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Article



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MORPHO-BIOLOGICAL AND ECONOMIC CHARACTERISTICS OF INTENSIVE APPLE VARIETIES

Abstract: The article provides information on summer Dayton, Vadimovka, early autumn Wagnera prizovoe, autumn Pamyat Esaulu and winter Goldrash varieties with average growth of trees, fruit marketability indicators and high yield for intensive type apple orchards, the tasting value of the fruits of these varieties was 4.5-4.6 points, the yield indicators were 21.0-35.5 kg per tree.

Key words: intensive, orchard, cultivar, fruit, biometric indicator, branch diameter, body circumference, leaf level, assimilation level, fruit size, tasting, tree, productivity.

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Introduction

The development of intensive horticulture envisages the use of fast-harvesting, high-yielding weak growing varieties. One of the main factors in providing the population with fresh, juicy apple fruits all year round is: The ripening time of the fruits of its assortment is different, especially the long shelf life of the late autumn and winter varieties.

Apple is one of the most important fruit plants of the horticultural industry. Today, its total area exceeds 6,378,000 hectares, and its total yield exceeds 89.3 million tons¹. Further increasing the productivity of apple orchards involves the creation and industrialization of completely new varieties that are biologically useful and economically efficient [17; 47-49-p.], [1; 3-17-p.].

In order to further increase the effectiveness of intensive apple orchards established in the republic today, it is an urgent task to select high-yielding varieties based on the study of the morpho-biological

and economic characteristics of new introduced and local varieties, to determine productivity indicators, and to develop effective agrotechnical elements specific to a particular variety, finding an effective solution to these tasks will allow to sufficiently increase the productivity of intensive apple orchards and the quality of the fruit grown in them.

Research methodology: Studies on the study of morpho-biological and economic characteristics of intensive apple varieties were carried out in the intensive orchard planted in the low M-IX graft of apple in the soil-climatic conditions of the Tashkent region in 2020-2022. According to the ripening period, 35 different varieties of apples were divided into summer, early autumn, autumn and winter groups.

Apple trees were planted in a 4.0x2.0 m scheme, in vertical symbags, and grown by palmette method, and calculations and observations were made in 4 repetitions out of 5 trees in each option.

¹<https://ru.wikipedia.org/wiki/%D0%AF%D0%B1%D0%BB%D0%BE%D0%BD%D1%8F>

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The height of the tree was measured on a measuring rod with 1 cm divisions. This measurement was performed at one time (end of vegetation) - after harvesting, i.e. after straightening branches without fruits.

The diameter of the branch was measured in the same terms as the height of the tree and on a measuring rod. For this purpose, in trees with spherical branches, from the left and right sides, along the row, perpendicular to the soil, according to the tightest diameter of the cross branches. At the junction of this perpendicular with the ground, two marks were placed along the row and transverse to it. The distance between the marks was measured on a ruler. The average value was calculated from two measurements.

Body girth was measured at the end of vegetation in two mutually perpendicular directions (along the row and across) using a barbell at a height of 30 cm above the soil level. From the two measurements, the average diameter of the body was found, and then its circumference was calculated according to the following formula:

$C = \pi \times D$; here: π – is a constant number and it is equal to 3.14, D – body diameter [4; 5–15-p.], [13;

253–299-p.].

Leaf level - after the leaves have fully developed (August, September) was determined by the weighting method recommended by A.A. Nichiporovich [11; 11-46-p.]. Leaf level was calculated on trees in five typical trees - vegetative and fruit crops. For this, leaves were taken in four replicates from 10 common branches, 10 spear branches and 10 vegetative branches. The number of leaves in one tree, its level and assimilation level were calculated.

Average fruit weight was determined for trees in each experiment and each replicate by randomly selecting 200 fruits from the harvested crop, weighing them, and dividing the total weight by 200.

Fruit size was determined using GOST 21122-75 [5; 10-p] indicators (Table 1).

Evaluation of the taste of fruits was determined by tasting them, that is, by conducting a tasting at the time of their consumption. For this, normally developed fruits, not affected by diseases and pests, were selected. Evaluation criterion was carried out in apple fruits on a 5-point system for all indicators, and the division of total points represented the final score given to the fruit.

Table 1. Fruit size, g.

Very small	Small	Little	average	average big	Big (large)	Very large (very large)
till 25,0	25,1-45,0	45,1- 90,0	90,1-135,0	135,1-180,0	180,1-250,0	250,0<

Estimates of yield per tree were calculated in 4 replicates from 5 trees in each variant.

Statistical analysis of research results was calculated in Excel 2010 and Statistica 7.0 for Windows computer programs with a confidence interval of 0.95% according to the method of B.A. Dospekhov [6 301–325-p].

Research results and their analysis: Increasing the productivity of apple orchards and fruit quality is mainly done in two ways; firstly, the application of high agrotechnical measures in the garden, and secondly, the introduction into production of intensive varieties and hybrids adapted to each soil-climatic conditions, yielding high-quality fruit. It is known that properly selected varieties ensure high and quality harvest under appropriate agrotechnical conditions.

Intensive horticulture is also changing the demand for apple varieties. In the establishment of intensive type apple orchards, it is required to plant short, mechanized, resistant to diseases and pests, no or weak shaking, spur-type varieties. In addition, the direction of use of the fruit (for fresh consumption, for processing, export abroad, etc.) and having high results in terms of product quality are considered to be the main indicators of the variety.

In the works of some researchers, the control of the growth strength of trees of different apple varieties is connected with the graft and it is emphasized that the growth rate of the trees depends on the biological characteristics of the variety and the graft [12; 183–184-p.], [10; 241–247-p.], [14; 17–21-p.].

In the researches of a number of scientists, it has been proven that the height of apple trees in seed grafts reaches 6.0-10.0 m, the root system reaches 1.5-2.0 m, depending on the physical properties of the soil, individual roots grow to a depth of 5.0-7.0 m. According to the authors, tree growth is slower in medium-sized clonal grafts, their height reaches 4.0-5.0 m, the root system reaches 1.0-1.5 m, and in low plantations, the height of apple trees reaches 2.0-3.0 m, and the roots grow to a depth of 0.6-1.0 m [15; 19–21-p.], [9; 4–5-p.], [14; 17–21-p.].

The growth power of trees, the size of their trunks, mainly depends on the growth power of the graft and variety to which they are connected, as well as the growing conditions of the trees. Based on this, when creating a garden, it is necessary to choose a suitable planting scheme based on the growth conditions of each variety. One of the main factors determining the suitability of a variety for intensive

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gardens is the height of the trees and their growth characteristics. Reducing the size of the tree increases its suitability for intensive orchards due to the ease of agrotechnical maintenance.

According to the results of the conducted research, the height of the trees of the summer "Pervenets Samarkand" (st) variety was 295 cm, and the branch diameter was 175 cm, compared to the standard variety, it was noted that the height of the trees and the diameter of the branches were smaller in all the summer varieties. According to this indicator, among the varieties of the summer group, the trees of the Kyzil Janoqi and Pristin varieties were found to be the smallest in size. In terms of the size of the body circumference of the trees, in the standard variety, except for the height of the tree and the diameter of the branches, it was at least 17.5 cm, and in comparison with the standard, a higher indicator was noted in all the summer varieties. According to this indicator, among the varieties of the summer group, trees of the Mantet and Stark Erlist varieties had the highest body circumference of 20.9; 22.6 cm.

Analyzing the number of leaves on the tree, tall and relatively wide diameter branches of "Pervenets Samarkanda" (st), "Oydin", "Elena", "Rustamiy" and Williams Pride varieties have leaves (6.4-8.9 thousand pieces) It was found that the number is the most, while the Kyzil Janoqi and Pristin varieties (5.3-5.7 thousand pieces) are the least. The change of the assimilation level of the tree was the highest 22.0-24.0 m² in "Oydin", "Elena" and "Rustamiy" varieties, depending on the number and level of leaves.

Biometric indicators of trees of early autumn varieties are also different, the height of the trees in Red Delishes (st) variety is 260 cm, the diameter of the branches is 160 cm, Compared to the standard variety, the height of trees is the highest in

Prikubanskoe (264 cm), Limonniy (272 cm) and hybrid II-X-11 (287 cm), while in "Farangiz", Wagnera prizovoe (205 cm) and Remo (221 cm) varieties was found to be the lowest. According to the diameter of the branches, a high indicator was noted in the varieties "Israel" (175 cm), Liberty Zimni (165 cm) and hybrids II-X-31 (173 cm), II-X-11 (168 cm). Among the varieties of this group, "Farangiz" (110 cm), Wagnera prizovoe (109 cm) and Remo (115 cm) varieties, which have low tree height, also have a small diameter of branches. The height of the trees was average, and the diameter of the branches was small (105-125 cm) in the varieties Renda (248 cm), Kandil Sinap (244 cm) and Starking Delishes (235 cm).

The number of leaves on a tree is high in Red Delishes (st) (6.0 thousand pieces), Prikubanskoe varieties and hybrids II-X-31 (6.9 thousand pieces), II-X-11 (7.8 thousand pieces) high, on the other hand, the lowest index was recorded in the varieties "Farangiz" (4.9 thousand pieces), Wagnera prizovoe (4.8 thousand pieces) and Remo (5.1 thousand pieces) with smallest size. Different indicators were also recorded on the assimilation level of the tree, and this indicator is the variety "Israel" (24.8 m²) with a large number of leaves and a large surface, and II-X-31 (22.1 m²), II-X-11 (23,9 m²) was found to be higher in hybrids. Although the average number of leaves in the "Bolajon" variety was 5.7 thousand pieces, the average leaf level was the highest at 36.6 cm², so the assimilation level of the tree was relatively high at 20.9 m². It was found that the assimilation level of Renda (14.3 m²), Kandil Sinap (11.5 m²), "Farangiz" (12.6 m²), Starking Delishes (14.4 m²) varieties, which have a small number of leaves and a small surface area, recorded the lowest index (Table 2).

Table 2. Biometric indicators and assimilation level of apple varieties (2020-2022)

Varieties	Biometric indicators of trees, cm.			Number of leaves on a tree, thousand pieces	Leaf level cm ²	Tree assimilation level m ²
	height	branch diameter	body circumference			
Summer apple varieties						
"Pervenets Samarkand" (st) in	295	175	17,5	8,9	23,0	20,5
"Oydin"	278	163	19,9	7,4	32,5	24,0
"Elena"	285	152	19,7	6,9	31,9	22,0
Qizil Janoqi	245	138	18,3	5,3	30,0	21,3
"Rustami"	277	158	19,1	7,1	31,1	22,8
Mantet	265	153	20,9	6,1	32,7	19,9
Stark Erlist	258	148	22,6	5,6	24,4	13,7
Williams Pride	271	145	18,2	6,4	25,9	16,6
Pristine	244	147	18,5	5,7	25,8	14,7
Dayton	255	145	18,8	5,9	28,4	16,8
Vadimovka	250	140	18,9	5,8	28,5	16,5

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Early autumn apple varieties						
Red Delishes (st)	260	160	20,5	6,0	27,7	16,6
Renda	248	125	17,4	5,8	24,7	14,3
Candil Sinap	244	105	14,0	5,1	22,5	11,5
"Bolajon"	253	145	15,3	5,7	36,6	20,9
"Israel"	237	175	17,1	7,7	32,2	24,8
"Farangiz"	205	110	12,9	4,9	25,8	12,6
Prikubanskoe	264	152	21,9	6,3	30,2	19,0
Starking Delights	235	115	17,1	5,5	26,2	14,4
Limonniy	272	149	21,6	5,9	30,1	17,7
Renora Zimnyaya	235	140	16,8	5,4	28,7	15,5
Remo	221	115	14,7	5,1	28,9	14,7
Sunprice	258	155	20,1	5,8	27,4	15,9
Liberty Zimni	255	165	17,0	5,7	29,8	17,0
Wagner prizovoe	205	109	16,8	4,8	31,1	14,9
II-X-31	238	173	18,8	6,9	32,1	22,1
II-X-11	287	168	22,1	7,8	30,6	23,9
Autumn varieties						
King David (st)	256	140	18,9	7,6	27,1	20,6
Kubanskaya bagrennaya	265	155	19,8	6,2	29,1	18,0
Pamyat Esaulu	240	120	14,8	5,3	26,0	13,9
Florina	270	175	21,7	6,1	24,3	14,8
Winter varieties						
"Nafis" (st)	285	160	19,5	7,7	31,2	24,0
Fuji	258	152	16,8	5,7	32,5	18,5
Mutsu	272	178	18,5	6,1	37,8	23,0
Goldrush	253	138	16,3	5,5	27,1	14,9

The height of the trees of the autumn King David (st) variety was 256 cm, the diameter of the branches was 140 cm, compared to the control variety, the size of the trees of the Kubanskaya bagrennaya and Florina varieties was large, and the Pamyat Esaulu variety had a low index for both indicators, and the trees size was found to be small. The number of leaves in the variety King David (st) was the highest 7.6 thousand pieces, the average surface area was 27.1 cm², accordingly, the assimilation level was the highest 20.6 m². According to this indicator, the lowest indicator was recorded in Pamyat Esaulu variety (13.9 m²).

In terms of tree height, diameter of branches, number of leaves, level and assimilation level, winter "Nafis" (st) and Mutsu varieties recorded the highest index, while in all biometric indicators and assimilation level, the Goldrush variety recorded the lowest index.

In intensive orchards, the value of a variety is measured by its cultivation in an intensive orchard, the variety's early harvest, self-pollination (diploid), rate of yield increase, absence of wilting and overall productivity. [16; 3–21-p.]. In addition to the taste and pleasantness of the fruit, it is necessary to pay great attention to its qualities such as road resistance, shelf life, appearance (product appearance), which is the main measure. [7; 13–15-p.], [8; 67–69-p.].

The fruits of the best immune varieties are

characterized by high commercial qualities: the fruits are of average or larger than average size, well-shaped, and uniformly bright in color. It can be noted that in terms of the presence of the most important organic substances, they are not inferior to common localized varieties [2; 10–38-p.], [3; 78–97-p.]. Therefore, when choosing apple varieties, the size of their fruits, their tasting value and their productivity were analyzed.

According to the results of the research, the lowest indicator of the average weight of the fruits of summer group varieties was recorded in the variety "Pervenets Samarkanda" (st) (83.8 g), and it was found that the weight of the fruits is higher in all varieties compared to the standard variety. Dayton (231.3 g) and Vadimovka (236.9 g) varieties have the highest fruit weight, compared to the fruit of the standard variety 176.0-182.7% (2.8 times), local "Oydin" (164, 3 g.), and "Rustamiy" (174.9 g.) varieties are 96.1-108.7% (2 times) larger. The average weight of the fruits is also related to their ripening period, and the average weight of the fruits of the Kizil Jonaqi, Mantet, Stark Erlist, Pristin varieties, which ripen in the earliest summer periods (in the first ten days of June), is relatively small and is 80.8-112.5 g.

The quality of the fruit is determined by its size, appearance, texture, smell, and the taste is also

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important, so the apples were tasted when they were ready for consumption. When tasting the fruits, their appearance, size, color, smell, flesh consistency, sweetness, acidity and taste were taken into account, and a total score of 5.0 was given to its quality.

It is known that the amount of sugars and organic acids and their ratio determines the consumption and taste of the fruit. Acids, flavoring and flavoring (aromatic) substances contained in fruit, enzymes, affect human digestive organs and help to absorb other foods that are packed with fruit faster. They have a special value due to the high content of vitamins.

The biochemical composition of the fruit of apple varieties was also analyzed, and summer Dayton with high sugar content and low acidity (sugar content 12.4%, acidity 0.54%) and Vadimovka (sugar content 12.5%, acidity 0.46%) varieties were given a total of 4.5-4.6 points. According to this indicator, the highest 4.6 points were given to the fruits of the "Oydin" variety, the sugar content of the fruits was 12.3%, the acidity was 0.27%, and the water level was 84.5%. When evaluating fruits, some of their important characteristics increased the value of the fruit, while some of its characteristics caused it to be evaluated with a low value. Due to the small size of the fruit of the "Pervenets Samarkand" (st) variety, low sugar content (9.6%), and high acidity (0.92%), the tasting grade was evaluated with the lowest 3.7 points.

According to productivity indicators, the minimum productivity of one tree in summer varieties was 12.9 kg, and the maximum was 39.6 kg. "Pervenets Samarkanda" (st) yield from one bush was 18.3 kg, compared to the standard variety "Oydin" (36.7 kg), "Rustamiy" (39.6 kg), Williams Pride (27.2 kg.), Dayton (32.9 kg.), Vadimovka (34.9 kg.) yield is higher by 48.6-116.4%, "Elena" (14.7 kg.), Kyzil Janoqi (14.6 kg.), Mantet (17.4 kg.), Stark Erlist (16.8 kg.) and Pristin (12.9 kg.) varieties were found to be

lower by 4.9-29.5%.

Among the early autumn varieties, the fruit of the Red Delishes (st) variety was moderately large, weighing 169.8 g, Compared to the standard variety, the size of fruits of Renora Zimnyaya (184.8 g), "Farangiz" (206.2 g) and hybrid II-X-31 (249.5 g) is larger, average fruit weight by 8.8-46.9%, Prikubanskoe (265.5 g.), "Israel" (275.3 g.), Wagnera prizovoe (305.5 g.) varieties and II-X-11 (250.3 g.) it was found that the size of the fruit of hybrid varieties is very large, and the weight of the average fruit is 47.4-79.9% higher.

In terms of fruit weight, the size of the fruits of the "Bolajon" variety is small, the average weight is 58.4 g, and it is 2.9 times smaller than the fruit of the standard variety, and the fruits of this variety are mainly suitable for processing.

According to the results of tasting the fruits of the early autumn varieties, the fruits of the local "Israel" variety are light red in appearance, bright in color, the consistency of the flesh is soft, sweet (sugar content 12.7%), low in acidity (0.53%), juicy (82.5%) with the highest score of 4.7 points, and the fruits of "Farangiz", Renora Zimnyaya and II-X-11 hybrid were also rated with a high score of 4.6 points because they were sweet, pleasant, juicy.

According to productivity indicators, the minimum yield of one tree in early autumn varieties was 7.7 kg, and the maximum was 39.9 kg. Red Delishes (st) yield from one tree was 16.6 kg, compared to the standard variety Kandil Sinap (7.7 kg), "Farangiz" (14.9 kg), Limonniy (13.9 kg) varieties have a yield of 10.3-53.6% less, Sanprice (33.3 kg.) and Prikubanskoe (39.9 kg.) varieties have the highest yield, 100.6-140.4% compared to the standard variety it was found that there were many (Table 3).

Table 3. Fruit size and yield indicators of apple varieties (2020-2022)

Varieties	Fruit (medium)			Relative to the fruit of the control variety, %	Tasting rating, 5.0 points	Productivity	
	weight, g.	height, cm	diameter, cm			from one bush, kg	relative to the control variety,%
Summer apple varieties							
"Pervenets in Samarkand" (st)	83,8	4,6	6,3	100,0	3,7	18,3	100,0
"Oydin"	164,3	5,5	7,5	196,1	4,6	36,7	200,5
"Elena"	169,0	6,5	7,5	201,7	4,2	14,7	80,3
Qizil Janoqi	88,0	5,5	5,6	105,0	4,1	14,6	79,8
"Rustami"	174,9	6,2	7,5	208,7	4,5	39,6	216,4
Mantet	80,8	5,2	6,2	96,4	4,5	17,4	95,1
Stark Erlist	104,5	5,5	6,9	124,7	4,5	16,8	91,8
Williams Pride	208,5	6,7	8,2	248,8	4,5	27,2	148,6
Pristine	112,5	5,5	7,2	134,3	3,8	12,9	70,5
Dayton	231,3	7,5	8,9	276,0	4,6	32,9	179,8
Vadimovka	236,9	7,2	8,9	282,7	4,5	34,9	190,7

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EKF _{0.5}	0,7	0,3	0,3	-	-	0,4	-
Sx	0,12	0,05	0,04	-	-	0,06	-
Early autumn apple varieties							
Red Delishes (st)	169,8	7,9	7,2	100,0	4,4	16,6	100,0
Renda	124,5	6,5	6,1	73,3	3,9	18,6	112,0
Candil Sinap	126,8	7,33	6,30	74,7	4,3	7,7	46,4
"Bolajon"	58,4	4,5	4,4	34,4	4,0	18,3	110,2
"Israel"	275,3	8,7	10,6	162,1	4,7	30,9	186,1
"Farangiz"	206,2	7,8	7,2	121,4	4,6	14,9	89,7
Prikubanskoe	265,5	7,5	8,7	156,4	4,5	39,9	240,4
Starking Delights	124,6	4,8	6,6	73,4	4,3	31,0	186,7
Limonniy	119,5	6,2	5,7	70,4	4,2	13,9	83,7
Renora Zimnyaya	184,8	6,3	7,4	108,8	4,6	24,9	150,0
Remo	155,9	6,6	7,3	91,8	4,5	20,3	122,3
Sunprice	130,8	5,8	7,1	77,0	4,5	33,3	200,6
Liberty Zimni	170,3	5,8	7,4	100,3	4,4	27,3	164,4
Wagner prizovoe	305,5	7,0	9,5	179,9	4,5	29,3	176,5
II-X-31	249,5	7,9	9,9	146,9	4,5	28,7	172,9
II-X-11	250,3	8,6	8,2	147,4	4,6	29,8	179,5
EKF _{0.5}	0,4	0,3	0,2	-	-	0,3	-
Sx	0,08	0,05	0,04	-	-	0,05	-
Autumn apple varieties							
King David (st)	185,6	7,5	7,5	100,0	4,4	36,5	100,0
Kubanskaya bagrennaya	259,9	6,4	8,8	140,0	4,6	37,8	103,6
Pamyat Esaulu	254,7	6,7	8,4	137,2	4,7	21,0	57,5
Florina	194,5	5,7	7,6	104,8	4,5	35,2	96,4
EKF _{0.5}	0,7	0,2	0,1	-	-	0,5	-
Sx	0,11	0,03	0,02	-	-	0,07	-
Winter apple varieties							
"Nafis" (st)	248,9	7,5	8,3	100,0	4,1	38,4	100,0
Fuji	193,4	6,3	7,4	77,7	4,6	18,6	48,4
Mutsu	285,9	7,8	8,6	114,9	4,8	20,4	53,1
Goldrush	128,3	5,7	6,4	51,5	4,5	35,5	92,4
EKF _{0.5}	0,7	0,1	0,1	-	-	0,3	-
Sx	0,10	0,01	0,02	-	-	0,04	-

The size of fruits of autumn varieties is large in King David (st) (185.6 g) and Florina (194.5 g), and in Kubanskaya bagrennaya (259.9 g) and Pamyat Esaulu (254.7 g) varieties it is found to be very large. According to the results of fruit tasting, autumn varieties were rated with 4.5-4.7 points higher than the standard variety. In autumn varieties, the yield from one tree was the highest in the Kubanskaya bagrennaya variety (37.8 kg), and the lowest in the Pamyat Esaulu variety (21.0 kg). The fruits of the winter Mutsu variety were very large, with an average weight of 285.9 g. The fruits of this variety were given the highest 4.8 points. The size of Fuji (193.4 g) fruits

is large, and the fruits of this variety were rated high (4.6 points). In terms of productivity, the highest indicator (38.4 kg.) was recorded in the "Nafis" (st) variety, and the lowest (18.6 kg.) productivity was recorded in the Fuji variety, which prevailed in terms of fruit quality indicators, compared to the standard variety.

Based on the results of the research, the morphological and economic characteristics of the growth and development of local and introduced varieties of apple grown on low grafts were evaluated and the following were concluded. In order to expand the regional assortment of apple trees in the republic, it is necessary to comprehensively evaluate new and

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ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

promising varieties, which will allow to create intensive orchards from varieties that are characterized by the fastest adaptation, productive, high-quality fruits, average growth rate.

According to the height of the trees and the diameter of the branches, the summer Kizil Janoqi, Mantet, Stark Erlist, Pristin, Dayton and Vadimovka, early autumn Renda, Kandil Sinap, "Farangiz", Starking Delishes, Renora Zimnyaya, Remo, Wagnera prizovoe, autumn Pamyat Esaulu, winter Fuji and Goldrash varieties were distinguished from other varieties by the average growth of their trees.

According to the marketability of the studied

varieties, summer "Oydin", "Rustamiy", Williams Pride, Dayton and Vadimovka, early autumn "Israel", Prikubanskoe, Wagnera prizovoe varieties and hybrids II-X-31, II-X-11, autumn Kubanskaya Bagrennaya, Pamyat Esaulu, Florina, Winter Fuji, and Mutsu varieties were distinguished from other varieties by the average fruit weight and high tasting value.

The highest yields are summer "Oydin", "Rustamiy", Williams Pride, Dayton and Vadimovka, early autumn "Israel", Prikubanskoe, Sunprice, Wagnera prizovoe varieties and II-X-31, II-X-11 hybrids, autumn Kubanskaya bagrennaya, Florina was noted in winter Goldrash varieties.

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