

# EVALUATION OF SOME AUTOCHTHONOUS GRAPEVINE VARIETIES PRESENTED IN THE GENOFOND OF ISPHTA

## EVALUAREA UNOR SOIURI DE VIȚĂ DE VIE AUTOHTONE PREZENTE ÎN GENOFONDUL ISPHTA

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**Abstract.** Evaluation of old autochthonous grapevine varieties, including neglected or at risk of extinction, is actual in the perspective of use of their still unexplored potential in the development of viticulture. Phenotyping of autochthonous varieties presented in the Grapevine Genepool of Research and Practical Institute for Horticulture and Food Technology (ISPHTA), in the general context of European genetic resources, was performed in the frame of project COST FA1003. Evaluation according unique protocol included description of phenological stages according BBCH scale, as well as determination of some oenocarpological parameters of some varieties grown in industrial plantations ('Coarnă neagră', 'Feteasca albă', 'Rară neagră') and of varieties presented only in Ampelographic Collection ('Copciac', 'Turba plotnaia belaia', 'Turba râhlaia belaia', 'Maischii ciornâi' etc.).

**Key words:** grapevine, old autochthonous varieties, phenotyping,

**Rezumat.** Evaluarea soiurilor vechi autohtone de viță de vie, inclusiv a celor neglijate sau supuse riscului de dispariție, este actuală în perspectiva utilizării potențialului lor încă neexplorat în dezvoltarea viticulturii. Studiul fenotipic al soiurilor autohtone prezente în fondul genetic al Institutului Științifico-Practic de Horticultură și Tehnologii Alimentare (ISPHTA), în contextul general al resurselor genetice din spațiul european, a fost efectuat în cadrul proiectului COST FA1003. Evaluarea, conform protocolului unic, a inclus descrierea fazelor fenologice după scara BBCH, determinarea unor parametri oenocarpologici atât pentru unele soiuri cultivate și în plantațiile industriale ('Coarnă neagră', 'Feteasca albă', 'Rară neagră'), cât și a soiurilor prezente numai în colecția ampelografică ('Copciac', 'Turba plotnaia belaia', 'Turba râhlaia belaia', 'Maischii ciornâi' ș.a.).

**Cuvinte cheie:** viță de vie, soiuri vechi autohtone, fenotipare

### INTRODUCTION

Establishment of old autochthonous grapevine assortment occurs by sec. XIV-XVI (Teodorescu, 1964) and it was presented in plantations mainly until the mid of XIX century. With the invasion of pathogens and of the introduction of American species and hybrids in Europe, assortment based on local varieties was severely affected. In the Republic of Moldova, the presence of old autochthonous varieties decreased over the years both as areas presented in plantation and the

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number of varieties included in the assortment: in 1949 16% of the standard assortment were old varieties, in 1964 - 10 %, from 1980s and to date – 4-5% and currently it includes only varieties 'Coarnă neagră', 'Fetească albă' și 'Rară neagră' ('Băbească neagră') (Savin, 2012b).

Compared to other countries, where old autochthonous assortment numbers hundreds of varieties, here he is less numerous and, according to bibliographic sources includes about 50 varieties representing by eco-geographical origin both the area Proles *pontica* (subproles *balcanica* Negr. and subproles *georgica* Negr.) and Proles *orientalis* (subproles *antasiatica* Negr. and subproles *caspica* Negr.).

Marginalization of old autochthonous varieties is an omission in the creation of sustainable viticulture, both by their absence in plantations and by ignoring in breeding programs their increased adaptability to local pedo-climatic factors, resistance to pathogens as well as the diversity of their productive and qualitative potential. Valorization on the current stage of this component of the assortment can offers both distinctiveness, originality and attractiveness of autochthonous production, but also serve as a source of productivity, adaptability to local climatic conditions for future breeding programs, inclusively in the context of "Climate Change" (Savin, 2014).

Reassessment on various aspects of the local old autochthonous assortment for the purpose of revealing and using of their potential, in part, was initiated in the frame of regional and international programs: inventory, description of resource presented *ex situ* (Savin et al., 2008, 2012a); *on farm* assessment (Savin, 2010); description, diversity assessment, documentation, identification, including the use of genetic-molecular methods (Ghețea et al., 2012; Zulj Mihaljevic et al., 2013). Recently, in the frame of project COST FA1003 (<http://users.unimi.it/grapenet/>) assessments continued in the context of grapevine genetic resources from practically the entire European area, applying phenotypic methods (Rustioni et al., 2014) and molecular biology (De Lorenzis et al., 2014). Some results will be presented below.

## MATERIAL AND METHOD

Studies were conducted in 2012 and 2013 in the Grapevine Genepool (Genofond) of the Research and Practical Institute for Horticulture and Food Technologies located in the south of Chisinau city (46°58'39.65" N and 28°46'21.68" E, altitude 201 m). From all 40 old autochthonous varieties registered in Genofond in study were included four varieties for table grapes ('Coarnă albă', 'Coarnă neagră', 'Damașin galben' and 'Tâța caprei') and 17 varieties for wine ('Bășicată', 'Cabasmă', 'Fetească albă', 'Galabură', 'Gordin', 'Plavaie', 'Turba plotnaia belaia', 'Turba râhlaia belaia', 'Zghihară' – with green-yellow berries and 'Breză', 'Cabasia', 'Ciorcuță neagră', 'Ciorcuță roză', 'Copceac' , 'Maischii ciornâi', 'Negru de Akerman' - with colored berries).

According phenotyping protocol accepted in the frame of project COST FA1003 were determined: the average weight of a grape, the average weight of 10 berries, the weight of skin and seeds of 10 berries, berry length and width, sugar and acid content of must.

Years of study (2012, 2013) differs by contrasting weather conditions, especially related to rainfall, maximum temperatures recorded in summer

(www.meteo.md). The 2012 was a dry year, with precipitation below long-term norm, setting some records for the maximum temperatures and duration: for the first time during the period of instrumental observations was recorded absolute maximum of +42.4°C, and the number of days with high temperatures (>+30°C and +35°C) exceeded 3-15 times the norm. The 2013, in terms of thermal regime had temperatures close to the norm, but heavy rainfall, especially during ripening and harvesting of grapes (in September), which caused the loss of some sorts.

## RESULTS AND DISCUSSIONS

According to information from the Vitis International Variety Catalogue (VIVC - <http://www.vivc.de/index.php>), some of the old autochthonous varieties, registered in Institute's Genofond - 'Breză', 'Ciorcuța neagră', 'Ciorcuța roză', 'Damașin galben', 'Turba râhlaia belaia', 'Turba plotnaia belaia' and other are presented only in one or in a limited number of collections. Given their absence in industrial vineyards, these genotypes are under the threat of extinction. Evaluation and revealing of their productive and qualitative potential were made compared to varieties having a relatively or important significance in industrial plantations ('Coarnă neagră', 'Coarnă albă', 'Fetească albă' etc.), also widespread and outside the country.

Applying phenotyping protocol was determined the diversity of technological properties of old autochthonous varieties for table (Table 1, Figure 1) and wine grapes (Table 2).

Table 1

Some technological properties of old autochthonous varieties for table grapes

Variety	Date of harvest	Average weight of single bunch, g	Average weight of 10 berries, g	Glucos-acidometric index	% of skin	% of seeds
Chasselas blanc	19.09.2012	175	25,7	6,3	13,10	4,49
	24.09.2013	224	36,6	3,8	16,09	2,65
Coarnă albă	19.09.2012	178	32,2	5,7	17,78	3,69
	02.10.2013	278	33,8	3,3	35,36	4,01
Coarnă neagră	26.09.2012	183	30,1	4,1	10,71	3,11
	30.09.2013	358	42,8	3,4	21,10	1,62
Damașin galben	05.09.2012	89	24,8	2,8	16,80	4,53
	20.09.2013	264	48,7	2,9	15,04	2,15
Țâța caprei	07.09.2012	387	30,3	5,7	18,70	5,26
	02.10.2013	774	44,0	2,0	29,65	2,41

The majority of varieties for table grape have small-medium weight of a single bunch (according to gradations of descriptor OIV 502), except 'Țâța caprei' variety. Mention that the variety 'Damașin galben', with mixed-use grapes, in years with adequate moisture can reach a weight of grapes and berries similar to the recognized table grape varieties. During the study years varieties had gained a favorable sugar/acidity ratio (2,9-6,3).

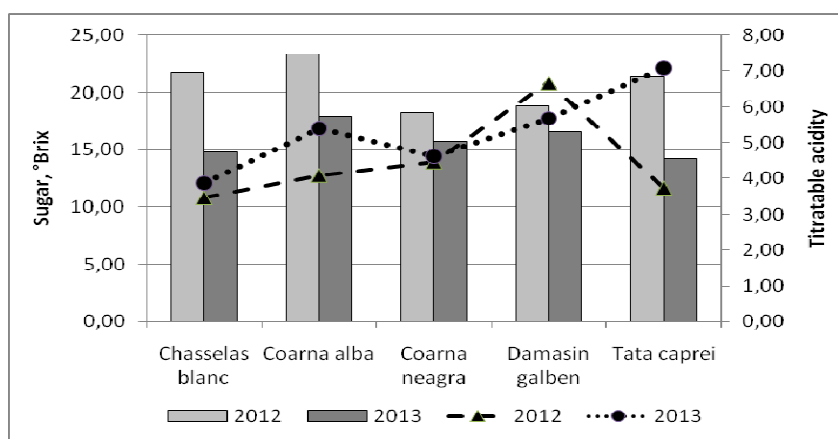


Fig. 1 - Sugar and acid content in must of old autochthonous table varieties

Varieties for wine grapes have more pronounced uniformity concerning the shape and size of berries - most of them has small, spherical or broad ellipsoidal berries, but by the average weight of the cluster there is a wide variation - from small (60-110 g) to medium and large bunches (400-600 g), the index varies and depends on the year of study.

Table 2

Some technological properties of old autochthonous varieties for wine grapes

Variety	Date of harvesting	Average weight of single bunch, g	Average weight of 10 berries, g	Content of must in:		% of skin	% of seeds
				sugar, °Brix	titra-table acidity		
Varieties with green-yellow color of berry skin							
Bășicată	18.09.2012	189,61	22,70	13,00	9,20	11,31	3,07
	02.10.2013	367,78	33,07	12,93	11,00	24,55	3,13
Cabasma	18.09.2012	151,64	19,93	23,33	4,90	20,35	5,57
	23.09.2013	396,11	28,79	14,17	6,77	12,58	3,15
Feteasca alba	19.09.2012	99,96	13,62	22,07	3,35	11,20	6,61
	12.09.2013	185,08	15,30	20,47	6,36	18,77	9,17
Galabura	06.09.2012	123,69	20,77	15,33	8,72	15,29	3,36
	16.09.2013	318,33	35,43	17,20	6,82	12,50	4,06
Gordin	07.09.2012	239,64	26,96	21,57	6,20	18,50	4,64
	24.09.2013	346,89	36,50	15,23	8,55	38,62	1,89
Plavai	19.09.2012	190,66	23,31	20,37	4,47	15,54	4,64
	16.09.2013	392,33	27,50	16,57	7,47	19,68	2,74
Turba plotnaia belaia	19.09.2012	326,39	25,43	22,07	5,85	12,97	5,99
	13.09.2013	602,78	30,98	12,37	7,51	21,95	4,68
Turba rahlaia belaia	19.09.2012	107,88	23,30	22,67	5,91	26,32	5,99
	13.09.2013	318,33	24,00	18,07	8,04	18,34	2,79
Zghihara	19.09.2012	260,50	24,64	18,93	4,97	9,41	4,75
	02.10.2013	351,89	29,33	16,63	7,30	33,56	4,28

Variety	Date of harvesting	Average weight of single bunch, g	Average weight of 10 berries, g	Content of must in:		% of skin	% of seeds
				sugar, °Brix	titra-table acidity		
Varieties with colored berry skin							
Breaza	20.09.2012	209,03	15,65	18,67	4,55	20,78	8,33
	02.10.2013	374,67	28,59	17,20	6,67	21,75	4,39
Cabasia	20.09.2012	291,90	31,08	20,87	5,32	16,15	4,19
	16.09.2013	258,89	26,44	15,57	5,75	33,42	4,34
Ciorcuță neagră	20.09.2012	101,03	13,00	21,10	5,80	11,78	8,35
	01.10.2013	236,78	23,51	16,60	6,30	21,77	4,70
Ciorcuță roză	20.09.2012	250,53	22,45	21,07	3,41	15,49	5,15
Copceac	20.09.2012	160,42	25,41	26,30	6,17	14,09	4,97
	10.09.2013	237,22	28,33	19,93	6,45	23,31	6,00
Fetească neagră	20.09.2012	66,44	7,10	25,93	5,82	32,07	13,07
	11.09.2013	441,56	20,00	21,30	9,27	18,67	4,60
Maischii ciornâi	20.09.2012	196,00	15,08	26,33	4,32	26,63	12,77
	20.09.2013	337,44	26,97	18,43	5,80	16,94	6,06
Negru de Akerman	20.09.2012	204,37	30,00	20,67	4,47	16,77	5,04
	13.09.2013	281,44	28,37	18,83	7,23	19,62	3,30

In 2013 more than half of the studied grape varieties had the average weight of single bunch greater than 300 g, and for variety 'Turba plotnaia belaia' exceeded 600 g. Knowing the advanced fertility of old autochthonous varieties, we can estimate and their increased productive potential. However, prolonged rainfall during September in this year, followed by anomalous low temperatures in early October (4-5°C lower than norm) did not favored the accumulation of conditions ensuring a satisfactory quality of production. In these conditions the varieties 'Bășicată', 'Brează', 'Ciorcuță neagră', 'Damașin galben', 'Zghihară' showed relative or advanced resistance to *Botrytis cinerea* Pers. Taking into account the medium-late time of full physiological maturity of berries for these varieties, future study is needed, inclusively in other pedo-climatic zones.

## CONCLUSIONS

1. In the Grapevine Genepool of the Institute was established the presence of a significant number of old autochthonous varieties, compared to the total number cited in the literature. Some varieties ('Brează', 'Ciorcuță neagră', 'Ciorcuță roză', 'Damașin galben', 'Turba râhlaia belaia', 'Turba plotnaia belaia') are present only in a limited number of collections, so it is necessary their supplementary preservation.

2. Varieties for table grapes reached in the years of study favorable characteristics for fresh consumption (grape weight, ratio sugar/acidity). Variety 'Damașin galben' can be used as source of necessary characteristics in pre-breeding

and breeding programs (mixed-use of grapes, medium-late time of maturity, crisp berry, resistance to gray mold).

3. Varieties for wine represents a wide diversity concerning the average weight of the grape and berry. The quality of some varieties were strongly affected by adverse environmental conditions (rainfall, lower temperatures etc.), but varieties 'Bășicată', 'Breză', 'Ciorcuță neagră', 'Zghihară' had shown resistance to *Botrytis cinerea* Pers.

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