Assessment of economically valuable traits of apple varieties and features of the main elements of the technology for their cultivation in an arid climate

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Abstract. The purpose of the research is to create winter-hardy, large-fruited, high-yielding, high-quality varieties of apple trees of different ripening periods and their growing technology (use of a biological product) in the South Urals. The research was carried out on the basis of Orenburg Experimental Station of Horticulture and Viticulture - a branch of the Federal State Budgetary Scientific Institution "Federal Scientific Selection and Technology Center for Horticulture and Nursery " from 1999 to 2020. Research objects were summer apple varieties – “Orenburgskoe”, “Orenburgskoe krasnoe”, “Soltsevskoe” (K); winter – “Orenburgskoe pozdnее”, “Zimne”, “Yuzhnouralskoe” (K). The counts and observations were carried out according to generally accepted methods. As a result of the studies, the data obtained showed that the property of short stature as a genetic trait of resistance is transmitted to the offspring during hybridization. The varieties “Orenburgskoe pozdnее”, “Zimne” and “Yuzhnouralskoe” showed the greatest increase in productivity embodiment experience “Evrikor Forte + 7” 2.5 l / ha by 25.4%, 24.3% and 22.2% respectively. Thus, the application of "Eurikor-Forte + 7" increased both the number of fruits and their weight, and also increased the yield of the studied varieties.

1. Introduction
In recent years in many countries, including Russia, interest in gardening has been increasing, one of the links of which is the use of low-growing forms of trees with a compact crown and the usual non-spurous type of fruiting. The steppe zone of the South Urals belongs to the arid zone and is characterized by atmospheric drought and low precipitation.

At the same time in the conditions of the Urals, one of the most important advantages of the apple tree is its high winter hardiness. The possibility of growing apple trees as a crop in our region appeared after the creation of a winter-hardy assortment. However, in the created varieties, in some severe winters, significant damage to the wood was noted, fruit buds often froze. Therefore, for our zone, we can consider the positive effect of snow for undersized varieties. We are faced with the task of identifying winter-hardy, drought-resistant, fruitful varieties of pome crops [1, 2]. Along with grafting on low-growing vegetatively propagated rootstocks to obtain such plantings, it is of great interest to use low-growing varieties that maintain a restrained tree growth when grafted onto ordinary seed stocks.
In a scientific article, Sedov (2015) points out that only 140 cultivars from the RSRISH apple gene pool were used in breeding as initial forms both in Russia and abroad, and are the ancestors of new cultivars [3]. The correct selection of the original parental forms contributes greatly to the success of breeding new varieties. However, it is important to breed special low-growing varieties with a flat-horizontal crown. When introducing such varieties, it is very important to select the initial parental varieties for crossing with short stature characters. It should be noted that among woody plants there are undersized weeping forms in cedar, mulberry, mountain ash, ash and other species [4, 5]. Similar weeping forms are found in the apple tree among wild species and cultivars [6]. Therefore the weepingness of the crown which withstood the influence of natural selection in the process of a long evolution of plants and exists in nature among various tree species is a stable form. Apparently, the weeping crown shape in apple and other tree species is determined by a separate gene or several genotypes, as well as the nature of the recently revealed compact crowns [7].

In recent years the cultivation of orchards, obtaining an environmentally friendly and stable harvest has taken one of the main places in the fruit growing industry of the South Urals. At the same time in modern agriculture, along with fungicides, herbicides and insecticides, various biological products are also used [8]. To obtain biologically valuable products and preserve soil fertility it is necessary to use biological products in plant growing that improve plant root nutrition, increase resistance to stress factors, stimulate plant growth, the formation of ovaries and fruits, accelerate ripening times, and improve product quality. Biologics are safe for the environment and promote sustainable low-cost crop production [9, 10].

For an arid climate, it is necessary to create winter-hardy, large-fruited, high-yielding, high-quality apple varieties of different ripening periods and to improve the elements of their cultivation technology (use of a biological product).

2. Materials and methods

Research was carried out at the Orenburg Experimental Station of Horticulture and Viticulture - a branch of the Federal State Budgetary Scientific Institution "Federal Scientific Selection and Technology Center for Horticulture and Nursery" from 1999 to 2020. Research objects: summer apple varieties “Orenburgskoe”, “Orenburgskoe krasnoe”, “Solntsedar” (K); winter – “Orenburgskoe pozdnee”, “Zimnee”, “Yuzhnouralskoye” (K); organic-mineral humic fertilizer "Evrikor-Forte + 7” (composition: N - 8.4%, P - 3.6%, K - 10.4%, B - 0.7%, S - 0.04%, Fe - 0.06%, Cu - 0.01%, Zn - 0.01%, Co - 0.0005%, Mo-0.0012%. Li, Cr, Ni – in chelate form).

Object of study. “Orenburgskoe pozdnee”. Winter variety of selection of FSBSI "Orenburg Experimental Station of Horticulture and Viticulture RSTIHN" was obtained from crossing of Vyubetskaya weeping with Welsey, distributed and zoned in the Ural region. Authors are M.A. Mazunin, N.F. Mazunina, O.E. Merezhko.

The tree is a natural dwarf, the crown is of medium density, rounded-spreading, branches are crooked, rarely located. The height of the tree on seed stocks is up to 2.0 m, the bark on the trunk and main branches is brown. Shoots are medium, arched and of brown colour. The buds are medium, pressed, rounded. The leaves are medium, dark-green; the edge of the leaf is finely crenate. The flowers are medium, pinkish, with oval petals. Fruits weighing 140-160 g are large up to 320 g, round conical in shape. The skin is soft, smooth, greenish-yellow; most of the fruit is dark red. The peduncle is of medium size and straight. The funnel is medium and blunt-conical. The cup is half-open, the saucer is medium (Figure 1).

The main color when removed and at full maturity is greenish-yellow. The cover color on most of the fruit surface is dark red. Subcutaneous points are invisible. The heart is medium in size and round. The chambers are semi-open and medium-sized. Seeds are medium, ovoid, brown. The pulp is creamy, medium density, fine-grained, juicy, sweet and sour taste, with a medium aroma. Chemical composition: the sum of sugars - 10.2%, titratable acids - 0.8%, ascorbic acid - 16.1 mg / 100g, soluble solids - 13.8%. Removable ripeness occurs in the third decade of September. Duration of storage of fruits is up to 170 days. Productivity is 146.5 kg / ha. The variety has high winter hardness and is resistant to scab.
Figure 1. Apple variety “Orenburgskoe pozdnee”

“Zimnee”. Winter variety of selection of FSBSI "Orenburg Experimental Station of Horticulture and Viticulture RSTIHN" was obtained from crossing of Vydubetskaya weeping with Ural winter. It was distributed and zoned in the Ural region. Authors are M.A. Mazunin, N.F. Mazunina, O.E. Merezhko.

The tree is a natural dwarf, the crown is of medium density, the branches are crooked, located rarely; the ends of the branches are directed upwards. The height of the tree on seed stocks is up to 3.0 m, on vegetatively propagated clonal stocks up to 1.5-2.0 m, the bark on the stem and main branches is brown. Shoots are brown, medium, arched. The buds are medium. Leaves are medium, oblong, elliptical, green, corrugated with gentle nerves. The leaf blade is concave and curved downward. The leaf edge is finely serrate and wavy. The flowers are medium, chalky, pink with aroma. The petals are round, medium. Fruits weighing 120 g are large up to 190 g, flattened-spherical, slightly ribbed. The skin is soft, smooth, oily, greenish-yellow. The peduncle is of medium size, medium (Figure 2).

Figure 2. Apple variety “Zimnee”
The funnel is medium, blunt-conical. The calyx is half-open, the saucer is medium and smooth. The main color when removed and at full maturity is greenish-yellow. The integumentary coat is blurred, orange. The subcutaneous points are medium, hardly noticeable. The heart is medium in size, onion. The chambers are semi-open, medium-sized. Seeds are medium, ovoid, dark brown in color. The pulp is greenish, medium density, tender, fine-grained, juicy, sweet and sour taste, with a medium aroma. Chemical composition: the sum of sugars - 10.2%, titrated acids - 0.8%, ascorbic acid - 14.0 mg / 100g, soluble solids - 13.6%. Removable ripeness of fruits occurs in the third decade of September. Duration of storage of fruits is up to 100 days. The yield is 162.7 kg / ha. It has high winter hardiness, the variety is resistant to scab.

“Orenburgskoe”, Late summer variety of selection of the Federal State Budgetary Scientific Institution "Orenburg Experimental Station of Horticulture and Viticulture RSTIHN". It was obtained from crossing a seedling of a large-fruited apple tree 8-95 with White filling. It is distributed and zoned in the Ural region. Authors are M.A. Mazunin, N.F. Mazunin, O.E. Fatneva.

The tree is a natural dwarf, the crown is of medium density, branches are rare. The height of the tree on seed stocks is up to 3.0 m. The bark on the trunk and main branches is peeling and gray. Fruiting is at the ends of the growth shoots (Figure 3). Shoots are medium, round, pubescent, green in color. The buds are large, pressed, rounded. Leaves are medium, ovoid, matte, green, leaf edge is large-crenate, even. The flowers are large, cupped, pinkish. The petals are medium and oval. Fruits are large, one-dimensional, rounded, slightly ribbed. The peduncle is medium and curved. The funnel is medium, blunt-conical, the calyx is half-open; the saucer is medium, wide. The skin is medium, oily.

Figure 3. Apple variety “Orenburgskoe”

The main color at the time of ripening is whitish-yellow. The integumentary over the least part of the fetus is red, the subcutaneous dots are medium green. The heart is medium, ovoid. The chambers are semi-open, medium-sized. Seeds are medium, round, brown. Green pulp, medium density, tender, very juicy, sweet and sour taste, with a medium aroma. Chemical composition: the sum of sugars - 10.6%, titrated acids - 0.7%, ascorbic acid - 19.4 mg / 100g, soluble solids - 14.3%. Removable ripeness of fruits occurs in the first decade of September. Duration of storage of fruits is up to 40 days. Productivity is 193.3 kg / ha. The winter hardiness is high; the variety is resistant to scab.

“Orenburgskoe krasnoe”. Summer variety of selection of FGBNU "Orenburg Experimental Station of Horticulture and Viticulture RSTIHN" was obtained from free pollination and distributed in the Ural region. Authors are E.Z. Savin, O.E. Merezhko, G.R. Mursalimov.
The tree is medium-sized; the shape of the crown is spreading; branches are rare. The height of the
tree on seed stocks is up to 3.5 m. The bark on the trunk and main branches is smooth, reddish in color
(Figure 4).

Figure 4. Apple variety “Orenburgskoe krasnoe”

Shoots are medium, straight, pubescent, brown. The buds are medium, pressed, pubescent,
rounded. The leaves are medium, ovate, matte, dark green with a bluish tint, smooth, the edge of the leaf
is serrate-crenate, wavy. The flowers are small, chalky, pinkish, fragrant. The petals are medium,
oval. Fruits weighing is 120 g, one-dimensional, round. The stalk is medium, straight. The funnel is
shallow, blunt-conical, rusty is weak, the calyx is half-open, the saucer is medium, smooth. The skin is
soft, smooth, shiny. The main color is greenish at the time of ripening. The cover paint throughout the
fruit is blurry, dark red in color. Subcutaneous points are small, hardly noticeable. The heart is medium,
cordate. The chambers are semi-open, medium-sized. Seeds are medium, ovoid, brown in color. The
pulp is creamy, medium density, tender, juicy, sweet and sour taste, with a medium aroma. Chemical
composition: the amount of sugars - 11.1%, titratable acids - 0.7%, ascorbic acid - 15.4 mg / 100g, soluble
solids - 13.3%. Removable ripeness occurs in the second decade of August. Duration of storage of fruits
is up to 20 days. Productivity is 170.0 kg / ha. The variety has high winter hardiness; the variety is
resistant to scab.

Experiment design. Terms of treatments and method of application. Foliar feeding of plants: 1st is
in the "pink bud" phase and 2nd is after flowering, 3rd is after the formation of the ovary. The
consumption of the working solution is 800 l / ha. Planting scheme 3 x 5 m, 4-fold repetition, the area
of the experimental plots is 1800 m², the number of experimental plants is 5 pcs.

Soluble solids were determined by the refractometric method in accordance with GOST ISO 2173-
2013, titratable acidity in accordance with GOST Z 514 34-99. The sugar-acid index was
 calculated. Ascorbic acid was determined titrimetrically. All results are calculated on the basis
of analyses carried out in four replicates (n = 4).

Field experiments, records, observations were carried out according to generally accepted methods
[11, 12, 13].

Statistical processing.
Statistical analysis was performed using the office software package "Microsoft Office" using the
program "Excel" ("Microsoft Office", USA).

3. Results and discussion
In the course of the study, a comparative analysis of the winter apple varieties “Orenburgskoe pozdnee”,
“Zimnee”, “Yuzhnouralskoe” (K) was carried out in terms of the average fruit weight, average yield and
biochemical analysis. The bred apple varieties in comparison with the control by weight exceed by 56.0
 g ("Orenburgskoe pozdnee"), 26.0 g (“Zimnee”). The average yield of the “Orenburgskoye pozdnee”
variety exceeds the control by 10.4%, and the “Zimnee” variety by 32.6% (Table 1). In summer apple varieties “Orenburgskoe” and “Orenburgskoe krasnoe,” the excess of control in terms of fruit weight was 30.0 g and 40.0 g, respectively. The average yield of the Orenburgskoye variety exceeds the control by 34.9%, the “Orenburgskoye krasnoe” variety by 18.6%. According to the biochemical analysis of the studied varieties, no significant difference was observed in comparison with the control variant.

Table 1. Comparative characteristics of apple varieties, 1999-2020.

| Variety                     | Average fruit weight, g | Vitamin C, mg/100g | Sugar, % | Soluble dry matter, % | Acids, % | Average yield kg/der c/ha |
|-----------------------------|-------------------------|---------------------|----------|-----------------------|----------|--------------------------|
| **Summer varieties of apple trees** |                         |                     |          |                       |          |                          |
| Letnee striped (K)          | 80.0 ± 5.6              | 19.4 ± 0.4          | 10.6 ± 0.2 | 14.3 ± 0.1 | 0.7 | 25.8 ± 1.1 143.3        |
| Orenburgskoe                | 110.0 ± 7.7             | 19.4 ± 0.6          | 10.6 ± 0.2 | 14.3 ± 0.3 | 0.7 | 34.8 ± 2.6 193.3        |
| Orenburgskoe krasnoe        | 120.0 ± 6.2             | 15.4 ± 0.4          | 11.1 ± 0.3 | 13.3 ± 0.3 | 0.7 | 30.6 ± 2.3 170.0        |
| NSR 0.5                     |                        |                     |          |                       |          |                          |
| **Winter varieties of apple trees** |                         |                     |          |                       |          |                          |
| Yuzhnouralskoe (K)          | 94.0 ± 6.1              | 13.0 ± 0.2          | 9.8 ± 0.2 | 13.4 ± 0.1 | 0.7 | 23.9 ± 0.9 131.4        |
| Orenburgskoe pozdnee        | 150.0 ± 8.4             | 16.1 ± 0.4          | 10.2 ± 0.4 | 13.8 ± 0.3 | 0.8 | 26.4 ± 1.3 146.5        |
| Zimnee                      | 120.0 ± 7.9             | 14.0 ± 0.2          | 10.2 ± 0.3 | 13.6 ± 0.3 | 0.8 | 31.7 ± 1.8 162.7        |
| NSR 0.5                     | -                       | -                   | -        | -                     | -        | 2.8 3.1                 |

Biological products affect the growth and development of plants and also mitigate the negative effects of environmental stresses in the process of ontogenesis. Treatment with the studied drugs in the first half of the growing season contributed to the strengthening of physiological and biochemical processes in apple trees, that is, there was a good preservation of the economically useful ovary, strong retention, normal growth and development of apple fruits.

The highest percentage of useful ovary in summer varieties “Orenburgskoe krasnoe” and “Orenburgskoe” during processing was noted in the variant "Eurikor-Forte + 7" (2.5 l/ha) –30.4% and 30.0%, exceeding the control value almost 2 times. And in varieties of winter ripening at the same concentration the indicator of useful ovary was equal to 29.9% (variety “Zimnee”), exceeding the variant without treatment 1.9 times. The smallest percentage of useful ovary was noted in the variant with the treatment "Eurikor-Forte + 7" 3.5 l/ha and exceeded the indices without treatment 1.4 times (Table 2).

Analyzing the results obtained, it was found that the drug "Eurikor-Forte + 7" had a positive effect on fruit trees, that is, the strength of fruit formation increased, the shedding of the ovary and fruits decreased.

According to Table 2, we see that the average fruit weight in summer varieties varied within 80.0-125.0 g, and in winter varieties within 94.0-158.0 g. The largest fruit weight was in the “Eurikor-Forte + 7” 2.5 l/ha in varieties “Orenburgskoe” (129.0 g) and “Orenburgskoe pozdnee” (158.0 g), the indicator increased by 17.0 and 12.0%, respectively, relative to the variant without treatment.

Of the studied variants of the experiment, “Eurikor-Forte + 7” 3.5 l/ha turned out to be less effective, an increase in fruit weight by an average of 7.0 % was noted. The use of the drug "Eurikor-Forte + 7" had a positive effect on the increase in the average weight of apple fruits.

The yield of a variety is the most important indicator of its biological and economic characteristics and depends on ecological and agricultural practices in horticulture. By increasing the number of fruits and increasing the weight of each fruit, the yield of the studied variety increased.
Table 2. Influence of the "Eurekor-Forte + 7" biological product on the yield of summer and winter apple varieties, 2018-2020

| Variety          | Processing option | Discarded ovary, % | Useful ovary, % | Average fruit weight, g | Average yield kg / der c / ha |
|------------------|-------------------|--------------------|-----------------|-------------------------|-----------------------------|
| Letnee striped   | Without processing| 85.88              | 14.12           | 80.0 ± 5.6              | 25.8 ± 1.1 143.3           |
|                  | "Eurekor-Forte + 7" 1.5 l / ha | 73.83              | 26.17           | 92.0 ± 2.6              | 27.0 ± 1.0 149.8           |
|                  | "Eurekor-Forte + 7" 2.5 l / ha | 71.75              | 28.25           | 95.0 ± 5.0              | 28.1 ± 1.4 155.9           |
|                  | "Eurekor-Forte + 7" 3.5 l / ha | 79.63              | 20.37           | 89.0 ± 3.3              | 26.6 ± 1.6 147.6           |
| Orenburgskoe     | Without processing| 83.52              | 16.48           | 110.0 ± 7.7             | 34.8 ± 2.6 193.3           |
|                  | "Eurekor-Forte + 7" 1.5 l / ha | 72.38              | 27.62           | 121.0 ± 2.6             | 36.9 ± 2.8 204.8           |
|                  | "Eurekor-Forte + 7" 2.5 l / ha | 70.0               | 30.0            | 129.0 ± 3.8             | 39.1 ± 2.2 217.0           |
|                  | "Eurekor-Forte + 7" 3.5 l / ha | 77.31              | 22.69           | 118.0 ± 3.1             | 35.3 ± 1.3 195.9           |
| Orenburgskoe krasnoe | Without processing| 86.12              | 13.88           | 108.0 ± 3.2             | 30.6 ± 2.3 170.0           |
|                  | "Eurekor-Forte + 7" 1.5 l / ha | 76.8               | 23.2            | 114.6 ± 4.3             | 34.1 ± 3.0 189.3           |
|                  | "Eurekor-Forte + 7" 2.5 l / ha | 69.6               | 30.4            | 119.0 ± 3.9             | 36.7 ± 3.9 203.7           |
|                  | "Eurekor-Forte + 7" 3.5 l / ha | 79.0               | 21.0            | 111.0 ± 2.7             | 33.8 ± 1.3 187.6           |
| NSR 0.5          |                   |                    |                 |                         |                             |
| Yuzhnouralskoe   | Without processing| 85.1               | 14.9            | 94.0 ± 6.1              | 23.9 ± 0.9 132.6           |
|                  | "Eurekor-Forte + 7" 1.5 l / ha | 79.4               | 20.6            | 100.0 ± 5.9             | 27.1 ± 1.9 150.4           |
|                  | "Eurekor-Forte + 7" 2.5 l / ha | 77.2               | 22.8            | 103.0 ± 6.6             | 29.2 ± 2.7 162.1           |
|                  | "Eurekor-Forte + 7" 3.5 l / ha | 82.3               | 17.7            | 98.0 ± 4.3              | 25.6 ± 1.7 142.1           |
| Orenburgskoe pozdnее | Without processing| 82.9               | 17.1            | 140.0 ± 4.4             | 26.4 ± 1.3 146.5           |
|                  | "Eurekor-Forte + 7" 1.5 l / ha | 76.8               | 23.2            | 153.0 ± 5.2             | 29.3 ± 1.9 162.6           |
|                  | "Eurekor-Forte + 7" 2.5 l / ha | 75.4               | 24.6            | 158.0 ± 4.9             | 33.1 ± 2.4 183.7           |
|                  | "Eurekor-Forte + 7" 3.5 l / ha | 80.7               | 19.3            | 150.0 ± 8.4             | 28.5 ± 1.5 158.2           |
| Zimnee           | Without processing| 84.2               | 15.8            | 120.0 ± 4.9             | 31.7 ± 1.8 162.7           |
|                  | "Eurekor-Forte + 7" 1.5 l / ha | 73.4               | 26.6            | 125.1 ± 5.6             | 33.2 ± 2.0 183.9           |
|                  | "Eurekor-Forte + 7" 2.5 l / ha | 70.1               | 29.9            | 132.1 ± 4.7             | 36.5 ± 1.4 202.2           |
|                  | "Eurekor-Forte + 7" 3.5 l / ha | 77.5               | 22.5            | 123.4 ± 3.5             | 31.9 ± 2.2 176.7           |
| NSR 0.5          |                   |                    |                 |                          |                             |
The greatest increase in yield was obtained in the variant of the experiment "Eurikor-Forte + 7" 2.5 l/ha in the varieties “Orenburgskoe pozdnee”, “Zimnee” and “Yuzhnouralskoe” by 25.4%, 24.3% and 22.2%, respectively. The smallest increase in yield was in the variant "Eurikor-Forte + 7" 3.5 l/ha in the “Letnee” striped variety by 3.0%, in the “Yuzhnouralskoe” variety by 7.2%. Thus, the use of the biological product "Eurikor-Forte + 7" on apple trees promoted an increase in the productivity of trees and ensured a high yield per unit area.

**Table 3. Influence of the drug "Eurikor-Forte + 7" on the biochemical composition of fruits of summer and winter varieties of apple, 2018-2020.**

| Variety          | Processing option | Vitamin C, mg / 100g | Sugar, % | Soluble dry matter, % | Acids, % |
|------------------|-------------------|----------------------|----------|-----------------------|----------|
| **Letnee striped** |                   |                      |          |                       |          |
| Without processing |                  | 19.31 ± 0.4          | 10.60 ± 0.2 | 14.30 ± 0.1           | 0.70     |
| "Evrikor-Forte + 7" 1.5 l / ha | 19.13 ± 0.6          | 10.53 ± 0.4          | 14.41 ± 0.3 | 0.68     |
| "Evrikor-Forte + 7" 2.5 l / ha | 19.58 ± 0.3          | 10.61 ± 0.2          | 14.53 ± 0.2 | 0.66     |
| "Evrikor-Forte + 7" 3.5 l / ha | 18.90 ± 0.4          | 10.50 ± 0.3          | 14.26 ± 0.1 | 0.70     |
| **Orenburg** |                   |                      |          |                       |          |
| Without processing |                  | 19.45 ± 0.6          | 10.66 ± 0.2 | 14.39 ± 0.3           | 0.68     |
| "Evrikor-Forte + 7" 1.5 l / ha | 19.48 ± 0.4          | 10.62 ± 0.3          | 14.43 ± 0.2 | 0.69     |
| "Evrikor-Forte + 7" 2.5 l / ha | 19.87 ± 0.6          | 10.64 ± 0.3          | 14.55 ± 0.3 | 0.66     |
| "Evrikor-Forte + 7" 3.5 l / ha | 19.47 ± 0.4          | 10.55 ± 0.2          | 14.38 ± 0.2 | 0.70     |
| **Orenburg red** |                   |                      |          |                       |          |
| Without processing |                  | 15.40 ± 0.4          | 11.10 ± 0.3 | 13.30 ± 0.3           | 0.61     |
| "Evrikor-Forte + 7" 1.5 l / ha | 15.45 ± 0.3          | 11.06 ± 0.3          | 13.34 ± 0.2 | 0.58     |
| "Evrikor-Forte + 7" 2.5 l / ha | 15.51 ± 0.4          | 11.11 ± 0.2          | 13.42 ± 0.3 | 0.53     |
| "Evrikor-Forte + 7" 3.5 l / ha | 15.42 ± 0.2          | 11.02 ± 0.3          | 13.32 ± 0.3 | 0.55     |
| **Yuzhnouralskoe** |                   |                      |          |                       |          |
| Without processing |                  | 13.10 ± 0.2          | 9.84 ± 0.2 | 13.40 ± 0.1           | 0.71     |
| "Evrikor-Forte + 7" 1.5 l / ha | 13.08 ± 0.3          | 9.80 ± 0.2           | 13.46 ± 0.1 | 0.76     |
| "Evrikor-Forte + 7" 2.5 l / ha | 13.03 ± 0.2          | 10.02 ± 0.2          | 13.85 ± 0.3 | 0.83     |
| "Evrikor-Forte + 7" 3.5 l / ha | 12.86 ± 0.4          | 9.83 ± 0.2           | 13.51 ± 0.1 | 0.79     |
| **Orenburgskoe pozdnee** |                   |                      |          |                       |          |
| Without processing |                  | 16.33 ± 0.4          | 10.43 ± 0.4 | 13.84 ± 0.3           | 0.80     |
| "Evrikor-Forte + 7" 1.5 l / ha | 15.71 ± 0.2          | 10.40 ± 0.2          | 13.31 ± 0.1 | 0.77     |
| "Evrikor-Forte + 7" 2.5 l / ha | 15.89 ± 0.2          | 10.51 ± 0.4          | 13.79 ± 0.1 | 0.79     |
| "Evrikor-Forte + 7" 3.5 l / ha | 15.60 ± 0.3          | 10.47 ± 0.3          | 13.71 ± 0.3 | 0.75     |
| **Zimnee** |                   |                      |          |                       |          |
| Without processing |                  | 14.18 ± 0.2          | 10.29 ± 0.3 | 13.76 ± 0.3           | 0.83     |
| "Evrikor-Forte + 7" 1.5 l / ha | 14.09 ± 0.2          | 10.31 ± 0.1          | 13.61 ± 0.2 | 0.79     |
| "Evrikor-Forte + 7" 2.5 l / ha | 14.12 ± 0.3          | 10.13 ± 0.3          | 13.92 ± 0.2 | 0.73     |
| "Evrikor-Forte + 7" 3.5 l / ha | 14.79 ± 0.1          | 10.02 ± 0.2          | 13.67 ± 0.3 | 0.77     |
The chemical composition of fruits is associated with internal biological processes and with the activity and direction of enzymes. It is a varietal trait and depends on the influence of external conditions. Biochemical results showed that in the fruits of the studied varieties, the average dry matter content varied from 13.30% to 14.55%. The highest dry matter content in the variant with the treatment "Eurikor-Forte + 7" at a dosage of 2.5 l / ha was observed in the varieties “Letnee” striped (14.53%) and “Orenburgskoe” (14.55%) (Table 3). In the variant without treatment, this indicator turned out to be lower than with the use of the drug on all studied varieties and varied from 13.30% (variety “Orenburgskoe krasnoe”) to 14.39% (variety “Orenburgskoe”).

Fruits were characterized by an increased sugar content (> 10%) in all variants of the experiment. The general acidity gives the fruit a specific taste and, thus, contributes to their better assimilation. Organic acids in fruits using "Eurikor-Forte + 7" vary in the range from 0.53 to 0.83 %. The maximum indicator was obtained in the variant of the experiment "Eurikor-Forte + 7" 2.5 l / ha in varieties “Yuzhnouralskoye”, “Orenburgskoye pozdnnee”. The highest indicator of vitamin C was found in the variant "Eurikor-Forte + 7" 2.5 l / ha in the varieties “Letnee” striped (19.52 mg / 100g) and “Orenburgskoe” (19.87 mg / 100g) and increased in comparison with the variant without processing by 1.4 and 2.1%.

4. Conclusion

1. As a result of the studies, the data obtained showed that the property of short stature as a genetic trait of resistance is transmitted to the offspring during hybridization. Trees are fast-growing, they begin bearing fruit in the third year. During reproduction, trees of natural dwarfs on seed vigorous rootstocks reach a height of 2.5 ... 3.0 m.

2. The results obtained allow us to conclude that it is advisable to use the drug "Eurikor-Forte + 7" at a concentration of 2.5 l / ha, which had a positive effect on fruit trees, that is, the strength of fruit formation, the percentage of useful ovary, fruit growth and strong retention on the tree were increased. All this contributed to an increase in the productivity of trees and ensured a high yield per unit area.

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