Scientific Papers, Series B, Horticulture, Vol. LVI, 2012
ISSN Online 2286-1580, ISSN-L 2285-5653

ESTABLISHMENT OF A TECHNOLOGY IN THE NONCONVENTIONAL CARROT CULTURE ON PERLITE LAYER

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Abstract

Soilles culture growing system are based on a new generation of rooting layers: inert, sterile, good permeability, uniform materials such as the perlite and rockwell. Perlite is physically stable, chemically inert and relatively cheap material. The porous nature of the cellular granule ensures a product that is light to handle, large quantities available moisture and has a strong capillary attraction for water [2]. It is free draining and well aerated, neutral pH, complete freedom from pests, pathogens and weed seeds [1]. All of these qualities make it ideal candidate rooting layer for commercial carrot crop production. Plant nutrition problems can be solved by application of nutrient solution. This solution must therefore provide all the essential macro and micro elements required for healthy growth and good development of carrot roots. Each nutrient from solution must be added at a rate which exactly matches its removal by the roots, that the toxicities can be avoided. A common problem associated with soilles culture is to find recipes for optimum nutrient solutions for each crop. The work of girl proposes testing of nutrient solutions and finding optimal prescription for the carrot crop in perlite layer. The main parameters, electroconductivity and pH have been monitored and adjusted function of the environment conditions and phenophases.

Key words: nutrient, management, soilles culture, variety

INTRODUCTION

Unconventional crops have developed significantly in recent years due to productivity, excellent quality of the production, continuous cycles of production.

All of these have led to the conclusion that this technology is one effective. Computerized control of all factors of vegetation in the space of culture and access to equipment of last generation determined from more and more farmers to turn toward this technology.

Growing tomatoes in fruits and vegetables soilless culture structure, same place and it holds and the growing world classical [1].

Other species of culture in non-conventional system are: lettuce, cucumbers, aubergines, peppers, strawberries but also areas intended for the production of cut flowers (rose, crizantema, carnation).

Most widely used substrate is all mineral wool but perlite layer begins to be more and more used and extended the range of cultivated species.

Perlite layer it is an organic substrate obtained from volcanic silicon rocks, it is chemically inert, it has a good capacity for the detention of water, it has very good porosity and a pH neutral.

For this reason they tried its use in roots crop fourfold good varieties and hybrids of small dimensions and with a growing season of 60-80 days.

Specialty literature and the other media does not indicate the exact types of solutions nutritional technology used in the framework of the culture of the carrot.

In fact we can't talk about a technology described but only a few items.

Research to propose to continue research begun last year with respect to an appropriate system of fertilisation culture of carrot on perlite layer substrate and the issue of technology clear.

MATERIAL AND METHOD

For the setting up of carrot culture on perlite layer substrate has been used pots made of plastic with volume of 6 l / pot , the basis of which have been practiced holes with a view to draining nutrient solution. The perlite layer substrate was used with a granule size of 2 mm

and the preparation of the solution nutrients were used 3 types of fertilizer complex manufactured by Scotts Netherlands. Fertilizer characteristics are presented in Table 1.

Table 1.Chemical composition of Universol fertilizer [5]

Nutritive elements	Green Universol 23+6+10+2	Yellow Universol 12+30+12+2	Violet Universol 9+9+27+3
Total nitrogen, (N) of which	23	12	9
N nitric	11.5	8.8	2.4
N ammoniacal	11.5	3.2	6.6
Phosphorum (P2O5)	6	30	9
Potassium (K2O)	10	12	27
Magnesium (MgO)	2.5	2.5	3.3
Iron (Fe) EDTA	0.06	0.06	0.06
Boron (B)	0.01	0.01	0.01
Copper (Cu) EDTA	0.01	0.01	0.01
Manganese (Mn) EDTA	0.04	0.04	0.04
Molybdenum (Mo)	0.001	0.001	0.001
Zinc (Zn) EDTA	0.01	0.01	0.01
Conductivity (EC) for solution with concetration 1g/l la 21 º C	1.5 mS/cm²	1.2 mS/cm²	1.3mS/cm²
Maximum solubility grams/liter	250	250	300

Bifactorial experience with the 8 variants have been carried out through a combination of 3 types of nutritional solutions with 4 cultivars F1 of 3 degrees of early.

Nutrient solution 1 has been implemented in Universol green , the solution 2 of Universol yellow and solution 3 from Universol violet .Solutions of the above have been necessary quantities of Ca and Mg so that final solution contain nutrients necessary roots carrot. Grade cultivars used in experience are sources U.K. and their features are to be found in table 2.

Table 2.Biological materials used for study

Variety	Vegetation period		Root shape
	No. of days	maturity	
Purple Haze F1	80-90	Semi late	cylinder
Rainbow F1	70-80	Semi late	conical
Baby Carrot F1	50-60	Extra early	conical
Rondo F1	80	Semi early	round

Electroconductivity nutrient solutions used have been adjusted to the values in table 3.

This undercoat of perlite layer has been entered in pots, it was humectants and then have sown seeds in a as backings of accuracy (PRO SEEDER) so as to ensure a density of 80 plants / m².

In the first phases of the sowing, nutrient solution has been applied by spraying area.

When the roots have developed enough, undercoat perlite layer has been irrigated by immersing the pots in containers containing nutrient solution.

The solutions have been periodically replaced, and this operation is the only work of care of the culture. They have not been necessary works to combat the pests and diseases.

In this experiment, observations and determinations have been made, regarding the number of days necessary for emergence, the percentage of emerged plants, the growing rhythm of the aerial part and at random the growing dynamics of carrot roots [3].

RESULTS AND DISCUSSIONS

Yet in the light of experience last year it has been found that the solution in a haste emergence plants and develop rosette of leaves. As soon as roots of carrot has tuber were applied nutrient solutions yellow and violet. It should be pointed out that fertilizer Universol is manufactured in several formulas according to the ratio of nutrients and these fertilizers have been chosen and adjusted in the light of experience phenophase plants and their requirements.(see table 3)

Table 3.Phenophases calendar

Week 1 from seedling	East 92 %
Week 2 from seedling	Fisrt appearance of true leaves; 1-2 leaves/ plant
Week 3 from seedling	Growth true leaves ; 5.5 cm the higher leaf
Week 4 from seedling	Rosette formation; 4-5 leaves per rosette
Week 5 from seedling	Growth rosette and higher leaf have 10.4 cm
Week 6 from seedling	Growth rosette and higher leaf have 15.7 cm
Week 7 from seedling	Growth rosette and higher leaf have 19.8 cm
Week8 from seedling	Growth rosette and higher leaf have 20.7 cm
Week 9 from seedling	Growth rosette and number of leaves at 7
Week10 from seedling	Growth of root; pencil dimension at 7.4 cm lenght

The nutrient solution concentration and pH nutrient solution has been insured by measuring the electrical conductivity of the solution and the pH thereof depending on the parameters it solution correction which nutrient is necessary for a correct of the plants [4]. Past experience has shown that the pH it is recommended to maintain the value 6.5 in such a way that trace

elements such as Fe, Mn not to precipitate and the roots of carrot able to absorb trace elements of nutrient solution [3] .
Reduction in the rate of growth, of absorption of nutrient solution and the sweat of the plants are determined by changes in electro-conductivity [1,4].
Electro conductivity (Ec) can be influenced by the temperature and it is good to be kept around 21°C. A fall in the entail its increase in value of Ec and at the same time slows down the rate of growth of the plants [3].
The measured parameters (electroconductivity, pH) in the tested nutritive solutions may be found in the tables 4a,4b and the influence of the nutritive solutions on the rosette and on the variation of the root length are to be found in the tables 5 and 6.

Table 4a. Mesurement of nutritive solution parameters
A – from sowing to the east; B – leaf emergence seed-lobe;C – vegetative growth , 30 days from east;

Pheno phase	**Green Solution**	
	Nutrient solution conductivity in substrate mS/ cm² at 21°C	pH
A	1.52	7.1
B	1.86	6.8
C	2.15	6.8

Table 4b.Mesurement of nutritive solution parameters
D – vegetative growth, 60 days from east

Phenophase	Violet Solution	
	Nutrient solution conductivity in substrate mS/ cm² at 21°C	pH
D	1.74	6.5

Table 5.Nutrient solution influence on rosette height and number of leave

Cultivar	S1		S2	
	Rosette height (cm)	No of leaves	Rosette height (cm)	No of leaves
Purple haze F1	20.7	7	17.5	6
Rainbow F1	18.9	6	17.3	5
Baby Carrot	16.9	7	15.8	6
Rondo	16.6	7	15.2	6

S1 = green solution + yellow solution ;
S2 = green solution + violet solution

Table 6.Influence nutrient solution on root length and girth variation (intermediate results)
L= length of root; Ø= thickness of root

Cultivar	S1		S2		Characteristic dimension of cultivar	
	L (cm)	Ø (cm)	L (cm)	Ø (cm)	L (cm)	Ø (cm)
Purple Haze F1	19.1	8.3	18.0	7.8	20-25	10-12
Rainbow F1	16.3	8.2	15.7	7.1	17-18	10-12
Baby Carrot	9.7	4.7	7.9	3.5	10-11	6
Rondo	4.2	9.4	3.9	8.2	4-5	12-15

S1 = green solution + yellow solution ;
S2 = green solution + violet solution

CONCLUSIONS

The results obtained can be pulled following conclusions:
Other than film which experienced influence is visible and cultivars with short period of the growing season is suitable for the best of such a substrate.
Complex fertilizers used in combination depending on the phenophase constitutes the basic ingredients to which we can add sources of Ca and Mg.
Influence of the 3 types of solutions nutrients on growth in roots of carrot is noticeable.
Will it be possible to obtain a culture of carrot on substrate of perlite layer even with a technical base material medium.

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EX·TERRA·AVRVM