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Study of the Distribution Zones of Regional Apple Varieties Cultivated in the Conditions of the Nakhchivan Autonomous Republic and the Diseases Observed in Them

Abstract

The article studies the high-yielding, frost-resistant, disease- and pest-resistant, stone fruit varieties cultivated in the Ordubad and Sharur regions. Phenological observations were conducted on the discovered varieties, and promising varieties were selected and increased. It was observed that apple, pear, and quince varieties cultivated in those zones were resistant to frost, disease, and pests. For this reason, it is appropriate to widely increase apple plants in the villages located in the mountain and foothill zones of the Nakhchivan Autonomous Republic.

Keywords: *productivity, phenological observation, selection, plant hybridization, seedling, confectionery*

Introduction

The maximum satisfaction of the population's daily demand for various fruit products has always been in the focus of the state. Therefore, the further expansion of orchards, the selection and placement of productive and promising varieties and their increase are considered one of the requirements of today. Unlike other regions of the Republic of Azerbaijan, the territory of the Nakhchivan Autonomous Republic is very favorable for the cultivation of fruit plants and the production of high-quality and abundant crops. Among the fruit plants cultivated in the territory of the Autonomous Republic, apple is also planted and cultivated in large areas, and apple ranks first among stone fruits and constitutes the majority among existing stone fruits.

The history of fruit growing in Nakhchivan suggests that the fruit varieties currently cultivated in gardens are the product of centuries-old folk selection on wild fruit plants in the area. The cherry forms of the apple are widespread in the Bichenak and Nasirvaz forests. Of the most cultivated forms of the apple, the summer and autumn-winter varieties are also cultivated more in the foothill zone. The summer variety of the apple is cultivated more, and the winter variety is cultivated less (Talybov & Bayramov, 2013, pp. 20-21).

Research

The State Program “On the Development of Fruit and Vegetable Growing in the Nakhchivan Autonomous Republic in 2021-2025” has been adopted. In order to successfully fulfill the tasks set in this area, it is first of all necessary to select high-yielding varieties that are suitable for the natural and economic conditions of each region engaged in fruit growing, as well as various zones of our autonomous republic, and to widely apply them in production. It is from this perspective that the discovery and propagation of valuable apple and pear varieties that have been cultivated in the autonomous republic since ancient times, but are still rarely found, as well as the cultivation and transfer of more productive varieties to farms, are of great practical importance for the successful implementation of the food program that is now being implemented with great effort in our republic. The main goal of growing fruit and berry crops is to obtain fruit and berry products that contain very valuable and necessary substances for human nutrition, normal growth and development of the body. In addition to using fruits and berries fresh during the fruit season, fruit jams, jams, povidlo, juice, etc. products made from them are used throughout the year. One kg of

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skim milk contains 580-640 calories. One kilogram of apples produces 440-556 calories, which is 4/3 of the calories in milk (Hasanov, 2010, p. 6).

The hormones and essential oils contained in the fruit and cherry also stimulate appetite, prevent weight gain, and slow down aging. They strengthen the functional activity of organs, prevent possible diseases, and increase the body's resistance to external influences (Bayramov, 2019, p. 5).

Purpose of the study Nakhchivan Autonomous Republic has been famous for its high-quality and numerous fruit varieties since ancient times. Many varieties of pitted, seeded, berry-bearing and other fruit varieties have been grown here through folk selection, which not only do not lag behind, but even surpass the varieties common in other regions in terms of their taste, aroma and other characteristics (Nasir, 1995, pp. 140-141).

The purpose of studying varieties is to identify ancient, highly productive, frost-resistant, disease- and pest-resistant varieties of pitted fruit, to study their biological and economic characteristics and recommend the best ones for production (Hasanov, 2000, p. 93).

Material and Research Methods

The main material of the study is the native apple and pear varieties and forms cultivated in the territory of the Nakhchivan Autonomous Republic. In carrying out the research work, the methodology programs and methods of the I. V. Michurin State Research Institute of Fruit Growing adopted in fruit growing were used. Developing the agrarian economy of the republic, as well as improving the food supply of the population and establishing intensive orchards are important state issues and require the creation of quality fruit varieties and increasing productivity in agriculture. High-yielding, frost-resistant, disease- and pest-resistant, stone-bearing fruit varieties cultivated in the territories of Ordubad and Sharur districts were studied. Ordubad district has been famous for its high-quality and numerous fruit breeds and varieties since ancient times. Hundreds of very rare stone-bearing, stone-bearing, and stone-bearing fruit varieties have been grown here through folk selection. Many of them have gained great fame worldwide even today (Talibov & Bayramov, 2013, p. 36).

A. Kh. Rollov (1896) stated that people in the Nakhchivan region have been engaged in fruit growing since ancient times and noted the spread of valuable fruit varieties in this area in connection with this. He showed the variety diversity of the main fruit plants cultivated in the Nakhchivan region, of which the largest number falls on the share of apples (Talybov & Bayramov, 2013, p. 12).

In the Nakhchivan Autonomous Republic, the most productive, frost-resistant, disease- and pest-resistant, stone-fruit varieties are distributed in the Ordubad region. Among these varieties, the following can be mentioned: Yaz Melasi, Yay Melasi, Rajabi, Kırmızı alcha, Tabarza, Goyja, Gilas, Novras, Gilanar, Genza, Dırnys, Kulus, Misri apple, Gızıl apple, Abrash apple, Dağ pear, Cıl-chil pear, Kırmızı yanaq pear, and the quince varieties Sari heyva, Melayi heyva, Vezri heyva, Novras heyva and others (Bayramov, 2019, pp. 22-23).

In the Nakhchivan Autonomous Republic, apples account for only 50% of the orchards. The main reason for this is that the apple fruit is of high quality, ripens at different times and lasts a long time. Apple varieties that survive the winter are more valuable.

Despite the low prevalence of autumn and winter apple varieties, there is a high demand for these varieties to provide the population with apple fruit. Apple plants are mainly cultivated in foothills and mountainous areas. It has been observed that apple varieties cultivated in these zones are resistant to frost and diseases and pests. It is convenient to cultivate quality apple varieties that survive the winter in mountainous regions. The fruits of apple varieties cultivated in the mountainous zone can be stored for a long time and are of high quality. For this, it is advisable to widely increase apple plants in the villages located in the mountain and foothill zones of the Nakhchivan Autonomous Republic. Fruit plants included in this group belong to the Rosaceae family, the Maloideae subfamily and separate genera (Hasanov, 2010, p. 217).

Stone fruit plants are widely cultivated in our republic and have large areas. From this group, those considered promising for our republic are apple, pear, quince and partly hawthorn.

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Apples are divided into three groups according to their ripening time. 1. Summer varieties. Such varieties ripen in the summer in July-August in our republic. These varieties include White apple, Borovinka, Red musk, Ordubad beauty, Rashad apple, Summer apple and others. 2. Autumn varieties. They ripen in September-October. Unlike summer varieties, they can be stored for 1-1.5 months. These include Girde red apple, Heiwa apple, Ordubadi, Mazra, Stekan apple, Shakh apple, Sour apple, Zolagli apple and others. 3. Winter varieties. These are varieties that are resistant to long-term storage and transportation. These varieties include Dash apple, Daragi, Akbari, Gelin apple, Haji Huseyn, Khumar apple, Kalamfur, Gizil Ahmadi, Logazbeyi, Sari sour, Seyid Shukur, Sultani, Tabag apple, Top red apple, Vahab apple and others. 4. There are 60 known species of the pear (Pyrus L.) genus. It is a tree up to 20-25m tall. Its flowers are large, with white petals. Depending on the variety, its fruits are of different shapes and quality. The root system is compact and deep-rooted. Pear is propagated by cuttings (Talybov & Bayramov, 2013, p. 65).

Pear has been cultivated by humans since ancient times. Although pears do not last as long as apples, they are a very widespread and important fruit. In Azerbaijani horticulture, they rank second after apples in terms of yield among stone fruits. The main reason for this is that pear fruits are of high quality, ripen at different times, and remain in season until March-April. In the foothill zone, winter pear varieties are suitable for cultivation. Pear plants are mainly cultivated in the foothills and lowlands. Pear varieties cultivated in those zones have been observed to be resistant to frost and diseases and pests (Bayramov, 2017, pp. 25-27).

For this reason, it is appropriate to increase the best varieties of local pear plants in the villages in the lowland and foothill zones of the Nakhchivan Autonomous Republic. Regarding the technological characteristics of local apple and pear varieties, it has been found that the acidity within apple varieties decreases when ripe, and the apples are sour-sweet, intoxicating and sweet in taste depending on the percentage of sugar and acidity. Candies made from apple sugar are a medicine for coughs. Apple fruit is beneficial, has a pleasant taste, cools the heart, and helps with digestion (Bayramov, 2019, pp. 24-25).

Apples are consumed a lot in dried form. On average, 12.5 kg of dried apples and 4 kg of jeja are obtained from 100 kg of apples. Jeja is used to make jam. The fruit of pear varieties is often used fresh. Pears are juicy, tasty, and fragrant, so they are often used. They contain vitamins C and B. Pears are digested faster than apples. Pear fruits are also used dried. The best pear jam is obtained from the varieties of Hasta pear, Safi pear, etc. Dried pear jam contains up to 29-30 % sugar. (Bayramov & Guliyev, 2017, pp. 25-27).

Delicious candies, pastries and confectionery, vodka and wine are made from pear fruit. Only crushed, damaged, overripe and other rotten fruits are used to prepare these final products. In addition, almanac is prepared from Mehdi pear, Dırnısı, Khoy pear varieties. The wood of the pear tree is very valuable, hard and valuable wooden items are made. The fruits of local apple and pear varieties were given to the laboratory and the following were determined by conducting technological analysis.

Autumn varieties of local apples produced for jam: Sultanı, Mazra apple, Gami apple, Ganza red apple varieties are suitable. The jam is tasty and high-quality. Local apples suitable for juice production: Müşgü apple, Gülaman apple, Nabat apple varieties are high-quality and fragrant. According to their sugar content: Top red apple, Mikhey apple are suitable for the production of chem. The fruits of local pear varieties that are late ripening and produced for jam: Kashta pear, Fakhri pear varieties are juicy and juicy, so they are suitable for jam and of good quality. Medium-ripening local pear varieties that are sweet and produced for jam: Safi pear, Khoy pear. Varieties of local pears produced for pavidlo are early ripening varieties. Agrotechnical measures applied in the study of local apple and pear varieties should be carried out in a timely manner – irrigation should be carried out 8-12 times during the vegetation period. Depending on whether the year is dry or rainy, irrigation begins at the end of March, early April and continues until October-November. In addition, the provision of organic fertilizers to apple and pear orchards is very important. To meet the growing demand of the population for fruit and berry products, it is necessary to expand intensive garden areas. The most common diseases in fruit trees are spotting, black cancer, fruit rot,

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powdery mildew on apples, spotting on pears, stisporos, bacterial and viral diseases (Rahimov, 1988, p. 118).

Spotting is the most common disease on fruit plants and causes the most crop loss. Small (1-2 mm), gradually expanding (10-15 mm) circular gray velvety spots are formed on infected flowers, leaves and fruits. For chemical control, spraying with 1 % Bordeaux mixture should be carried out. Treatment should be carried out 3-4 times during the vegetation period. Although spotting does not cause rot in the fruit, it creates conditions for this. Powdery mildew infects buds, shoots, leaves and trunks. A dirty white coating first forms on them, and this coating gradually turns brown. Black dots may also form on the spots. Infected leaves turn yellow, dry quickly, buds stop developing, and the tree cannot bear fruit.

Alternaria – infects the leaves and fruits of the apple tree. The first signs of the disease are purple spots on the leaves. The tissue of the infected fruits hardens. Rust – develops on the leaves and fruits of the apple tree. The leaves fall off and the tree weakens. The fruits of infected trees are of poor quality, and the following year such trees do not bear fruit. Fruit rot – as a result, brown or dark brown spots appear on the fruits. The skin of the fruit softens, turns brown and gives off a sour smell. Among the pests, the following can be mentioned: apple green moth, apple bloody moth, pear orchard, apple fruit eater, apple moth, apple glasswing butterfly, apple flower eater. If timely measures are taken to combat these diseases and pests, a bountiful harvest can be obtained from the orchards. The following drugs can be used for this. Proteks-forte 150g\ 100 l of water or Kral 20 ml 100 l of water, Mostar 20g\ 100 l of water or Matodor 20 ml \ 100 l of water Dentis 30ml \ 100 l of water. Pests of apples. Pillows – Their eggs hibernate under the gray-oak colored comma-like shields on the trunk, begin to feed by sucking the sap of the trunk and weaken the trunk, eventually causing the destruction of the branches (Huseynov, Jalilov, & Huseynov, 2017, pp. 97-100).

Leafhopper - mainly its caterpillars weaken the plant

When the shoots begin to swell, they enter the shoots and eat their insides. They feed on the leaves. They cover the leaves with a web and twist them.

Aphids - green aphids and blood aphids are found. They live in colonies on leaves and young shoots. They feed by sucking the sap of the stem and roots.

Apple flower aphids – lay their eggs inside the flower buds of the apple, so that the aphids that hatch from the eggs eat the internal organs of the flower and cause the flower petals to stick together with their secretions. As a result, the flowers do not open and the yield decreases.

Apple fruit aphids – caterpillars eat the inside of the fruit, opening a channel towards the seed chamber and eating the seed embryo. Chemical control should be carried out during the open feeding period of the aphids (Hasanov, 2015, pp. 208-209).

Mites – because they suck the sap of the plant from the plant cells, the leaves turn brown, fade and fall off prematurely. The caterpillars of the Apple Moth settle on the leaves during the budding period of the apple and begin to feed on the leaves. The following measures should be used against diseases and pests of stone fruit varieties.

Treatment	Disease and pest	Medication phase	Name of the drug and dosage per 1ha
sequence 1st	Spotted, manaliosis, downy mildew Pests of apples	Until the buds open	Mosetam 20 g 100 l water Proteks-forte 150 g \ 100 l water
treatment 2nd	Powdery mildew, alternariosis	After flowering	Suncupro Bordeaux 1500g \ 100 l of water
treatment 3rd	Spotted, powdery mildew, rust disease	Before flowering	Saneb 300g \ 100 l\water
treatment 4th	A dewy, floury dew	Access to the pink bud	Antracol 200g \ 100 l of water
treatment 5th	Powdery mildew, powdery mildew, fruit rot	4th spraying 15-20 days later	Antracol 200g \ 100 l of water

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Disease control should be carried out prophylactically without observing any symptoms (signs) of the disease. Pest control is carried out based on agronomic observations. Results of the study and their discussion.

The apple varieties we studied occupy a unique place among the valuable fruit plants of the Nakhchivan Autonomous Republic. These plants are mainly valued for their fruit. As a result of the studies we conducted on apple trees and the information we obtained from the literature, it is clear that the following main local varieties of these plants, which constitute the main part of fruit growing in the territory of the Nakhchivan Autonomous Republic, exist: Logazbey, Daraghi, Rajabi, Dash alma, Agh alma, Kepek alma, Pambighi, Dolma alma, Shekeri, Heyva alma, Stekan alma, Tabag alma, Gelin alma, Kuku almasi, etc. Local varieties common in the AR were used in the study.

Conclusion

In the autonomous republic, the best varieties of apples, pears, and apples that differ significantly from each other in terms of ripening time and ripen at different times should be increased, and cross-breeding of these plants should be established. For this purpose, these varieties can be increased by grafting and distributed to farms. Because the economic efficiency of these varieties is very high, and you can get a lot of income from these fruits and strengthen the family budget.

Of the local apple varieties, Sultani, Mazre apple, Ganza, red, Top red varieties are suitable for planting in the mountain and foothill zones of the autonomous republic. Sultani, Mazre apple, Ganza red, and Mikhey apple varieties are suitable varieties because they are of good quality and have a long storage period.

It is appropriate to create a nursery farm in the republic to increase local apple and pear varieties. It is advisable to follow the 6 x 5m planting scheme when establishing mother orchards and planting these varieties in the autonomous republic gardens for the increase of the mentioned varieties.

Considering that these varieties have high efficiency indicators, it is appropriate to replace them with varieties that give low yields and are not adapted to soil and climatic conditions in peasant (farmer) family farms.

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