THE CROP YIELD BEHAVIOUR OF SOME ELITE HYBRID VARIETIES OBTAINED AT S.C.D.V.V. BLAJ

COMPORTAREA ÎN PRODUCȚIE A UNOR ELITE HIBRIDE OBȚINUTE LA S.C.D.V.V. BLAJ

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Abstract: *Improving grapevine variety at S.C.D.V.V. Blaj is a traditional process and it has continuity. Sexuate hybridisations were carried out with a view to obtaining new varieties of very good quality, with high concentration of sugar accumulation and acidity, which could ensure high wine quality. Following hybridisation, elite hybrids were selected, which today can be found in comparative competitive plantations, 200 block vine of elite vine varieties in each plantation. The elite hybrid varieties designated as 5-26; 6-10; 6-4-4 and 110 were examined compared to the control samples Feteasca Regala - 21 Bj (Elite varieties no. 6-10, 6-110, 4-4) and Pink Traminer -60 Bj (Elite variety no. 5-26). As a result of the study, it was found that the elite varieties have a good sugar/acidity balance, of which, numbers 5-26 and 6-110 stood out.*
Key words: Hybrid elite varieties, sugar accumulation, high acidity, quality

Rezumat: *Ameliorarea soiurilor de viță de vie la S.C.D.V.V. Blaj este de tradiție şi are continuitate. Au fost efectuate hibridări sexuate în vederea obținerii de soiuri noi de calitate foarte bună, cu concentrația acumulărilor în zahăr şi aciditate ridicată, care să asigure o calitate deosebită a vinurilor obținute. În urma hibridărilor au fost selecționate elite hibride, care astăzi se găsesc în plantațiile comparative de concurs, câte 200 butuci din fiecare elită. S-au studiat elitele hibride 5-26; 6-10; 6-110 şi 4-4 comparativ cu martorul Fetească regală-21 Bj (Elitele 6-10; 6-110; 4-4) şi cu martorul Traminer roz-60 Bj (Elita 5-26). În urma efectuării studiului asupra elitelor hibride comparativ cu martorii amintiți, s-a constatat că elitele au un raport zahăr/aciditate bun. Se remarcă elitele hibride 5-26 şi 6-110.*
Cuvinte cheie: Elite hibride, acumulări de zahăr, aciditate ridicată, calitate

INTRODUCTION

Since consumer demands for quality grapes and wines are always growing, research in improving quality and crop yield in grape vines remains opportune (Oprea and Moldovan, 2007). Productivity and quality of grapevine varieties are very complex features, which depend on the genetic traits (inherited genotype or dowry) of each variety, on the environmental conditions and on the interaction between genotype and environment (Sestraş, 2004).

Ampelographic characteristics: The elite varieties 5-26, 6-10, 6-110, 4-4 are potential new varieties of grapes with a high yield and high quality, given by a high concentration of sugar in the must.

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The elite variety 5-26 resulted from hybridisation between the hybrid elite variety 8-33-44 (Iordana x Pink Traminer) and the 51-19 elite variety (Raisin de Saint Pierre x Perla de Csaba) followed by selection in the greenhouse. Given the similarity with Pink Traminer, the elite variety 5-26 was studied in comparison with the above-mentioned variety taken as a control sample. The shoots are brown with small, brown inflorescences and well developed tendrils, with a slower vegetative growth like Pink Traminer 60 Bl. (the control sample) (fig. 2). The leaf is medium size with reddish veins, embossed, dark metallic green, with prominent teeth and less clear lobes (fig. 1).

Fig. 1 - Elite variety 5-26.

Fig. 2 - Pink Traminer-60 Bl.

The Elite variety 6-10 resulted from hybridisation between two elite varieties of the Laboratory for grape vine improvement of SCDVV Blaj. The following elite varieties were crossed 9-35-10 (Pink Traminer x Iordana) and 51-19 (Raisin de Saint Piere x Perla de Csaba). It should be noted that elite variety 9-35-10 has a great crop yield with very modest accumulation of sugar and the 51-19 elite variety has a lower but early yield, with high levels of sugar in the must.

The elite variety 6-10 shows a brownish growth bud, green large inflorescences, moderate growth similar to Fetească regală -21 Bl. (the control sample) (fig. 3).

Fig. 3 - Fetească regală-21 Bl.

The elite variety also has an early veraison, as the grapes begin to enter the veraison stage in the first half of August. The grape berries are round and

thick as with Fetească regală, with a large number of grapes per vine. The leaf is yellowish green, with similar reddish shoots per cane. The berries are thick but not compact, spherical, translucent with a thin skin and pleasant taste especially at veraison. Sometimes, the yield of the grape variety is extremely high and cannot be supported by the grape vine; therefore, during dry periods in late summer, it can be seriously affected. The grapes greatly resemble the Feteasca regala control sample-21 Bl, but they enter veraison much earlier and have higher sugar concentration. The elite variety should be harvested in mid-September, when technological maturity is reached. The elite variety can be grown in northern areas of the country as well (Lechința vineyard), where it reaches technological maturity in late September (fig. 5).

The elite variety 6-110 belongs to the same hybrid combination as elite variety 6-10. Its growth is strong; the growing shoots are erect with long internodes. The shoots are reddish in their early stage and reddish brown during adulthood. The leaves have long stalks, red as the main veins, with dark green sharp teeth. The grapes are large with semi-compact berries placed on the rachis, which sometimes become rusty at veraison; the rachis is reddish, long, and branched (fig. 4).

Fig. 4 - Elite variety 6-110

Fig. 5 - Elite variety 6-10

Fig. 6 - Elite variety 4-4

The elite variety 4-4 belongs to the same hybrid combination as the variety 6-10. After a linty bud break, the shoots are brownish green with medium sized inflorescences and strong tendrils. It has strong growth with large leaves, embossed, dark green and poorly indented. The leaf has five lobes or almost complete, the grapes are the size of the Feteasca regala control sample-21 Bl. The berry is bigger than the control sample's, spherical, translucent-looking and thicker skin (pleasant taste, balanced, good for fresh consumption). In undergoes an early veraison in the first decade of August (fig. 6).

MATERIAL AND METHOD

The study of elite varieties 6-10, 6-110 and 4-4 versus Fetească regală 21 Bl. and of the elite variety 5-26 versus Pink Traminer-60 Bl was resumed. Three hybrid elites belong to the combination of hybrids 9-35-10 (Pink Traminer x Iordana) x 51-19 (Raisin de Saint Pierre x Perlă de Csaba). The varieties 6-10, 6-110 and 4-4 were studied according to all the improvement plan options allowed by our experimental technical standards, and compared with the basic variety from the Târnave Vineyard - Fetească regală-21 Bl.

The elite variety 5-26 (fig. 2) obtained under the same conditions was studied in comparison with another control sample - basic variety from the Târnave Vineyard - Pink Traminer-60 Bl. In order to establish the value of the hybrid elite varieties, observations and measurements were performed to determine the ampelographic characteristics, the agro-biological characteristics as well as the quantity and quality of the grape crop yield (Ardelean, 1994).

RESULTS AND DISCUSSIONS

Weather conditions. The year 2011 was different as compared to the average of years, characterized by two periods of drought (table 1). The first period was recorded in April and May, when the vines did not suffer much. In June, high amounts of rainfall were recorded, which brought soil moisture to normal levels. July maintained humidity within normal parameters as there was important rainfall. Grape vine development was almost normal until August, which was a droughty month, due to which the vegetation period was reduced.

Table 1

Weather conditions during the vegetation period in 2011, at SCDVV Blaj

Month	Average monthly temperatures (° C)		Extreme temperatures (° C)		Temperatures sum (° C)			Rainfall sum (mm)	
	Multi-annual	Real	Min.	Max.	global	active	useful	Multi-annual	Real
March	4.7	5.6	-9.8	21.8	143.8	76.8	6.8	23.9	9.4
April	10.4	11.3	-1.4	23.9	339.4	254.5	64.5	68.3	23.6
May	15.2	15.6	0.1	29.7	482.8	460.8	180.8	80.2	45.6
June	18.3	19.5	8.5	34.1	585.8	585.8	285.8	93.6	116.4
July	19.8	21.2	9.9	35.3	656.7	656.7	346.7	99.0	44.0
August	19.3	21.1	8.6	35.4	653.1	653.1	343.1	64.0	4.6
September	15.1	18.6	6.8	32.9	556.8	556.8	256.8	56.7	8.2

A second drought was felt in August and September and extended through October, time during which there was almost no precipitation. As compared to the sum of multiannual precipitation of 120.7 mm, only 12.3 mm rainfall was recorded during the two months (table 1).

Vine growth and development was favourable until veraison, when drought was fully felt by the plant. The veraison period began about two weeks earlier than in normal years. In the last days of September, wilting of the grape vine began, followed by wilting of the grapes.

Fertility and productivity. The relative fertility coefficient ranged from 0.3 recorded in Pink Traminer-60 Bl control sample for the elite variety 5-26 to 1.2 for the variety Fetească regală-21 Bl, taken as control sample for the white elite varieties (6-10, 6-110, 4-4). The absolute fertility coefficient ranged between 1.2 for the elite variety 4.4 and 1.8 for the elite variety 5-26. The weight of 100 berries was highest at elite variety 6-110 (305 g), as compared to control sample Fetească regală-21 Bl which had a weight of 184 g. The elite variety 5-26 (100 berries) weighed 195 g compared to 172 g for Pink Traminer-60 (table 2).

The weight of one grape cluster for the variety Fetească regală-21 Bl. was of 110 g and of 141 g for the elite variety 6-110. 6-10 had similar size and weight grapes as Fetească regală-21 Bl. The weight of a grape cluster from the elite variety 5-26 was 124 g and the sample control Pink Traminer 60-Bl registered 96 g.

The relative productivity index reached a maximum value of 137 at the elite variety 5-26, a very high value compared to that recorded with Pink Traminer-60 Bl (28). The 6-110 elite variety with the value 127 came close to the control sample Fetească regală-21 Bl, which showed a relative productivity index value of 132. Elite variety 5-26 recorded a high value (224) of the absolute productivity index compared with the Pink Traminer variety-60 Bl (125). Of the elite varieties for white wines, the elite variety 6-110 recorded the highest value of the absolute productivity index, and namely 198, higher even than the control sample that recorded a value of 176 (table 2).

Table 2

The fertility and productivity of elite variety hybrids created at SCDVV Blaj

Elite variety hybrid	Fertile shoots %	Fertility coefficient		Weight of 100 berries (g)	Average weight of a grape bunch (g)	Productivity index	
		Relative	Absolute			Relative	Absolute
6-10	67	1.0	1.5	240	97	97	146
6-110	31	0.9	1.4	305	141	127	198
4-4	69	0.8	1.2	291	123	99	148
Fetească regală -21 Bl. (Co.)	74	1.2	1.6	184	110	132	176
5-26	66	1.1	1.8	195	124	137	224
Pink Traminer -60 Bl. (Co.)	22	0.3	1.3	172	96	28	125

Grape quality and yield. The studied elite varieties recorded in 2011 crop yields that exceeded those of the control samples. The elite variety 6-110

recorded a high yield with 10,001 kg/ha, while the elite variety 5-26 yielded the best crop, 16,001 kg/ha, much more than the control sample Pink Traminer-60 Bl, which yielded only 7,334 kg/ha.

The recorded concentration of sugars in grapes was highest with elite variety 4-4 with a value of 226 g/l and with the 6-10 elite varieties with 222 g/l, concentrations much higher than that of Fetească regală Bl-21 (187 g/l). The 5-26 elite varieties accumulated a quantity of 225 g/l sugars, which was significantly exceeded by the control sample Pink Traminer-60 Bl, which accumulated 248 g/l sugars in the must.

The elite variety 6-110 recorded a total acidity of must of 4.1 g/l H_2SO_4, value that was similar to that of Fetească regală -21 Bl (control sample). Instead, elite varieties 6-10 and 4-4 showed a lower total acidity of must, of 3.5 g/l H_2SO_4 respectively 3.6 g/l H_2SO_4.

The highest total must acidity was registered by the elite variety 5-26 (5.2 g/l H_2SO_4), which exceeded the Pink Traminer control sample-60 Bl. by much (3.7 g/l H_2SO_4). This high acidity shows that the 5-26 elite varieties had a high potential for the accumulation of sugars in grapes but was harvested quite early (table 3).

Table 3

The production of grapes and quality of must

Elite variety hybrid	No. of grape vine bunches on vine block	Yield		Quality of must	
		kg/vine block	kg/ha	Sugar g/l	Acidity g/l H_2SO_4
6-10	22	2.13	8.820	222	3.5
6-110	17	2.40	10.001	219	4.1
4-4	18	2.20	9.167	226	3.6
Fetească regală-21 Bl. (Co.)	32	2.04	8.334	187	4.1
5-26	31	3.84	16.001	225	5.2
Pink Traminer-60 Bl. (Co.)	19	1.76	7.334	248	3.7

CONCLUSIONS

1. Of the elite varieties studied, 6-110 stands out and must be further researched so as to suggest its homologation.
2. Elite variety 5-26, which was also studied in previous years, confirms the good results and will be proposed for homologation.
3. The 6-10 and 4-4 elite varieties show a high potential for crop yield and quality, so they will be studied in the following years.

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