

# MARA, NEW VARIETY OF VINE FOR TABLE GRAPES, WITH INCREASED GENETIC RESISTANCE, CREATED AT S.C.D.V.V. IASI

MARA, SOI NOU DE VIȚĂ DE VIE DE STRUGURI PENTRU MASĂ, CU  
REZISTENȚĂ GENETICĂ SPORITĂ, CREAT LA S.C.D.V.V. IASI

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**Abstract.** Scientific research in the field of improving vines, with the permanent role of innovating and diversifying the assortments of vine, by creating new genotypes that are qualitatively and productively valuable, with a better resistance to diseases and stress factors, has an open way for the expansion and completion of the assortment of table grapes from the country's vineyards. As an answer to this, at SCDVV Iasi, through works of directed sexual hybridization between the interspecific hybrid Seyve-Villard 12303 and Ozana, has been obtained and homologated in 2011 the assortment called Mara. The new creation is characterized by medium-sized grapes (230 g), medium to large grains (3.7 g), with crisp core and black-cyan coloured skin. The average grape production is about 4.95 kg / vine, respectively 18.75 tons / ha calculated production, of which 90% is the commodity production. It has a good biological resistance to the mildew and powdery mildew and a middle one to the grape's gray rot. The assortment matures the grapes in their IV-V age.

**Key words:** sexual crossing, resistant varieties, statistical methods.

**Rezumat.** Cercetarea științifică din domeniul ameliorării viței de vie, cu rol permanent de înnoire și diversificare a sortimentelor viticole, prin crearea de noi genotipuri mai valoroase calitativ și productiv, cu rezistență mai bună la boli și factorii de stres, are cale deschisă pentru lărgirea și completarea sortimentului de struguri pentru masă din podgoriile țării. Pentru a răspunde la acest deziderat, la SCDVV Iași, prin lucrări de hibridare sexuată dirijată între hibridul interspecific Seyve-Villard 12303 și Ozana s-a obținut și omologat în anul 2011 soiul Mara. Noua creație se caracterizează prin struguri de mărime medie (230 g), boabe mijlocii spre mari (3,7 g), cu miezul crocant și epiderma colorată în negru-azuriu. Producția medie de struguri este de 4,95 kg/butuc, respectiv 18,75 tone/ha producție calculată, din care peste 90% reprezintă producția marfă. Prezintă rezistență biologică bună la mană și făinare și una mijlocie la putregaiul cenușiu al strugurelui. Soiul își maturează strugurii în epoca IV-V.

**Cuvinte cheie:** hibridare sexuată, soiuri rezistente, analiza statistică.

## INTRODUCTION

The varietal range of the varieties for tables grapes admitted for the reproduction in the recreation plantations from the population's households is rather limited and it needs to be supplemented and diversified with new genotypes.

The pronounced heterozygous character of the grape vine, the involvement

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of the genes which control the resistance, the long period between seminal generations, as well as the appearance of determining factors which favor the action of plants sensitizing (rainy years for diseases resistance and cold winters for frost resistance), extend the research period. For definite conclusions, it was imposed the control of resistance's durability in time, in order to maintain this property. The research made in the last four decades in our country, have lead to the procurement of certain grape vine genotypes with increased resistance to diseases (Moldovan et al., 1987 and 1994, Oprea et al., 1994 and 2007, Calistru and Damian, 1999, Culcea et al., 1994 and 2004).

The new grape vine varieties with biological resistance to cryptogamic diseases and to frost, also have production and quality properties which are superior to the ones from Seyve – Villard class, but especially to the hybrid direct producers, these being created only for the recreation plantations from the non-winegrowing areas being destined either for fresh consumption or for obtaining different non-alcoholic drinks.

Following this direction of creation of new resistant genotypes, a new variety of table grapes, called Mara, has been approved at Research and Development Station for Viticulture and Wine-making Iași.

## MATERIAL AND METHODS

The research activity devoted to this purpose has started at SCDVV (Research and Development Station for Viticulture and Wine-making) Iași, after the 1980s. After a preliminary sustained study of the germplasm sources with resistance to diseases and frost, there was performed a wide range of controlled sexual hybridizations using as genitors vinifera varieties with superior properties of production, quality, precocity in grape ripening and inter-specific hybrids from Seyve – Villard class, hybrid direct producers and sometimes even varieties of vine rootstocks. From these hybrid combinations resulted Mara variety, which derives from the intercrossing of varieties S.V. 12303 with Ozana, which was approved in December 2011 (figure 1).



**Fig. 1 – Mara Variety**

By covering all the stages of the improvement scheme specific to the creation of new varieties with increased biological resistance, respectively the field of hybrids and the one for contest, the new variety has been tested and studied for the inspection of the properties of resistance to the main cryptogamic diseases (blight, mildew and grey mould of grapes), to frost and for the inspection of the production and quality properties. The experimental plantations have not been protected during the winter and during the vegetation period there have not been applied anti-cryptogamic treatments, with the exception of very rainy years, when there were required 1-3 interventions. During 2009–2011, which represented the final stage of the improvement scheme through controlled sexual hybridization, the agro-biological and technological studies have been carried out in compliance with ISTIS (The State Institute for Variety Testing and Registration) requirements. The description of distinctness characteristics was performed according to the descriptors adopted by UPOV (Union for the Protection of New Varieties of Plants). During the pre-approval stage, it was carried out the serological test (ELISA) of the presence of the main viruses, and the results were negative. For comparison it was used Milcov variety which is similar as direction of production, growth vigor and epidermis' color.

## RESULTS AND DISCUSSIONS

During the study period, the weather conditions in Iași vineyard, Copou wine-growing centre, where are located experimental fields, it was signalled the presence of cold winters, with absolute minimum temperatures which were under the freeze limit for the grape vine, respectively  $-27^{\circ}\text{C}$  in the air and  $-35^{\circ}\text{C}$  at the ground surface ( 26.01.2010), with springs warmer than the standard temperature, but more poorer in precipitations, with the exception of the year 2010, very warm summers, with absolute maximum temperatures which frequently rose over  $30^{\circ}\text{C}$  in the air, and the average temperatures in July, August and September were over the standard, being very favorable to the completion of the main physiological and bio-chemical processes which influence its production and quality. The precipitations during the vegetation period were poorer in the year 2009 (214 mm) and in the other years they were close to the normal values, but they were irregularly distributed, the largest quantities being registered in June during the blooming period, with negative influence on the processes of fertilization and graining of the berries of grapes.

On the background of this weather conditions, Mara variety has started its vegetation through disbudding between 25<sup>th</sup> of April 6<sup>th</sup> of May, without significant differences in comparison with the witness, as well as the flowering phenophase located between 5<sup>th</sup>–8<sup>th</sup> of June. Grapes' ripping was realized between 30<sup>th</sup> of July 12<sup>th</sup> of August, and the grapes reached commercial maturity during the period 23<sup>rd</sup> of September 5<sup>th</sup> of October, with approximately three weeks later that the witness variety. Its extension offers the possibility of fresh consumption of grapes for a longer period (table 1).

Table 1

Phenological spectrum					
Variety	Disbudding	Flowering	Grapes ripping	Commercial maturity	Fall leaves
Mara	25.04 - 06.05.	05 - 08. 06.	30. 07 - 12.08.	23.09-05.10.	25.10.
Milcov (mt)	23.04 - 04. 05.	03 - 10. 06.	26.07 - 08.08.	21.08-15.09.	25.10.

Regarding the coverage of the phenological spectrum, the new Mara variety integrated in the ecosystem conditions, completing its vegetation period after 182 days.

Fertility and productivity of the new variety, appreciated through the percentage of fertile vine shoots, the absolute and relative fertility coefficients and the absolute and relative productivity indices (table 2) show its superiority for all the analyzed elements compared to the witness. The new variety show a high fertility potential, 87,6% of the vine shoots from a vine stalk being fertile, the absolute and relative fertility coefficients having values higher than 1, respectively 1,63 and 1,42, superior to Milcov variety (1,47 and 1,01). One can state significant differences between the values of the productivity indices, these ones being higher in the case of Mara variety when compared to the witness.

Table 2

**Fertility and productivity elements of the Mara variety**

Variety	Fertile shoots %	Fertility coefficients		Productivity indices	
		absolute	relative	absolute	relative
Mara	87,6	1,63	1,42	389	339
Milcov (mt)	65,4	1,47	1,01	278	191

The studied technological properties complete the elements of acquaintance with the new variety, under the aspect of the opportunity of its homologation and cultivation in recreation plantations, in population's households within the incorporated area or in the non-winegrowing areas (table 3).

Table 3

**The technological properties of the Mara variety**

Variety	Grapes production:				Average weight / grape g	Average weight 100 berry g	Sugars g/L	Total acidity g/L H <sub>2</sub> SO <sub>4</sub>	Maturati on of grapes
	effective kg/ vine stalk	calculated t/ha	high %	increa se					
Mara	4,95	18,75 <sup>xx</sup>	91	-	239	370	180	4,9	IV - V
Milcov (mt)	3,88	14,69	80	27	189	280	138	3,0	III - IV

DL 5% = 0.368; DL 1% = 0.609; DL 0,1% = 1,14.

Grape size realized in the case of this new variety, appreciated for its average weight is of 239 g/grape compared to 189 g/grape in the case of the witness. The berry is middle-sized, weighting 3,7 g/berry, also superior to the witness variety (2,8 g/berry), with black/blue, uniform epidermis and crunchy pulp. The effective production of grapes for each vine stalk and calculated per hectare reveals the increased biological potential of the new variety, this one achieving a multi-annual average production of 4,95 kg/vine stalk, respectively of 18,75 t/ha, ensuring a production increase with 27% in comparison to the witness, assured significantly and distinctly from a statistical point of view.

The commercial and consumption values are reflected through the high proportion of production to be delivered, which represent 91% of the total production. Quality-related elements show an increased potential of accumulation

of sugar (180 g/L) and total acidity in must (4,9 g/L H<sub>2</sub>SO<sub>4</sub>), which are more reduced in the case of Milcov variety, in the conditions of the winegrowing ecosystem of Copou.

The values of the technological indices resulted from the physical-mechanical analysis of one kilogram of grapes complete the qualitative properties of the new Mara variety (table 4).

Table 4

**Physico-mechanical composition of 1 kg grapes and technological indices of Mara variety compared with control**

Elements determined	Mara	Milcov (mt)
<b>1 kg grapes:</b>		
no. berry normally developed, healthy	262	380
berry, g	980	972
bunch, g	20	28
must, g	640	630
volume of must, cm <sup>3</sup>	585	600
no. berry/100 g bunch	27	39
<b>100 berry:</b>		
average weight, g	389	280
volume, cm <sup>3</sup>	350	250
number of seeds	237	243
seeds weight, g	12	14
skin weight, g	23	22
core weight, g	354	244
<b>Technological indices:</b>		
berry index	27	39
structure of the grape index	49	35
composition of berry index	10,1	6,78

Checking the resistance properties of the variety to low temperatures and to the attack of the main cryptogamic diseases, one can state that they have been influenced by the evolution of the climate conditions in the ecosystem (table 5).

Table 5

**Resistance to frost and fungal diseases main (notes OIV scale)**

Variety	% Viable buds	Blight		Mildew		Grey mould of grapes
		leaf	grapes	leaf	grapes	
Mara	39 – 95	9	9	9	9	7 – 8
Milcov	27 – 93	7	8	7	7	6

If vine stalks are not protected during winter, in the presence of some absolute minimum temperatures of – 27 °C in the air and – 35 °C at soil surface, Mara variety has been affected by frost in a quite high proportion, the viability of the winter grape buds was of 39% only, being similar to *vinifera* varieties. The biological resistance has been good to the main cryptogamic diseases, when applying a reduced number of treatments during the period of vegetation (1-3) in the years with abundant precipitations, being appreciated with 9 for blight and mildew on leafs and grapes and with 7-8 for grey mould of grapes in the OIV (International Organisation of Vine and

Wine) scale, values which are superior to the witness, Milcov variety, in the conditions of applying 6-7 phytosanitary treatments.

## CONCLUSIONS

1. The new created variety, called Mara, is an original and valuable creation that enriches the source of germoplasm, completes and diversifies the varietal conveyor of the table grapes, with increased resistance to diseases.

2. Presents a high potential of fertility (87,6% fertile vine shoots), reflected in the high and permanent productions, of 18,75 t/ha, of which 91% represents the production to be delivered.

3. Grapes are middle-sized, with large berries, black/bluish coloured, crunchy pulp and pleasant taste, semi-compact, which reach maturity at the 4<sup>th</sup> – 5<sup>th</sup> ages.

4. This new creation is recommended in case of reproduction for recreation plantations, population's households or in areas outside the winegrowing ones.

*Acknowledgments:* This study was conducted in the P.S. 1.1.7/2011, Sectoral Plan ADER 2020, funded by the Ministry of Agriculture and Sustainable Development (MARD).

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