EVALUATION OF NEW GRAPEVINE VARIETIES AND PERSPECTIVE ELITES IN GENOFOND OF ISPHTA

EVALUAREA UNOR SOIURI ŞI ELITE DE PERSPECTIVĂ DE VIŢĂ DE VIE ÎN CONDIŢIILE GENOFONDULUI IŞPHTA

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Abstract*. In the paper are presented the agrobiological and ampelographic characteristics of the new varieties and elites, created and highlighted in the Republic of Moldova (National Institute of Vine and Wine, currently Scientific and Practical Institute for Horticulture and Food Technologies). Presented genotypes possess separately or in different combinations the characteristics necessary for a sustainable, competitive vitiviniculture: quality, including a different degree of seedlessness, productivity, increased or enhanced resistance to extreme fluctuations of temperature (in winter and in summer), to cryptogamic diseases, diverse use, long-term storage, transportability. The diversity of presented characters and properties is a valuable potential for completing existing assortment; serves as the basis for the development of organic production and as a strategic pre-breeding fund in future breeding programs.*
Key words*:* grapevine, varieties, elites, assortment, breeding, resistance

Rezumat. *În lucrare sunt prezentate însuşirile agrobiologice şi caractere ampelografice pentru soiurile noi şi elitele, create şi evidenţiate în Republica Moldova (Institutul Naţional al Viei şi Vinului, actualmente Institutul Ştiinţifico-Practic de Horticultură şi Tehnologii Alimentare). Genotipurile prezentate posedă separat sau în diferite combinaţii caracterele necesare unei viti-viniculturi sustenabile, competitive: calitate, inclusiv grad diferit de apirenie, productivitate, rezistenţă sporită sau avansată la fluctuaţiile extreme de temperaturi iarnă/ vară, la bolile criptogamice, utilizare diversă, păstrare îndelungată, transportabilitate. Diversitatea caracterelor şi însuşirilor prezente constituie un potenţial valoros pentru completarea sortimentului existent, serveşte ca bază pentru elaborarea producţiei eco şi ca fond strategic bre-breeding în viitoarele programe de amelioare genetică.*
Cuvinte cheie*:* viţa de vie, soiuri, elite, sortiment, ameliorare, rezistenţă

INTRODUCTION

The global area under vines is 7.5 million ha, and from global grape production, estimated in 2016 to 7.5 million quintals, 35.8% were used for fresh consumption, for wine production - 47.3%, for raisins (dried grapes) - 8.0% and

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for juice and must production - 5.5% (OIV statistical report, 2017). According to the same source, the Republic of Moldova, with a total area under vines of about 140 thousand ha, ranked 13th in the world after this indicator, after the volume of wine produced (estimated at 1.7 million hl) - 19th place and 12th place after export volume (1.2 mhl). The vitiviniculture sector remains an important one for the country's economy, with the potential to diversify the market with products of high nutritional and curative value, and to develop effective value chains.

The location of the republic's territory at the northern limit of the industrial viticulture essentially influences the efficiency of the branch. The creation in the Republic of Moldova and the implementation in production of new varieties, including seedless, with genetic resistance to abiotic and biotic unfavorable factors (Savin, 2012; Catalog of varieties, 2018), is a decisive factor in diminishing economic losses, in ensuring food safety and security, and the development and implementation of other varieties with similar economic efficiency increases this contribution. Some initial assessments of varieties and perspective elites resulting from these breeding programs are presented in this paper.

MATERIAL AND METHOD

The studies were carried out during the period 2009-2017 within the grapevine Genofond located at the Scientific-Practical Institute of Horticulture and Food Technologies (southern part of Chisinau city). The weather conditions of the experimental plots correspond to the conditions of the Codru wine region of the Republic of Moldova

In study were included new varieties, elites created in the Republic of Moldova: seedless genotypes I-15-15, I-5-68, II_2-1-97, II_2-13-66, Apiren roz (v.II) and genotypes with seeds Basarabia, I-2-24, I-5-58, II_2-11-19, Gen Piticul (fig. 1).

Basarabia II_2-11-19 I-5-58 I-5-68 II_2-13-66

Fig. 1 Genotypes included in study

Planting scheme is 3.0 x 1.25 m, the training system is a bilateral cordon on the high trunk (60 cm). The total number of eyes left on cutting, the number of buds started in vegetation, the number of shoots, including the number of fertile shoots, the number of grapes, the size (length, width) and the weight of the grapes and beries were determined. The ampelographic description was performed according to the OIV Descriptor (2009).

The processing of the experimental data, the graphical presentation was done with the STATISTICA 7.0 software package.

RESULTS AND DISCUSSIONS

In order to determine the degree of adaptation of these genotypes to the wintering conditions and the evaluation of the productive potential, were determined the number of buds started in the vegetation and the formation of the fruitful elements - the number of shoots and inflorescences, the percentage of fertile shoots, the absolute (AFC) and relative (RFC) fertility coefficients, absolute (API) and relative (RPI) productivity indices (tab. 1, fig. 2).

Table 1

Indexes of fertility and productivity for new varieties and perspective elites (average for 2009-2016)

Name of genotype	Fertile shoots, %	AFC	RFC	Average weight of bunch, g	API*	RPI**
Seedless varieties						
I-15-15	77.5±3.3	1.62±0.05	1.26±0.09	237.8±28.9	385.2	299.6
I-5-68	66.8±4.7	1.26±0.04	0.82±0.06	304.9±41.6	384.2	250.0
II_2-1-97	66.8±4.9	1.31±0.03	0.88±0.08	397.4±49.8	520.6	349.7
II_2-13-66	63.9±4.4	1.28±0.07	0.81±0.08	360.7±51.1	461.7	292.2
Apiren roz (v.II)	53.2±7.3	1.13±0.06	0.62±0.10	384.9±51.5	434.9	238.6
Seedy genotypes						
Basarabia	38.2±6.1	1.06±0.02	0.42±0.07	320.5±45.1	339.7	136.6
I-2-24	77.9±4.0	1.75±0.06	1.37±0.10	150.8±16.1	263.9	206.6
I-5-58	53.3±4.9	1.10±0.03	0.60±0.07	767.3±84.6	844.0	460.4
II_2-11-19	66.5±4.7	1.36±0.09	0.91±0.10	284.5±35.8	386.9	258.9
Gen Piticul	78.4±2.7	1.49±0.05	1.16±0.07	199.2±17.0	288.8	231.1

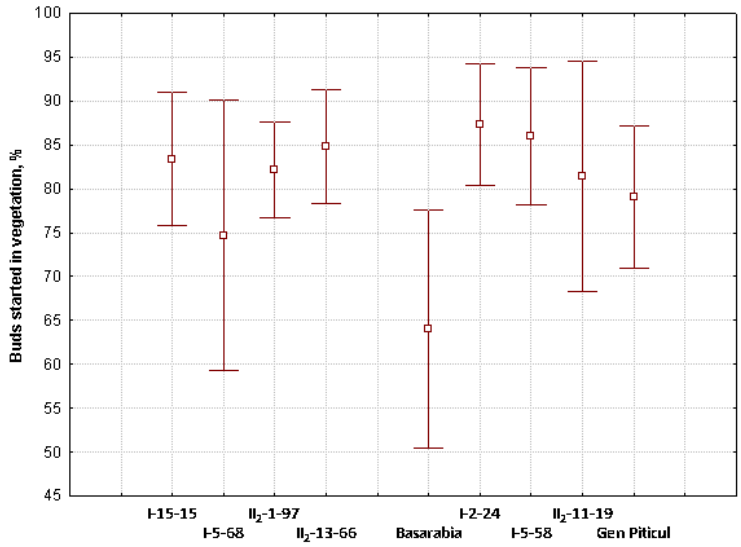

Fig. 2 Percent of buds started in vegetation
(□ –mean value; I - 95% confidence interval)

In the group of seedless genotypes, the average percent of fertile shoots range from 53.2% for Apiren roz (v.II) to 77.5% for the elite I-15-15, the latter being also characterized by the higher percentage of shoots with 2 inflorescences (about 30%). For the group of seedy genotypes is revealed a more pronounced variability after this index, the values being between 38.2% (Basarabia variety) and 78% (I-2-24 and Gen Piticul). In this group are manifested by the increased percentage of shoots with 2 inflorescences the genotypes Gen Piticul (44%) and I-2-24 (62%).

Table 2

Ampelographic characteristic of new varieties and perspective elites

Name of genotype	Mature leaf				Bunch			
	OIV 067	**OIV 068**	**OIV 076**	**OIV 081-1/ 083-2**	**OIV 202**	**OIV 203**	**OIV 208**	**OIV 502**
Seedless varieties								
I-15-15	4	2|3	3	1/9	9	5	1	3
I-5-68	4	2|3	5	1/1	9	5-7	1	3
II_2-1-97	4	2|3	3	1/1	5	5	3	3-5
II_2-13-66	4	2	3	1/1	5	5	3	3-5
Apiren roz (v.II)	2	3|4	4	1/1	7	5	1	3-5
	Berry							
	OIV 220	**OIV 221**	**OIV 223**	**OIV 225**	**OIV 236**	**OIV 503**	**OIV 505**	**OIV 506**
I-15-15	3-5	3-5	2	1	1	1-3	5	1-3
I-5-68	3	3	2	6	1	1	7	3
II_2-1-97	5	5	2	1	2	3	5	5
II_2-13-66	5	3	3	2	1	1-3	5-7	3-5
Apiren roz (v.II)	5	5	2	5	5	3-5	5-7	3
Seedy genotypes								
	Mature leaf				**Bunch**			
	OIV 067	**OIV 068**	**OIV 076**	**OIV 081-1/ 083-2**	**OIV 202**	**OIV 203**	**OIV 208**	**OIV 502**
Basarabia	2	3	5	1/1	5-7	5	2	3-5
I-2-24	4	1|2	2	1/1	3	3	1	1
I-5-58	2	3|4	3	1/1	7	7	2	7
II_2-11-19	4	2	3	1/1	5	5	2	3
Piticul	4	2	2	9/1	5	3-5	1	1-3
	Berry							
	220	**221**	**223**	**225**	**236**	**503**	**505**	**506**
Basarabia	7-9	5	6	6	1	5	5-7	3-5
I-2-24	3	3	2	6	1	1	7	3-5
I-5-58	9	7	6	2|5	1	7	5	3-5
II_2-11-19	5-7	5	2-3	1	1	5	7	3
Piticul	7	5	3	1	1	5	5	3-5

In the study years, with severe temperatures of -26...30°C in some winters (2010, 2012, 2014), most of the genotypes were manifested by the increased

percentage of buds started in vegetation (80-85 %) (Fig. 2). The variability of this index, characterized by the coefficient of variation C_V,%, over the years shows a pronounced homogeneity for most genotypes - C_V<30% for I-5-68, II_2-13-66, Apiren roz (v.II), I-2-24, I-5-58, II_2-11-19, Gen Piticul, and therefore a stability in their successful wintering in various weather conditions.

Characterizing the size of the grapes according to their length (OIV 202), we find in the group of seedless genotypes a variability from medium grapes to large and very large grapes (I-15-15, I-5-68) and according the weight (OIV 502) - small-medium grapes (tab. 2). Within the group of seedy genotypes, most of them are with medium-sized grapes in length and various by weight - small (I-2-24, Gen Piticul), small-medium (Basarabia) and large (I-5-58).

The size and weight of the berry (OIV 220 and OIV 503) are important characteristics for the commercial aspect of grapes intended for fresh consumption. For all seedless genotypes, the berries are small to medium or medium in length and small in weight, with the exception of the variety Apiren roz (v.II) with medium berries. In the group of seedy genotypes predominate grapes with large and very large berries, and according the weight of berry - medium or large. All genotypes provide an accumulation of sugars and total acidity in must (OIV 505 and OIV 506) favorably for consumption of fresh grapes or for technological processing. Preliminary tests indicate long-term storage and transport availability for the Basarabia variety, the elites II_2-11-19 and II_2-1-97.

The evaluation of the main phenological phases (table 3) denotes for the most of studied genotypes a period of about 140-150 days from the time of bud burst to full maturity of the berries, being classified at the late or very late maturation period. It is evidenced by the middle - middle-late maturation genotype with seeds II_2-11-19 (first decade of September) and seedless genotypes I-15-15, I-5-68, Apiren roz (v.II) (middle of September).

Table 3

Main phenological phases of new varieties and perspective elites (average for 2009-2016)

Name of genotype	Time of bud burst	Time of fool bloom	Beginning of ripening	Time of full maturity	Interval bud burst – maturity, days
Seedless varieties					
I-15-15	26.04	07.06	07.08	14.09	146
I-5-68	25.04	01.06	26.07	14.09	143
II_2-1-97	23.04	06.06	02.08	22.09	147
II_2-13-66	24.04	31.05	28.07	21.09	150
Apiren roz (v.II)	17.04	10.06	28.07	12.09	142
Seedy genotypes					
Basarabia	28.04	05.06	02.08	17.09	142
I-2-24	27.04	30.05	12.08	30.09	158
I-5-58	26.04	05.06	30.07	29.09	158
II_2-11-19	25.04	04.06	26.07	08.09	137
Gen Piticul	27.04	05.06	13.08	25.09	152

At an initial assessment (visual, in field conditions) was established an increased or advanced resistance of these genotypes to cryptogamic diseases - a prerequisite for reducing the number of chemical treatments of future vineyards, the possibility of using the grapes to produce eco production.

The described genotypes, through the range of agrobiological traits that characterize them, are a valuable biological material, a pre-breeding strategic fund for future breeding programs. For elite I-15-15, for example, there was found an increased regenerative potential of immature embryos (Chiriac *et al.,* 2007), with great perspectives to engage in assortment amelioration, including according the seedless X seedless cross scheme.

CONCLUSIONS

The studied genotypes have a variety of characters favorable for completing and diversifying the assortment: middle - middle-late maturation period; a wide range of color of berry skin - green-yellow, pink, black-violet, black-blue; seedlessness; muscat or specific flavors; medium, large or very large grapes and berries; increased fertility, biological resistance, diverse use.

The presence, separately or in various combinations of high quality, including seedlessnes, productivity, resistance, other useful features, presents a criterion for theirs inclusion in the pre-breeding germplasm fund for further use in the improvement of the grapevine assortment.

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