

ORIGINAL ARTICLE

**Investigation of Some Agrobiological Features Of Table And Raisins Grape Varieties Introduction To Samukh And Goygol Districts**

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**ABSTRACT**

*Grapes and grape products have made an important contribution to the development of the agricultural sector in Azerbaijan and were one of the leading industries. Currently, the transfer of viticulture and winemaking in the country to a new stage of development is one of the main issues facing us. Among these issues, the lack of information about which of the many grape varieties brought from abroad will benefit in which region has a special place. A special place in these issues is occupied by the lack of information about which of the numerous grape varieties imported from abroad will benefit in which region. In this regard, it is important to study the morphological, agrobiological and economic-technological features of valuable native and introduced grape varieties in the soil and climatic conditions of the viticultural regions of the republic and to determine the technology of cultivating varieties based on the biological and ecological characteristics of the region, on scientific grounds. Taking into account the above, in our research work we have studied some agrobiological features of grape varieties introduced to the territory of the Samukhsky and Geigelsky districts of the republic. First, the duration of the vegetation phases of varieties in both regions was studied. Then the yield indicators were investigated. During the study, introduced grape varieties in Goygol district on the terms of maturity, were grouped ultra early-ripening - 5%, early-ripening - 15%, mid-early ripening - 20%, mid-ripening - 10%, mid-late ripening - 15%, late-ripening - 25%, latest-ripening - 10%, and in Samukh district ultra early-ripening - 5.9%, early-ripening - 23.5%, mid-early ripening - 5.9%, mid-ripening - 5.9%, mid-late ripening - 11.8%, late-ripening - 35.3%, the latest-ripening - 11.7%. The lowest and highest yields per hectare were recorded in Goygol vine plantations: 128 cwt (variety Ichkimar) and 304 cwt (variety Red-Glob) for raisins and table varieties. In Samukh district, the lowest yield is 133.4 cwt (Shasla White and Claret Pink varieties); the highest yield is 320.0 cwt (Red-Glob variety).*

**Keywords:** table varieties, yield indicators, agrobiological features, vegetation phase, economic efficiency.

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**INTRODUCTION**

Modern assortment of industrial vineyards should meet the needs of the market and include varieties with high indices of productivity, product quality. Variety determines the direction of use of grape products and plays a leading role in improving their quality [4,13,14].

Grapes and grape products have made an important contribution to the development of the agricultural sector in Azerbaijan and were one of the leading industries. In the first years of our independence, the country's economic problems did not bypass this sphere either. Currently, one of the main upcoming issues is the transition of viticulture and winemaking to a new stage of development in the country. In

recent years, in the development of viticulture in our country has done a lot of work, the state issued more than 40 million manat concessional loans for the development of production and processing of grapes, there have been great successes in the varieties and quality of products.[3].

Since the soil and climatic conditions of our republic are quite favorable for grape plants, all grape varieties can be successfully cultivated in each of our regions. But the main condition should be considered the observance of the subtleties in their cultivation and processing. The usefulness of agronomic measures in the vineyard is also determined by soil and climatic conditions. At one time, the issue of zoning grape varieties was considered as a state measure. Our grape growers have some knowledge and experience with regional varieties. However, grape growers have little information about which of the many grape varieties introduced from abroad will benefit a particular region. In this regard, the study of morphological, agrobiological and economic- technological features of valuable domestic and imported grape varieties in the soil and climatic conditions of the viticultural regions of the republic and the identification on a scientific basis of the technology of cultivating varieties based on the biological and ecological characteristics of the region are considered relevant theoretical and practical problems [15].

The study of the agrobiological features of the variety is understood to mean the features of the duration of vegetation and phenological phases, the strength of bush growth, the rate of ripening of shoots, yield, the degree of falling of flowers and the features of pea berries in clusters, resistance to diseases and pests, agrotechnics used in accordance with the biological characteristics of the variety, and the reaction of the variety to environmental conditions. In our research work, we also studied some agrobiological features of grape varieties introduced on the territory of the Samukh and Goygol districts. First, the duration of the vegetation phases of varieties in both regions was studied. Then productivity indicators were investigated. It is desirable for farmers and specialists engaged in viticulture to know the phenology of the grape varieties they grow. Because each cycle of grape varieties has its own uniqueness, and different agrotechnical methods of cultivation, protection, etc. are used for each phenophase.

## **MATERIAL AND METHODS**

The materials of the research are introduced grape varieties. The study of vine plantations is carried out according to the methodology of Lazarevsky M.A. Nedov P.N.

### **EXPERIMENTAL PART.**

The grape varieties that we investigated were grouped by vegetation duration according to the methodology as follows: ultra early-ripening (V.p. 120 and less); early-ripening (V. p. 121-130 days); mid-early ripening (V.p. 131-140 days); mid-ripening (V.p. 141-150 days); mid-late ripening (V.p. 151-160 days); late-ripening (V.m. 161-170 days); the latest-ripening (V.p. > 171 days) [1-2].

During the study, it was found that the beginning of vegetation (budburst) the raisins and table grape varieties in the Samukh district had - 15.04 (for the Perlet variety) - 21.04 (for the White Shasla variety), and in the Goygol district - 18.04 (for the Kata Kutgan, Perlet, Chehrai tayfi, Ichkimar, Muscat of Alexandria) - 24.04. (Agadayi variety) numbers.

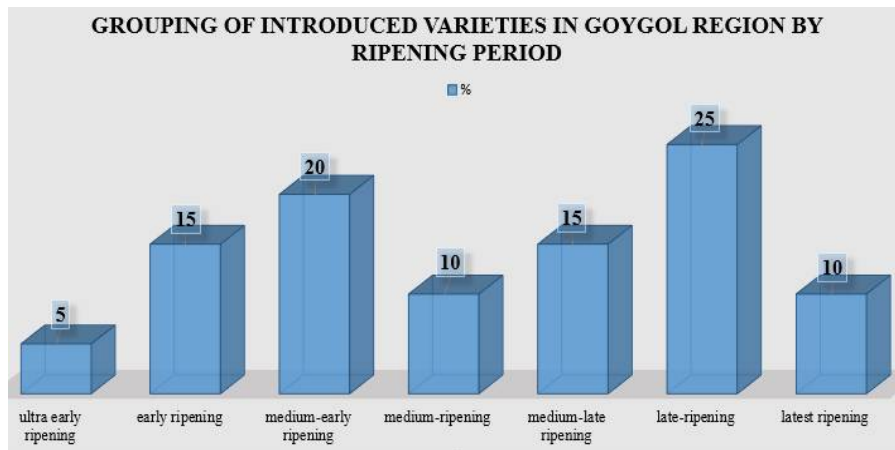
The ripening of the raisins and table grape varieties in the Samukh district was recorded at -14.08 (Prima variety) -14.10 (Muscat of Uzbekistan variety), and in the Goygol district - 07.09 (Odessa souvenir variety) - 8.10 (Tayfi pink variety) numbers.

The following conclusions can be drawn from the analysis of the main phenological phases of introduced grape varieties in the Geigel and Samukhsy districts:

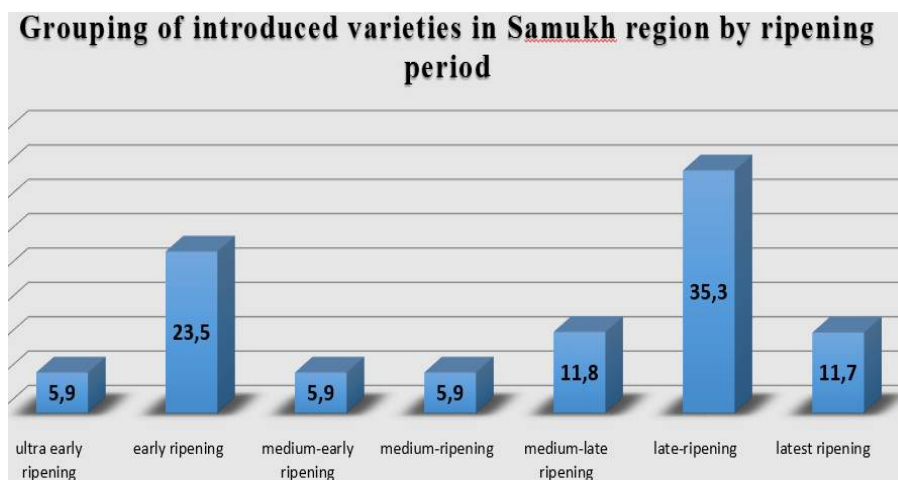
-During the main phenological phases of grape varieties in the Goygol and Samukh districts, there were no fundamentally distinctive features between the varieties;

-According to the terms of ripening of the crop in the Geigel district, introduced grape varieties are divided into the following groups: ultra early-ripening - 5%, early-ripening - 15%, mid-early ripening - 20%, mid-ripening - 10%, mid-late ripening. - 15%, late-ripening - 25%, latest-ripening - 10%

- In the Samukh district, introduced grape varieties are divided into the following groups according to ripening terms: ultra early-ripening - 5.9%, early-ripening - 23.5%, mid-early ripening - 5.9%, mid-ripening - 5.9%, mid-late ripening - 11.8%, late-ripening - 35.3%, the latest-ripening - 11.7%.



**Figure 1.** The ripening period of introduced grape varieties in the Goygol district



**Figure 1.** The ripening period of introduced grape varieties in the Samukh district

Over the years of research work, mildew, oidium and gray rot diseases were mainly detected in the studied varieties. The resistance of the studied varieties to these diseases was determined by observation. One of the most common and dangerous diseases of the grape plant is mildew (*Plasmopara viticola* Berl. and de Toni). This disease develops on all the green organs of the grape plant – leaves, shoots, inflorescences, berries, tendrils. The leaves are infected with mildew throughout the growing season. On young leaves, the disease forms characteristic pale green or yellow, slightly shiny, oily, spots of various shapes and sizes. At this time, their diameter becomes at least 2-3 cm. The development of mildew in the bunches and leaves of the studied grape varieties and the indicators of resistance to this disease were at different levels. According to the results of the immunological evaluation, the varieties were considered resistant or relatively resistant to the spread of false powdery mildew on the leaves.

One of the most common, dangerous diseases of grapes is oidium disease. The disease is caused by *Uncinula necator* Burr, which belongs to the order Erysiphales of the class of marsupial fungi. All the green organs of the grape plant are infected with oidium. The leaves are covered with a grayish, easily erased coating on top, and gray spots form under the cover. The development of oidium is more dangerous for berries. When erasing the gray plaque formed on the berries, it emits a specific fishy smell. According to the results of the immunological evaluation, the varieties against oidium disease spreading on the leaves were recognized as resistant or relatively resistant. In addition, according to the degree of development of oidium disease in bunches, the varieties are rated by 5 points as relatively stable varieties.

One of the most common diseases of grapes is gray rot. The causative agent of the disease is *Botrytis cinerea* Pers. it's a mushroom. This disease usually affects berries during the ripening period, develops rapidly in wet weather. The surface of the berries is covered with a gray mold-like coating, softens, the cellulose veil is separated from the pulp. The berries acquire a sour taste, smell of mold, and are unsuitable for making juice. Wine from such a solution also has an unpleasant smell, quickly turns brown and sours. In red grape varieties, coloring substances are destroyed. According to the results of

immunological evaluation, varieties against gray rot were classified as unstable, stable or relatively stable varieties. Over the years of experience, it has been established that among all varieties there are no varieties that are very resistant to diseases (1bal).

**The main indicators of the yield of introduced grape varieties.**

One of the main characteristics of the adaptation of introduced grape varieties to the terrain are the main indicators of productivity. Normal or high indicators of basic productivity indicate that varieties have better adaptability. Introduced grape varieties grown and cultivated in Goygol and Samukh districts have been the majority in plantations for many years. A high financial income was received from the cultivation of such varieties. According to the methodology, grape varieties by yield from one bush are divided into the following groups: 1. lowest yield- 3.0 kg and below; 2. low yield - 4.0-5.0 kg; 3. average yield - 6.0 - 8.0 kg; 4 high yield - 9.0 - 11.0 kg; 5. highest yield- 12.0kg and more.

Yield per bush in conditions of Goygol district was: in the raisin variety Sultania - 8,0 kg, in table varieties Agadai - 6,0 kg, White Shasla -4,8kg, Taifi Pink- 11,0 kg, Muscat of Hamburg -8,3 kg, Ichkimar -4.8 kg, Muscat of Alexandria -9.0 kg, Muscat of Italy - 9.5 kg, Cardinal - 8 kg, Kattakurgan – 6 kg, Black janjal - 7.0 kg, Black souvenir - 5.3 kg, Odessa souvenir - 5.0 kg, Parkent - 10.0 kg, Prima - 7 kg, Perlet -5.4 kg, Pobeda - 8 kg, Red Globe -11.4 kg, Sweet Thompson – 5.6 kg, Fast-ripening Magarach-5,7 kg.

**Samukh district.**

Samukh district. Yield of sultanas and table varieties of grapes in the territory of Samukh district, was 8.7 kg Sultania – 9.3 kg, Karaburnu - 9.0 kg, Agadai - 7.0 kg, White Shasla - 5.0 kg, Pink Claret - 5.0 kg, Taifi Pink - 11.5 kg, Muscat of Hamburg - 9.0 kg, Muscat of Italy - 11.0 kg, Cardinal - 9,0 kg, Black Souvenir - 5,6 kg, Muscat Uzbek - 11,0 kg, Parkent - 10,7 kg, Prima - 7,0 kg, Perlet - 6,0 kg, Pobeda - 8 kg, Red Globe - 12,0 kg, Sweet Thompson - 6,5 kg.

The yield of grape varieties of the Goygol and Samukh districts is grouped as follows. (Figure 3; 4; 5; 6).

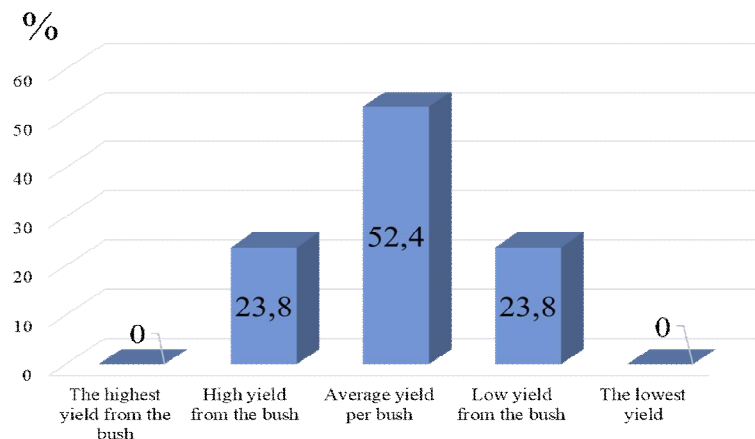
Based on the analysis of the main indicators of productivity of introduced table and raisin grape varieties, the following conclusions can be concluded:

- The main indicators of yields of introduced grape varieties grown in Goygol and Samukh districts were average or high.

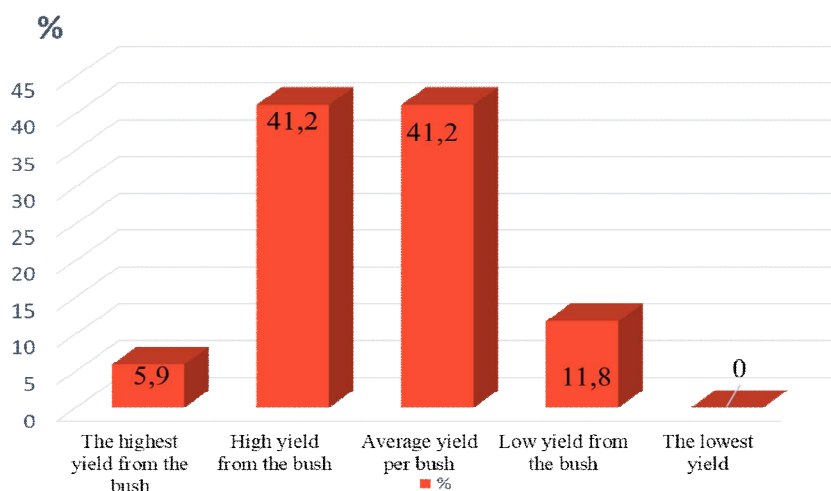
-Among the varieties tested, Red Globe variety with yield - 12.0 kg per bush, belongs to the group of varieties with the highest yield; Pink - 11.5 kg, Muscat Italian - 11 kg, Muscat Uzbek - 11 kg, Muscat of Hamburg - 9 kg, Karaburnu - 9 kg, Muscat of Alexandrian - 9 kg, Agadai - 7 kg - in the group with high yield; varieties Ichkimar - 4,8 kg, Cleret pink - 5 kg, White Chasla - 5 kg, Black Souvenir - 5,6 kg, Fast-ripening Magarach - 5,7 kg, Odessa Souvenir - 5 kg - low yielding varieties, and lowest yielding varieties were not found.

According to the methodology, table grape and raisin varieties introduced in Goygel district were divided into the following groups by yield per bush: low yield - 23.8%, medium yield - 52.4%, high yield - 23.8%. As can be seen from the diagram, neither lowest and highest yields were recorded in Goygol district.

- In the Samukhsky district, among the studied grape varieties, there was no very low yield per bush. Low productivity was 11.8%, average productivity - 41.2%, high productivity - 41.2% and highest productivity - 5.9% as a result, the varieties were distributed among 4 groups.



**Figure 3.** Yield from a bush in groups of introduced grape varieties in the Goygol district



**Figure 4.** One of the groups of introduced grape varieties in the Samukhsky district tənəkdən məhsuldarlıq

#### **Assessment of economic efficiency of introduced grape varieties.**

The economic efficiency of grape cultivation as a branch of agriculture depends on the introduction into practice of new clones and grape varieties more adapted to soil and climatic conditions [5, 7].

The variety has become an object of the market and a full participant in commodity–money relations, the calculation of the economic efficiency of breeding achievements in viticulture is another component of insufficient knowledge that needs to be solved [6,8,9].

A significant impact on the reduction of the real efficiency of production and reproductive capabilities of the subject has non-compliance with the optimal ratios and values of techno-economic indicators by commodity producers. The size of disproportions and imbalances in reproduction processes, as well as the required level of regulators are determined by the insufficiency of forms of state regulation for leveling macroeconomic disproportions and motivation of expanded reproduction of basic production assets [10,11,12].

Considering the above and the fact that Goygol and Samukh districts belong to the areas where viticulture is widely developed, during the study we determined the economic efficiency of table grape varieties and sultanas, imported from foreign countries in Goygol and Samukh districts. Undoubtedly, the use of household resources for growing grapes is an important condition for obtaining high financial income from the site. Therefore, the determination of the economic efficiency of introduced grape varieties cultivated in production creates the conditions for the correct selection of varieties when laying new plantations. In the Goygol and Samukh regions, autumn was observed from the bush to tastes and an emotional histogram (şəkil 5; 6).

In the course of the work, the yield per hectare, the selling price of a hundredweight of products, the income from the sale of a hundredweight of products, the amount of net profit and profitability were calculated. The wholesale price of the grape harvest is calculated within the minimum limits, 0.50-0.60 kopecks for kishmish and table varieties. The obtained indicators are shown in Table 1.

#### **Goygol district.**

In raisins and table varieties. The lowest and highest yields per hectare in grape plantations are: 128 cwt (Ichkimar variety) and 304 cwt (Red-Globe variety). The income received from the sale of one hundredweight of products, kishmish and table varieties ranged from 6400 manats (Ichkimar variety) and 18240 manats (Red-Globe variety) for kishmish and table varieties.

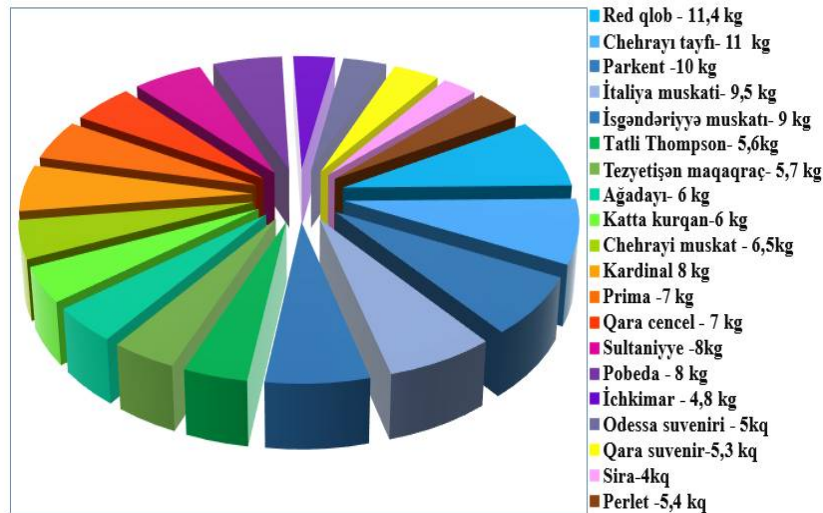


Figure 5: Yield of promising grape varieties introduced in Goygol district

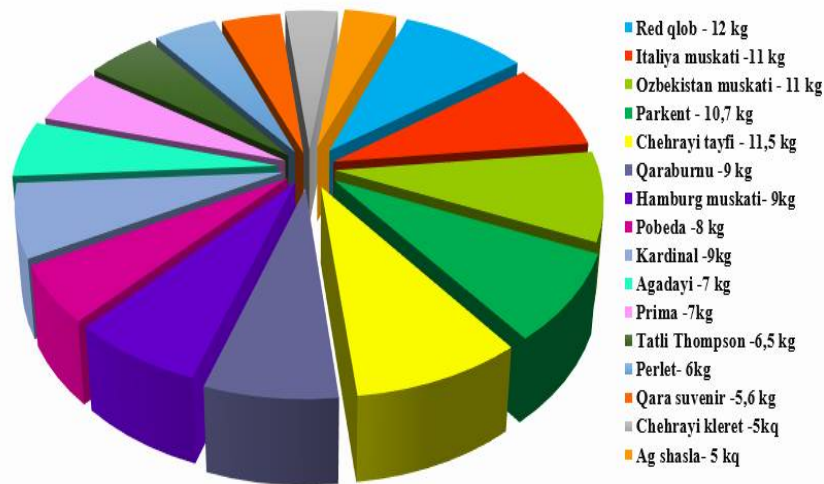


Figure 6: Yield of promising grape varieties introduced in Samukh district

The Ichkimar and Red Globe varieties also had the lowest and highest net profit figures. Thus, from the Ichkimar variety, the net profit received amounted to 3690 manats, and from the Red-Glob variety 15530 manats. The Ichkimar and Red Globe varieties also had the lowest and highest net profit figures. Thus, from the Ichkimar variety, the net profit received amounted to 3690 manats, and from the Red-Glob variety 15530 manats.

**Samukhsky district.**

According to the yield collected from 1 ha in the studied vineyards: the lowest yield is 133.4 c (in the varieties Shasla White and Claret Pink); the highest yield is 320.0 c (in the Red-Globe variety). The income received from the sale of one hundredweight of products was recorded as the lowest in the varieties of White Shasla and Jahraya Claret (6670 manats), and the highest income in the Red Globe variety (16,000 manats).

In terms of net income and profitability, the lowest indicator is 3960 manats (White and Pink Claret Shasla varieties), the highest is 13290 manats (Red-Globe variety), the lowest profitability of these varieties is 146.1%, and the highest profitability is 490.4%.

**Table 1** Economic efficiency of introduced grape varieties

Variety	Yield from one hectare, cwt	The sales price of one centner of the produc, man.	Profit from the sale of one centner of products, man.	Costs per hectare man.	Net profit, man.	Profitability %
<b>DİSTRİCT GOYGOL</b>						
<b>RAİSİNS AND TABLE VARIETY</b>						
Sultania	214,4	60,00	12864,00	2710	8010	295,6
Agadai	268,0	50,00	13400,00	2710	6890	254,2
Shasla White	321,6	50,00	12864,00	2710	3820	141
Pink taifi	348,9	60,00	15700,00	2710	11955	441,1
Muskat of Hamburg	241,2	60,00	12060,00	2710	8635	318,6
İchkimar	254,6	50,00	11457,00	2710	3690	136,2
Muskat of İskenderiye	241,2	60,00	10854,00	2710	9290	342,8
Muskat of İtaly	187,6	60,00	8442,00	2710	9955	367,3
Kardinal	348,9	70,00	13484,00	2710	8486	313,1
Katta kurqan	321,6	60,00	12864,00	2710	6890	254,2
Black Janjal	187,6	50,00	8472,00	2710	6670	246,1
Black Souvenir	375,2	50,00	16884,00	2710	4355	160,7
Odessa souvenir	268,0	50,00	12160,00	2710	3955	145,9
Parkent	321,6	50,00	14472,00	2710	10620	391,9
Prima	187,6	70,00	8442,00	2710	7208	266
Perlet	268,0	60,00	12870,00	2710	4490	165,7
Pobeda	455,6	60,00	18224,00	2710	7955	293,5
Red-qlob	375,2	70,00	16884,00	2710	15530	573,1
Sweet Thompson	321,6	50,00	14472,00	2710	4755	175,5
Fast-ripening Magarach	348,9	50,00	15660,00	2710	4890	180,4
<b>DİSTRİCT SAMUKH</b>						
<b>RAİSİNS AND TABLE VARIETY</b>						
Sultania	348,4	60,00	20904,00	2710	8890	328,0
Agadai	286,0	50,00	14300,00	2710	6620	244,3
Shasla White	214,0	40,00	8576,00	2710	3960	146,1
Cleret pink	375,2	45,00	16084,00	2710	3960	146,1
Taifi Pink	348,4	40,00	13936,00	2710	12625	465,9
Muscat of Hamburg	321,6	45,00	14472,00	2710	9290	342,8
Muscat of İtaly	341,2	45,00	10854,00	2710	11960	441,3
Kardinal	321,6	50,00	16080,00	2710	7955	293,5
Black Souvenir	402,0	45,00	18090,00	2710	4760	175,6
Qaraburnu	286,0	40,00	11440,00	2710	9290	342,8
Muscat Uzbek	321,6	45,00	14472,00	2710	6960	256,8
Parkent	375,2	45,00	16884,00	2710	11560	426,6
Prima	214,0	40,00	8576,00	2710	6620	244,3
Perlet	321,6	40,00	12864,00	2710	5290	195,2
Pobeda	455,6	40,00	18224,00	2710	8620	318,1
Red-Qlob	428,0	45,00	19296,00	2710	13290	490,4
Sweet Thompson	349,4	45,00	15678,00	2710	5955	219,7

**RESULT AND DISCUSSION**

Thus, as a result of the study of the economic efficiency of grape varieties introduced in the Geigel and Samukhsky districts, the following ideas can be put forward:

- In the Goygel district, among the introduced varieties Sultania, Red Globe, Muskat of Hamburq , Pink taifi, Muskat of Italy, Pobeda, Parkent and others are highly profitable varieties;
- In the Samukh district, among the introduced varieties Qaraburnu, Sultania, Red-Qlob, Pobeda, Muskat of Hamburq, Pink taifi, Muskat of Italy, Parkent and others are highly profitable varieties;

## REFERENCES

1. Guliyev v.M., Panahov T.M. (2017). Azerbaijan ampelography. Volume I, Baku, pp. 3-110
2. Salimov V.S. (2019). Ampelographic screening of grapes. Baku, "Teacher" publishing house, pp. 153-159
3. Valiyeva S.I. (2020). The current state of grape and wine export in Azerbaijan and opportunities to increase it. *Agricultural Economics*, No. 1 (31). Pages 85-91
4. Banjanin T., Rankovic-Vasic Z. (2016). Impact of climate factors on agro biological characteristics of Pinot Noir variety in Trebinje vineyard. Proceedings of the VIIth International Scientific Agriculture Symposium. "Agrosym , Jahorina, Bosnia and Herzegovina. - 2016. - 116-121.
5. Bramley R.G.V., Ouzman J., Trought M.C.T., Neal S.M., Bennett J.S. (2019). Spatio temporal variability in vine vigour and yield in a Marlborough Sauvignon Blanc vineyard. *Australian journal of Grape and Wine Research*. V.25 – N4. – P.430-438.
6. Brunori E., Cirigliano P., Biasi R. (2015). Sustainable use of genetic resources the characterisation of an Italian local grape wine variety (Grechetto rosso) and its own landscape // *Vitis*. Vol. 54. P. 261-264.
7. Buesa I., Caccavello G., Basile B., Merli M.C., Poni S., Chivella C., Intrigliolo D.S. (2019). Delaying berry ripening of Bobal and Tempranillo grapevines by late leaf removal in a semi-arid and temperate-warm climate under different water regimes. *Australian journal of Grape and Wine Research*. V.25 – N1. – P.70-82.
8. Fraga H., Malheiro A.C., Moutinho-Perera J., Jones G.V., Alves F., Pinto J.G., Santos J.A.(2014). Very high resolution bioclimatic zoning of Portuguese wine regions: present and future scenarios // *Regional environmental change*. Vol. 14(1). P. 295-306.
9. Ibanez J., Carreno J., Yuste J., Martinez-Zapater J.M. (2015). Grapevine breeding and clonal selection programs in Spain // *Grapevine breeding programs for the wine industry*. P. 183-209. *Fruit growing and viticulture in the South of Russia* № 71(5), 2021 г.
10. Lehner O.M., Harrer T. (2019). Accounting for economic sustainability environmental social and governance perspectives . *Journal of applied accounting Research*. V. 20(4), P. 365-371. Doi: 10.1108/JAAR-06-2019-0096.
11. Nurim Y., Asmara E.N. (2019). Industry characteristics and Patterns of sustainability reports // *Indonesian journal of sustainability accounting and management*. V. 3. P. 174-186.
12. Plushchiko VG., Kononov A.A., Avdotin V.P., Plushchiko V.V., Gurina R.R.(2020). Reducing the level of cognitive distortions when assessing the vulnerability of complex technical systems based on criteria modelling methods // *International Review on Modelling and Simulation*. N 13(6). P. 425-437. Doi: 10.15866/iremos.v13i6.17812.
13. Roychev V. (2016). Comparative ampelographic evaluation of the earliest ripening and very early ripening table vine cultivars // *Lozarstvo I Vinarstvo*. 61(1). – S. 45-55.
14. Vujovic D.S., Zunic D.M., Pejcin B.M., Popovic-Djordjevic J.B. (2016). Ampelographic description of cluster, berry and seed of Merlot cultivar (*Vitis vinifera* L.) and its selected clones. *Journal of Agricultural Sciences*. 61(1). – P. 11-17. (<http://wine-grape.gov.az/az/agrotechnics-of-grapes/>).

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