COMPARATIVE STUDY ON THE BEHAVIOR OF CLONAL SELECTION OF THE MAIN VARIETIES GROWN IN THE VINEYARD PIETROASA

STUDIU COMPARATIV PRIVIND COMPORTAREA UNOR SELECȚII CLONALE ALE PRINCIPALELOR SOIURI CULTIVATE ÎN CENTRUL VITICOL PIETROASA

STROE Marinela Vicuța, ISPAS Sofia,
DAMIAN I., BUCUR Georgeta Mihaela
University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania

Abstract *Extremely qualitative grape varieties, autochthones or global ones exist either as biotype or as ecotypes that can adjust well to crop conditions after a long selection process, but lose their value of productivity and production quality. Therefore sorting clone selections with the highest adaptability to ecopedoclimatic conditions of a vineyard center, increased resistance to environment parameters and further setting up of the polyclone vineyard are the main possibilities of development and efficiency for the Romanian wine industry. Therefore, the experiment was conducted during 2007-2008, under the SEL 51-035 project, and the main purpose was establishing the adaptability degree of some clone selections from Grasa de Cotnari, Tamaioasa romaneasca, Băbeasca neagra, Busuioacă de Bohotin, Muscat d'Adda, Muscat de Hamburg varieties and from Feteasca neagra- variety waiting to be homologated.*

Key words: selection clonals, quality, quantity

Rezumat *Soiurile de vită de vie, atât cele autohtone, cât şi cele din sortimentul mondial, foarte valoroase din punct de vedere calitativ, se prezintă sub forma unor biotipuri sau ecotipuri, care supuse unui proces indelungat de selectie prezintă o bună adaptare la condițiile de cultură în care s-au format, dar care s-au depreciat sub aspectul productivității şi calității producției. Ca urmare, alegerea selecțiilor clonale, care manifestă cel mai mare grad de adaptare la condițiile ecopedoclimatice ale unui anumit centru viticol, rezistențe sporite la influența factorilor de mediu şi ulterior înființarea plantațiilor policlonale, constituie importante posibilități de dezvoltare-eficientizare a industriei vitivinicole din România. În acest context, experiența a fost realizată în perioada 2007-2008, în cadrul proiectului SEL 51-035, având ca principal scop stabilirea gradului de adaptabilitate a unor selecții clonale ale soiurilor Grasă de Cotnari, Tămâioasă românească, Băbească neagră, Busuioacă de Bohotin, Muscat d'Adda, Muscat de Hamburg şi a elitei în curs de omologare - Fetească neagră.*

Cuvinte cheie: clone, calitate, cantitate.

INTRODUCTION

This study is a preliminary indication of the clonal selections of varieties behavior, Grasă de Cotnari, Tămâioasă românească, Băbească neagră, Busuioacă de Bohotin, Muscat d'Adda, Muscat de Hamburg and ongoing elite approval, Fetească neagră – in ecopedoclimatic conditions recorded in the Pietroasa vineyard. The experience was achieved during 2007-2008, with the main interest

in determining the adaptability degree of these clonal selections and the elite, in an area with a moderate weather conditions, highlighting, obtaining and multiplication of autochthon biological material, justifying the need to introduce and expand them in culture.

MATERIAL AND METHOD

In order to reach the proposed goal one has taken into study Grasă de Cotnari (4 Pt, 45 Pt), Tămâioasă Românească (36 Pt, 5 Pt), Băbeasca Neagră (94 Pt), Muscat d'Adda (5 Pt), Muscat de Hamburg (4 Pt), Busuioacă de Bohotin (26 Pt) sorts and ongoing elite approval, Fetească neagră. They can be found in the Ampelographic collection of Pietroasa wine growing center. Regardless of the selection, the type of cutting was Guyot on the semi high, with 28 buds/vine. In order to determine the agro biological and technological potential of the experimental variants studied, one has analyzed the following indicators – the percentage of viable buds/vine, the absolute fertility and relative coefficients, the productivity index (absolute and relative ones), the average weight of a grape, the mass of 100 grapes, the production assessed from a quantitative (kg/vine) and qualitative point of view, the sugars concentration (g/l), the content of total acidity (g/l tartaric acid). The aspects mentioned above were analyzed during just one crop year, 2007-2008, due to the fact that the comparative analysis of these sorts has been thoroughly studied.

RESULTS AND DISCUSSIONS

From a climatic point of view, the wine-growing year of 2007-2008 was characterized by unusual high temperatures during the summer, temperature frequently passing over 36°C, accompanied by almost inexistent precipitations (6,5 mm) noting unfavorable climate conditions. These factors determined a speeding of the process of maturation, this fact influencing in a dissatisfactory way the quality of the production. In viticulture center of Pietroasa, the value of heliothermal index in 2008 decreased by 0,12 from the average multi annual value, the average value of hydrothermal coefficient in the wine growing center of Pietroasa was in accordance with the multi annual averages of 1,07 and for the viticulture year of 2007-2008 – 0,88 therefore low resources. The bioclimatic index in 2007-2008 has an average value of 7,56 in accordance with the multi annual averages registered in the vineyard, of 9,02, one noting as general aspect a very large spectrum of this index which locates the vineyard on the upper limit of favorable characteristics, in comparison with the multi annual average for the region, thus reflecting very favorable conditions for growth and ripening on one hand, and on the other hand the obtaining of a superior quality production at the most times, irrespective of the analyzed category of sorts. The average values of oenoclimatic ability registered are of 4880 in accordance with the multi annual registered media in the vineyard and 4876 for 2007-2008 which places the viticulture center in one of the classes with high favorable characteristics regarding the obtaining of superior quality wines as well as the culture of the table sorts. The agro biological assessment of studied clonal selection, analyzed by indicators as the force of growth, the percentage of viable buds, the fertility

Table 1

The synthesis of the main fertility elements of clone selections study

The viticulture Year	Experimental variants (clone selections)	% viable buds	Growth vigor	Fertile shoot	The fertility coefficients		Productivity index	
					CFA	CFR	IPA	IPR
2008	Clones for quality white wines							
	Grasă de Cotnari 4 Pt	80,6	xxx	75	1,0	0,85	165	140
	Grasă de Cotnari 45 Pt	81	xxx	76	1,0	0,88	160	141
	Clones for aromatic wines							
	Tămâioasă românească 36 Pt	82,7	xxx	70	1,0	0,64	130	83
	Tămâioasă românească 5 Pt	81,6	xxx	71	1,06	0,72	138	94
	Clones for rose wines							
	Busuioacă de Bohotin	82	xxx	71	1,04	0,84	125	101
	Clones for red wines							
	Băbească neagră 94 Pt	77	xxx	73	1,0	0,73	169	123
	Clones for quality red wines							
	Fetească neagră 10-4	85,9	xxx	72	1,0	0,65	142	92
	Clones for table grape sorts with medium maturity							
	Muscat de Hamburg 4Pt	80,1	xx	71	1,0	0,70	178	125
	Muscat d'Adda 5 Pt	79,8	xxx	70	1,0	0,68	197	134

coefficients, the productivity index (Table 1) shows that the studied clone selections have a medium to normal potential production and that the genotype has a direct connection with this index and their average values are also influenced by the climate conditions. The analysis obtained from an output quantity and quality - will be presented on data listed in (Table 2), taking into account the particularities of each clonal selection skills, and the production direction.

The clone selections of *Grasă de Cotnari 4 Pt* and *45 Pt* registered values of the average weight of a grape within the normal limits specific for the sort, 165 g (4 Pt) and 160 g (45 Pt). Regarding the selections of the *Tămâioasă românească (36 Pt, 5 Pt)* sort, one notes differences among them, differences which will be felt also in the obtained production. Thus the clone *36 Pt* has the average weight of a grape of 120 g and the clone *5 Pt* that of 133 g. For the selection *Busuioacă de Bohotin 26 Pt* this parameter does not register values different from the population of the sort, the weight being practically classified within the limits of the sort (90 g). Analyzing the results obtained for the *Băbească neagră 94 Pt* selections, one notes that there are no different values compared to the population of the sort, the weight being classified within the limits of the sort (120 g). The ongoing elite approval, *Fetească neagră 10-4* registered limits of the average values of sort (140g). In the case of the clone selections of the table sorts of *Muscat de Hamburg 4 Pt and Muscat d'Adda 5 Pt*, the values of this parameter are also registered within the limits of the average values obtained by the populations of the two sorts, 178 g for the *Muscat de Hamburg sort* and for the *Muscat d'Adda* sort, 197 g. The mass of 100 grapes (g*)* - in this sector one has noted significant differences only for the sort of *Grasă de Cotnari*, being able to make the comparison due to the existence of the two selections (4 Pt and 45 Pt) - in the case of the other selections one can mention that they classify within the average normal limits of the sorts from which they have been selected.

The sugars (g/l) - The *Tămâioasă românească* sort is recognized from the point of view of its production quality, registering high accumulations of sugars accompanied by an average production, favorable for obtaining white aromatic wines of quality. For this wine growing year the clone selections of Tămâioasă românească sort accumulated great quantities of sugar, ranging from 246 g/l for *36 Pt* and 244 g/l for *5 Pt*, followed by *Busuioacă de Bohotin*, 245 g/l and at a very short distance the selections of the *Grasă de Cotnari* sort, 238 g/l for *4 Pt* and 240 g/l for *45 Pt*. One notices also that the selection of *Băbească neagră 94 Pt* sort has accumulated sugars at the superior limits of the sort, 219 g/l allowing the obtaining of a wine with a rather high alcoholic potential. The ongoing elite approval, *Fetească neagră 10-4* sort accumulated average values of sugar at the superior limit, 242 g/l. For the clone selections of the *Muscat de Hamburg 4 Pt* and *Muscat d'Adda 5 Pt* table sorts, values of this quality parameter were also classified within the limits of the average values obtained for the populations of the two sorts, 188 g/l for the *Muscat de Hamburg* sort and a little lower for the *Muscat d'Adda* sort, 185 g/l. However for all the selections one notes that there is a determining influence of the genotype on the accumulations of sugars in the grapes, being practically a hereditary characteristic.

Table 2

The synthesis regarding the quantitative and qualitative production obtained with the 8 homologated clone selections in Pietroasa vineyard

The viticulture year	Experimental variants (clone selections)	Average weight of grape (g)	Weight of 100 grapes (g)	Sugars (g/l)	Acidity (g/l)	Production (kg/grape vine)	Production (t/ ha)
2008	Clones for quality white wines						
	Grasă de Cotnari 4 Pt	165	270	238	5,5	2,400	8,9
	Grasă de Cotnari 45 Pt	160	266	240	5,4	2,250	8,5
	Clones for aromatic wines						
	Tămâioasă românească 36 Pt	130	145	246	5,5	1,700	7,2
	Tămâioasă românească 5 Pt	138	153	244	5,5	1,820	7,6
	Clones for rose wines						
	Busuioacă de Bohotin 26 Pt	120	132	245	5,1	1,800	7,5
	Clones for red wines						
	Băbească neagră 94 Pt	169	165	219	5,8	2,940	12
	Clones for quality red wines						
	Fetească neagră 10-4	142	110	242	5,4	2,400	8,9
	Clones for table grapes sorts with medium maturity						
	Muscat de Hamburg 4 Pt	178	290	188	5,6	2,800	10,3
	Muscat d'Adda 5 Pt	197	325	185	5,7	2,900	10,8

The level of acidity has been correlated with the quantity of sugar accumulated in the grapes of the experimental variants, one noting that the acidity values were lower then sugar value of the experimental variants. There were minimal differences that did not surpass 0,1 g/l.

The production (kg/grape vine, t/ha) - Comparing the average values one finds that *Grasă de Cotnari 4 Pt* selection has supplied a production of grapes (2,400 kg/grape vine- 8,9 t/ha) and *Grasă de Cotnari 45 Pt* (2,250 kg/grape vine- 8,5 t/ha). In the case of the two clone selections of *Tămâioasă românească* sort the productions were classified within the limits of the production capacities of the sort, aiming to obtain a quality production thusly: 1,700 kg/grape vine (7,2 t/ha) for *36 Pt*, respectively 1,820 kg/grape vine (7,6 t/ha) for *5 Pt*.

In the case of the *Busuioacă de Bohotin 26 Pt* clone selection the production also classifies within the limits of production for the sort, aiming at obtaining a quality production thusly: 1,800 kg/grape vine (7,5 t/ha). The production obtained at the *Băbeasca neagră 94 Pt* is higher, 2,940 kg/grape vine (12 t/ha). The ongoing elite approval, *Fetească neagră 10-4* obtained a higher production, meaning 2,400kg (8,9 t/ha). In the case of the *Muscat de Hamburg 4Pt and Muscat d'Adda 5 Pt* selections the grape production is 2,800 kg/ grape vine (10,3 t/ha) for the first selection (4Pt) and for the second selection (5Pt) 2,900 kg/grape vine (10,8 t/ha).One noticed that in the case of the experiment variants that are very close in terms of genetic values, the biological and technological parameters are close, thus posting a selection may be done only by sugar value concentration.

CONCLUSIONS

1.The obtained results from the point of view of the agro biological and technological behavior lead to the idea that the clone selections taken for the study can be multiplied with success in order to obtain an autochthon certified biological material, at the same time justifying the necessity of their introduction and extension in the culture.

2.The capacity than transmission and acquisition of different characters, such as precocity of debuding, the size of grapes, early baking grapes, increased capacity of sugar accumulation of these varieties and clonal selections, is due to their phylogenic age submitted, and their full adaptation in pedoclimatic conditions in vineyard Pietroasa.

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