

# Fertility And Yield Of Introduced Apple Varieties On Different Rootstocks Under Conditions Of Chechnya

*Kh. E. Mamalova\**

Kadyrov Chechen State University, Sheripova Street, 32, 364024, Grozny, Russia

**Abstract.** In the present article the effect of dwarf clonal rootstock MM-106, M-9, M-26 on introduced apple-tree varieties was studied. With the identified specificity of productivity formation and quality of fruits, taking into account the methods of cultivation. Fruits of apple trees serve as a rich source of pectin substances. The unique soil and climatic conditions of many regions of our republic, contribute to the industrial and amateur cultivation of the fruit crop of the apple tree. In this connection, it became necessary to assess the economic efficiency of various apple varieties and justify their selection for further use in the technological process of intensive horticulture in conditions of Chechnya. To allocate apple-tree varieties with a complex of features having economic and production significance, which consists in determination of influence of variety and rootstock, on terms of entry of trees in the period of fruiting and formation of yield.

## 1 Introduction

Modern horticulture makes high demands on the assortment of apple trees. The main methods for obtaining new varieties of this crop are selection and introduction. Introduction means the transfer of plants outside the area of their former distribution. Adaptation to environmental conditions occurs within the existing heredity, which is not constant, and also changes to a greater or lesser extent along with changes in the environment [6]. When cultivating an apple tree, the main task is to obtain good quality fruits with minimal financial costs. To achieve this goal, the yield must be high. This is the main indicator for the introduction of varieties into production, introduction from other regions and use in breeding. Productivity is the result of a combination of such biological traits and properties as resistance to diseases, pests and adverse environmental factors, since high yields can only be obtained on healthy trees that are free from pests and diseases.

The fruit crop of apple-tree is rich in a complex of positive properties such as drought resistance, winter-hardiness, frost-resistance, and a high level of adaptation to adverse conditions, which contributes to a wide range of distribution of the crop. Apple trees take root well on fertile, moisture-absorbing soils rich in humus, with a good coefficient of moisture, as well as chernozems, light clay soils. During the cultivation of this crop, it is

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\*Corresponding author: [mamalovah@mail.ru](mailto:mamalovah@mail.ru)

necessary to control alkalinity (Pn should not exceed the norm), and if it is not enough, be sure to lime the soil. Apple trees are also unstable to salinity and sensitive to saline soils.

Applefruit is rich in sugars, (fructose) - 11.7-12.9%, ascorbic acid (vitamin C) - 16.8 grams, pectins (fiber) - 11.2-13.6%, p-active substances - 236-242 m / g. and titratable acids - 0.34%. Economic efficiency of apple-tree varieties varies from year to year as it depends on the age of the tree, on the correct care and observance of all agro-technological measures in intensive horticulture. [17.c.143]. In this regard, the purpose of our research is: the study of apple varieties of world selection-Golden Rangers, Red Brebourne and Fuji Fubrax.

The following tasks were set:

1. updating and improvement of industrial regional, zoned variety of pome crops.
2. Integrated assessment of economic efficiency, marketable qualities and biochemical composition of apple trees.

## 2 Research Methodology

The problem of studying the potential of apple resistance to the negative effects of low temperatures and the selection for production and breeding use of the best genotypes with the maximum severity of resistance remains relevant [8]. According to the results of a long-term study of winter hardiness of apple trees, varieties with resistance to winter adverse conditions were identified by modeling damaging factors in the autumn-winter period. The potential of resistance of kidneys and tissues according to the components of frost resistance was revealed [10]. The results of observations showed that soil conditions and irrigation regime have a significant impact on the main qualitative indicators of the growth and development of the root system of apple trees of the winter variety 'Renet Simirenko' [2]. In recent years, in order to further improve the assortment of apple trees, a number of new varieties of winter ripening have been included in the State Register of Breeding Achievements of the Russian Federation, approved for use in the North Caucasus region. The analysis of long-term data on variety testing of apple trees in various environmental conditions of the North Caucasus was carried out [1].

Objects of research, are varieties of foreign selection, grafted on various rootstocks. Golden Rangers variety is grafted on Dutch rootstock M9. Red Brebourne- and Fuji Fubrax varieties are M26, M106 [9.C.276]. These rootstocks are considered to be low-growing and medium-growing, early enter fruiting and give good yields. With high-tech methods of orcharding, the average yield of apple trees from one tree on various rootstock, increases significantly (by 25-30kg) [7]. Orchard productivity, with compacted planting schemes is stabilized on the 4th year. Up to 20 years yields average 50-60t/ha per year. In general, there are a sufficient number of dwarf clonal rootstocks in the world, but these rootstocks, are considered the most demanded and effective for intensive plantings of apple varieties. Apple tree varieties on dwarf rootstock, which come into fruit bearing early, are early-fruiting.

## 3 Results and Discussions

The formation of the yield on a seedling in the range of 2-3 kg of apples, is considered the entry of the variety in fruiting. To expand the regional assortment of apple trees and amateur horticulture, new varieties of apple crop of world selection, with a complex of features of economic and production importance, have been identified:

Winter hardiness - the ability of trees to tolerate low temperatures peculiar to a given region[1]. High winter hardiness and remarkable qualities of fruits of apple trees, may well

be combined. The quality of apple trees is determined by such parameters as: average weight in grams, attractiveness of appearance in points (on a 5-point scale), tasting score of taste in points (on a 5-point scale), storability (duration of storage, expressed in the number of months). In addition, it is customary to characterize the shades of taste and flavor qualities of fruits: sweet, sour-sweet, spicy, sour-sweet, wine-sweet, etc. To determine the consumer (taste) characteristics of fruit quality, individual and group tastings are repeatedly conducted. Particular attention when assessing the quality of fruits is paid to their biochemical composition: ascorbic acid in milligrams, the content of sugars in percentage, per 100 grams of fruit weight, P-active substances (catechins and leucoanthocyanins) in mgr. [14.C.120].

**Table 1.** Commodity qualities and biochemical composition of apple trees

Traits (indicators)/ Varieties	Red Brebourne	Golden Rangers	Fuji Fubrax
Average fruit mass, g	150	160	230
deviation d	x	+10	+80
Attractiveness of appearance, point	5,0	4,6	4,8
Tasting score of taste, point	Sour-sweet, juicy	Sour-Sweet	Sour-Sweet
Taste evaluation criteria	x	x	x
The chemical composition of the fruit, including:	11,7	14,7	16,9
Sum of sugars, %	x	+3,0	+5,2
deviation, %	16,8	10,1	12,8
Ascorbic acid, mg/100g	x	-6,7	-4,0
deviation, %	236.0	243.0	204.2
Sum of P-active substances (vitamin P), mg/100g	x	+7,0	+8,2
Ripening time, harvesting	From late September to October	Early, late September	September
Shelf life (subject to storage conditions)	Early February	Until May	Until May

Table 1.shows the data on the objects of the study, characterizing the marketable qualities and biochemical composition of fruits. Deviations in values of fruit weight of Golden Rangers apple-tree are insignificant, in contrast to the variety Red Brebourne. It was found that the highest value in Fuji Fubrax variety is 230 g, which markedly differs from the other varieties in its weight, appearance and taste. Golden Rangers and Fudgie Fubrax varieties, almost no difference in terms of fruit ripening and harvesting (early to late September), but it was distinguished by good storability, in contrast to varieties of Red Brebourne. Compliance with certain technological conditions, affects the preservation of fruit, as well as the marketable appearance. All investigated apple varieties formed fruits with optimal biochemical composition, high taste and marketable qualities. [8.C.58] Rich in their biochemical composition, apple-tree fruits are in demand among the general population.

## 4 Conclusions

In the course of the research work carried out it follows:

1. Profitability of the studied varieties allows to use them for expansion of zoned assortment of apple trees. Planting of industrial and farmer orchards.
- 2.The use of dwarf, clonal rootstock directly affects the formation of the main varietal economic-valuable features of apple trees: early maturity, early maturity, fruit quality and yield.

All the studied apple-tree varieties can be classified as early-fruiting and early-ripening due to early enough ripening of fruits.

In the ecological conditions of our region, during the complex evaluation of economically valuable signs, apple varieties of world selection Red Brebourne, Golden Rangers, Fuji Fubrax are recommended for improvement and expansion of industrial orchards of the republic.

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