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SCIENTIFIC BASIS OF CULTIVATION TECHNOLOGY OF LOCAL AND INTRODUCED APRICOT VARIETIES UNDER THE CONDITIONS OF SOUTHERN AND CENTRAL REGIONS OF UZBEKISTAN

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Abstract. The article presents the results of research conducted to study the cultivation technology of local and introduced apricot varieties under the environmental conditions of the southern and central regions of Uzbekistan. Particular attention was paid to tree growth and development, productivity, fruit quality improvement, and adaptability to ecological factors. The study evaluated the effectiveness of agrotechnical practices, tree viability, proper crown formation, and their influence on yield performance. Furthermore, the selection of varieties adapted to specific climatic conditions and the timely implementation of appropriate cultivation practices were shown to improve fruit quality, enhance environmental adaptability, and contribute to other valuable agronomic characteristics.

Keywords: introduction, promising varieties, local varieties, fruit, shoot, ecological factors, quality, bud, pruning, flowering, yield, orchard, regions, introduced varieties, climate, selection.

Introduction Apricot is one of the most widely cultivated stone fruit crops in Uzbekistan. It is especially common in the Fergana and Zarafshan valleys. The fruits are consumed fresh, dried, and processed into various products. Fresh apricot fruits contain 8.4–19.0% sugars, 0.3–1.7% organic acids (mainly malic and citric acids, with small amounts of salicylic and tartaric acids), 0.1–1.6% pectin, and vitamins A and C. Dried apricots contain 80% or more sugars. The kernels of many apricot varieties grown in Central Asia are sweet and are consumed similarly to almond kernels. They contain 45–58% oil and approximately 28% protein [1].

According to numerous scientific sources, apricot is one of the oldest fruit species domesticated by humans. Although Armenia was initially considered its center of origin, later studies identified China as its primary origin. At the same time, several literature sources confirm that Central Asia is also one of the centers of apricot origin, since wild apricot forms are still commonly found throughout the region. Apricot has been known and cultivated in Uzbekistan since the 6th–7th centuries BC [2, 3, 4].

The influence of environmental factors plays a crucial role throughout plant ontogenesis, affecting the transmission of genetically determined characteristics from one generation to another. In all cultivated fruit crops, growth, development, and fruit production are directly related to environmental conditions such as temperature, light, water availability, air, and soil properties. The effect of each factor on plant growth depends on the degree of interaction with other environmental factors [5, 6].

Studies on apricot varieties revealed significant differences in their response to environmental conditions. Analysis of the obtained results demonstrated a positive relationship between chilling requirements and flowering dates. Furthermore, starch concentration in apricot tree organs decreased with increasing exposure to low temperatures, whereas glucose and fructose concentrations increased [7].

It has been emphasized that drought-tolerant varieties should be widely utilized in breeding programs aimed at improving adaptation to arid regions. Moreover, the development of new varieties based on the stress-resistance characteristics of wild relatives contributes to enhanced productivity and improved fruit quality [8, 9, 10].

Results. The water content of leaves in the studied apricot varieties was evaluated. The highest water content was observed in the varieties Shelechko (1.04 g), Sarvari (0.99 g), Krasnoshchekiy (0.96 g), and Ruhi Djuvanon Miona (0.94 g). Compared with the standard variety Subkhony (0.83 g), the water content of these varieties was higher by 0.21 g, 0.16 g, 0.13 g, and 0.11 g, respectively.

In contrast, lower water content than the standard variety Subkhony was recorded in Nurafshon (0.81 g), Alisher (0.76 g), Mulla Sadyk (0.73 g), Gulistan (0.69 g), Marokand (0.65 g), Vympel (0.61 g), Avecina (0.56 g), Burivestnik (0.55 g), Salimiy (0.52 g), and Kursadyk (0.51 g) varieties (Figure 1).

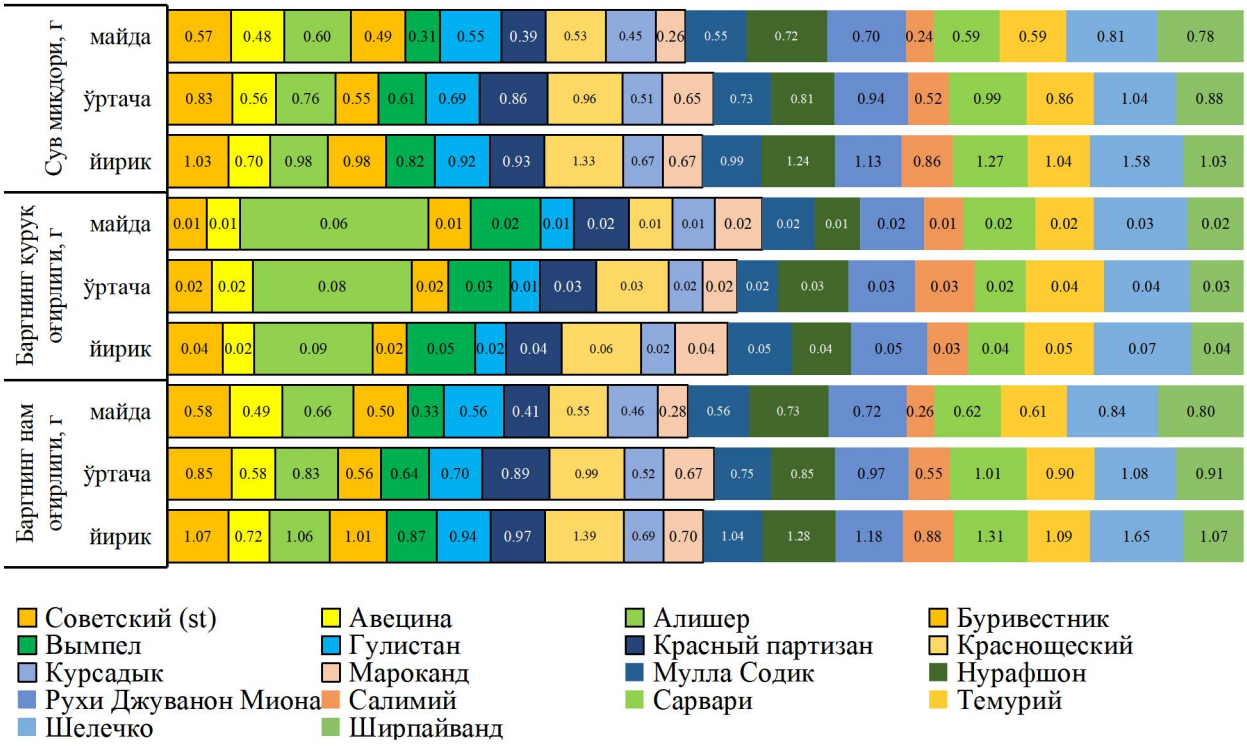


Figure 1. Water content in leaves of local and introduced apricot varieties with small, medium, and large leaf surface area.

The water content in the leaves of the small-leaved apricot variety Sovetskiy (st) was 0.57 g. Compared with the standard variety, higher water content was observed in the varieties Shelechko (0.81 g), Shirpayvand (0.78 g), Nurafshon (0.72 g), and Ruhi Djuvanon Miona (0.70 g), exceeding the standard by 0.13–0.24 g. Conversely, the lowest water content in small leaves was recorded in the varieties Krasny Partizan (0.39 g), Vympel (0.31 g), Marokand (0.26 g), and Salimiy (0.24 g),

which were all lower than the standard variety Sovetskiy (st). Thus, among the local and introduced apricot varieties studied, the highest leaf water content was observed in the Shelechko variety (1.14 g), whereas the lowest value was recorded in the Marokand variety (0.53 g).

Analysis of fruit size and quality characteristics of 6–8-year-old local and introduced apricot varieties showed that the highest number of fruits per tree was recorded in the Alisher variety, averaging 427.0 fruits per tree. The lowest fruit number was observed in the Vympel variety, with an average of 167.3 fruits per tree. This was 218.7 fruits, or 56.7%, lower than that of the standard variety Sovetskiy (st). Other apricot varieties produced 46.0–203.5 fewer fruits per tree, corresponding to a reduction of 11.9–52.7% compared with the standard.

According to the data presented in Table 1, the following varieties were classified as large-fruited (41–60 g): Vympel (63.1 g), Shelechko (59.5 g), Krasnoshchekiy (52.6 g), Nurafshon (47.9 g), Ruhi Djuvanon Miona (47.8 g), Sarvari (46.1 g), Temuriy (45.6 g), Krasny Partizan (45.0 g), Alisher (43.6 g), Mulla Sadyk (41.3 g), and Kursadyk (41.1 g). The varieties Shirpayvand (35.7 g), Marokand (35.6 g), and Burivestnik (32.4 g) produced fruits classified as above medium-sized (31–40 g). Medium-sized fruits were observed in Sovetskiy (st) (28.4 g), Avecina (28.2 g), Gulistan (26.8 g), and Salimiy (23.2 g).

Among the studied local and introduced apricot varieties aged 6–8 years, the Vympel variety produced the heaviest fruits, averaging 63.1 g. Compared with the standard variety Sovetskiy (st), fruits were heavier by 4.0–31.1 g in the varieties Shelechko, Krasnoshchekiy, Nurafshon, Ruhi Djuvanon Miona, Sarvari, Temuriy, Krasny Partizan, Alisher, Mulla Sadyk, Kursadyk, Shirpayvand, Marokand, and Burivestnik. In contrast, the varieties Avecina, Gulistan, and Salimiy produced fruits that were 0.2–5.2 g lighter than those of the standard variety Sovetskiy (st).

Table 1. Fruit size and quality characteristics of local and introduced apricot varieties

1-жадвал

Маҳаллий ва интродукция қилинган ўрик навларининг мева ўлчамлсари ва сифати кўрсаткичлари

Навлар номи	Бир тупдаги мева сони, дона	Бир дона мева вазни, г	Мева эни×бўйи, см
Советский (st)	386,3±7,9	28,5 ±0,41	3,2×3,5
Авецина	306,7±6,3	28,2 ±0,41	3,9×3,7
Алишер	427,3±8,7	43,6 ±0,65	4,5×5,2
Буривестник	337,3±6,9	32,4 ±0,47	4,6×4,0
Вымпел	167,3 ±3,4	63,1 ±0,94	5,2×5,0
Гулистан	295,3 ±6,0	26,8 ±0,39	3,2×3,5
Краснощекий	270,3 ±5,5	52,6 ±0,76	4,1×5,3
Красный Партизан	279,0 ±5,7	45,0 ±0,66	4,2×5,1
Курсадык	340,0 ±6,9	41,2 ±0,62	3,8×3,6
Мароканд	182,5 ±3,7	35,6 ±0,53	4,5×4,4
Мулла Садык	301,0 ±6,1	41,3 ±0,85	3,7×3,7
Нурафшон	312,6 ±6,4	47,9 ±0,80	4,2×4,6
Рухи Джуванон Миона	323,5 ±6,6	47,8 ±0,78	4,3×4,4
Салимий	294,8 ±6,0	23,2 ±0,48	2,2×3,4
Саврари	275,5 ±5,6	46,1 ±0,95	4,5×4,7
Темурий	226,6 ±4,6	45,6 ±0,84	4,7×4,8

Шелечко	251,1 ±5,1	59,5 ±1,08	5,3×5,9
Ширпайванд	236,7 ±4,8	35,8 ±0,64	4,6×4,5

Furthermore, analysis of fruit width and length dimensions revealed that the largest fruits were produced by the Shelechko (5.3 × 5.9 cm) and Vympel (5.2 × 5.0 cm) varieties, whereas the smallest fruits were observed in the Salimiy variety (2.2 × 3.4 cm).

Biochemical analysis of fruits from 6–8-year-old local and introduced apricot varieties showed that the water content in the fruits of the standard variety Sovetskiy (st) was 80.9%. Compared with the standard, significantly higher water content was recorded in the varieties Krasny Partizan (83.6%), Krasnoshchekiy (82.7%), Gulistan (82.6%), and Shirpayvand (82.5%), exceeding the standard by 2.7%, 1.8%, 1.7%, and 1.6%, respectively. In contrast, lower water content was observed in the varieties Sarvari (76.6%), Ruhi Djuvanon Miona (74.6%), and Avicenna (72.8%), which were 4.3%, 6.3%, and 8.1% lower than the standard variety, respectively (see Appendix 15).

The dry matter content of fruits in the standard variety Sovetskiy (st) was 19.1%. Higher values were recorded in the varieties Ruhi Djuvanon Miona (25.4%), Sarvari (23.4%), Kursadyk (23.0%), and Vympel (22.6%), exceeding the standard by 6.3%, 4.3%, 3.9%, and 3.5%, respectively. Conversely, lower dry matter content was found in the varieties Krasny Partizan (16.4%), Salimiy (17.0%), and Avicenna (17.2%), which were 2.7%, 2.1%, and 1.9% lower than the standard variety.

The sugar content of fruits in the standard variety Sovetskiy (st) was 15.9%. Compared with the standard, higher sugar accumulation was observed in the varieties Nurafshon (19.3%), Krasny Partizan (18.7%), Ruhi Djuvanon Miona (18.4%), and Sarvari (18.4%), exceeding the standard by 3.4%, 2.8%, 2.5%, and 2.5%, respectively.

The lowest sugar content was recorded in the varieties Krasnoshchekiy (14.8%) and Burivestnik (15.6%), which were 1.1% and 0.3% lower than the standard variety, respectively.

The titratable acidity of fruits in the standard variety Sovetskiy (st) was 1.03%. Higher acidity levels were observed in the varieties Gulistan (1.10%) and Avicenna (1.05%), exceeding the standard by 0.07% and 0.02%, respectively. In contrast, the lowest acidity was recorded in the varieties Ruhi Djuvanon Miona (0.60%) and Krasny Partizan (0.60%).

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