

## ECONOMIC EFFICIENCY INDICATORS OF THE QUINCE PLANT

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**Abstract.** In the paper the results of the comprehensive study are given for the agrobiological characteristics of productive and high-quality quince varieties, economically more efficient and adaptive to the soil and climate conditions of the region. The need for obtaining a quality product from a field unit can be met if the planting scheme of the researched varieties and forms is followed correctly. Preservation, increase, and distribution of the gene fund, and use in breeding work of the researched quince varieties create the basis for increasing quince production in horticultural farms and meeting the population's demand for those products throughout the winter. The level of profitability of quince varieties is determined and the following indicators are achieved: the most profitable variety is Shekeri heyva (161.80%), and the least profitable variety is Jardam (122.23%). In other varieties, this indicator is 129.25-150.76% and show an intermediate position. All the quince varieties we discovered are economically profitable.

**Keywords:** quince, discovered variety, form, economic efficiency, profitability, efficiency.

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### 1. Introduction

The main goal of the agrarian policy carried out in our republic is the implementation of dynamic development of agriculture, as well as the further improvement of private property and entrepreneurship control over the means of production, the meeting of the population's demand for fresh fruit products and food industry's demand for raw materials through local production. In this direction, one of the important problems is to make maximum use of the land, which is the basis of the agricultural production process.

It is known from the literature that the diverse climate-soil conditions of the Republic of Azerbaijan are quite favorable for the development of fruit growing, which is one of the important crop production areas, on the basis of modern technologies. Nine world climate types out of 12 exist in Azerbaijan. This creates unique opportunities for the increasing agricultural production potential, reliable provision of quality fruit and berry products to the population through internal production, as well as for the increasing economic income in the agricultural sector and the transformation of Azerbaijan from an importing country to an exporting country.

Increasing the production of quality berries, the economic efficiency and competitiveness of the products in existing orchards can be achieved as a result of the implementation of innovative technologies with the help of new fruit plant varieties and modern agricultural techniques. The basis of the intensification of fruit growing is the application of innovative technologies, as well as the high-level study of the biological potential of varieties with the effective use of ecological and technological factors. In other words, opening the biological and genotypic potential of the variety to the

maximum extent due to the application of new technologies through the efficient use of natural resources is one of the important problems to be solved in fruit growing. Thus, the priority development of horticulture consists of the development and application of intensive innovative cultivation technology that ensures the preservation of soil fertility, which is the main means of production in this field, and at the same time ensures a high and quality product.

According to the estimations of UN experts, the number of world population in 1870 was 1.4 billion. Currently, the world population has exceeded 7 billion. In 2035, this number is expected to be 8.4 billion. Considering that arable land areas are decreasing day by day, it is necessary to develop and apply new technologies for the reliable supply of agricultural products to the population (Levenko, 2010).

The analysis of the modern state of horticulture shows that under normal technological care, intensive-type gardens are more profitable. Due to the density of planting, such gardens pay off the incurred costs in a short time, yield quickly, produce high and quality products, and require less money for maintenance and harvesting (Karpenchuk, 1987).

The analysis of the modern state of fruit growing shows that intensive-type gardens are more profitable under normal technological care conditions. Because, increasing the production of high-quality fruit and berry products, increasing the economic efficiency in gardens and the competitiveness of the produced fruit products can be achieved as a result of the implementation of innovative technologies with the help of new fruit varieties and modern agricultural techniques.

Along with the ability of quince varieties to adapt to various environmental conditions, meeting the requirements of intensive horticulture is also one of the main factors from an economic point of view. In this regard, one of the main tasks facing modern breeding is the creation of quince varieties that give high and quality products, are tolerant to stress factors and have limited biometric indicators (Yilmaz *et al.*, 2021; Rather *et al.*, 2020; Prichko, 2017).

It is known that one of the main factors influencing the adaptation of the quince plant to certain cultivation conditions is the critical temperature limit during the winter period, a sharp change in temperature near the end of winter, and late spring frosts. A temperature of  $-30^{\circ}\text{C}$  during the relative dormancy period is considered a dangerous temperature limit for quince flower buds (Baxitovich, 2023; Wojdyło *et al.*, 2021; Kopylov, 2017).

Biomorphological and economic-technological characteristics of quince varieties and forms have been intensively studied all over the world, including our republic.

Currently, in order to obtain a high and quality fruit product from orchards, it is possible to ensure the intensification of the production process as a result of the application of the set of agrotechnological measures mentioned below at the appropriate level. For this, the use of the latest achievements of agricultural science and advanced practices in the developed countries of the world in the organization of production in the horticultural farms of our republic; regional specialization of industrial fruit growing on the basis of combined individual farms and agro-industrial complexes; the mechanization and automation of agrotechnological care work in orchards should be carried out following standards; along with measures such as further improvement of irrigation and melioration measures, investment in quince orchards should be increased.

From this point of view, detection, collection, propagation of high-yielding, disease and pest-resistant, and frost-resistant, especially spring frost-resistant varieties

and forms of the quince plant with the high value among fruit plants, organization of the "Gene Fund-Collection garden", and also taking it as a starting material in the selection works carried out to acquire new varieties are among the most important issues of the day.

## **2. Conditions, research materials and methods**

The purpose of the work was to identify the folk selection varieties of the quince plant common in the Western region, to determine its economic and biological characteristics, and its economic efficiency, as well as to collect the best of them in the Training-experimental farm of Azerbaijan State Agrarian University to form "Gene Fund-Collection garden".

Sary heyva, Valachin, Shakari, Garaman, Pensar, Bardag and Jardam varieties of quince plant, which are included in the group of endemic plants for our republic, were selected as the objects of the research.

**Research methods.** The generally accepted methods of horticulture (Zhidekhina, 1999; Methods of experimental work and methodical recommendations of the North-Caucasus Zonal Research Institute of Horticulture and Winemaking, 2002; Karpenchuk & Melnik, 1987; Ovsyannikov, 1986; Dospekhov, 1985) were used for the experiments.

## **2. Results and Discussion**

At present, numerous studies have been conducted in the field of evaluating the efficiency of agricultural products under modern conditions in our country. Besides, the vast majority of studies are devoted to the issues of economic efficiency evaluation in the activities of individual economic subjects.

According to the definition of economic efficiency given by P. Heine, this economic category is reflected in the operation of objective economic laws and is seen in one of the most important aspects of social production - productivity (Heine, 2015).

To evaluate the indicators of economic efficiency in horticultural farms, it is important to create a working environment that forms the efficiency of any economic entity and stimulates entrepreneurial activity. The level of profitability of production is the basis for determining the economic efficiency of farms. Making a profit in any product is clear evidence of the achievement of the intended result in the production process. Thus, the efficiency of production in horticultural farms can be determined by the following economic indicators: profitability of the producer of commodity products, profitability of production and sale.

From this point of view, when determining the economic efficiency indicators of quince orchards, first of all, the cost price of the product was calculated. The difference in cost price is definitely represented by the harvest from the gardens. That is, additional costs for the collection, packaging, transportation, and the time of sale of surplus products create factors such as the price difference. In addition, trees of quince orchards require higher investment in various maintenance works (pruning, disease and pest control in trees and products) in orchards planted from varieties with strong vegetative height compared to varieties with naturally low height and limited biometric indicators. As a result, in this type of garden, the cost price of the product increases and the level of profitability, which is considered its main economic indicator, changes.

The economic efficiency indicators of quince varieties presented in the table are based on our research results.

As seen in the table, the average yield per 1 ha has changed depending on the varieties. The most productive variety was Shakari heyva (181.6 cwt/ha). The lowest productivity was recorded in the Jardam variety - 155.1 cwt/ha. The average cost price of 1 ha of the quince orchard varied between 8,324 and 8,898 AZN. According to the market prices, the selling price of 1 kg of quince fruit was taken as 1.2 AZN on average. The sales value of the total product varied between 18,612 and 21,792 AZN, and the net profit varied between 10,237 and 13,468 AZN depending on the farm productivity.

**Table 1.** Economic efficiency of quince varieties (*per ha*)

Variety	Productivity, cwt/ha	Cost price of the product, AZN	Selling price of the product, AZN	Net profit, AZN	Profitability, %
Sary heyva	165.4	8 375	19 848	11 473	136.99
Valachin	161.2	8 375	19 344	10 969	130.97
Shakari heyva	181.6	8 324	21 792	13 468	161.80
Garaman heyva	170.3	8 898	20 436	11 538	129.67
Pensar	175.0	8 375	21 000	12 626	150.76
Bardag heyva	160.0	8 375	19 200	10 825	129.25
Jardam	155.1	8 375	18 612	10 237	122.23

The main indicator is ultimately the level of profitability of quince varieties. It can be seen that the highest level of profitability was obtained in the Shakari heyva variety (161.80%), and the lowest profitability level was obtained in the Jardam variety (122.23%). In other varieties, this indicator ranged between 129.25% and 150.76%.

All the quince varieties studied are economically profitable.

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