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CULTIVATION OF SEEDLINGS OF LOCAL GRAPE VARIETIES BY BIOLOGICAL METHODS

To produce national brands from local grape varieties that meet modern requirements and the interests of producers, it is essential to organize the rapid propagation and planting of local and introduced grape varieties through rootstock selection using biotechnological methods. The rapid development of viticulture and the economic, agrotechnical, agrochemical, protective, and other measures carried out in this area largely depend on the choice of grape varieties when planting vineyards. To develop viticulture in a market economy, obtain environmentally friendly products, and address the environmental cleanliness issues of vineyards, winegrowers are undertaking significant efforts to create high-yielding and high-quality grape varieties. To develop viticulture, as a rule, when planting vineyards, seedlings of zoned, promising, and recommended grape varieties are used. Unlike seedlings grown on their own roots, it is considered advisable to use planting material obtained by grafting when landscaping gardens.

Keywords*:* grape, approbation, seedling, variety, plant, graft, rootstock, fertilizer.

Introduction. Local grape varieties are widely studied in most wine-growing countries of the world [1-9]. It is the obligation of every person working in the scientific field of viticulture to organize the rapid propagation and planting of local and introduced grape varieties using biological methods for the production of national brands. With the support of the Ministry of Agriculture, in 2019, after the creation of a new specialized complex for the production of grape grafted plant material on the territory of the Institute located in the Shemakha Experimental Station, local phylloxera-resistant and zoned technical grape varieties of Madrasa, Bayanshira, Shirvanshahy, Khindogny, Hamashara, and table grapes Ag kishmish, Gara kishmish, Ag shany, Gara shany, etc., were produced.

At the same time, the institute's specialists and researchers consult with farmers and other grape producers on planting prepared seedlings and cultivating them in compliance with agricultural practices, the potential of which is planned to be widely exploited.

Scientific research and its implementation in production in accordance with the "Field Experiment Methodology" are carried out based on the approved Viticulture Development Procedure. Considerable attention is given to the mechanism for implementing the rules for testing in vineyards and nurseries. Currently, viticulture in the republic is developing daily, production is expanding, and a diverse range of grapes is being produced. Testing conducted in all orchards enables the storage, selection, and sorting of grapes suitable for planting. This opens up vast opportunities for the development of viticulture in our country.

The study subjects were six grape varieties planted at the institute's grape nursery in the Absheron district. At the same time, to develop nursery production according to the work and schedule, the Madrasa grape variety, planted at the Shamakha Experimental Station, and Bayanshira grapes, grown at the Ganja Experimental Station, were also grown at the nursery plot. The work was carried out by institute staff and a working group.

Aim of the study. The research aimed to organize accelerated propagation and planting of local and introduced technical and table grape varieties grown in different soil and climatic conditions using biological methods.

Research methodology. Conducting research and development work and implementing it into production was carried out in accordance with the “Methodology of Field Experiments”

by Professor B.A. Dospekhov (statistical processing of research results) and the standard of the Republic of Azerbaijan – AZS-911:2022 "Grape Seedlings. Technical Conditions", implemented in accordance with the modern requirements [10].

Currently, wealthy winegrowers bring grape planting material from abroad, and the need to cultivate vineyards using locally produced seedlings is on the agenda. In the near future, the cultivation of grape seedlings is expected to increase in our republic. Extensive scientific research is being conducted to address the challenge of growing seedlings of local grape varieties, both for farms within our country and for export to foreign markets.

Results. To obtain high-quality planting material for the vineyards, the department's staff conducts extensive and individual selection work. Planting material is sourced from selected vines, phytosanitarily clean, productive, and well-developed plants. Research to study and evaluate the potential of grape varieties is traditionally conducted taking into account their demand in viticulture. When selecting local, introduced, and promising varieties, it is crucial to separately study their morphological, technological, biological, and economic characteristics.

Several methods are used to explore the viticultural potential of grape varieties, including biomorphological, technological, economic, and mathematical-statistical approaches. While these studies often consider the specific growing conditions of the varieties by comparing zoned varieties with others, the results can sometimes fall short. Scientists are therefore focusing on developing more effective, reliable, and productive methods to evaluate the potential of grape varieties [14].

The length and width of the cuttings for propagation are evaluated to ensure they match the average size typical of the variety. Cuttings with very long internodes tend to develop weaker roots compared to those with shorter internodes. While thin stems have high regenerative ability, they produce fewer seedlings under unfavorable conditions. A key step in plant testing is assessing the development and health of shoots by cutting them crosswise. If the inside of the eyes appears light green and juicy, the shoot is healthy. However, if the internal part of the eye is burnt and dark-colored, the shoot is considered unsuitable for planting [11].

Viticulture requires grape varieties that can withstand abiotic and biotic challenges, produce high yields, adapt to local conditions, and resist diseases and pests, all while meeting consumer preferences. To achieve this, the institute carries out extensive research on selecting and propagating both local and introduced varieties [12].

In viticulture, mass selection and testing are essential to develop juicy, large-fruited, productive, and high-quality varieties. Approval is underway for acquiring clean and healthy planting materials. The trials are currently in good condition. Cultivation and maintenance are carried out in accordance with nursery and vineyard practices. The varieties are constantly monitored. To obtain high-quality planting material, the institute's staff conducts mass selection and individual selection processes in the vineyards. The planting material is selected from phytosanitarily clean, productive, and well-developed vines.

The time for conducting trials in viticulture is considered to be the time of full physiological ripening of grapes. Currently, grape varieties are classified by leaf structure, bunch shape, and shoot structure and size [13]. The experiment was conducted on the varieties listed in Table 1.

Table 1

Seedlings of grape varieties planted in the Apsheron Experimental Station

Table varieties	Yield of seedlings %	Technical varieties	Yield of seedlings %
Ag Shani	60	Hamashara	55
Gara Shani	60	Khindogny	60
Ag kishmish	55		
Gara kishmish	55		

CONCLUSION

Studying the developmental stages, adaptation, ecology, productivity, resistance to biotic and abiotic factors, and organoleptic and phenological characteristics of local and introduced varieties in Absheron conditions is of great scientific and experimental importance for determining their potential. As a result of these studies, regular observations of the developmental stages of the Ag Kishmish, Khindogny, Hamashara, and other varieties were conducted. Among the varieties presented, the best Apsheron variety adapted to specific soil and climatic conditions is Ag Kishmish, which has demonstrated better organ development than other varieties.

To produce seedlings, cuttings from six own-rooted grape varieties were planted and grown. Early trials showed a yield and development rate of 55–70% among the varieties, making them almost indistinguishable. In the Apsheron district, harsh conditions including extreme heat, insufficient irrigation, and poor soil fertility, severely affected plant growth, causing most plants to wither and underperform. Consequently, around 55-65% of the varieties produced seedlings, which are planned for use in restoring and establishing new vineyards on the institute's experimental plots.

All agrotechnical activities are carried out in the planted vineyard according to the methodology. When comparing seedlings by green parts and root systems, the technical varieties Khindogny and table grape varieties Ag Shani and Gara Shani differed from other varieties in terms of growth rate. Summarizing the results of research on the above varieties, it can be noted that the cultivation and planting of table and industrial grape varieties are favorable in the soil and climatic conditions of Absheron.

References

1. Ampelographic and bioproductive characteristics of Cabernet Sauvignon clones in Oltenia winegrowing region, South-West Romania / Cichi D. D. et al. *Scientific Papers. Series B. Horticulture.* 2024. Vol. 68(2). Pp. 262-269.
2. Collins C., Wang X., Lesefko S., De Bei R., & Fuentes S. Effects of canopy management practices on grapevine bud fruitfulness. *Oeno One*. 2020. Vol. 54(2). Pp. 313-325.
3. Opportunities and limitations of improved irrigation management in Mediterranean viticulture / Costa J. M. et al. *Agricultural Water Management*. 2022. Vol. 261. Pp. 107298. https://doi.org/10.1016/j.agwat.2021.107298.
4. Costea D. C., Căpruciu R., Cichi D. D., & Băducă Cîmpeanu C. Research concerning the reaction of vines to variable climatic conditions. Scientific Papers. *Series B. Horticulture*. 2023. Vol. 67(2). Pp. 224-229.
5. de Toda F. M., Martín L. M., & Sancha J. C. Effects of cluster thinning on grape and wine composition in high-yielding Tempranillo vineyards. *OENO One.* 2021. Vol. 55(1). Pp. 127–139. https://doi.org/10.20870/oeno-one.2021.55.1.2965.
6. Dobrei A., Sala F. Comparative analysis of grape cultivars based on leaf geometry fractal parameters. *Journal of Horticulture, Forestry and Biotechnology*. 2024. Vol. 28(2). 2024. Pp. 18-25 https://jhfb.ro/index.php/jhfb Print ISSN: 2066-1797 Online ISSN: 3045-1876.
7. Vine responses to temperature and water stress under climate change scenarios: A synthesis of physiological and agronomic insights / Frioni T. et al. *Plants*. 2022. Vol. 11(3). Pp. 409. https://doi.org/10.3390/plants11030409.
8. Characterization of grapevine genetic resources in the comunitat valenciana (Spain) / Gago P. et al. *International Journal of Fruit Science*. 2022. Vol. 22(1). Pp. 287-302. https://doi.org/10.1080/15538362.2022.2037039
9. Gambetta G. A., Herrera J. C., & Castellarin S. D. The physiology of sugar accumulation in grape berries: New insights into the role of sugar transporters. *Frontiers in Plant Science*. 2020. Vol. 11. Pp. 820. https://doi.org/10.3389/fpls.2020.00820
10. According to the standard of the Republic of Azerbaijan-AZS-911:2022 "Grape seedlings. Technical conditions", a new state standard. Baku, 2022.

11. Salimov V. S., Gurbanov M. R. Selection of valuable genotypes from populations of Pink Raisin and White Raisin grape varieties under Absheron conditions by clone selection method. Reports (ANAS). Baku, 2011. No. 5. P. 86 -94.
12. Panahov T. M., Salimov V. S. Grape varieties of Azerbaijan. Baku: Teacher publishing house, 2012. 288 p.
13. Salimov V. S. Selection of grapes. Baku : Teacher, 2019. 304 p.
14. Salimov V. S. Ampelographic screening of grapes. Baku : Teacher, 2019. 289 p.

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ВИРОЩУВАННЯ САДЖАНЦІВ МІСЦЕВИХ СОРТІВ ВИНОГРАДУ БІОЛОГІЧНИМИ МЕТОДАМИ

Для створення національних марок з місцевих сортів винограду, що відповідають сучасним вимогам та інтересам виробників, необхідно організовувати швидке розмноження та посадку місцевих і завезених сортів винограду шляхом селекції підщеп за допомогою біотехнологічних методів. Швидкий розвиток виноградарства та економічні, агротехнічні, агрохімічні, захисні та інші заходи, що здійснюються в цій галузі, значною мірою залежать від вибору сортів винограду при посадці виноградників. Для розвитку виноградарства в умовах ринкової економіки, отримання екологічно чистої продукції та вирішення проблем екологічної чистоти виноградників, виноградарі докладають значних зусиль для створення високоврожайних і високоякісних сортів винограду. Для розвитку виноградарства, як правило, при посадці виноградників використовують саджанці зонованих, перспективних і рекомендованих сортів винограду. На відміну від саджанців, вирощених на власних коренях, при відтворенні виноградників вважається доцільним використовувати посадковий матеріал, отриманий шляхом щеплення.

Ключові слова: виноград, апробація, саджанець, сорт, рослина, щеплення, підщепа, добриво.