

The main indicators of body thickness, branch growth of intensive apple trees

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Abstract. This article examines personal methods of rejuvenating and normalizing pruning of zoned apple varieties on the growth dynamics of fruiting tree branches. It should be noted that at present, in intensive apple orchards, in order to obtain a constantly high yield of fruits with good qualities, attacking their entry into fruiting and harvesting from 2-3 years after planting them in a permanent place is the main requirement for a high yield of fruits.

1 Introduction

In the field of intensive fruit growing in Uzbekistan, further increase of fruit production, sharp improvement of quality and reduction of the cost of fruit cultivation are planned mainly through the establishment of new intensive orchards and continuous production of abundant and high-quality crops from existing orchards. The full implementation of this task requires the establishment of new apple orchards and the use of scientifically based cultivation technologies.

In recent years, accelerated (intensive) fruit orchards have been established in our country, in these orchards we learn how to shape fruit trees and take into account the biological characteristics of varieties, taking into account the variety and its biological characteristics, depending on the age of the trees, 3-4 branches are harvested annually. Cutting methods and levels of the rejuvenation cycle, as well as specific shaping measures, have not been thoroughly studied on a scientific basis in the conditions of Uzbekistan.

Currently, the total area of orchards in the Republic of Uzbekistan is 216,400 hectares, of which 89,100 hectares or 44.0% of the total area is covered by seeded fruits.

Today, intensive orchards, together with high-quality crop production, require the creation of orchards to reach harvest faster, that is, in 3-6 years after planting. Also, in intensive orchards, slow- and medium-growing, high-quality yielding varieties with small bushes are selected, and high-quality agrotechnical measures are applied to them.

In Uzbekistan and foreign countries, a group of researchers conducted scientific research on the effects of the methods and degrees of cutting excess branches of apple trees on growth, development and productivity, and obtained various scientific data based on the study of the effect on the biological characteristics of the variety in different soil and climate conditions, and in turn, have given scientific recommendations suitable for each

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situation. However, it should be noted that the research conducted in this regard does not provide an opportunity to fully reveal the biological characteristics of fruit tree varieties, fruiting of branches, and their rejuvenation cycles.

Rejuvenating and normalizing cutting methods used for cyclical renewal of fruit tree branches for 3-4 years, determining the degree of shortening depending on the condition of the branches and giving a certain shape to the trunk is the most important agrotechnical factor in increasing productivity and improving quality.

Studies on the methods and levels of pruning in German intensive orchards have not been carried out as a whole and collectively in specific soil-climatic conditions of Uzbekistan. Including, in the process of growing apples in orchards in the Bukhara region, it is necessary to pay special attention to the biological and variety characteristics of the trees, the year of fruiting of the branches, rejuvenating and normalizing methods of pruning, pruning levels, and shaping of the trunk.

Based on the above-mentioned points, it can be said that the selected research direction is considered extremely relevant and actual, and has great scientific and practical importance in increasing the productivity and quality of fruit trees.

2 Materials and Methods

In the soil-climate conditions of the Bukhara region, by determining on a scientific basis the methods of cyclically rejuvenating and normalizing pruning of the branches of apple varieties regionalized in our Republic and the most effective levels of shortening the growing branches depending on the condition of the tree, a steady (stable) high-quality harvest every year in intensive fields is to give recommendations to production on cultivation technology [1-12].

To achieve this goal, the following tasks were performed:

- To study the dependence of the method and degree of pruning on the cutting of growing branches of fruit trees, to determine the effect of the main phytometric indicators on growth, development and productivity;

Research in 2016-2022 at the Bukhara State University and at the horticultural farm "Amin Hayot Bogi" located in the Bukhara district.

The economic territory is located in the north-west of Uzbekistan, bordering Jondor district to the north, Romitan district to the north-east, and the city of Bukhara to the south.

The weather of the territory of Bukhara region, where the farm is located, is characterized by a sharp continental climate. Average annual precipitation is 200-240 millimeters. Most of the precipitation falls in the winter-spring season. Therefore, in order to get a high and quality harvest from apple trees, it is necessary to water them.

The soil of the experimental apple orchards is an alluvial soil that has been irrigated since ancient times. In the agrochemical analysis, the amount of humus in the old and newly irrigated grasslands is 0.8-1.4%, nitrogen is 0.06-0.12%, total phosphorus is 0.1-0.18%, and potassium was 1.22-1.45%. Sizot waters are located at a depth of 2.5-2.7 meters.

Research object. The object of research is three apple varieties, Pervenets Samarkand, Renet Simirenko and Golden Delishes, which differ from each other in their biological characteristics. The graft medium-growing MM-106 apple seedlings were planted in 2012 and placed in the experimental garden in a 6.0x4.0 m layout. The tree branches are shaped in a semi-thinned manner. It is irrigated 4-5 times a year, at the rate of 750-850 m³/ha.

Experience system. Scientific works were conducted in 2016-2022 in order to study methods and levels of pruning of branches in apple tree varieties.

Regulation of the vegetative and reproductive activity of trees and its management is one of the main tasks of agrotechnics, which requires attention to the methods and levels of

giving trees a certain shape and cutting. When properly placing trees in the garden, shaping them, and pruning them according to the method and level of pruning, it is necessary to always remind them that the branches should be directed only towards the optimal environment or, if not, in the direction close to the optimal conditions.

The specific characteristics of the tree variety and generation are constant depending on its reaction to the external environment. The effective action of the gardeners depends on the method and level of pruning they use, and the growth and development of trees conforms to the objective laws, and experts know exactly how much each method affects each tree, and accordingly, they will be so fruitful.

When rejuvenating and standard pruning methods and levels are applied to mature and grown main branches, as a result of their shortening, the process of growth and development is activated, deep physiological changes occur in fruit trees. will continue to grow.

According to many advanced experts and researchers involved in horticulture, by applying the method and level of pruning, the trees are given shape and its body attains a strong and strong skeleton. Due to the application of this measure, equal arrangement of growth and crop branches in the tree trunk is ensured, watering and feeding procedures are improved, favorable conditions are created for their growth and development and fruiting, the development of growth branches and fruits is enhanced, the quality of the crop and its resistance to pests, diseases and winter are increased.

Dehorning basically consists of removing fruiting or vegetative branches, semi-skeletal or skeletal parts of the uppermost (tip) part of the branches. Removing the upper part of the growth point is usually considered a weak cut, when more than half of the branch has well-developed shoots or cutting a large part of the branch, it is a type of short cut or strong cut.

Strong pruning can be used only in special situations: when excessive branches have grown, when it is necessary to restore the branches together and it is impossible to achieve this by other methods, by cutting immature branches, or in order to ensure branching in a strictly specific order to give the tree a certain desired shape, individual branches or otherwise, it is necessary to carry out rejuvenating the whole tree branches, reducing the size of branches and other situations. In the options where rejuvenating pruning was used in a three-four year cycle to replace the branches that have produced fruit, the total number of growing branches decreased by 10-14% according to the varieties.

3 Results and Discussion

Table 1. Effects of pruning methods and levels on the amount and location of main growth branches in apple trees

Rejuvenating cutting options for growing branches that have produced fruit	Number of buds on remaining branches (pieces)	By tree levels			Number of main growing branches by tree levels
		Lower part, piece	Middle part, piece	Upper part, piece	
«Golden Delishes»					
Control	Not reducible	26	36	16	78
3-year cycle	4-8	11	22	8	47 55 60
	8-12	13	24	10	
	12-16	15	28	12	
	Not reducible	16	30	14	

4-year cycle	4-8	11	23	9	43
	8-12	13	25	11	49
	12-16	16	30	12	58
	Not reducible	21	35	17	68
«Renet Simirenko »					
Control	Not reducible	28	42	20	50
3-year cycle	4-8	14	20	11	45
	8-12	16	22	13	51
	12-16	18	25	15	58
	Not reducible	20	27	16	63
4-year cycle	4-8	15	21	12	48
	8-12	17	23	13	53
	12-16	19	26	16	61
	Not reducible	20	28	17	65
«Pervenets Samarkand»					
Control	Not reducible	23	35	17	75
3-year cycle	4-8	11	21	7	39
	8-12	12	22	9	43
	12-16	14	24	13	51
	Not reducible	16	26	15	57
4-year cycle	4-8	11	22	7	41
	8-12	13	24	9	46
	12-16	14	26	16	51
	Not reducible	17	27	16	60
NSR ₀₉₅					5.9
R%					4.1

The data in Table 1 above shows that the total number of growing branches by varieties decreased by 12-18% compared to the control in the variants, which were rejuvenated with a three-four-year cycle of replacement branches when cutting the bearing branches. It was observed that this reduction was mainly due to the cutting of old, fruit-bearing branches. The results of research show that when the productive branches are pruned, new, more young and productive branches are formed in their place.

In all options, where different pruning methods and levels were used for the 3 varieties under study, the location of the branches in the tree trunk along the layers is very convenient, and in the lower layer of the option that used rejuvenating and normalizing cutting methods and reduction levels with three to four cycles to replace the replacement branches. 32%, 58% in the middle layer and 10% in the upper layer of newly growing branches. In the control option, the growing branches were placed in the same amount along the tiers and the trunk of the tree, this indicator is much less comfortable compared to the tested options.

When using a standardized, replacement, rejuvenating method of pruning of fruiting branches on a three-year cycle, old, ineffective branches are cut and new, young, fast-growing fertile branches grow in their place, making it possible to obtain a high and quality harvest.

During the period of 2016-2022, during the application of the 3-4-year cyclic rejuvenating cutting method in the Golden Delishes, Renet Simirenko, Pervenets Samarkand varieties of apples studied in 2016-2022, it was determined from the research that when the main branches are rejuvenated every 3-4 years, it has a positive effect on its growth and development. and this is evident in the data of Table 1. During pruning, the number of primary branches that have yielded fruit was reduced by 8-51%, and biological and physiological processes were improved in all remaining branches, which led to an increase in productivity and an improvement in fruit quality.

It was also found that in 3 different apple varieties studied in the experiment, by rejuvenating the branches of the fruiting crop as a replacement every 3-4 years, conditions for the optimal growth and development of the apple tree are created, and the tree has constantly bearing branches, and it gives a high and quality harvest.

4 Conclusion

The length of the branches of the first order does not decrease by 0.9-7.1 cm compared to the control in the options where the method of rejuvenating and standard pruning is used instead of the branches that have yielded fruit according to the annual growth years, which is an optimal condition for the full growth of the apple tree and indicates the formation of crop elements in the branches.

In the process of cutting, leaving the trees as substitutes for 3-4 years and rejuvenating the yielding branches, the main yielding branches are 38-60 cm, and in the control option, 60-63 cm. This indicator decreased to 3.5-21% in the variant where different cutting methods and levels were used. Also, the growth of the main fruiting branches of 42-52 cm corresponds to the fruiting period of an apple tree, it was found that this indicator can be maintained when applying pruning methods and levels.

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