

STUDYING THE MECHANICAL COMPOSITION OF COLLECTION SAMPLES OF GRAPES

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Abstract. *In this article illustrated results of studying mechanical composition of 111 collection grape varieties from the RIPGR gene pool, where were analyzed valuable properties of grape varieties based on various directions. As a result of the researches have been identified suitable table and technical varieties of grape with higher economically valuable properties for growing in Tashkent region.*

Keywords: *grapes, variety, bunch, juice yield, gene pool, collection, sample, productivity, yield, mechanical analysis.*

INTRODUCTION. The natural and climatic conditions of Uzbekistan (soil conditions, varied vertical zoning, long growing season, significant solar insolation, the presence of a dry subtropical zone and high temperatures) allow the cultivation of various grape varieties from ultra-early to late-ripening varieties.

In order to develop viticulture and winemaking, the President and the Government declared a number of Resolutions on measures for the further development of viticulture in the Republic. It is planned to increase the area of vineyards to 200 thousand hectares, special attention should be paid to technical grape varieties and create new plantations of technical (wine) varieties on an area of 30 thousand hectares. At the same time, new plantations must be pure-varietal and consist of varieties widely known in the world for the subsequent production of export-oriented elite wines. Also, in order to develop, modernize and increase the competitiveness of viticulture and winemaking in the Republic, according to the Resolution (No. PR-4161 02/05/2019) and the Decree (No. DP-5656 02/05/2019) of the President of the Republic of Uzbekistan, to intensify the industry in the Republic, great work must be carried out to implement and the cultivation of new, well-known and promising foreign technical grape varieties, the products of which are in great demand on the world market.

The existing wine assortment of grapes in Uzbekistan requires improvement. In order to further stable development of the viticulture and winemaking sector in the country, targeted increasing and cultivation new promising varieties of industrial grapes, strengthen and financial supporting for the provision of raw materials to processing enterprises, training high qualified specialists, as well as increasing the volume of exports of viticulture and wine products. To achieve high goals in these directions has been declared Resolution of the President of the Republic of Uzbekistan “On measures for the further development of viticulture and winemaking in 2023 - 2026.”

LITERATURE AND METHODOLOGY. Uzbekistan is situated in the Central Asian center of origin of cultivated plants. The flora of the republic is very close in genesis and composition to the flora of neighboring republics (1, 2, 3). All new varieties of grapes, created in the process of natural morphogenesis, were selected by human from wild forms. It goes without saying that the selection of new forms among wild grapes continues to occur today. Each viticulture region has developed its own local assortment, which bears the imprint of local natural conditions. In accordance with local natural conditions, these forms are characterized by higher adaptability to drought, salinity and other growth factors (4, 5, 6).

Accordingly, these forms are characterized by various morphological characteristics that differ from other forms. Their available spectrum of polymorphism is wide, which requires a detailed study of their identification and generalization (7, 8).

Uzbekistan is wonderful land of the earth, one of the most ancient and brilliant centers of viticulture and winemaking culture. Despite the successes achieved in the field of ampelographic research and selection, the assortment of grapes in Uzbekistan needs to be enriched and improved. Particular attention should be paid to replenishing and improving the technical and table grape assortment with high-quality varieties with different ripening periods.

The main task in the field of technical assortment of grapes is the identification and introduction of high-quality varieties of universal use, with high sugar accumulation energy and early ripening [6, 8]. Each new variety must have wide plasticity to the soil and climatic conditions of its cultivation [5, 8].

For achieving solutions of these problems, in 2017-2018, studies were carried out on 111 varieties of grape collections that had not been studied previously, or had been studied to a limited extent.

Research methods. The mechanical composition of the bunches of the studied grape varieties was determined according to the method of Professor N.N. Prostoserdova [9]. At the beginning of the researches were determined average weight of a bunch, the weight of berries, ridges, peels, seeds, solid residue, pulp with juice, and the number of berries and seeds in a bunch. Then, based on these data, were compared the structure, composition and structure of the grape bunches.

In grape juice, the mass concentration of sugars and titratable acids was determined by using standard methods [10, 11]. The mass concentration of tartaric, malic, citric and succinic organic acids, the mass concentration of potassium, sodium, magnesium and calcium cations were determined by using a "Kapel-105M" capillary electrophoresis system.

RESULTS AND DISCUSSIONS. An important indicator of quality for table grapes is: the size of the bunch and berries, a high percentage of the edible part, marketability, high mechanical properties, and transportability. For technical varieties - worth yield.

Over the years of research, it has been revealed that the mechanical composition of the studied varieties varies within the following limits: skin 1.3-11.0%, seeds - 0.8-9.0%, juice and solid parts of the pulp 75-95% (Table 1).

The varieties that stood out in terms of the average size of bunches during the study period were Xusayne Garmskiy, Artik oga, Kata kurgan ferganskiy, Sovetskiy stoloviy, Nadjim, Ishaki from 470 to 1023, and this figure is quite stable over the years.

Large berries from table and table-raisin varieties (5.3-7.5 g): Obak rassechenniy, Artik oga, Xusayne Garmskiy, Italiya., Italy. Among the small-berry varieties, varieties of predominantly technical direction are noted - Champion, Kizilovyy, Shasla muskatnaya (1.5-2 g).

Table No. 1

Mechanical analysis of a bunch of grapes (2017-2018)

№	Name of variety	Average weight of a bunch	Size of a bunch, sm	Average number of berries in a bunch, pcs.	Weight 100 pcs. seeds, g.	Weight 100 pcs. berries, g.
Varieties with high juice yield						
1.	Saperavi	246	17,6x11,1	104	3,8	235
2.	10/45 (Tavkveri x Pino chyorniy)	262	15,2x8,9	115	3,6	228
3.	125/22 (Tavkveri x Kaberne Sovinon)	271	16,7x11,7	107	3,7	252
4.	Ak mayzi	402	16,9x11,2	92	3,6	420
5.	Ak pari	252	16,3x8,6	68	5,5	361
6.	Kara keleskiy	417	21,5x10,3	133	5,1	339
7.	Muskat armyanskiy	222	17,7x10,5	105	4,6	222
8.	Yalanja byala	264	16,7x9,3	103	3,4	251
The most meaty varieties						
1.	Ocha xorak	575	20,5x11,9	163	3,8	362
2.	Taush	512	21,0x14,4	167	3,7	195
3.	Lok kok uzyum	618	23,6x14,0	146	3,6	412
4.	Xusayne garmskiy	229	19,5x8,8	35	5,9	543
Large berry varieties						
1.	Obak rassechenniy	871	21,9x17,6	150	4,9	672
2.	Artik ocha	310	19,8x7,0	48	6,2	574
3.	Kopa	410	22,1x10,1	84	5,5	472
4.	Nairi	160	13,1x9,5	51	5,3	313
5.	Siyex mayda	650	21,3x14,5	241	5,2	266

In the total mass of the bunch, ridges account for 1.2 to 3.0% in most varieties (Table 2). For the varieties Xusayne Garmskiy, Shasla muskatnaya and Taush this figure is 3-4%. In the variety – Ak pari of ridges account for 7.8-9% of the total weight of the bunch.

High content of juice (must) (>80%) was concentrated in varieties of technical direction - 10/45 (Tavkveri x Pino chyorniy), 125/22 (Tavkveri x Kaberne Sovinon), Ak mayzi, Ak pari,

Muskat denausskiy, Kara obak kitabskiy and Yaranja byala. Up to 80% of the juice contained berries of the Kara kelesskiy, Kopa Muskat armyanskiy and Bryazi varieties.

Based on the weight of the edible part (93-95%), the following varieties stood out: Oga Khorak, Tukhumi kaftar, Taush, Portala, Ak Maizi, Portala, Maizi cobwebby.

Table 2.

Mechanical composition as a percentage of the total weight of the bunch (2017-2018)

№	Variety name	ridges	juice	hard part pulp	skin	seeds	edible part
1	Saperavi	2,9	85,4	10,5	4,2	2,4	90,5
2	10/45 (Tavkveri x Pino chyorniy)	1,7	88,3	7,9	3,2	2,2	92,9
3	125/22 (Tavkveri x Kaberne Sovinon)	1,9	86,8	8,7	3,4	2,3	92,4
4	Ak mayzi	1,3	83,1	9,1	4,1	2,4	92,2
5	Ak pari	7,0	79,2	9,0	2,8	2,0	88,2
6	Kara keleskiy	2,5	78,1	12,3	4,5	2,6	90,4
7	Muskat armyanskiy	2,3	80,9	7,8	5,7	3,3	88,7
8	Yalanja byala	1,6	84,9	6,9	4,2	2,4	91,8
9	Ocha xorak	2,1	46,8	46,6	2,6	1,9	93,4
10	Taush	3,5	54,5	39,4	1,3	1,8	93,9
11	Lok kok uzyum	2,3	24,4	45,7	3,4	1,2	93,1
12	Xusayne garmskiy	2,5	47,1	44,9	3,2	2,3	92,0
13	Obak rassechenniy	1,7	64,3	26,7	6,7	1,3	90,3
14	Artik ocha	2,2	73,1	19,6	2,4	2,7	92,7
15	Kopa	1,7	78,2	14,0	4,0	2,1	92,2
16	Nairi	2,3	73,9	17,1	3,6	3,1	91,0
17	Siyex mayda	2,2	66,3	21,6	5,4	4,0	88,4

In terms of transportability, the table varieties stood out first: Obak rassechenniy, Pustigov rozoviy and Kopa, and wine varieties Shiroka melnishka and Nairi. To crush the berries of these varieties, a force of 1400-1700 g is required, and to tear off a berry, a force of 400-500 g is required.

CONCLUSION. As a result of the study of the mechanical composition of collection samples of grapes of the Research Institute of Plant Genetic Resources, the mechanical composition of grape bunches was determined and samples were identified according to the size and total weight of the bunch, the size of the berries, the high content of juice (must) (>80%) and the weight of the edible part of the berries. The selected variety samples serve as primary material in the selection of grapes in areas of use.

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