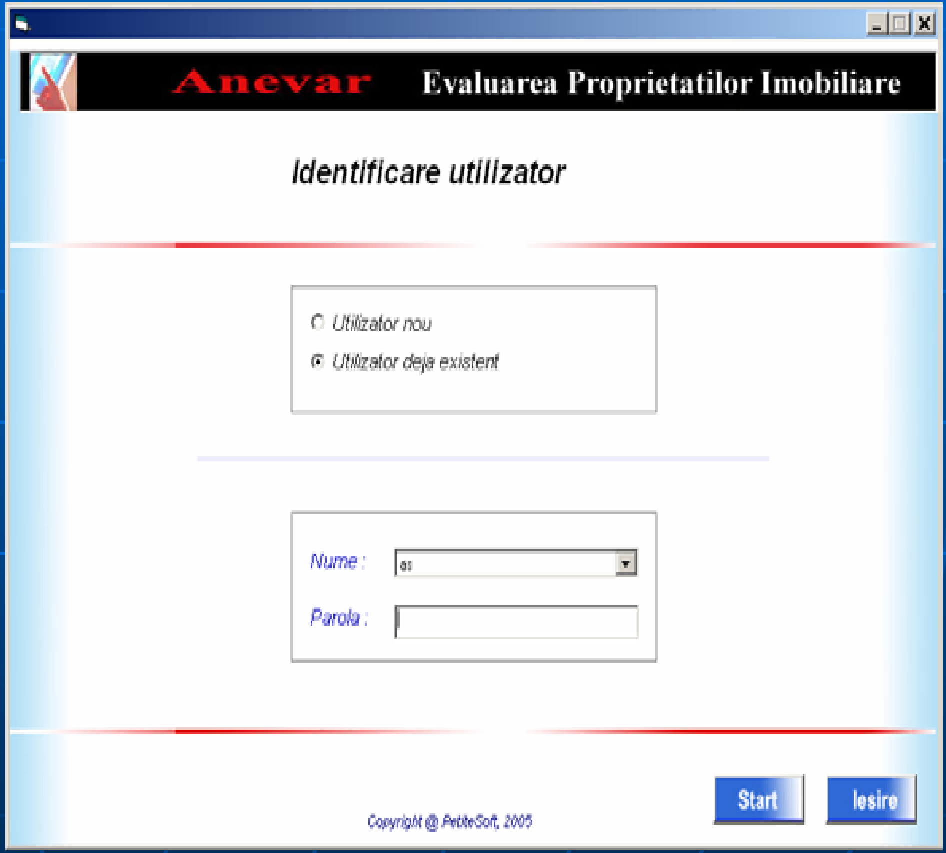
PREZENTARE APLICATIE

- Studentul poate parcurge cursul (aici prezentat in format pdf la apasarea butonului 'Curs')

- Dupa parcurgerea teoriei din curs, studentul isi fixeaza cunostintele folosind testele construite pe baza informatiilor din curs, apeland butonul 'Instruire prin Teste'

INSCRIEREA STUDENTULUI LA TEST

Studentul parcurge testele identificandu-se cu nume si parola, care se vor inregistra in baza de date.

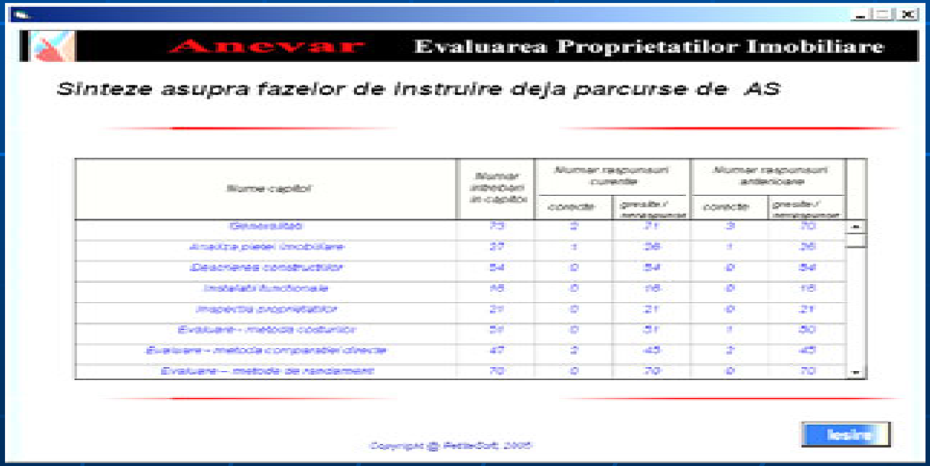


ALEGERE TEST

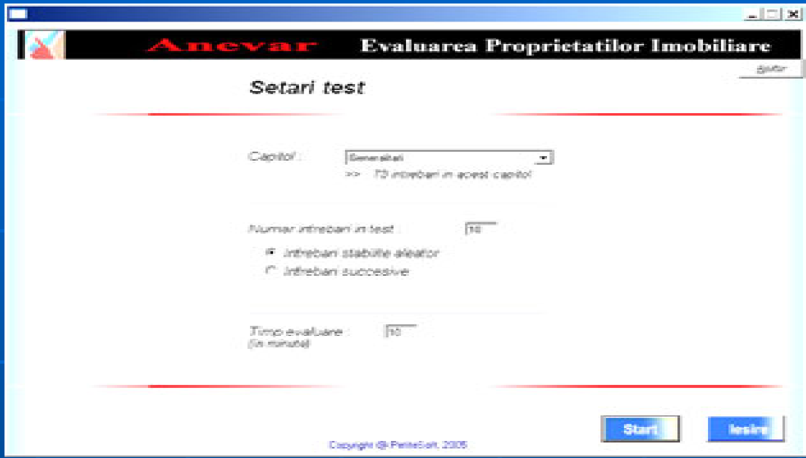
Cartea cuprinde un numar de teste construite prin trei metode:

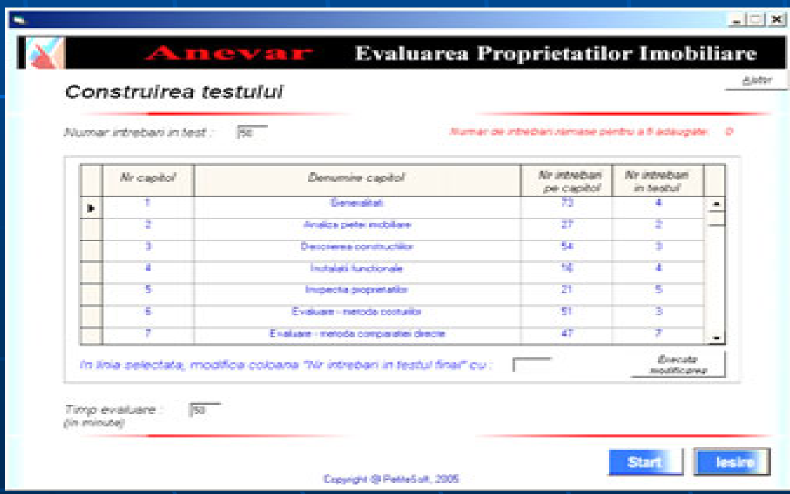
1. Teste alese dintr-un capitol, la care verificarea raspunsurilor se face la finalul testului
2. Teste alese dintr-un capitol, la care verificarea este imediata
3. Simulare examen, adica un test complet din mai multe capitole

Dupa parcurgerea testelor se poate vizualiza 'Sineza rezultatelor' pentru a se constata evolutia studentului in procesul de instruire



SETARI TEST

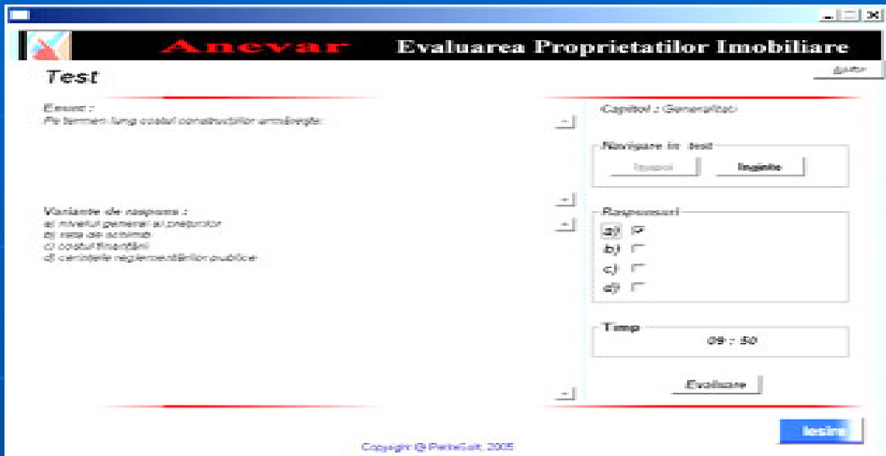


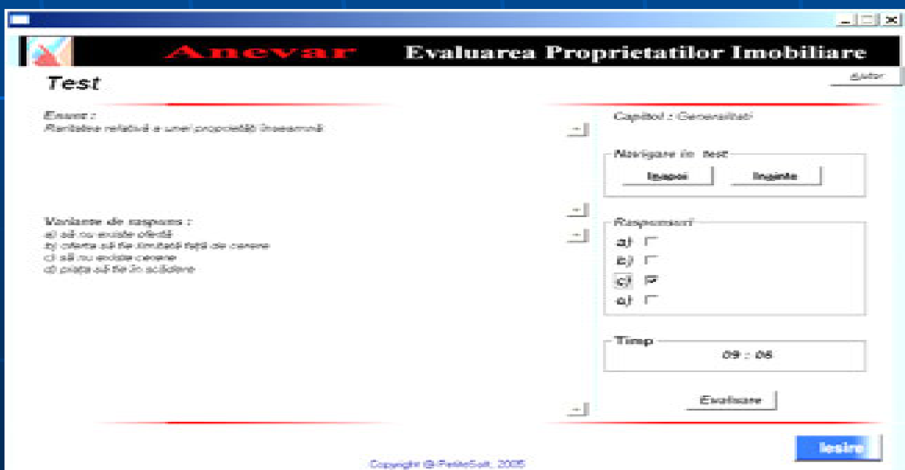


- La fiecare test se stabileste capitolul din care se aleg intrebarile, modul de selectare a intrebarilor (‘aleator’ dupa ceasul sistemului de calcul sau ‘succesiv’ conform cu introducerea lor in baza de date) si timpul de raspuns

- Simularea examenului-construirea testului final se face plecand de la un numar implicit de 50 intrebari, care se distribuie pe capitole; ecranul afiseaza mesaje prin care este asistata aceasta actiune.

RASPUNSURILE LA TEST

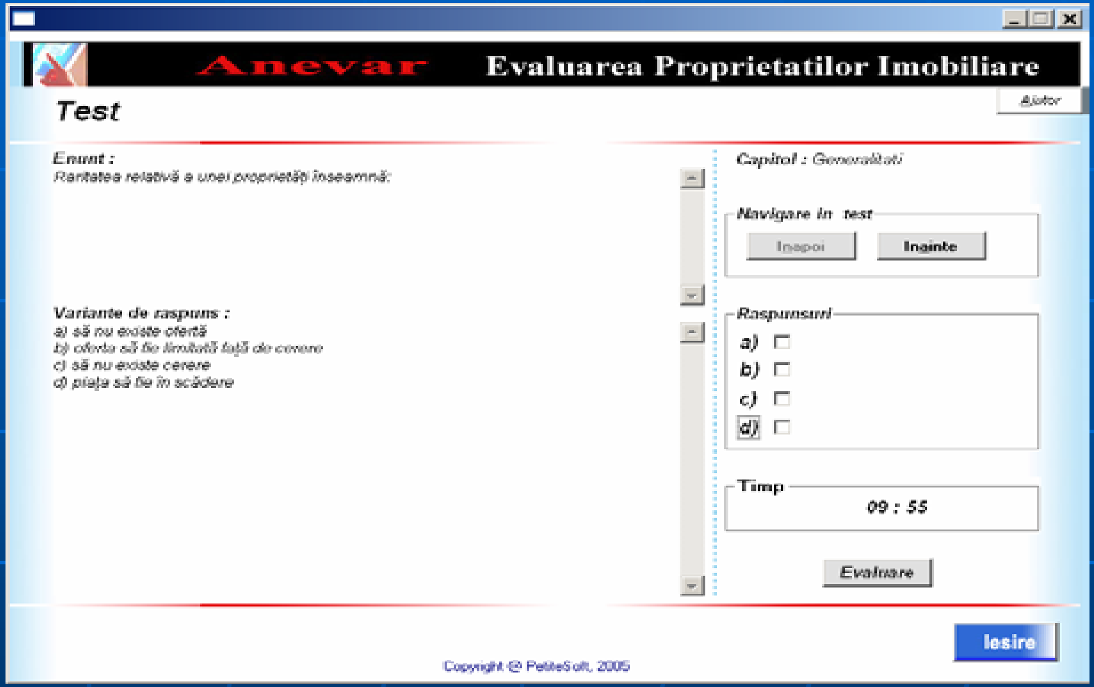




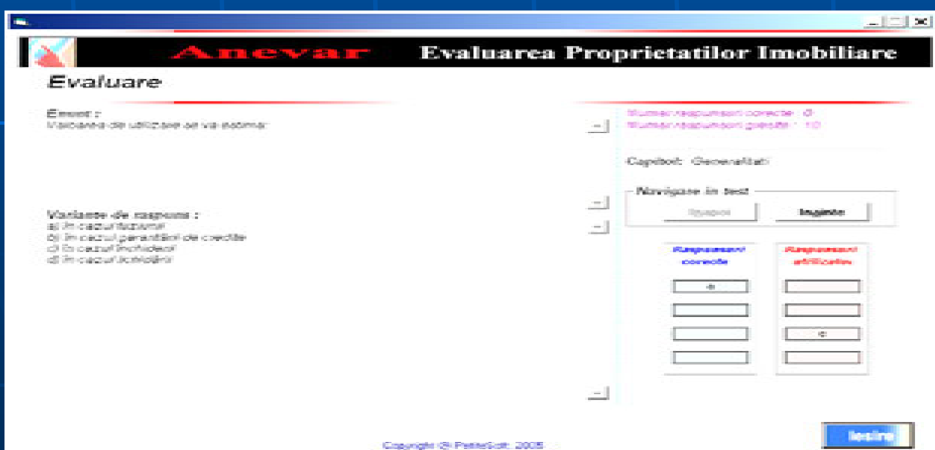
- Sunt afisate: enuntul intrebarii si variantele de raspuns (0,1,…)
- Studentul da raspunsurile prin bifarea in casetele "checkbox"
- Timpul de raspuns se cronometreaza
- Actionand butoanele 'Inainte' si 'Inapoi' se poate reveni la orice intrebare din test
- La final se face evaluarea

EVALUAREA TESTULUI

Evaluarea se face apeland butonul "EVALUARE"



EVALUARAREA TESTULUI



- Se afisaza numarul de raspunsuri corecte, numarul de raspunsuri gresite si apoi fiecare intrebare cu raspunsul dat de student si raspunsul corect
- Pentru a vedea fiecare raspuns se apeleaza butoanele ‘Inainte’ si ‘Inapoi’
- Se detaliaza raspunsurile corecte (dreptunghiurile colorate albastru) si cele ale studentului (dreptunghiurile colorate rosu) pentru fiecare intrebare din test

EDITARE DE TESTE

- Posibilitatea de a crea un test selectand anumite intrebari sau selectand aleatoriu intrebarile din diferite capitole

- Posibilitatea de a seta :
  - ponderea fiecarei intrebari la punctajul total
  - ponderea fiecarui capitol din lucrare in evaluarea finala
  - timpul de evaluare

- Posibilitatea de a printa testul pe hartie
  - astfel incat el sa constituie proba juridica a examinarii

- Posibilitatea de a printa grile si de a le evalua

EDITARE DE TESTE

- Utilitate :
  - Cadrelor didactice, permitand elaborarea de teste individualizate
  - Firmelor care doresc sa testeze cunostintele viitorilor angajati
  - Firmelor care supravegheaza pregatirea profesionala prin examene de prelungire a licentei (aeronautica, energetica nucleara, consultanta, evaluare)
  - Autoevaluare: simulare examen pentru studenti
  - Antrenament pentru profesii diverse

EDITARE DE TESTE

- Flexibilitatea bazei de date – se pot introduce:
  - Alte tipuri de teste
  - Imagini
  - Grafice
  - Probleme

INVITATIE

- Editura INVEL MULTIMEDIA realizeaza pentru dumneavoastra cursuri universitare in format ‘CARTE INTELIGENTTA’ utilizand programul EVALINFO

VA MULTUMIM

PENTRU ATENTIE!

Un an fără academicianul David DAVIDESCU

Doamnelor şi domnilor,

Astăzi se împlineşte un an de la trecerea în nefiinţă a academicianului David DAVIDESCU, părintele agrochimiei româneşti. Un an fără sfaturile şi îndrumările sale preţioase. Ne obişnuisem ca la intervale de câţiva ani, sau chiar mai des să avem pe masa de lucru o nouă carte semnată de Domnia sa. Astfel de evenimente nu vor mai fi, dar pentru cele care au fost, profesorul a lăsat o operă ştiinţifică temeinică, care va mai servi mult timp drept pildă pentru urmaşi.

Domnul academician David DAVIDESCU a fost unul din corifeii ştiinţelor agricole româneşti. A pus bazele şi a dezvoltat agrochimia ca ştiinţă de sine stătătoare, în rândul celorlalte discipline din învăţământul agricol românesc.

Anul 1956 este un an de reper în ştiinţa agricolă românească, deoarece atunci a apărut primul tratat românesc de agrochimie, conceput şi scris de profesorul David DAVIDESCU, pe 896 de pagini.

Tratatul de agrochimie prezintă aspectele fundamentale ale noii ştiinţe din ţara noastră. Autorul a conturat legităţile agrochimiei, a pus bazele agrochimice ale fertilizării în raport cu cerinţele plantelor şi cu factorii climatici. Îngrăşămintele chimice sunt prezentate detaliat, atât din punct de vedere al însuşirilor chimice, al modului de fabricare, cât şi din punct de vedere agrochimic, al modului de administrare, al efectului asupra solului, plantelor şi a formării recoltei.

Agrochimia scrisă de profesorul David DAVIDESCU se baza pe cunoştiinţele dobândite, la acea dată, în ştiinţa solului, cu precădere în chimia solului, în nutriţia plantelor şi în folosirea îngrăşămintelor în agricultură, rezultate obţinute în ţări cu tradiţie în domeniu cum erau Rusia, Germania, Franţa, Anglia, S.U.A. Dar nu a uitat să evidenţieze rezultatele specialiştilor români printre care se numără profesorul Theodor Seidel, cel care rămâne în ştiinţă, în special, pentru introducerea metodei potenţiometrice la măsurarea pH-ului. La acest nume, am mai putea adăuga pe cel al dr. Pavlovski, care s-a remarcat prin elaborarea a numeroase metode fizico-chimice de analiză a solului şi a altor produse agricole şi prin studiile referitoare la adsorbţia şi desorbţia în soluri.

Tratatul scris de profesorul David DAVIDESCU a avut un ecou deosebit în epocă, fiind elogiat în sesiunea din februarie 1957, a Institutului de Cercetări Agricole al României, de însuşi directorul general de atunci al celui mai mare for de cercetare agricolă din ţară (astăzi Academia de Ştiinţe Agricole şi Silvice), şi totodată preşedintele Academiei Române, nimeni altul decât academicianul Traian SĂVULESCU.

Tratatul de agrochimie a consitutit şi constituie baza cursurilor de agrochimie care s-au ţinut la toate universităţile cu profil agricol, din ţară. De-a lungul anilor el a fost completat cu noi informaţii ştiinţifice obţinute în ţară şi în străinătate, apărând ediţii revizuite în anii 1963, 1969 şi 1980.

În anul 1982, profesorul David DAVIDESCU publică în limba engleză „Evaluation of fertility, by plant and soil analysis”, la Editura Abacuss Press în colaborare cu Editura Academiei Române.

În continuare, în anul 1991, publică în colaborare cu doamna prof. dr. Velicica DAVIDESCU, „Agrochimia Modernă”, o lucrare care aduce noi elemente agrochimice, punând accent pe aspectele de nutriție şi pe fenomenele legate de acestea.

Şirul lucrărilor cu titlu de „Agrochimie” se încheie în anul 1992 cu „Agrochimia horticolă”, o lucrare care este dedicată, în special, aplicării îngrăşămintelor la plantele horticole.

Începând cu anul 1972, academicianul David DAVIDESCU, publică la Editura Academiei Române, un ciclu de lucrări în seria „Chimizarea agriculturii”, în care sunt prezentate pe larg: ”Testarea stării de fertilitate prin plantă şi sol” (1972), „Fosforul în agricultură” (1974), „Azotul în agricultură” (1976), „Potasiul în agricultură” (1979), „Sulful, calciu şi magneziul” (1984), „Microelementele în agricultură” (1988) şi „Protecția chimică în agricultură” (1992). La redactarea acestor cărți şi-a asigurat colaborarea celor mai proeminente personalități ale agrochimiei, din țara noastră. Toate aceste lucrări reprezintă sinteze de o importanță deosebită teoretică şi practică pentru domeniul agrochimiei.

Academicianul David DAVIDESCU a pus la dispoziția celor care lucrează sau vin în contact cu agrochimia, două lucrări de mare utilitate practică „Agenda agrochimică” (1978) şi „Compendium agrochimic” (1999). Ambele lucrări prezintă elemente de chimie analitică adaptată problemelor de analiză a materialelor provenite din agricultură. Capitole speciale prezintă chimia şi agrochimia solului, a plantei, a îngrăşămintelor, a pesticidelor, a fitohormonilor, a substanțelor stimulatoare, a apei de irigație şi a poluării mediului agricol.

Profundele cunoştințe din domeniul ştiințelor biologice şi agricole l-au ajutat pe domnul profesor David DAVIDESCU să aducă contribuții semnificative la progresul agrochimiei prin enunțarea unor legi precum: „Legea ierarhizării factorilor de vegetație”; „Legea autoreglării biologice, a creşterii şi dezvoltării plantelor agricole”. De asemenea, a elaborat „indicele agrochimic al stării potențiale de fertilitate a solului”, „indicele agrochimic de pretabilitate a solului pentru cultura legumelor şi pentru plantațiile de pomi şi viță de vie”.

A elaborat formulele pentru calculul dozelor de îngrăşăminte pe baza indicilor agrochimici, a potențialului genetic şi a factorilor de mediu. Aceste formule au fost stabilite pentru întreaga gamă de plante cultivate, de la plantele de câmp, la pomi, viță de vie, legume sau flori.

În anul 2002, a apărut la Editura Ceres, sub redacția domnului academician David DAVIDESCU şi a doamnei prof. dr. Velicica DAVIDESCU, importanta lucrarea „Secolul XX, performanțe în agricultură”. O pleiadă de colaboratori, din cei mai avizați în domeniul ştiințelor agricole, au prezentat pe 1170 de pagini, realizările din toate domeniile ştiințelor agricole româneşti şi din învățământul agricol.

Opera ştiințifică publicată, a academicianului David DAVIDESCU cuprinde peste 400 de titluri, formate din lucrări ştiințifice, tratate şi monografii, broşuri de popularizare şi îndrumare tehnică. În total peste 20.000 pagini tipărite.

Realizările profesionale de excepție ale profesorului au fost recunoscute atât în țară, cât şi în străinătate. A fost ales membru corespondent al Academiei Române, în anul 1963, iar în anul 1990 a devenit membru titular. În cadrul Academiei Române a fost preşedinte al Secției de Agricultură şi Silvicultură. O dată cu organizarea Academiei de Ştiințe Agricole şi Silvice (1969) a devenit membru titular al acesteia.

În țară a fost distins cu premii, ordine şi medalii: Premiul „Gh. Doja” al Academiei RPR (1957), Premiul Ministerului Învățământului (1959, 1962), Ordinul Muncii clasa a II^{a} (1964), Ordinul Meritul Ştiințific clasa a II^{a} (1966). De asemenea, în anul 1995, i s-a acordat titlul de „Doctor honoris causa” al Universității de Ştiințe

Agricole şi Medicină Veterinară din Cluj – Napoca, iar în anul 2000 Ordinul Național pentru Merit în grad de Mare Cruce.

În străinătate a fost ales membru al Academiei de Ştiințe din New York (1965), membru al Academiei italiene dlle Vite e del Vino (1967), membru al Academiei de Ştiințe Agricole şi Silvice „V. I. Lenin" din Moscova (1970). A ținut prelegeri pe teme agrochimice la Universitatea liberă din Bruxelles (1964, 1966), la Facultatea de Agronomie din Geissen (1971, 1979, 1985), la Universitatea Santa Monica din Brazilia (1973). A făcut parte din colectivul de redacție al revistei „Agrochimica" (Pisa – Italia).

La cele de mai sus se adaugă participarea la aporape 50 de manifestări ştiințifice internaționale şi la foarte multe manifestări ştiințifice interne.

Din străinătate a primit: Medalia „Cosimo Ridolfi a Universității din Pisa (1965), Medalia Universității libere din Bruxelles (1966).

Ca profesor a contribuit la formarea a peste 3000 de ingineri şi a 60 de doctori în ştiințe agricole.

În paralel cu activitatea ştiințifică şi didactică, academicianul David DAVIDESCU a desfăşurat o intensă muncă de conducere administrativă în: învățământul superior, ca decan (1951 – 1954), prorector (1956 – 1959), rector (1959 – 1962), în Ministerul Agriculturii ca secretar de stat şi ministru adjunct (1959 – 1962), respectiv (1962 – 1969), în Ministerul Învățământului (1959 – 1971) ca preşedinte al Comisiei de Agricultură şi Silvicultură pentru atestarea titlurilor, diplomelor şi certificatelor universitare (1992 – 1998) şi în cadrul Academiei Române, ca preşedinte al secției de Ştiințe Agricole şi Silvice (1990 – 1998).

Pretutindeni pe unde a activat domnul academician David DAVIDESCU a lăsat brazde adânci. Sub conducerea sa, s-a revizuit rețeaua şcolară de învățământ agricol preuniversitar, înființându-se noi şcoli profesionale, de maiştri, licee agricole, silvice şi de industrie alimentară. Şcolile au fost dotate cu o foarte bună bază materială, pentru învățământul teoretic şi practic. S-au editat manuale şi cărți de specialitate atât pentru învățământul organizat în şcoli, cât şi pentru învățământul agrozootehnic de masă. Tot prin stăruința profesorului David DAVIDESCU au fost trimişi la specializare, în străinătate, tineri din cercetarea agricolă şi din producție.

Prin tot ce a făcut pe linie profesională şi şcolară, academicianul David DAVIDESCU rămâne o figură marcantă a ştiințelor agricole româneşti din a două jumătate a secolului XX şi de la începutul secolului XXI. El rămâne în memoria noastră ca om model. A obținut satisfacții profesionale, nu doar prin inteligența excepțională, ci mai ales prin eforturi şi dăruire totală profesiei îmbrățişate, pe care a slujit-o până în ultima clipă a vieții.

A fost un om ferm, exigent cu sine însuşi, dar şi cu cei din apropierea sa. Şi aceste trăsături de caracter au contribuit la realizările profesionale de excepție.

A ajutat dezinteresat, în spiritul dreptății, pe cei care apelau la dânsul. Omul David DAVIDESCU a fost o personalitate complexă. La prima vedere prestanța sa, care impunea respect, părea să te țină la distanță. Era numai o aparență. În realitate era un om corect judecător al meritelor fiecăruia.

Echilibrul interior, construit şi pe armonie în viața de familie, la care a contribuit, din plin, soția sa doamna profesoară Velicica DAVIDESCU, colaboratoare apropiată, a constituit un alt pilon de susținere a unei cariere profesionale fără cusur.

Doamnelor şi domnilor,

Rândurile de mai sus reprezintă o mărturie a felului cum l-am văzut noi, cei mai mult sau mai puţin apropiaţi. Însă felul cum ne-a văzut dânsul este concis prezentat în confesiunile de la sfârşitul volumului „Secolul XX. Performanţe în agricultură" şi care merită să fie ştiute. Citez:

„În îndelungata mea activitate didactică, ştiinţifică, în administraţia de stat şi în cele ale scrisului în domeniul specialităţii mele, am avut ocazia să cunosc mulţi oameni, cu funcţii mai mari sau mai mici. La mulţi am apreciat inteligenţa, puterea de muncă, talentul, caracterul adevărat, corectitudinea şi un comportament moral desăvârşit. În acelaşi timp, mi s-a oferit ocazia să cunosc şi versatilitatea caracterelor, ipocrizia, perfidia, dubla personalitate a unora, virtuţile şi slăbiciunile altora.

Întotdeauna am avut încredere în semenii mei şi în sinceritatea acestora, motiv pentru care le-am acordat întreaga mea apreciere. Am avut ocazia să suprind pe faţa unora admiraţia, iar pe faţa altora admiraţia unită cu invidia.

Pe mulţi i-am socotit prieteni, pentru ca, mai târziu, să constat că, de fapt, aveau alte sentimente.

Viaţa mi-a arătat că de multe ori, în relaţiile cu oamenii am greşit şi ar fi trebuit să analizez mai adânc atunci când am acordat încredere unor colegi, care cred că vor recunoaşte printre rânduri portretul celor care au fraternizat cu dubla personalitate şi ipocrizia.

Memorând trecutul, desprindem, prin contemplaţie, drumul ce trebuie urmat de fiecare în viitor." Am încheiat citatul.

Doamnelor şi domnilor,

Întreaga confesiune, dar mai ales ultima frază reprezintă un adevăr de netăgăduit.

Prof. dr. Radu LĂCĂTUŞU
Membru titular al Academiei de Ştiinţe Agricole şi Silvice