

BIOMETRIC PARAMETRES OF INTRODUCED PEACH PLANT VARIETIES

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Abstract. The article provides information about the biometric parameters of peach plant varieties. The research is envisaged the study of agro biological features, development indicators of peach plant varieties introduced in the conditions of Guba-Khachmaz region and adaptation of the region due to soil and climatic conditions. To compare the biological characteristics of varieties, the Fadai variety was used as a control variety. During the study, data were obtained on the peach plant varieties before and after the growing season, on tree height, crown width, and size of the umbilical of tree. As a result of the study, varieties with high biometric properties from introduced peach varieties were recorded. Depending on the biological properties of the varieties, the biometric properties of the peach varieties make it possible to determine in advance the peculiarities of pruning, which is an important agro technical treatment for plants. As a result of the research work, the height of the trees on the research varieties was 2.06-2.52 m, the projection area of the crown varied between 2.37-3.52 m², the volume of the crown varied between 1.63-2.95 m³.

Keywords: peach plant, variety, introduction, biometric parameters, Guba-Khachmaz.

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1. Introduction

The history of fruit growing in our republic dates back to ancient times, and we have ample opportunities to meet the population's demand for fruit products. In this regard, peach plant has great cultivation potential in all regions of Azerbaijan. In addition, the production of various products from peach plant, the ability to use it both fresh and processed, as well as the growing demand of the population for the fruits of this plant lead to the development of cultivation of the technology of the peach plant. Peach trees grow and develop rapidly. Peach varieties have different heights, diameters and crowns. The shape of the crown has a great influence on the quality of the fruit. Therefore, in varieties with a very dense crown, the fruits remain in the shade, lose their quality and become tasteless and small. On trees with a sparse and semi-sparse crown, the fruits fully use the light, the percentage of sugar increases, the shelf life increases, and the harvesting becomes easier (Hasanov & Aliyev, 2011).

Naturally, peach species are widespread in mountainous areas in China at altitudes of 1200-7000 m above sea level (Opanasenko & Elmanova, 2017). Some of these areas (Shenxi, Gansu and Tibetan mountains) have a dry climate with low frost in winter and a maximum annual rainfall of 300-600 mm in summer and an average annual temperature of + 6+15°C. In these regions and on the mountain plateaus of China, the soils of the natural distribution zone of peaches are washed to varying degrees and are carbonated brown, gray-brown, brown-brown soils, as well as chestnut soils formed in previously empty fields. It is widespread in the black, chestnut, brown and skeletal soils of the steppe

and foothills of Crimea. Peach plants are cultivating in the Fergana Valley, Tajikistan, the North Caucasus, the skeletal gray and brown soils of Moldova. Factors limiting of the spread and cultivation of peaches are including high salinity, strong skeletal soils, carbonate, acidic and alkaline, dense and heavy granulometric composition, low air permeability, high groundwater levels and their high salinity, soil micro and macroelement reserves, low humus. Due to its mechanical composition, the peach plant is suitable for clayey, sandy-clayey, calcareous, sufficiently moist, neutral or slightly acidic (Shaytan, 1967; p. 64) soils. First of all soil conditions should strengthen the development of the root system of the plant, creating favorable conditions for its development. In soils with poor aeration capacity, lack of air can lead to overgrowth and reduced productivity or complete destruction of trees. Light sandy soils are not considered suitable for peach cultivation due to lack of dryness and productivity. Peach cultivation is possible in sandy and gravelly soils with the application of high amounts of organic and mineral fertilizers every year. In Fergana Valley, peach cultivation is irrigated 12-16 times and the canopy of the plant reaches 3.8-4.6 m. The pH of the soil should be between 5-8. In dry soils, the peach plant grows poor, the quality is getting low with its small fruits. In moist clay soils, the development period of the peach plant is prolonging and sap flow is forming (Shaytan, 1967; p. 39). For peach cultivation, the height of groundwater should be at least 2 m below the soil surface. The main limiting factor is the climate and above all adverse weather conditions. Peach plant is dying in Georgia at -25°C , in Moldova at $-26 \dots -29^{\circ}\text{C}$, in the North Caucasus at $-28 \dots -29^{\circ}\text{C}$. For most varieties distributed in Crimea and northern Tajikistan, the critical temperature is considered to be the same limit (Opanasenko & Elmanova, 2017; p. 65).

Peach trees grow and develop quickly. Trees of peach plant varieties have different heights, diameters and umbrellas. The shape of the umbrella has a great influence on the quality of the fruit. Thus, in varieties with very dense umbrellas, the fruits remain in the shade, lose their quality and can not get color, become tasteless and small. In sparse and medium sparse umbrella trees, the fruits acquire their color by making full use of light, the sugar content increases, the shelf life of the fruit is extended and the fruit is easier to harvest.

The height of a peach tree is usually 4-6 meters. Shaytan (1967) notes that the height of the peach plant reached 3-5 m in Kiev, 8 m in China, California and southern regions. The umbrella is wide, round or scattered. The bark of young plants turns reddish-brown, and as it ages the bark turns greenish-brown. When there is no layer of fungus on the old bark, the bark turns silver.

The peach plant has a strong growth and the ability to form many shoots. The development of shoots starts in spring-summer, mainly in May-July, and ends in early August. However, it lasts until September. The shoots of the peach plant are green at the beginning of development, the woody part of the shoots is reddish-raspberry on the sunny side and the other side is green. In winter, these shoots turn dark when frosts fall. The shoots of White peach and other varieties are green even in winter. At $20-25^{\circ}\text{C}$ frosts, the branches darken and turn black, when the temperature rises, the branches regain their previous color (Giovannini *et al.*, 2013). There are several types of peach shoots (Shaytan, 1967). One of them is the tall shoots, which are strong, but only form vegetative shoots. There are no flower buds on such shoots. These sprouts are very rare in peaches.

One of the sprouts found in the peach plant is an abnormal sprout. These shoots are forming on the strong branches of the current year. 1,2 or 3 shoots are forming on it, most of which are flower shoots. In addition, haram sprouts are form on this plant. These shoots

are form from dormant shoots. Occurs mainly on trunks and skeletal branches. This type of shoots is very strong, 1.5-2 m long and 2-2.5 cm thick. Such shoots form abnormal shoots on the upper part by forming flowers which also have flower buds on them (Sokolova & Sokolov, 1987).

Peach varieties relate to environmental factors in different ways. For this reason, it is necessary to study the development of plant varieties.

2. Material and methodology

The research was carried out planted with a 3x5 planting scheme on 0.17 hectares at the Zardabi Research Institute of Fruit and Tea Growing, over 18 varieties of peach and nectarine: Melox-26, Melox-31, Melox-37, Netix-25, Netix-28, Netix-30, Netix-34, Redix-25, Redix-27, Redix-30, Redix-2-110, Malix-25, Malix-36, Malix-145, Guayox-30, Guayox-35, Gartairo, Gardeta. The study was carried out on the horticultural programming and methodology of fruit, berry and nut crops (Sedov & Ogoltsova, 1999). In the study, the Fadai variety was used for a comparative study of the pomological characteristics of other varieties.

The height of the tree was determined by measuring the distance from the ground to its highest point. The diameter of the stem was measured with a weightlifting at a height of 18-20 cm above the ground.

3. Purpose of the study

Study of agrobiological features and development parameters, as well as the selection of fast-growing, adapting to the climatic conditions of the region, introduced varieties of peach in the Guba-Khachmaz region.

Experimental part. During the research years (2018-2020), the height of the tree, the width of the stem and the size of the crown were measured before and at the end of the vegetation from the biometric parameters of peach plant varieties. Newly introduced peach varieties differ in their biological characteristics. Varieties are selected according to the structure, color, size and density of the trunk, branches and bark.

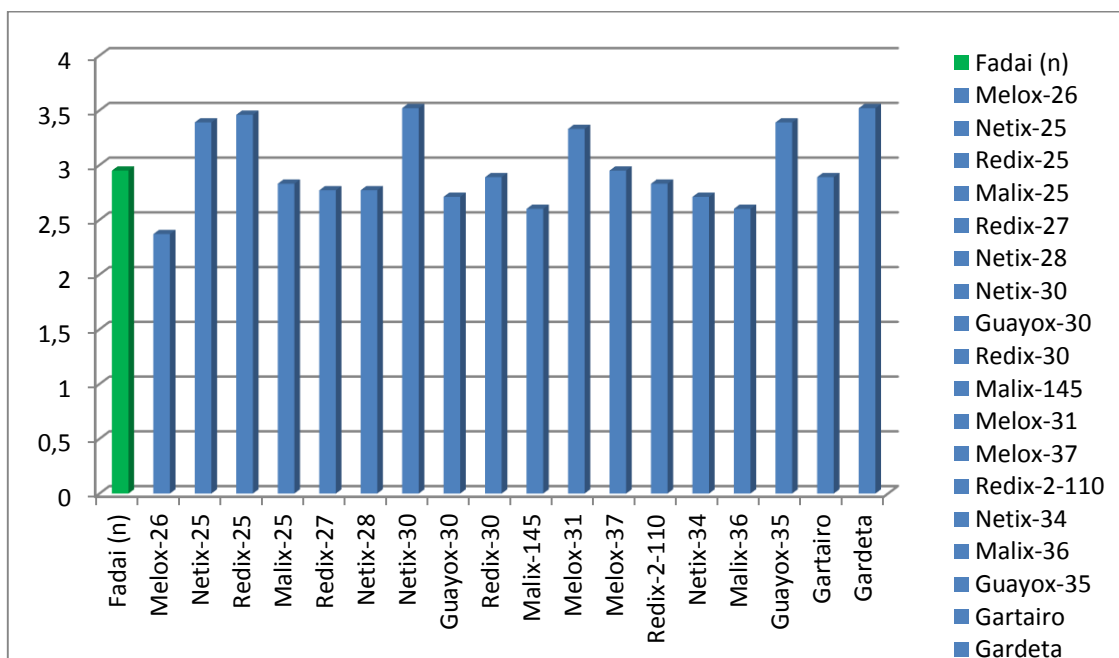
As a result of the research, the height of the trees of the introduced peach varieties varied between 2.06-2.52 m. Tree heights Netix-25, Redix-25, Netix-30, Melox-31, Quayoks-35 and Gardeta are higher (2.42-2.52 m) compared to Fadai (n) variety, while other varieties are relatively low. The highest index was Melox-31 with 2.53 m, the lowest index was Maliks-145 with 2.06 m.

The cross-section of the stem varied between 9.9-13.0 cm on the introduced peach varieties. Compared to the Fadai (n) variety, the width of the tree stem Netix-25, Redix-25, Netix-30, Melox-31, Quayoks-35 and Gardeta were higher, while other varieties were relatively low. The highest indicator was Garte with 13 cm the lowest indicator was Maliks-36 with 9.9 cm.

The diameter of the tree umbrella varied between 1.63-2.29 m according to the research varieties. The height of the stem on the introduced peach varieties varied between 0.37-0.54 m.

Table 1. Biometric parameters of introduced peach plant varieties
(Average indicators for 2018-2020)

№	Variety	The height of the tree(m)	The cross section of the stem in the tree (sm)	The diameter of the tree canopy is between the rows (m)	The diameter of the crown of the tree is between the plants (m)	The height of the stem (m)	Square projections crowns, m ²	Volume crowns, m ³
1	Fadai (n)	2,26	11,9	2,07	1,84	0,50	2,95	2,22
2	Melox-26	2,07	10,6	1,88	1,63	0,45	2,37	1,63
3	Netix-25	2,42	12,9	2,22	1,95	0,47	3,39	2,73
4	Redix-25	2,48	12,8	2,27	1,93	0,54	3,46	2,86
5	Malix-25	2,16	11,2	2,08	1,73	0,42	2,83	2,03
6	Redix-27	2,20	10,8	2,11	1,68	0,48	2,77	2,03
7	Netix-28	2,21	11,1	2,10	1,67	0,42	2,77	2,04
8	Netix-30	2,52	12,4	2,29	1,97	0,43	3,52	2,95
9	Guayox-30	2,18	11,3	2,03	1,69	0,47	2,71	1,97
10	Redix-30	2,16	11,1	2,07	1,78	0,54	2,89	2,08
11	Malix-145	2,06	11,5	2,04	1,63	0,43	2,60	1,78
12	Melox-31	2,46	12,8	2,13	2,01	0,52	3,33	2,73
13	Melox-37	2,22	11,6	2,13	1,76	0,49	2,95	2,18
14	Redix-2-110	2,21	11,2	2,07	1,75	0,40	2,83	2,08
15	Netix-34	2,25	11,2	2,05	1,70	0,54	2,71	2,03
16	Malix-36	2,18	9,9	1,96	1,69	0,47	2,60	1,89
17	Guayox-35	2,46	12,6	2,25	1,92	0,43	3,39	2,78
18	Gartairo	2,23	10,2	2,10	1,73	0,37	2,89	2,14
19	Gardeta	2,48	13,0	2,29	1,95	0,44	3,52	2,91

**Figure 1.** Crown projection area, m²

The projection area of the crown varied between 2.37-3.52 m² according to the research varieties, the lowest parameters was observed in Melox-26 (2.37 m²) and the highest parameters in Netix-30 and Gardeta (3.52 m²) compared to Fadai variety.

The volume of the crown varies between 1.63-2.95 m³ for research varieties, Melox-26 and Maliks-145 (1.63-1.78 m³) varieties are lower compared to Fadai variety, Netix-25, Redix-25, Netix-30, Melox-31, Quayoks-35 and Gardeta (2.73-2.95 m³) varieties had relatively high performance.

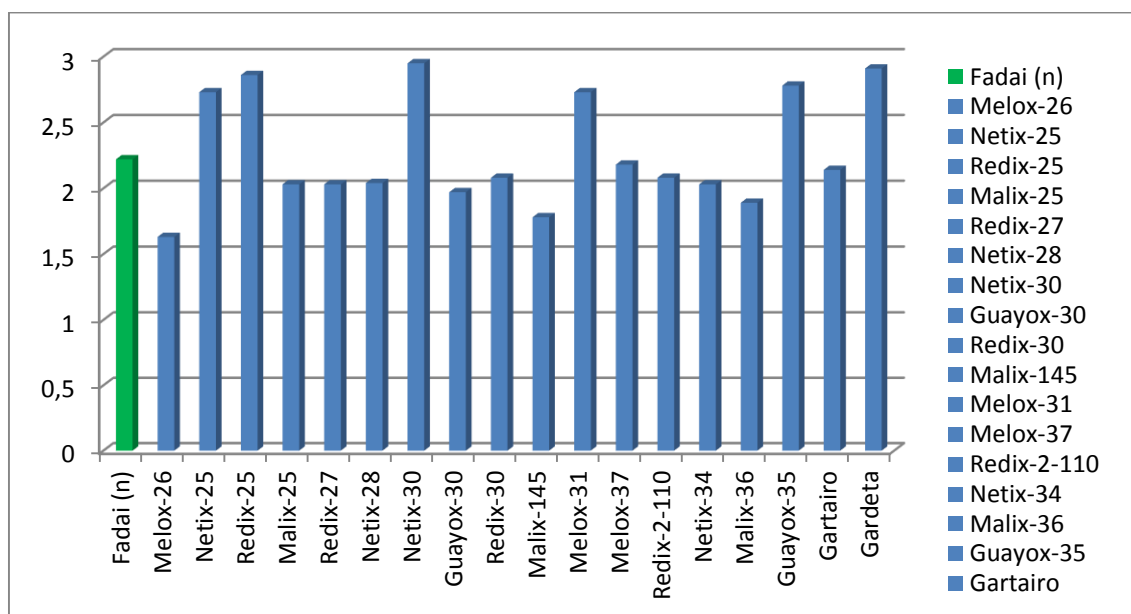


Figure 2. Crown volume, m³

4. Conclusion

We studied the agrobiological features of peach plant varieties introduced in Guba-Khachmaz region, as well as biometric parameters. During the research it was found that the biometric parameters of the varieties varied depending on the biological characteristics of the varieties belonging to that plant. The development parameters of the introduced peach varieties for 2018-2020 were studied. As a result of the research work, the height of the trees on the research varieties was 2.06-2.52 m, the cross section of the stem was 9.9-13.0 cm, the diameter of the tree crown was 1.63-2.29 m, the height of the stem was 0.37-0.54 m, the projection area of the crown varied between 2.37-3.52 m², the volume of the crown varied between 1.63-2.95 m³. Netix-25, Redix-25, Netix-30, Melox-31, Quayoks-35 and Gardeta varieties of peaches introduced in comparison with Fadai variety had relatively high indicators on all parameters.

References

- Giovannini, D., Liverani, A., Bassi, D., & Lateur, M. (2013). ECPGR Priority descriptors for peach [*Prunus persica* (L.) Batsch]. *European Cooperative Programme for Plant Genetic Resources*, 31 p.
- Hasanov, Z.M., Aliyev, J.M. (2011). *Fruit growing*, Baku, 519 p.

- Opanasenko, N.E., Elmanova, T.S. (2017). On the distribution and drought tolerance of *Persica* (*Persica vulgaris* Mill.) (Review article), *Bulletin of the State Nikitan Botanical Garden*, 123, 65-71.
- Sedov, E.N., Ogoltsova, T.P. (1999). Program and methodology of variety studies for fruit, berry and nut crops. *Orel: VNIISPK*, p.564.
- Shaytan, I.M. (1967). *Culture of Persia*, Kiev, p.195.
- Sokolova, S.A., Sokolov, B.V. (1987). *Peach*. 2nd ed., Chisinau: Kartya Moldova, p.327.