Scientific Papers. Series B, Horticulture. Vol. LVII, 2013
Print ISSN 2285-5653, CD-ROM ISSN 2285-5661, Online ISSN 2286-1580, ISSN-L 2285-5653

BEHAVIOUR OF SOME NEW VARIETIES OF TABLE GRAPES IN THE FIRST THREE YEARS AFTER PLANTING ON IMPROVED SANDY SOILS FROM SOUTHERN OLTENIA

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Abstract

The study was effectuated out on a number of 12 varieties of autochthonous and foreign origin. The experience was founded in the year 2010. Climatic conditions were favorable for cultivation of vines in year I and II and less favourable in the third year after planting, when they recorded, in winter, the minimum negative temperatures (-27 °C), well below the limit of resistance of the vine and in the summer very high temperatures associated with drought rendered and sunstroke. After planting all vines were entered in vegetation. At the end of vegetation period the percentage of normally developed vines was between 75 and 100. In year II continued the process of planting in places empty. In the year III (2012) have obtained the grapes on the buds situated at base of vines because the buds situated above the snow (about 35-40 cm thick) were perished all buds. With all these difficulties were emphasized a few varieties from the point of view of precocious and from the point of view of the potential to make on the short elements (2-3 eyes). From the point of view of precocious has noted the Prima Cl. 1022, that reached maturity of consumption at 15.07.2012. Transilvania and the Prima Cl. 1022 varieties, were highlighted, and in terms of the production of grapes, which means they have the potential to make on the short elements. The Prima Cl. 1022 achieved 9998 Kg/ha yield and Transilvania achived 10073 Kg/ha yield.

Key words: *range, sandy soils, table grapes, vine.*

INTRODUCTION

Viticulture is an important branch of culture in our country. Culture of table grape varieties is the second production direction for harvesters in the areas with higher heat as sandy soils from Southern and South-Western Oltenia. Vine varieties with table grapes are appropriate conditions of culture in our country (Martin T. et al., 1974).

In order to establish the different types of table grape varieties have carried out studies on their behaviour in different areas (Baniţă P., Vlădoianu Em., 1979; Costescu Adriana et al., 2012; Dumitru I. et al., 2009; Rotaru L., 2005; Mohammad A, Popa A., 2005).

After an assortment of table grape varieties is continuous improvement a priority of this process (Cichi D, Costea D.C., 2008; Popa C. et al., 2008; Popa C. et al., 2009; Stroe M.V. et al., 2012).

MATERIALS AND METHODS

The study was effectuated out on a number of 12 varieties of autochthonous and foreign origin. The experience was founded in the year 2010. The climatical conditions were favorable for cultivation of vines in year I and II and less favourable in the third year after planting, when they recorded, in winter, the minimum negative temperatures (-27 ^{o}C), well below the limit of resistance of the vine and in the summer very high temperatures associated with drought and sunstroke.

The studied varieties were the following: *Silvania, Timpuriu de Cluj, Muscat de Hamburg Cl. 4 Pt., Tamina, Someşan, Splendid, Napoca, Victoria, Prima Cl. 1022, Coarnă neagră selecţionată, Muscat de Hamburg Cl. 202, Transilvania.* Were planted 20-40 vines from each variety. The fertilization, at land preparation, made with 60 t/ha manure, 300 kg/ha Complex 15 15 15. At planting were applied 5 Kg/pit

manure semifermentated. In vegetative period, in may month, was applied 100 kg/ha Complex 15 15 15. To combat pests and diseases, we maked a total of 11 chemical treatments, 3 with Ridomil plus 48,5 WP – 0.3% + Sulfomat 80PU - 0.5%, 3 with Shavit F 72 WDG - 0.2%, 3 with Champ 77 WG 0.3% + Sulfomat 80PU - 0.5% and 2 with Dithane M45- 0.2%+Sulfomat 80PU -0.5%.

Were effectuated the following experimental observations and measurements:

- entrance in vegetation;
- planting rate of striking root;
- the number of eyes formed on the vine during the year;
- annual increases total length;
- number of shoots with thickness exceeding 6 mm at the second internode;
- grapes production in III year after planting.

The climatical conditions were favourable in I and II years (2010 and 2011 years) after planting and less favourable in III year (2012 year). In 2012 year perished all buds located above the layer of snow, which have 35-40 cm thick. Although all vines entered in vegetation after planting but not all have developed normally in the first year (Table 1). At the *Transilvania* variety, all planted vines have developed normally. In others, losses were between 1 and 9 vines, respectively 2.5% at the varieties *Coarnă neagră selecţionată* and *Muscat Hamburg Cl. 202* and 25% at the variety *Someşan*.

Table 1. Percentage of vines developed normally at the end of vegetation table grape varieties in first year after planting

Variety	Number of planting vines	Remaining vines		Number of vines sickly or feeble	
		nr.	%	nr.	%
Silvania	40	33	82.5	7	17.5
Timpuriu de Cluj	20	18	90	2	10
Muscat de Hamburg Cl. 4 Pt.	40	36	90	4	10
Tamina	20	19	95	1	5
Someşan	20	15	75	5	25
Splendid	40	37	92.5	3	7.5
Napoca	20	17	85	3	15
Victoria	40	31	77.5	9	22.5
Prima Cl. 1022	40	31	77.5	9	22.5
Coarnă neagră selecţionată	40	39	97.5	1	2.5
Muscat de Hamburg Cl. 202	40	39	97.5	1	2.5
Transilvania	40	40	100	-	-

The vigour of vines is shown by the length of the annual total number of nodes formed on vine (Table 2). The total length of annual increases recorded the values between 173 cm/vine at *Victoria variety*, and 507 cm/vine at *Transilvania variety*. With good results in this regard were highlighted *Tamina variety* (453 cm /vine). The worst result were achieved at *Timpuriu de Cluj* variety (185 cm/vine) and *Someşan* variety (188 cm/vine).

Although, internodes length is character variety, the number of nodes formed on a vines are approximately proportional to the length total annual increasing. The largest number of nodes formed at *Transilvania* variety (120/vine) and the lowest, the *Victoria* variety (39/vine).

In II year after planting continued the process of planting in places empty.

Table 2. Vine vigour in the first year after planting the varieties of table grapes in first year

Variety	Total length of annual increases in the vine (cm)	Number of nodes formed
Silvania	230	65
Timpuriu de Cluj	185	58
Muscat de Hamburg Cl. 4 Pt.	293	81
Tamina	453	110
Someşan	188	49
Splendid	296	63
Napoca	326	87
Victoria	173	39
Prima Cl. 1022	199	53
Coarnă neagră selecţionată	368	83
Muscat de Hamburg Cl. 202	385	91
Transilvania	507	12

In this year the buds have resisted over the winter, so that the percentage of viability of vegetation was 100, all varieties.
Plant vigour, expressed through the length of vegetative increases and the number of shoots with a diameter greater than 6 mm above the insertion point, the values differ from one variety to another (Table 3).

Table 3. The viability of the buds at the entrance of vegetation and vigor all the different varieties of vines with table grapes in the II year of planting

Variety	Viability of the buds at the entrance of vegetation %	Total annual increases (cm/vine)	Number of shoots with a diameter greater than 6 mm above the insertion point/vine
Silvania	100	153	3
Timpuriu de Cluj	100	280	3
Muscat de Hamburg	100	300	4
Tamina	100	275	2
Someşan	100	555	2
Splendid	100	620	3
Napoca	100	410	3
Otilia	100	366	3
Victoria	100	260	2
Prima Cl. 1022	100	350	3
Coarnă neagră selecţionată	100	980	4
Muscat de Hamburg Cl. 202	100	554	3
Transilvania	100	770	4

The most vigorous variety was *Coarnă neagră selecţionată,* which on the four shoots registered the annual increases of 980 cm/vine. The variety with vigour of the lowest was *Silvania* (153 cm/3 shoots).
In the III year (2012) have obtained the grapes on the buds located at base of vines because the buds situated above the snow layer (about 30 cm thick) were all perished.
Because to the reduce temperature value the dry cutting was effectuated using the short elements, of 2-3 eyes length. Even in these conditions have not been in all growth buds, at all varieties. The percentage of bud growth was between 70 and 100 (Table 4). Two varieties have a viability percentage of 100%, *Timpuriu de Cluj* și *Splendid,* only. The lowest number of buds go in the vegetation at the *Tamina* variety, 68 percent. With the growth of buds over 90% were most varieties, 8, *Silvania* and *Muscat of Hamburg*, with a percentage of 95. Other varieties have a percentage of the growth of buds between 80 and 89.
Vines vigour was expressed by the sum of total annual increases, the number of eyes formed on the vine and the number of shoots with a diameter greater than 6 mm, in the course of a year.
The difference of vigour between the vines are very large, in specially, as regards the amount of the total annual increases and the number of eyes formed on the vine in the course of a year (Table 4).
Thus, if the *Silvania* variety recorded 625 cm/vine, the annual increases and 64 eyes formed on the vine, at the *Victoria* variety, the same elements have values of 1364 cm/vine and 84 eyes/vine. The less vigorous varieties are part of *Silvania*, are *Timpuriu de Cluj* and *Someșan*. Differences were recorded regarding of the number of the shoots with diameter of 6 mm to the vine, which has values from 3 to 5.
Although it suffered considerable losses of buds and wood stocks were able to fruiting, even if not at the level of genetic potential. Had demonstrated the potential of fruiting of these varieties to make grapes on the short elements (2-3 eyes length). If some varieties of fruiting process was symbolic, others that production was at the level of a normal year from climatical point of view, with a large capacity of fruiting on the short elements inserted to the vine base, such as the *Transilvania* (10073 Kg/ha) and the *Prima Cl. 1022* (9998 Kg/ha), (Table 5). A level of production have been satisfied with the varieties *Muscat de Hamburg* (5302 Kg/ha), *Muscat de Hamburg Cl 202* (4999 Kg/ha) and Victoria (4923 Kg/ha). Without the potential for fruiting on the short elements were *Otilia* (1515 Kg/ha) *Someşan* (2196 Kg/ha), *Napoca* (2272 Kg/ha) and *Coarnă neagră selecţionată* (2575 Kg/ha). The quality of production of grapes had advantages and disadvantages due to the climatical conditions of this year for agriculture (Table 5).

Figure 1. Prima Cl. 1022 variety

The advantages in terms of the content of total sugars, which recorded higher values. Instead the weight of 100 grains and total acidity titrable were smaller. Varieties of table grapes accumulates usually, lower levels of sugars, at the consumption maturity.

In this year the content of sugars exceeded the value of 152 g/l in all varieties, from the *Transilvania* variety, to 241 g/l. The lower sugar content of 152 g/l was recorded the *Prima Cl. 1022* variety, which has reached maturity early consumption, to date 15.07. 2012.

Table 4. The viability of buds at the entrance of vegetation and vigour all the different varieties of vines with table grapes in the 3rd year of the planting

Variety	The viability of the bud at the entrance of vegetation %	Sum of total annual increases (cm/vine)	Number of eyes formationed on the vine	Number of shoots with a diameter greater than 6 mm, in the course of a year mm/vine
Silvania	95	625	64	3
Timpuriu de Cluj	100	658	66	5
Muscat de Hamburg	95	788	82	5
Tamina	68	826	86	5
Someşan	92	690	72	5
Splendid	100	770	67	5
Napoca	92	818	64	3
Otilia	84	790	74	4
Victoria	84	1364	84	4
Prima Cl. 1022	87	898	65	5
Coarnă neagră selecţionată	90	1124	85	5
Muscat de Hamburg Cl. 202	90	1068	80	5
Transilvania	100	1256	99	5

A sugar content of over 200 g/l were recorded and the varieties *Otilia* (204,5 g/l), *Muscat de Hamburg* (214,1 g/l). A sugar content of more than 180 g/l have been *Tamina and Coarnă neagră selecţionată* (184,3 g/l), *Someşan* (185,4 g/l) and *Timpuriu de Cluj* (192,8 g/l). A lower potential of sugar, along with the *Prima Cl. 1022,* are *Napoca* (162 g/l).

Climatical conditions influenced the negative weight of 100 grains of grapes specially to late maturing varieties. The varietiy which has recorded the lowest weight, 167 g, was *Silvania* and the variety with the highest weight was the *Tamina,* 661 g. Were emphasized the *Victoria* (648 g) and *Transilvania* (616 g) varieties. Varieties with a weight of 100 grains smaller are *Silvania, Someşan, Napoca, Timpuriu de Cluj.* Total titrable acidity expressed in g/l H_2SO_4, decreased due to very high temperatures and drought in all varieties studied, with values between 2.1 and 4.2 g/l H_2SO_4. The lower the value of the total titrable acidity was the *Silvania* variety (2.1 g/l H_2SO_4). Higher values, which have contributed to a more balanced taste, were recorded at *Transilvania and Tamina* varieties (4 g/l H_2SO_4.

Lower values of total titrable acidity registered at varieties *Timpuriu de Cluj* (2,15 g/l H_2SO_4), *Napoca* (2,25 g/l H_2SO_4) and *Victoria* (2,8 g/l H_2SO_4).

In this year the vegetative stage of vines were carried out close to normal until around June 15 (Table 6). Amid increasing temperature and installation of drought, the sum of temperature for a certain vegetative stage was achieved in a
shorter time, so the vegetative stage have succeeded with rapidity. In this way the precociousness of varieties has increased, evidence that some varieties of ripe stage began on the 26.06.2012, at *Prima Cl. 1022* variety.
The appearance of leaves, flourished and started farming grains stages were conducted like some normal years of climatical point of view. The appearance of leaves started most early on the *Someşan at* 04.04.12 and the latest, on the date of 14.04.12, at *Coarnă neagră selecţionată variety*. The end of this vegetative stage occurred, most early on the *Someşan* on 9.4.2012, and later, on data 20.04.12 at *Coarnă neagră selecţionată variety.* The *Prima Cl. 1022* variety, which was the early, the appearance of leaves began on the 9.4.2012 and finished in 16.04.2012. Blooming stage began, most early, on 12.05.2012 and ended, at early, on 23.05.2012 data to *Prima Cl. 1022* variety.

Table 5. The production of grapes and the quality of the different varieties of vines in the 3rd year after planting

Variant	Yield Kg/ha	Weight of 100 grapes grains g	Total sugar g/l	Total titrable acidity g/l H_2SO_4
Silvania	2575	167	173.7	2.1
Timpuriu de Cluj	1628	261	192.8	2.15
Muscat de Hamburg	5302	305	214.1	3.8
Tamina	2424	661	184.3	4
Someşan	2196	237	185.4	3.75
Splendid	4544	399	173.7	3.1
Napoca	2272	265	162	2.25
Otilia	1515	250	204.5	3.5
Victoria	4923	648	153.8	2.8
Prima Cl. 1022	9998	372	152	3.8
Coarnă neagră selecţionată	2575	316	184.3	3.75
Muscat de Hamburg Cl. 202	4999	389	196	3.5
Transilvania	10073	616	241	4.2

Table 6. Phenological observations at different vine varieties with table grapes in the 3rd year after planting, 2012year

Variant	The appearance of leaves		Blooming		Farming grains -Biginning-	Ripe stage -Biginning-	Maturity
	Biginning	end	Biginning	end			
Silvania	10.04.12	17.04.12	20.05.12	03.06.12	27.05.12	10.07.12	20.08.12
Timpuriu de Cluj	06.04.12	12.04.12	19.05.12	03.06.12	25.05.12	07.07.12	16.08.12
Muscat de Hamburg	06.04.12	12.04.12	21.05.12	03.06.12	26.05.12	12.07.12	17.08.12
Tamina	06.04.12	12.04.12	20.05.12	04.06.12	26.05.12	12.07.12	17.08.12
Someşan	04.04.12	09.04.12	20.05.12	04.06.12	26.05.12	13.07.12	14.08.12
Splendid	05.04.12	12.04.12	22.05.12	04.06.12	27.05.12	08.07.12	14.08.12
Napoca	07.04.12	13.04.12	14.05.12	29.05.12	19.05.12	06.07.12	20.08.12
Otilia	05.04.12	12.04.12	20.05.12	04.06.12	26.05.12	09.07.12	17.08.12
Victoria	10.04.12	16.04.12	22.05.12	06.06.12	27.05.12	15.07.12	20.08.12
Prima Cl. 1022	09.04.12	16.04.12	12.05.12	23.05.12	18.05.12	26.06.12	15.07.12
Coarnă neagră selecţionată	14.04.12	20.04.12	23.05.12	09.06.12	28.05.12	18.07.12	25.08.12
Muscat de Hamburg Cl. 202	09.04.12	15.04.12	22.05.12	06.06.12	27.05.12	12.07.12	20.08.12
Transilvania	12.04.12	17.04.12	23.05.12	09.06.12	28.05.12	18.07.12	22.08.12

Blooming stage was immediately followed by the beginning of the growth of the grains, which triggered the main early on 25.05.2012 data at *Prima Cl 1022* variety. Where as blooming stage lasts about 12 days, the period of growth of the grains overlap a few days over this stage, because the blooming has broken down. The following vegetative stages were produced in fewer days than was known due to the accumulation in a shorter time to

temperature required for a different stages. As I mentioned above ripe stage began on June 6.06. 2012 at *Prima Cl 1022* variety and on 6.07.2012 at *Napoca* variety.

CONCLUSIONS

In first year at the *Transilvania* variety, all planted vines have developed normally. In others, losses were between 1 and 9 vines, 2.5% at *Coarnă neagră selecţionată* variety and *Muscat Hamburg Cl. 202* variety, and 25% for the *Someşan* variety.

From point of view of vigour emphasized *Transilvania* variety with 120 nodes formed on vine and 507 cm the total length of annual increases.

In the II year of planting the vine vigour, expressed through the length of vegetative shoots and the number of shoots with diameter greater than 6 mm/shoot above the insertion point, the values differ from one variety to another. The table grape varieties at more vigorous variety was *Coarnă neagră selecţionată variety,* which on the four shoots registered a value of 980 cm.

The year three after planting, also, is for formation. Because of this, and to the fact that in 2012 the buds located at the height under 15-20 cm, were affected by the negative minimum temperatures, in the winter time, the varieties in question have not been expressing the true potential of fruiting. In this regard for the next year will take action to protect 2-3 shoots.

With all these difficulties were able to tear off a few varieties, from the point of view of the precociousness, or from the point of view of the potential to fruiting on the short elements (2-3 eyes length).

From the point of view of precociousness grapes table varieties noted the *Prima Cl. 1022* that reached consumption maturity at 15.7.12. *Transilvania* variety and the *Prima Cl. 1022* variety, were highlighted, and in terms of the production of grapes, which means they have the potential to fruiting on the short elements.

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