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# **ИЗУЧЕНИЕ СОСТОЯНИЯ ПРОИЗВОДСТВА ЯБЛОК В ПРОВИНЦИИ БАДАХШАН РАЙОН БХАРАК РЕСПУБЛИКИ АФГАНИСТАН**

# **STUDY OF THE STATE OF APPLE PRODUCTION IN BADAKHSHAN PROVINCE BARAK DISTRICT AFGHANISTAN**

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Яблоня возделывается во многих регионах мира. Яблоня произрастает в Восточной Европе, Западной Азии и горных районах Гималаев. Этот вид существует в дикой природе и был создан путем скрещивания двух или более видов диких яблок. Растения яблони произрастают в регионах с умеренным климатом. Благодаря своему географическому положению и климатическим условиям, Бахарак благоприятен для выращивания различных сортов яблок. Яблоки богаты сахарами, витаминами и минералами, в Бахараке произрастают различные отечественные и зарубежные сорта, такие как Ракхш, Самар Ганди, Сабзак, Гол Ахмади, Хаджех, а также иностранные сорта яблок: Самути, Ливанские желтые и красные, Сатурн, Самрид, Джуна Грид, Гала и т. д. Их размножение также осуществляется вегетативным и генеративным способами. Размножение подвоев в основном осуществляется черенкованием. В настоящее время производство яблок растет и является очень прибыльным бизнесом. В Бахараке возделывает более 4000 гектаров яблоневых садов и 80% яблок реализуется за пределами рынка Бахарака. Однако в последнее время из-за проблем в осуществлении уходовых работ за растениями большинство яблоневых садов имеют сильное повреждение вредителями и болезнями. Еще одной серьезной проблемой является нехватка холодильных и складских помещений

Apple is a fruit that is used in many parts of the world. The apple tree is native to Eastern Europe, Western Asia, and the Himalayan mountain regions. It existed in a wild form and was created as a result of the combination of two or more types of wild apples. Apple is a type of fruit of temperate regions. In terms of geographical location and climatic conditions, Spring is favorable for various varieties of apples. Apple is rich in sugars, vitamins, and minerals; there are various domestic and foreign varieties in Baharak such as (Rakhsh apple, Samar Ghandi, Sabzak apple, Gol Ahmadi, Khajeh apple, Nazk apple...) foreign apples (Samuti, Lebanese yellow and red, Saturn, Samrid, Jonah grade, Gala varieties) etc. And their propagation is also done in asexual and non-asexual ways. The propagation of mother stocks is mostly done by the root. Apple production is currently increasing, some gardeners are earning a lot of money from this sector. Also, the production of local apples was relatively good, but there was a problem that they were large and berry-like, and the former apple orchards were not given much special attention, but today the apple orchards are well managed and most of the apples are produced commercially. Baharak has cultivated more than 4,000 acres of apple orchards, and 80% of the apples are sold outside the Baharak market. But recently, as a result of the lack of attention to the apple orchards, most of the apple orchards have been attacked by pests and diseases. Another major problem is the lack of cold storage and storage facilities

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### **History of the development of gardening**

The history of gardening in the Baharak area is unknown, and there is no exact information about the beginning of growing apple trees in Baharak. There is an opinion that local varieties of apple trees have existed for many centuries. There are records that in 1978, an industrial garden was laid out with local varieties of apple trees in Baharak, information about the use of foreign varieties in laying out industrial gardens dates back to 2005.

Apple trees grow in temperate climates. For optimal growth and fruiting, apple trees require a cold period of 1,000 to 1,600 hours depending on the variety at temperatures below 7 degrees Celsius. If the area receives 600 to 700 mm of precipitation, apple cultivation is recommended [1].

The resistance of apple trees to cold is much higher than to heat, and some varieties of apple trees can withstand frost down to  $-46^{\circ}\text{C}$ . If the physiological need of the apple tree for cold is not satisfied, the growth and development of apple tree flowers may become abnormal, the flowers may fall off and not turn into fruits.

For some apple varieties, especially those with red and crimson fruits, cool night temperatures during the growing season play an important role in better fruit color development. For red-colored apple fruits, cool nights two weeks before harvest will result in better and more desirable color development [3].

The coloring agent in red apples is often anthocyanins, the production of which is slowed or stopped by exposure to ambient heat, resulting in a decrease in the intensity of the fruit's color.

Cloudless days with plenty of sunlight during the period of growth and development of apple fruits contribute to better coloring of the fruits.

<http://ej.kubagro.ru/2025/05/pdf/61.pdf>

Growing apples in highlands and mountain ranges where there are warm sunny days and cool nights, especially in the month preceding harvest, allows for apples with the desired aroma and color.

Apple trees can tolerate a wide range of temperatures and grow not only in economically developed areas where winters are so cold (-41 degrees Celsius) that the branches dry out, or it becomes so hot that the necessary cold (1000 to 1600 hours at temperatures below 7 degrees Celsius) is not provided [2].

### **Climate conditions Baharak district**

This area is located at a relatively high altitude above sea level. Baharak or Baharestan district is one of the most beautiful and green districts of Badakhshan province, which has a very long history and is considered one of the oldest and most important Silk Road highways in terms of transit, and currently has strategic importance. Baharak district is one of the 28 districts of Badakhshan province, ranking second in rank among districts. This district is located 10 kilometers southeast of Faizabad city: it borders Warduj and Shuhada districts in the east, Khash district in the west, Arganjhwa district in the north and Jurm district in the south. Its total area is 328 square kilometers. It turns out that due to its geographical location and climatic conditions, it is favorable for growing various types of fruits.

Apple trees do not do well in low latitudes with warm winters. Establishing apple orchards in mountainous areas allows apples to be given the desired elongated shape, as well as to improve their aroma, taste and flavor. Some varieties of apples have anthocyanin coloring and should be grown in areas where the days are warm and sunny during ripening, and the nights are cool [3].

### **Characteristics of local apple varieties**

Local apple trees are quite tall and reach a height of 6-12 meters. Local apples were of higher quality and yielded a comparatively higher yield. But according to

some farmers, standard methods of fertilization, watering and pruning were not applied to local apples. Currently, varieties of their pedigree are dying out. For example, there is a very small percentage of varieties such as Khadzhadzhe Sib, Samar Kandi, Chuke Sib, and some gardeners in the Baharak region are calling for the restoration of varieties. There is another problem in the republic - the lack of a quarantine zone, so some diseases and pests are brought from abroad [4,5,6].

Foreign apples have been successfully grown in Baharak district since 2005 and since they are compatible with the climatic conditions of Baharak district and produce high yields at a denser planting than local varieties, they are easy to pick. They have replaced local apples [7,8,9].

### **Local varieties grown in the Baharak region**

#### **1. Salted or white apple**

- ✓ A variety of autumn apples that are delicate white when raw
- ✓ The fruits have a sweet, piquant taste and a pleasant smell.
- ✓ The fruits have good shelf life.
- ✓ This is a variety of apple that grows in the Baharak region.



Figure (1) Appearance of the salt apple tree

## 2. **Variety Thin**

- ✓ In terms of ripening time, it is a summer apple.
- ✓ The taste is sweet, the color is red, the skin is thin.
- ✓ Its weight ranges from 300 to 450 grams.

## 3. **Sib Rakhsha variety**

- ✓ In terms of ripening time, it is a summer apple.
- ✓ The tree is vigorous.
- ✓ It is red in color and has a short shelf life.



Figure 2 - Appearance of the apple tree of the Sib Rakhsha variety

## 4. **Samar Gandhi**

- ✓ This is one of the varieties that bears fruit well.
- ✓ At first the green color slowly turns into white.
- ✓ It is of high quality.
- ✓ Its fruits are 7-10 cm in diameter.
- ✓ The height of the tree above ground level is 6–8 meters.





Figure 3. Appearance of the Samar Gandhi apple tree

5. **Apple tree variety - Green apple**

- ✓ Initially its color is green, but after cooking half of it turns white and half red. The taste is pleasant, sweet.
- ✓ The fruit size reaches 5-7 cm.
- ✓ The tree height reaches 5–9 meters in diameter.
- ✓ The skin is hard at first, but becomes very soft when cooked.



Figure 4 - Apple tree variety - Green apple

Apple tree variety - Beiruti

Beiruti apples are red and yellow.

It has excellent taste and high quality.

The diameter of the fruit is 5-9 cm. When grafted onto a seed rootstock, it reaches a height of 7-10 meters, and when grafted onto a medium-sized rootstock, 5-6 meters.



Figure 5 Apple tree variety red Beiruti



Figure 5 Apple tree variety yellow Beirut

## **Foreign varieties,cultivated in the Baharak region**

### **1: Smoothie**

- Fruit: Medium to relatively large, round, rectangular cone, smooth or slightly rough skin, greenish-yellow, then golden yellow, ripens in autumn.
- Fruit pulp: creamy, juicy, with seeds, sweet, aromatic taste, still used in cooking.

Tree: Medium-vigorous, wide, fruit-bearing, with wide-angled branches, early ripening, self-fertile.

- Storage: Usually until June.
- Resistance: Moderately resistant to powdery mildew and fire blight.



Figure 6 - Appearance of the Smoothie apple tree

### **Mutsu variety**

- It has good taste and high quality.
- It has a yellowish-green color and a pleasant smell.
- It has a large market.





Figure 6 - External appearance of the Mutsu apple tree

### **Samrid variety**

- Samrid has red color.
- White spots, sweet taste
- It has a good taste and aroma, as well as a pleasant smell.
- It is of excellent quality.



Figure 7 - Appearance of the apple tree variety Samrid

### **Variety Opening**

- Fruit: medium-sized, round, bright red.
- Fruit pulp: creamy and firm with milk tea-colored spots, juicy and seeded.
- Resistant to late spring frosts.
- Resistance: Resistant to scab (skin ulcers)



Figure 8 - External appearance of the apple tree of the Otkrytie variety

### **Red Devil variety**

- The fruits are red in color
- Juicy pulp with hints of milk tea, fresh and pleasant taste.
- A relatively strong, productive tree, good yield, early maturing.
- Resistant to scabies



Figure 9 - Appearance of the apple tree variety Red Devil

### **Cross variety**

- Fruit: medium, red and milky, aromatic, stays on the tree and does not fall, thin skin.
- Fruit core: creamy, fresh, aromatic, with sweet, honey-like seeds.
- Tree: regular in shape, medium in growth strength, spreading, with pubescent young branches, blooming profusely on one-year-old branches.
- Frost resistant
- Resistant to scab and powdery mildew.
- Usually stored until October.



Figure 10 - Appearance of the apple tree variety Cross

### **Red Windsor variety**

- Medium fruit, bright red in colour, needs to be reduced in size to maintain good size.
- Sweet, aromatic, honey-flavored fruit pulp
- Compact tree with good productivity.
- Resistant to cold
- Typically, supplies last until mid-November.



Figure 11 - Appearance of the apple tree variety Red Windsor

### **Jester variety**

- Medium sized fruit with bright red color on yellow and green background.
- The fruit has juicy, seedless pulp with a light, refreshing, delicious aroma.
- The tree is of medium growth strength, compact, early maturing, with good and reliable yield.
- Frost resistant, late spring, good pollen.
- Places are usually reserved until December.



Figure 11 - Appearance of the apple tree variety Jester



### **Variety Galaxy**

- Modified Rail Gala shape, round, medium
- Bright red with distinct green and yellow stripes, fleshy, sweet and juicy.



Figure 12 -Apple tree appearance Galaxy variety

### **Variety Rail Gala**

- The tree is medium-sized, upright, relatively spreading, with free fruit-bearing branches.
- Long conical shape, size may be small.
- Susceptible to scab, powdery mildew and fire blight.
- The stocks are kept in good condition.
- The pulp and skin of the half-fruit are uniform orange-red in colour, dense, creamy, early ripening, sweet and juicy, with an aromatic smell, excellent structure and quality.



Figure 13 -Apple tree appearancevariety Rail Gala

### **Fiesta variety**

- The fruit is round and wide, yellowish-green. Requires reduction in volume to maintain good size and shape. Remains on the top of the stem after ripening.
- The core of the fruit is juicy, grainy, aromatic and fragrant.
- The tree is of medium growth strength, the yield is high, the branching angle is wide.
- Resistance of flowering to late spring frosts Group
- Resistant to scab



Figure 14 -Apple tree appearanceFiesta variety

### **Reed Fall Staff variety**

- The fruits are medium sized, bright ruby in colour.
- The pulp of the fruit is sweet, juicy and contains seeds, suitable for making juice.
- The tree is of medium growth strength, branches are directed downwards, the yield is high.
- Resistant to late spring frosts, self-fertile.
- Usually stored until December.



Figure 15 -Apple tree appearanceReed Fall Staff variety

### **Fuji variety**

- The fruits are large, medium, round, conical, with a hard skin.
- The pulp is white, sweet, juicy, with seeds, and a honey flavor.
- The tree is of medium growth strength, fruiting is slow, fruiting is annual, the yield is high.
- Resistance: Average resistance to powdery mildew and fire blight.
- Stable base against scabies and some groups of insects



Figure 16 -Apple tree appearanceFuji variety

### **Saturn variety**

- Large conical fruits, light greenish-yellow with red.
- The pulp of the sweet fruits is juicy, with seeds, has a pleasant taste and is suitable for making juice.
- The tree is of medium growth strength, the yield is high.
- The variety is self-pollinating.



Figure 17 -Apple tree appearanceSaturn variety



Harvesting of different varieties of apples is done at different times. Apples are harvested for two purposes: commercial and for family consumption. If it is done for commercial purposes, the apples are picked when they are almost ripe, sometimes the apples are sold directly from the orchard. They are sold at a very low price, there is no refrigeration. One of the major problems in Baharak is the lack of housing and the lack of attention from the government to the horticultural sector. If for consumption, the family will not harvest the crop until it is well cooked. Apples are usually picked by hand in the spring. This is the best method of harvesting because it does not reduce the shelf life of the fruit, ensures the highest quality for the producer and the best marketability for the buyer [14,15,16].

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