GRAPEVINE BREEDING AND COMPLETION OF THE ASSORTIMENT IN THE REPUBLIC OF MOLDOVA

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Abstract

The paper presents data on the initiation of grapevine breeding programs in the Republic of Moldova and the history of the formation of the grapevine assortment. As a result of the crossbreeding programs and research conducted over the years, grapevine varieties with table and wine grapes resistant to unfavorable environmental factors were created and approved (Tudor, Guzun, Muscat de Bugeac, Viorica, Floricica, Meleag). Another important direction was to lay the foundation for the creation of seedless varieties with resistance to abiotic and biotic unfavorable environmental factors, adapted for cultivation in the temperate zone (Apiren roz, Apiren negru de Grozești, Apiren roz timpuriu). During the period 1980–2025, over 30 new varieties (18 table varieties, 11 wine, 7 seedless) obtained within the institute were homologated and introduced into cultivation in the republic, which contributed to the diversification of the grapevine assortment. Currently, in the recommended grapevine assortment, newly created autochthonous varieties constitute 46%.

Key words: grapevine, assortment, rezistance varieties,genetic resourse, seedless varieties.

INTRODUCTION

Viticulture on the territory of the Republic of Moldova has a millenary tradition, confirmed by paleontological discoveries that attest to the existence of grapevine on this territory since prehistoric times. The introduction of grapevine into culture is associated with the Tripole-Cucuteni culture (11th–5th millennia BC) and the establishment of the local assortment takes place in the 14th-16th centuries, being mentioned the most cultivated varieties: Fetească albă, Busuioaca, Crâmpoșie, Galbenă, Frâncușe (for white wines) and Fetească neagră, Băbească neagră (for red wines). The local varieties were the basis of the assortment until the middle of the 19th century, but with the invasion of phylloxera and cryptogamic diseases (downy mildew - *Plasmopara viticola*, powdery mildew -*Uncinula necator*), related to the introduction in Europe of American species and hybrids, the assortment based on local varieties was seriously affected (Dadu et all, (2017).

Thus, with the transition to grafted viticulture, varieties from other areas, mainly European varieties, were introduced and spread in Bessarabia. In 1897 were introduced direct producer hybrids (HPD) Seibel 1, Teras no. 20, Game Couderc, Couderc no. 201, 504, 120-21, 1101, etc. Later (in 1909) in the collection of the experimental station in Costiujeni (the predecessor of our Institute) were received from Richter nursery from France european varieties for wine (Aligote, Pinot gris, Riesling, Silvaner, Pinot, franc, Cabernet Sauvignon etc.) and table grapes (Chasselas Blanc, Chasselas rose, Chasselas muscque, Muscat de Hamburg), rootstock varieties (Riparia x Rupestris 101-14, Berlandieri x Riparia 420-A, Chasselas x Berlandieri 41 B etc.) and HPD (Castel 102, Couderc 83-32 Couderc 7-17, Seibel 209, 397, 1014, etc.). In the post-war period the first assortment approved in 1946 included 42 varieties (14 varieties with table grapes, 28 with wine grapes). Vineyards cultivated with HPD occupied approx. 91% of the vineyard area. Among the noble varieties, the largest area of table grape varieties was owned by the Chasselas group, and among the wine varieties by Aligote, Cabernet Sagvinion, Muscat alb. (Savin et al., 2024)

In order to improve the assortment, the study of the varieties present in the collections, of some recently introduced varieties, as well as of new creations from various wine-growing regions was initiated. The new assortment, approved in 1964 (it included 31 varieties - 22 for wine and 9 for table), was renewed by 50% compared to the previous one, all varieties being *Vitis Vinifera* (Romanov et al. 1968).

With the transition to the cultivation of vines on high, unprotected trunk, in the conditions of the lack of varieties resistant to frost and cryptogamic diseases, it led to a significant increase in the vulnerability of the *Vitis vinifera* assortment. Considering the geographical positioning of the Republic of Moldova at the northern extremity of the industrial viticulture area and the associated climatic risks, there is an urgent need to complete and diversify the assortment with adapted varieties, characterized by high resistance to frost and diseases, capable of ensuring stable and quality production. The lack of varieties with advanced resistance to low winter temperatures, diseases and pests presented a risk factor for the economic efficiency of viticulture. Cernomoreț et al, (2000).

The subsequent evolution of the grapevine assortment in the republic was significantly influenced by the initiation of breeding programs carried out within the Moldovan Scientific Research Institute for Fruit Growing, Viticulture and Winemaking (IMCȘPVV). These programs had as their main objective the creation of new varieties, characterized by increased resistance to unfavorable biotic and abiotic factors of the environment. The development and adaptation of these genetic breeding programs were carried out by breeders M. Juraveli and N. Guzun, who laid the foundations for a new direction of sustainable development in national viticulture.

The evaluation of the grapevine gene pool allowed the highlighting of genotypes as a source of genes with various characters, inclusiv resistance to frost and cryptogamic diseases, in order to include them in breeding programs (Ivanova, Viyugov, 1975). At the same time, the possibility of using complex hybrids (especially SV-20-365 and SV 20-366) was evaluated the descendants obtained from reciprocal crosses were evaluated to highlight the direction of use as parental partners in the formation of breeding programs various crossing schemes were applied. (Juraveli, Savin, 1972)

The parental partners involved in the crosses at the initial stage included old autochthonous varieties, genotypes originating from *Proles orientalis* Negr. and *Proles occidentalis* Negr., complex hybrids of French origin (Seibeli, Couderc, Seyve Villard)

As maternal parents were involved *Vitis vinifera* L. varieties with high production and quality, but sensitive to frost and *Plasmopara viticola*: table grape varieties Djura uzium, Guzali Kara, Pozdnii VIR-a, Pobeda, Coarnă neagră, Muscat Derbenschii, Nimrang and wine varieties Merlot, Riesling de Rhine, Aleatiko, Traminer roz, Cabernet Sagvinion, Rară neagră, Muscat alb. As paternal parents in the crossing programs were included complex hybrids which, along with advanced features of resistance to frost and cryptogamic diseases, also possess a higher grape quality compared to HPD: varieties for wine grapes Villard Blanc, Varousset and varieties for table grapes Pierrelle, Perle noir, Muscat de Saint Vallier, Datier de Saint Vallier.

As a result of research on newly created varieties, were highlighted genotypes Nistru, Criuleni, Noroc, etc. with resistance to gray moude and Moldova, Struguraş, Decabrischii, Cutuzovschii, Alb de Ialoveni, Negru de Ialoveni, Mărţişor, Leana, Plamennâi, Vierul, etc. with relative or advanced resistance to dawny mildew and wintering (Guzun,1980)

Towards the end of the 1970s, the first new varieties created as a result of the implementation of the breeding program, initiated in the early 1960 s, were tested by the State Commission for Plant Varieties. In 1980, the first table grape varieties Moldova and Muscat Iantarnâi were

homologated, later (in 1990) the first new wine grape varieties Viorica, Riton, Negru de Ialoveni were homologated.

Another goal of the breeders within the institute was the creation of seedless grapevine varieties.

The cultivation of grapevine varieties, which produce seedless grapes, has been attested since ancient times, but in the Danubian-Carpathian-Pontic area, no such varieties have been identified or recorded.

The lack of seedless varieties in the old native assortment in the Danubian-Carpathian-Pontic area is explained by the specific requirements of the classical seedless varieties, of oriental origin, to climatic conditions. Their distribution area is limited, these varieties being cultivated in regions with a longer vegetation period, with a high sum of temperatures and warm and dry autumns. Cultivated in areas with a temperate climate, they are characterized by low productivity, caused by the insufficiency of the climatic conditions necessary during the formation of flower buds. This situation determined the initiation, in the republic, of a programmatic concept regarding the creation of an seedless assortment adapted to local conditions (Savin, 2012, Tofan 2023)

The first research on seedless varieties in the Republic of Moldova began in 1955, testing 12 varieties introduced from various wine-growing regions. As a result of the research, the seedless varieties Kişmiş alb, Kişmiş roz, Askeri, Kişmiş Hişrau, Kişmiş VIR-a were not recommended for cultivation, due to low productivity and the absence of the climatic conditions necessary for their development. As a result in republic, in the early 60s, within the I.M.C.Ș.P.V.V. institute, the first program for creating seedless varieties with high productivity and satisfactory qualities, with a short vegetation period, earlier flower bud formation, adapted to the climatic conditions of the temperate zone was initiated. To achieve this goal, the first crosses were carried out between the table varieties Kata Kurgan, Pobeda, Babara, Nimrang, Volga–Don, Guzali-Cara - as maternal parents and the seedless varieties Kişmiş alb, Kişmiş negru, Kişmiş roz, Kişmiş VIR-a and new seedless hybrids (IV-20-17, VIII-30-17 - from the collection of the V.I.R. Research Station, Tashkent branch) used as paternal parents (Juraveli, 1976). Among the seedless descendants obtained, the first seedless varieties were highlighted and homologated - Kişmiş moldovenesc (1988) and Kişmiş lucistâi (1992), of standard quality, but they were sensitive to frost and cryptogamic diseases.

The paper presents the continuous process of genetic improvement of grapevines in the Republic of Moldova, initiated in the 1960s, as well as the contribution of grapevine genetic resources and new autochthonous varieties created to the formation and modernization of the assortment recommended for the agro-industrial sector of the republic.

MATERIALS AND METHODS

The breeding work, the evaluation of descendants, the highlighting and study of elites and the promotion of new varieties was carried out within the Breeding (Selection) Center of the Moldavian Scientific Research Institute for Fruit Growing, Viticulture and Winemaking (IMCȘPVV), and later - of the successors of this institute - the National Institute of Vine and Wine (INVV), the Scientific-Practical Institute of Horticulture and Food Technologies (IȘPHTA), and currently continues within the National Institute of Applied Research in Agriculture and Veterinary Medicine (INCAAMV) (located in the southern part of Chisinau city, Republic of Moldova - 46°58′39.65″ N and 28°46′21.68″ E, altitude 201 m).

To create a grapevine varieties adapted to local conditions, existing genetic resources with resistance to biotic factors and higt quality of berries were used as initial material: varieties from the ampelographic collection, hybrid elites, as well as genotypes obtained in previous research by M. Juraveli, Guzun N., interspecific hybrids Seibel, Seyve Villard. (table 1)

The program for creating seedless varieties with increased genetic resistance

to stress factors was initiated in 1970, with the initial crossbreeding scheme being accepted: ♀ *seeded resistant varieties* x ♂ *seedless varieties*.

As maternal parents (Table 1), forms with resistance to frost and mildew were taken, originating from crosses with complex hybrids of the third generation, including descendants VII-25-1, VII-25-3, VI-39-71 and VI-39-93, highlighted in the initial breeding program (Table 1). As paternal parents, seedless varieties and elites were included, originating from crosses of varieties of the *Proles orientalis* Negr. origin (Table 2): V-60-2, V-51-56, IV-1-45, Kişmiş moldovenesc, Kişmiş crasnâi turkmenschii (a native variety of Central Asia) (Savin, 2012).

Table 1. Parental forms included in the breeding program

Name of the variety / selection	Genetic origin	Destination of grapes, skin color of berries
Coarnă neagră	Old autochthonous variety	table grapes, blue black
Kişmiş moldovenesc	Pobeda x Kişmiş roz	table grapes, blue black
Kişmiş crasnâi turkmenschii	Variety originating from Central Asia	table grapes, blue black
Kismis VIR-a	Babara x Kişmiş negru	table grapes, green yellow
Marşalischii	Katta Kurgan x Pobeda	table grapes, dark red violet
Nr. 10	Nimrang x (Muscat de Alexandria x Amurskii)	wine grapes, blue black
Pobeda	Zabalkanskii x Muscat de Hamburg	table grapes, blue black
Pozdnii VIR-a	Nimrang x Dodreleabi	table grapes, blue black
IV-1-45	VIR-2 x Kişmiş crasnâi turkmenschii	table grapes, blue black
IV-20-17	Katta Kurgan x Kişmiş roz	table grapes, blue black
V-51-56	Guzali Kara x Kişmiş VIRa	seedless grapes, green yellow
V-60-2	Pobeda x (Katta Kurgan x Kişmiş roz))	seedless grapes, dark red
V-65-1	Muscat Oberlena x (SV 20-365 + SV 20-366)	wine grapes, green yellow
VII-11-30	Babara x Kişmiş negru	table grapes, blue black
VII-12-2	Nimrang x Karmanâi	table grapes, dark red
VII-25-1	(Nimrang x Karmanâi) x M-t de Saint Vallier	table grapes, blue black
VII-25-3	(Nimrang x Karmanâi) x M-t de Saint Vallier	table grapes, dark red
VI-39-71	Coarnă neagră x Pierrelli	table grapes, dark red
VI-39-93	Coarnă neagră x Pierrelli	table grapes, green yellow
XVIII-1-4	Cardinal x Kişmiş VIRa	table grapes, dark red
XV-18-55	Cabernet Sauvignon x Seibel 13-666	wine grapes, green yellow
XXI-4-46	SV 12-375 x Traminer roz	wine grapes, rose

RESULTS AND DISCUSSIONS

The conservation and use of grapevine genetic resources from the ampelographic collection have been an essential factor in diversifying the genetic base and have contributed significantly to the continuous creation of new grapevine varieties in the republic.

The main factor in improving the grapevine assortment is breeding. Grapevine breeding is a continuous process aimed at completing and diversifying the assortment, in order to adapt it to current pedoclimatic conditions and technological requirements. Genetic resources play an important role in improving the grapevine assortment. Genetic resources represent the foundation of breeding, providing the necessary biological basis for the creation of new high-performance varieties, adapted to climatic conditions. The success of obtaining new varieties, capable of supporting an ecological and competitive viticulture, depends essentially on the biodiversity of genetic resources accumulated in the grapevine gene pool.

The activity of the breeder follow from the needs and requirements of society, environmental conditions and is based on the potential of the grapevine gene pool. Its efficient use involves the preservation and valorization of existing genetic sources, including aboriginal ones, as well as the introduction of new resources capable of ensuring resistance to stress factors (frost, drought), productivity and superior quality (Olari, 2005, Savin, et al., 2020).

In the evolution of the grapevine assortment, after the 1980s, there was an increase in the share of new varieties created as a result of the breeding

programs initiated at INMCPVV and subsequently continued at INVV, IP ISPHTA, and IP INCAAMV under the coordination of Dr. T. Cazac, T. Olari. (Cazac, et al., 2008).

The republic's grape assortment was completed and diversified with new autochthonous varieties with table, wine and seedless grapes (table 3).

For production, the following table grape varieties are recommended - Muscat Iantarnîi, Codreanca, Frumoasa Albă, Leana, Guzun, Moldova, Alb de Suruceni, Muscat timpuriu, Muscat de Bugeac, Tudor, Ialovenschii ustoicivăi and wine grape varieties - Riton, Muscat de Ialoveni, Viorica, Luminița, Alb de Onițcani, Floricica, Legenda, Negru de Ialoveni (Table 2, 3; Figure 1, 2).

Table 2. Agrobiological characteristics of new autochthonous grapevine varieties for table grapes

Variety name	Weight of single bunch, g	Single berry weight, g	Berry size, mm	Time of maturity of berry	Resistance to deseasis	Frost resistance	Growth vigor
Varieties with yellow green or rose berries							
Avgustovschii	130-250	2-3	16 x 15	01 (10.VIII)	increased	-25°C	medium
Muscat iantarnâi	250-340	2-3	19 x 17	01 (15.VIII)	low	-18°C	medium
Muscat timpuriu	250-400	6-7	28 x 22	01 (10.VIII)	increased	-22°C	high
Mărgăritar	350-450	5-6	27 x 22	03 (25.VIII)	increased	-24°C	medium
Frumoasa albă	300-350	5-6	24 x 22	05 (20.IX)	increased	-23°C	medium
Leana	295-350	4-5	25 x 18	05 (20.IX)	medium	-22°C	medium
Startovâi	380-500	5-6	23 x 20	05 (15.IX)	medium increased	-23°C	medium
Guzun	300-400	4-5	26 x 20	06 (25.IX)	increased	-24°C	medium
Iubilei Juravelea	350-550	5-6	24 x 28	06 (05.X)	increased	-23°C	high
Ialovenschii ustoicivâi	380-500	6-7	28 x 23	07 (05.X)	medium increased	-24°C	high
Varieties with black berries							
Codreanca	380-600	6-8	31 x 19	03 (25.VIII)	medium increased	-22°C	high
Pameati Negrulea	320-450	5-6	30 x 19	04 (10.IX)	increased	-23°C	medium
Muscat de Bugeac	300-350	3-4	21 x 18	05 (20.IX)	increased	-22°C	high
Tudor	350-550	5-7	30 x 22	06 (25.IX)	medium increased	-22°C	medium
Moldova	320-500	5-6	24 x 19	06 (25.IX)	increased	-22°C	high
Osennii ciornâi	450-600	6-7	27 x 22	06 (25.IX)	medium	-22°C	high

Figure 1. Varieties for table grapes: Muscat timpuriu, Tudor, Guzun, Muscat de Bugeac

Muscat timpuriu - the grapes are medium-sized, cylindroconical. The berries are medium-large (28x22 mm), elongated-ovoid shape, semi-crispy and have a muscat aroma. Variety with increased resistance to gray moude and powdery mildew.

Guzun - variety with large, cylindroconical grapes. The berries are oval and semi-crispy with a muscat aroma. The productivity of variety is 12-13 t/ha. Grapes are used for fresh consumption and for long term storage.

Tudor - the grapes are large, conical with medium density. The berries are very large (30x22 mm), oval semi-crispy. The productivity of variety is 12-13 t/ha. Grapes are used for fresh consumption and for long term storage.

Pamiati Negrulea - the grapes are large (320-450 g), cylindroconical. The berries are medium-large, cilindrical, semi-crispy. The productivity of variety is 11-14 t/ha. Variety with increased resistance to gray moude and powdery mildew.

Muscat de Bugeac - the grapes are large, cylindroconical. The berries are medium-sized, round, juicy, with a muscat aroma. The productivity of variety is 11-13 t/ha. Variety with increased resistance to gray

moude and powdery mildew. Grapes are used for fresh consumption and for long term storage (Nicolaescu et al., 2015)

Table 3. Agrobiological characteristics of new autochthonous grapevine varieties for wine grapes

Variety name	Weight of single bunch, g	Time of maturity of berry	Resistance to deseasis	Frost resistance	Growth vigor
Varieties with yellow green or rose berries					
Meleag	150-200	04 (05.IX)	medium increased	-26°C	medium
Legenda	170-220	05 (15.IX)	increased	-23°C	medium high
Floricica	160-200	05 (20.IX)	increased	-23°C	medium
Riton	170-210	05 (20.IX)	medium increased	-23°C	high
Viorica	150-220	06 (20.IX)	increased	-24°C	medium
Muscat de Ialoveni	200-255	06 (25.IX)	increased	-24°C	medium
Alb de Suruceni	220-300	06 (25.IX)	increased	-24°C	medium
Luminița	165-210	06 (25.IX)	medium	-23°C	medium
Alb de Onițcani	180-225	07 (05.X)	increased	-24°C	medium
Varieties with black berries					
Codrinschii	165-190	07(05.X)	medium	-22°C	medium
Negru de ialoveni	170-200	07 (05.X)	increased	-23°C	medium

Figure 2. Varieties for wine grapes: Viorica, Floricica, Meleag, Codrinschii

According to the color of the berries for the newly created varieties (table 2, 3) the varieties with white berries predominate and are relatively evenly distributed in all ripening groups. Varieties with colored berries (pink-black) are more presented in the groups with medium - late ripening.

Viorica - the grapes are medium, cylindrical - conical, semi-compact. The berry is medium, round, yellowish green, juicy, with a special aromatic taste. Variety is resistant to powdery and dawny mildew, to gray moud. The Viorica variety is cultivated in wine-growing areas with the sum of active temperatures at the level of 2800ºC. The obtained production is used for the manufacture of dry and dessert white wines, sparkling wines and aromatic juices.

Floricica - the grape is medium, conical or cylindrical, winged, loose or semi-loose. The berry is small or medium, round, with a specific taste of the variety. It is used for the manufacture of dry and semi-sweet wine. The bushe are vigorous. The maturity of the shoots towards autumn is good. Increased resistance to to powdery and dawny mildew, to gray moud and anthracnose. The average yield is 12–15 t/ha. The Floricica variety is cultivated in the "Center" and "South" wine regions. The production obtained is used to make dry and semi-sweet white wine.

Meleag - the grapes are cylindrical-conical, of medium size. The berries are small, oval, juicy, with thin skin, pink in color, with specific aroma. The Meleag variety is cultivated in the Central South and South-East wine regions, used for the production of quality white wine. The average yield is 12 - 13 t/ha.

Codrinschii - the grape is medium, cylindroconical or conical, semi-lax. The berry is medium, round, black, covered with bloom. Aroma with weak shades of solonaceous is used for the production of table wines. The bushe are medium vigorous in growth. The average yield is 12 - 13 t/ha.

The process of improving seedless grapevine varieties in the republic continued under the coordination of Dr. hab. Gh. Savin, with the objective of increasing the resistance of seedless genotypes to unfavorable wintering conditions, as well as to the main diseases and pests (savin, 2012).

As a result of the study, forms with different degrees of seedlessness were highlighted, according to Smirnov (1965, 1974). As a result, 5 varieties were homologated and patented – Apiren alb, Apiren roz, Apiren negru de Grozeşti, Apiren Basarabean, Apiren roz timpuriu (Table 4, Figure 3).

Khishmis lucistâi (Super Nova) - the grapes are uniaxial, medium-large in size, conical or cylindroconical in shape, loose. The berries are medium-large in size (23 x 18 mm), pink in color with semi-crispy consistency, the taste is fine, with a specific aroma. Productivity of the variety: 11-13 t/ha. It is used for fresh consumption and technological processing.

The Apiren roz variety has large grapes, cylindrical-conical in shape, uni-winged, with berries normally arranged on the bunches, round or slightly elliptical, medium (18 x 18), crispy, with specific taste.

The Apiren alb variety has large or very large, winged, conical in shape bunches, with elliptical, semi-crispy, normally arranged berries with specific fine aroma.

The Apiren negru de Grozeşti variety has medium-sized grapes, conical in shape, uni-winged, with berries normally arranged on the bunches, the berry is round, small-medium, black-blue, semi-earthy, neutral aroma.

The Apiren roz timpuriu variety has small-medium sized grapes, uniaxial, conical in shape, with berries normally arranged on the bunches, round or short elliptical berry, small-medium (16 x 15 mm), crunchy, with specific aroma. When the grapes are kept long time on the bushes, the raisining process takes place.

Table 4. Agrobiological characteristics of homologated seedless grapevine varieties of autochthonous creation

Variety name	Weight of single bunch, g	Single berry weight, g	Berry size, mm	Time of maturity of berry	Resistance to deseasis	Frost resistance	Growth vigor
Apiren roz timpuriu	180-300	1,5-2,5	16 x 15	03 (20.VIII)	increased	-24	medium
Kişmiş lucistâi	350-550	3,0-4,5	23 x 18	03 (25.VIII)	low	-20°C	medium
Apiren roz	256-555	2,5-4,0	18 x 18	03 (25.VIII)	increased	-22°C	medium
Apiren Basarabean	220-350	1,0-1,7	15 x 13	04 (10.IX)	medium	-24°C	high
Apiren negru de Grozeşti	200-370	1,0-2,0	16 x 14	05 (15.IX)	medum-increased	-24°C	high
Apiren alb	270-580	2,0-2,5	17 x 15	05 (15.IX)	increased	-22°C	medium
Kişmiş moldovenesc	400-600	5,0-6,0	21 x 18	06 (25.IX)	low	-20°C	high

Figure 3. Homologated seedless varieties: Kişmiş lucistâi, Apiren alb, Apiren roz, Apiren roz timpuriu

The varieties are characterized by relative or increased resistance to wintering, the regeneration capacity of these varieties after wintering being increased.

The obtained seedles varieties diversify and complete the grapevine assortment intended for fresh consumption, long term storage and technological processing (juice, jam, compote, marinades, raisins) and winemaking) (Savin, 2006).

As new promising grapevine varieties that can complete the grapevine assortment are the new genotypes with table grapes (Straseni, Marta, Tighina, Basarabia, I-5-58) and the seedless elites CC-IV-21, II2 – 1-97, VIII-1-24 (Table 5; Figure 4).

Figure 4. New perspective genotypes to complete the grapevine assortment: CC-IV-21, VIII-1-24, Basarabia

Basarabia - medium-large sized grapes, weight 385–550 g, truncated berries weighing 6-7 g, black-blue skin, covered

with pruin, with 2-3 seeds; the consistency of the berry is semi-crisp, with colorless must, fresh taste; the variety ensures a production of 4–5 kg of grapes per bunch and 8–10 t/ha; medium-high growth vigor . Resistance to wintering conditions and the main cryptogamic diseases – medium. (Savin et al., 2024)

CC-IV-21 - the vigor of the bunch is low-medium; the grapes are large (450-500 g), uniaxial, 2-3 winged, sometimes branched, conical or cylindro-conical in shape, with berries normally arranged on the bunches, sometimes slightly compact; The berry is round or slightly flattened, large (3-5 g), with red or dark red skin, crispy, with a specific aroma

Table 5. Agrobiological characteristics of perspective varieties and elites

Variety name	Weight of single bunch, g	Single berry weight, g	Berry size, mm	Time of maturity of berry	Frost resistance
Genotypes with yellow green or rose berries					
Tighina	350-500	5-6	28 x 23	06 (25.IX)	-24°C
I-5-58	470-820	8-12	33 x 30	07 (01.X)	-23°C
Genotypes with black berries					
Marta	350-650	5-6	29 x 24	04 (20.VIII)	-23°C
Străşeni	400-700	7-8	28 x 25	04 (05.IX)	-21°C
Basarabia	385-550	6-7	25 x 20	05 (10.IX)	-22°C
Seedless genotypes					
CC-IV-21	300-500	4-5	22 x 22	05 (16.IX)	-24°C
II_2-1-97	300-450	3,5-4,5	20 x 20	07 (25.09)	-24°C
VIII-1-24	350-650	6-7	28 x 20	07 (25.IX)	-20°C

VIII-1-24 - the grapes are medium-large, branched, of cylindroconical shape, with an average weight of 400-600 g. The berry is large 26-28 mm, cylindrical, dark red in color, crispy. The ripening period of the grapes is late. The grapes can be used for fresh consumption and long-term storage. Growth vigor of the trunks is average (Tofan, 2023).

During the period 1980–2025, the results of breeding programs in the republic led to the homologation of over 30 new varieties (18 for table grapes, 11 for wine and 7 seedless) obtained within the institute

If the assortment adopted in 1964, along with the classic varieties, only a few old autochthonous varieties (Coarnă neagră, Rară neagră, Fetească albă și Fetească regală) and some introduced varieties were present. Currently, according to the Catalog of plant varieties of the Republic of Moldova (2025), 108 grapevine varieties are included (35 table varieties, 53 wine varieties, 8 seedless varieties, 8 varieties for food products, 9 rhizogenic varieties (*Vitis vinifera* L. x *Muscadininia rotundifolia* Michx.)). (Registrul de soiuri, 2024).

In the recommended grape variety, the share of newly created local varieties is significant, constituting 46%

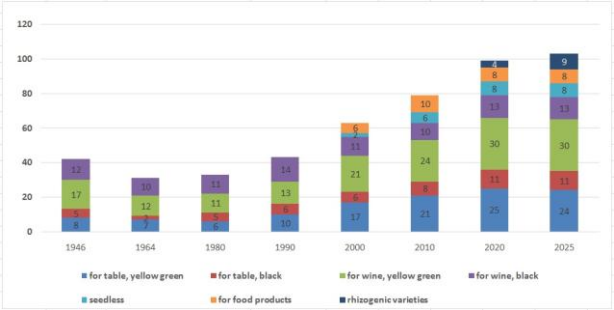

Figure 5. Evolution of the grapevine assortment in the Republic of Moldova – number of varieties by grapes use direction

According to the data presented in Figure 5, a significant increase has been observed in the grapevine assortment of the Republic of Moldova since the 1990s. By 2000, 63 grapevine varieties were registered. In the same year, two new groups were included: seedless varieties and varieties intended for food products. Later, in 2020, the third group was introduced into the Register of Plant Varieties – rhizogenic varieties (*Vitis vinifera* L. × *Muscadinia rotundifolia* Michx.) of local creation, developed within the Institute of Genetics, Physiology and Plant Protection (IGFPP) (Alexandrov, 2024)

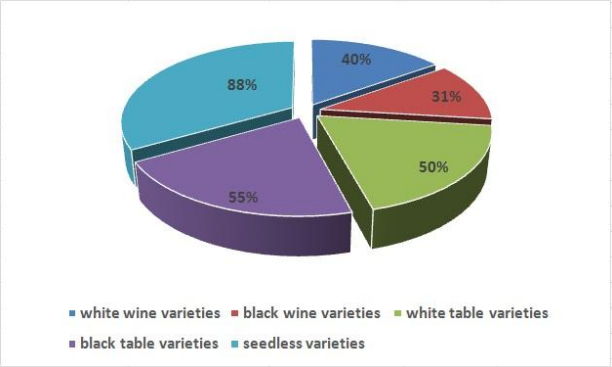

Figure 6. Share of native grapevine varieties in the Plant Varieties Register according to classification groups

Of the white-berry table varieties included in the assortment, 50% are new local varieties, and of the black-berry table varieties, 55% belong to this category. In the group of wine varieties, new local varieties with white berries account for 40%, and those with black berries — 31%.
New autochthonous seedless varieties hold the largest share, reaching 88% of this group (Figure 6).
In the current assortment of the Republic, along with the newly created native varieties and some old native varieties (Coarna neagră, Rară neagră, Fetasca neagră, Feteasca regală), the register includes varieties introduced with an extra-early ripening period (01) - Perla de Csaba and Muscat jemcijnâi; the early ripening period (03) includes 9 introduced varieties - Irşai Oliver, Prezentabil, Regina viilor, Arcadia, Cardinal, Cubani, Victoria, Ranii Magaracea, Sauvignion, Muscat Otonnel, etc. The group of mid-ripening varieties (05) includes 3 varieties with white table berries Chasselas d'ore, Chasselas mousque, Chasselas rose and 12 varieties for wine Aligote, Chardonay, Rkațiteli, Bianca, Malbec, etc. The semi-late group (06) includes the Original variety - with pink table berries and 3 varieties for wine Viognier, Pervomaischii, etc. The late group (07) is represented by the Caraburnu and Muscat de Hamburg varieties with table grapes and 7 varieties with wine grapes Saperavi, Cabernet Sagvinion, Merlot, Bastardo Magaraceski, etc.

CONCLUSIONS

The genetic improvement program of the grape variety in the Republic of Moldova was aimed at creating new grape varieties for various uses, including seedless, with increased or advanced resistance to unfavorable environmental factors (frost, wintering, diseases and pests).
As donors of characters (traits), Seive Villard hybrids were used, which possess resistance to cryptogamic diseases, low temperatures and traditional European varieties, which ensure increased quality and productivity, varieties and elites from Central Asia.
The genetic improvement activity within the institute over the years has contributed to the diversification of the grape variety, by approving and introducing into cultivation over 30 new varieties, adapted to local pedoclimatic conditions.
For the first time, the local assortment was completed with seedless varieties adapted to the climatic conditions of the temperate zone, which produce grapes for fresh consumption, long-term storage and technological processing (juice, jam, compote, marinades, raisins, etc.).

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