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VRANCEA - NEW VARIETY OF VINE FOR OBTAINING WHITE WINES OF HIGHER QUALITY CREATED AT S.C.D.V.V. ODOBEŞTI

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Abstract

The scientific research in the field of improvement of vines has as main objective the diversification of the wine variety by creating new varieties with high quantitative and qualitative potential, with tolerance to diseases, pests and stress factors. Responding to this purpose, at the SCDVV Odobeşti was created the 'Vrancea' variety, obtained from the sexual crossing of the hybrid combination (Traminer x Armaş) with the 'Fetească regală' variety, approved in 2018. The new creation is characterized by grapes of small to medium size (153 g) , small to medium grains (1.9 g), uniform, globular, with thin skin, pink - yellow, succulent pulp, slightly firm, without anthocyanin coloration. The average grape production is 6.7 kg/ha, respectively 23.7 t/ha. It presents good tolerance to the main cryptogamic diseases and stressors. The grapes reach maturity in their V age. Higher quality white wines are obtained, with an average alcoholic potential (12.0-12.6% vol alcohol), good total acidity (6.2 g/l tartaric acid) and medium to high values of the extract non-reducing dry (21.0 g/l).

Key words*: sexual hybridization, tolerance, variety*.

INTRODUCTION

Productivity, quality and adaptability of vine varieties are very complex characteristics that depend on the genetic traits (inherited genotype or dowry) of each variety, the environmental conditions and the interaction between genotype and environment (Sestraș, 2004).
The obtaining of vines varieties with higher productive and qualitative traits, adapted to climate change, which exploit local natural resources in the context of sustainable viticulture, is the result of research in the field of vine improvement.
Through works of sexual hybridization enter and interspecific, at the S.C.D.V.V. Odobeşti have been approved in the last three years, three varieties: 'Măgura' and 'Remus' - varieties for wine grapes and 'Putna' variety for table grapes (Bosoi et al., 2017; Puşcalău et al., 2018).
To this genetic dowry is added the new 'Vrancea' variety, intended for the production of high quality white wines approved in 2018 (Mihu et al., 2016; Puşcalău et al., 2017).

MATERIALS AND METHODS

The study was carried out in the period 2016 - 2017, on a 34-year-old plantation, set up on a soil of leached chernozem type, located in the biological field of S.C.D.V.V. Odobeşti.
The 'Vrancea' variety was obtained from the sexual crossing of the hybrid combination (Traminer x Armaş) with the 'Fetească regală' variety, named during the study - the hybrid elite 8-5-1.
Studied and verified in all the stages imposed by the improvement scheme by sexual hybridization, according to the norms of experimental technique, it was compared with one of the basic varieties from the assortment of the Odobeşti vineyard - 'Fetească regală', which represents the paternal parent and is similar as the production direction.
The varieties 'Vrancea' and 'Fetească regală' (the control) were grafted on to the Kobber 5 BB rootstock, with Dr. Guyot cutting system. The fruit load was 44 buds/vine, distributed on 9-eye fruiting cane and 2-eye spur.

The planting distance is 2.2 m x 1.2 m, returning 3787 vine/ha. Were studied the main ampelo-graphic characters, determinations were made regarding the elements of fertility and productivity, the quantity and quality of grape production, physico-mechanical composition of grapes and technological indices, the physico-chemical characteristics of the wine.

RESULTS AND DISCUSSIONS

Climate condition. The research period was characterized by very high heliotermic availability (2451.7 hours in 2016 and 2536.3 hours in 2017) compared to the multiannual value of 2137.2 hours (Table 1). Also, the average annual air temperatures recorded in the two years of study (12.7ºC, respectively 12.3ºC) were above the multiannual average value (10.6ºC).

Table 1. The main climatic data from the study period (Odobeşti, 2016-2017)

Climate indicator	Multiannual (1946-2015)	Year		Average 2016 - 2017
		2016	2017	
Annual				
The average temp.,ºC	10.6	12.7	12.3	12.5
Temp. max. abs. ºC	39.4	35.4	37.9	36.7
Temp. min. abs., ºC	-22.8	-14.0	-15.6	-14.9
Amount degrees usuful temp (Σºtu), ºC	1624.9	1952.8	1926.0	1939.4
The amount heatstroke, hours	2143.0	2451.7	2536.3	2494.0
Precipitation amount, mm	615.5	1049.0	655.2	852.1
On the vegetation period				
The average temp.,ºC	17.1	18.7	18.5	18.6
Temp. max. abs. ºC	39.4	35.4	36.8	36.1
Temp. min. abs., ºC	-8.2	-0.1	1.2	0.6
Amount degrees usuful temp (Σºtu), ºC	1609.7	1938.0	1892.5	1915.3
The amount heatstroke, hours	1655.0	1912.5	1917.8	1915.2
Precipitation amount, mm	436.9	909.4	492.4	700.9

The rainfall regime was surplus in 2016 (1049.0 mm) and close to normal in 2017 (655.2 mm). The sum of the useful temperature degrees during the vegetation period (1938.0ºC, respectively 1892.5ºC) was well above the multiannual value (1609.7ºC).

The ampelographic characters. At the budburst (Stages C, Baggiolin), the rosette is greenish-brown. The tip of the shoot is completely open with bristles and anthocyanic pigmentation absent or very small (Figure 1).

Figure 1. 'Vrancea' variety (young shoots)

The young leaves (4th leaf) are pentalobate with deep sinuses, intense green color. The adult leaves are medium, intensely green, pentalobate, with the upper lateral sinuses of the tongue are open, elliptical, with a "V" base, and the petiole sinus is wide open in the U or V shape (rarely in the shape braces).

The petiole is slightly longer in relation to the median rib length. The shoots have vigor of medium growth, green-red color on the sunny side and reddish on the shaded side, with streaks on both sides and middle merits.

The flowers are normal hermaphrodites, on type 5, with fertile pollen. The grapes are small to medium in size, cylindrical in shape, uniaxial, sometimes double-winged, with a length of 12.0-14.0 cm (Figure 2).

Figure 2. 'Vrancea' variety (leaf, grape, berry)

The grains are small to medium, uniform, globular, with a thin skin, pink - yellow - more intense on the sunny side, and the pulp is succulent, slightly firm, without anthocyanin coloration and no specific taste.

The vegetation phases. Under the climatic conditions of the Odobeşti vineyard, the new variety carried out the annual cycle of vegetation in 182 to 193 days, the beginning and the end of the vegetation taking place at calendar dates close to the control variety – 'Fetească regală' (Table 2).

Table 2. The phenological spectrum of the 'Vrancea' variety (Odobeşti, 2016 -2017)

Variety	Phenological phases					During the vegetation days
	Disbudding	Flowering	Grapes ripping	Technological maturity	Fall leaves	
'Vrancea'	10 - 15.IV	2 - 10.VI	2 - 5.VIII	14 - 20.IX	14 -20.X	182-193
'Fetească regală' (Mt.)	9 -14.IV	29.V- 2.VI	4 - 6.VIII	14 - 16.IX	13 - 19.X	182-194

The full ripening of the grapes at the new variety was carried out in the second decade of september, approximately with 'Fetească regală' variety (Mt.), falling within the 5th age of ripening.

Fertility and productivity (Figure 3). The main elements of fertility and productivity of the new variety, appreciated by the percentage of fertile shoots, the coefficients of fertility (absolute and relative), the average weight of the grape and the productivity indices (absolute and relative), show higher values compared with the control variety - 'Fetească regală' (Table 3).

Table 3. Comparative fertility and productivity of the 'Vrancea' variety

Variety	Year	Fertile shoots (%)	Fertility coefficients		Productivity indices		Average weight grapes (g)
			relative	absolute	relative	absolute	
'Vrancea'	2016	91	1.63	1.79	243	267	149
	2017	74	1.04	1.41	163	221	157
	Average	83	1.34	1.60	203	244	153
'Fetească regală' (Mt.)	2016	85	1.25	1.46	158	184	126
	2017	72	1.10	1.57	171	212	155
	Average	79	1.18	1.52	165	198	141

Figure 3. The variety 'Vrancea'

The biological resistance to the main cryptogamic diseases was established by assessing the grades from 1 to 9 according to the resistance scale developed by O.I.V (International Organisation of Vine and Wine). In the year 2016 (year favorable to the attack of cryptogamic diseases), under the application of the treatment scheme, the variety Vrancea showed resistance close to or even superior to the control variety Fetească regală (Table 4).

Table 4. Behavior of the 'Vrancea' variety at the main diseases of vines (after O.I.V. descriptor list for grape varieties and *Vitis* species, 2nd edition - 2009)

Variety	Downy mildew (*Plasmopara viticola*)		Powdery mildew (*Uncinula necator*)		Gray rot (*Botrytis cinerea*)	
	Leaf OIV 452	Grape OIV 453	Leaf OIV 455	Grape OIV 456	Leaf OIV 458	Grape OIV 459
'Vrancea'	7	7-9	7	7-9	7-9	5
'Feteasca regală' (Mt.)	7	7	7	7	7	5

Resistance to stressors and growth force. In the climatic conditions recorded in Odobeşti vineyard (years 2016 and 2017), the new 'Vrancea' variety showed good frost resistance comparable to the 'Fetească regală' variety and a high drought tolerance (Table 5).

Table 5. Behavior of the 'Vrancea' variety to stress factors (after OIV descriptor list for grape varieties and *Vitis* species, 2nd edition - 2009)

Variety	Frost resistant (% dead buds)	Drought resistant	Growth vigor
'Vrancea'	9.8	7	5
'Fetească regală' (Mt.)	10.2	5	7

The vigor of growth of the buds expressed by the length of the shoots is an average one.

Quantity and quality of production. The study of the technological characteristics of the grape production completed the knowledge elements for the new 'Vrancea' variety (Table 6 and Figure 4).

The number of grapes per vine and the production obtained (kg / vine) confirm the data on the fertility of the vine for the 'Vrancea' variety compared to the control variety.

Table 6. The quantitative and qualitative characteristics of the grapes in the 'Vrancea' (2016 - 2017)

Variety	Year	No. grapes/ vine	Grape production		Sugar (g/l)	Total acidity (g/l H_2SO_4)
			kg/vine	t/ha		
'Vrancea'	2016	48	7.22	25.27	192	3.58
	2017	40	6.33	22.15	212	3.35
	Average	44	6.77	23.71	202	3.47
'Fetească regală' (Mt.)	2016	35	4.55	17.23	188	3.62
	2017	33	5.20	18.19	191	4.36
	Average	34	4.88	17.71	189	3.99

The grape production made by the new variety, as an element that defines the opportunity of its approval and extension in culture, was superior to the control variety.

The average value of grape production over the two years of study was 6.77 kg/ha, respectively 23.71 t/ha in the 'Vrancea' variety compared to 4.88 kg/ha respectively 17.71 t /ha in the control variety - 'Fetească regală'.

The production increase achieved by the new 'Vrancea' variety is 39% compared to the control variety being provided statistically ($p < 0.05$ - 0.0039), and representing a production increase of 1.89 kg/vine, respectively 6.0 t /ha.

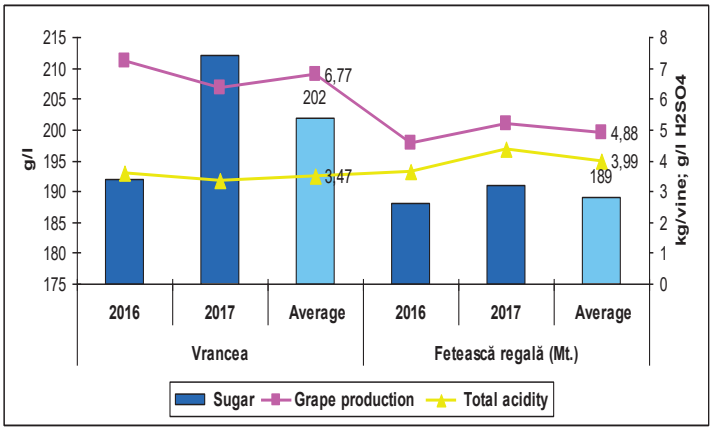

Figure 4. Quantity and quality of production (Odobeşti, 2016-2017)

The quality of the production appreciated by its sugar content and acidity of the juice, shows a potential for accumulation of sugars higher than the control variety (average values of 202 g/l in the 'Vrancea' variety, respectively 189 g/l in 'Fetească regală' variety), under the conditions of an average acidity of 3.47 g/l H_2SO_4 in the 'Vrancea' variety, respectively 3.99 g/l H_2SO_4 in the control variety.

The values of the technological indices resulted.

from the physical-mechanical analysis of one kilogram of grapes, complete the qualitative properties of the new 'Vrancea' variety (Table 7).

Table 7. Physico-mechanical composition of 1 kg grapes and technological indices of 'Vrancea' variety compared with control

Elements determined	'Vrancea'	'Fetească regală' (Mt.)
1 kg grapes:		
Berry, g	960	956
Bunch, g	39	46
Must weight, g	735	758
Volume of must, cm^3	662	725
Seeds, g	38.4	27.3
Skin and core weight, g	187	171
Marc weight, g	225	198
100 berry:		
Average weight, g	198	189
Volume, cm^3	176	168
Number of seeds	181	161
Seeds weight, g	6.6	5.8
Skin weight , g	23.5	18.3
Core weight, g	145	165
Technological indices:		
Berry index	51	55
Structure of the grape index	25	28
Composition of berry index	5.62	9.15

The oenological parameters of the wines obtained from the 'Vrancea' variety were comparable to those of the control variety - 'Fetească regală', namely an alcoholic concentration of 12.65% vol., a total acidity of 6.85 g/l tartaric acid and a non-reducing dry extract of 19.90 g/l (Table 8).

Table 8. The physico-chemical characteristics of wines (average data 2016-2017)

Soiul	Alcohol vol. %	Total acidity g/l tartaric acid	Dry extract unred-ucible g/l	Residual sugar g/l
'Vrancea'	12.65	6.15	19.90	1.29
'Fetească regală' (Mt.)	12.49	5.92	17.98	3.04

The physico-chemical characteristics of the obtained wine classify the 'Vrancea' variety in the assortment of white wines of superior quality.

CONCLUSIONS

The new variety, called 'Vrancea', is an original and valuable creation, which enriches the source of germplasm, completes and diversifies the varietal assortment of grapes for white wines, with an increased resistance to diseases and abiotic factors.

It has a high fertility potential (83% fertile vines), reflected in the high and constant productions, from 22 to 25 t/ha.

The quality of the production appreciated by its sugar content and acidity of the must, shows a potential for accumulation of sugars higher than the control variety (average values of 202 g/l in the 'Vrancea' variety, respectively 189 g/l in the 'Fetească regală' variety).

The physico-chemical characteristics of the obtained wine classify the 'Vrancea' variety in the assortment of white wines of superior.

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