



## FORMATION AND YIELD OF FRUIT TREES IN INTENSIVE APPLE ORCHARDS

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Article history:	Abstract:
<b>Received:</b> January 11 <sup>th</sup> 2022 <b>Accepted:</b> February 11 <sup>th</sup> 2022 <b>Published:</b> March 30 <sup>th</sup> 2022	This article provides information on the yield, formation and yield of fruit trees in intensive apple orchards. In apple varieties, the optimum yield and yield quality was achieved by rejuvenating the branches for 3-4 years as a replacement, leaving 8-16 buds on the fruiting branches.
<b>Keywords:</b> Intensive gardening, apple varieties, stunted grafts, irrigation, cutting methods and levels, crop formation, yield, crop quality, efficiency.	

In intensive fruiting, the method of shortening the annual branches has a positive effect on the activation of physiological processes in the plant, resulting in a sharp increase in productivity and improvement of fruit quality as a result of normal growth and development processes. Continuing the effect of shortening the branches to different lengths gives good results in the growth of branches, skeletal branches, especially in the root system and changes in other elements, the thickening of the body, as well as the growth of leaf surface.

Even when a branch at the top of a tree is pruned vigorously, moderately, and even weakly, it improves the growth of the branches in the process of the beginning of fruiting and the addition of fruit to the crop, and lays the groundwork for the proliferation of fruit branches. Analogous ideas have been noted by a number of researchers in their studies [1,2,3,5,7].

The degree of shortening of young apple tree branches at different rates is one of the indicators that have a positive effect on the growth of annual wood mass. Excessive pruning measures enhance the growth of annual branches, but does not always provide an overall increase in growth in the trees. The method of shortening the branches of fruit trees in a weak or moderate manner provides better growth of them up to 31-10 cm compared to other pruning options, while in the strong pruning option the branches were longer.

Light passes 5-14 times less to the center of the tree tip than the periphery, which is said to significantly slow down the rate of photosynthesis.

The optimal lighting conditions for photosynthesis of apple tree leaves in intensive orchards are 50-65% of total solar radiation, where the top of the tree trunk does not fully provide light to many leaves, and light is a key factor in photosynthesis productivity [4,6,8,10,12].

In intensive orchards, the location of the leaves at the top of the trunk can vary depending on how well they are lit. The author found that a tree trunk with a height of 3 meters had a higher radiation velocity than a tree with a height of 0.5-2.0m. Regardless of the method of shortening the branches, the highest radiation activity was determined at a height of 0.8 m on the south side of the inner part of the apple tree crown, and the lowest - on the west side of the top of the trunk [9,11,13].

In general, a strong shortening allows a significant increase in vegetative mass, thickening the top of the tree, which negatively affects the transmission of sunlight to its center. Therefore, it is advisable to shorten the branches of fruit trees every year depending on the age, condition, navigation, biological characteristics of the tree, especially the method of strong shortening, which creates favorable conditions for photosynthesis in the leaves located inside the tree. improves light penetration.

Cutting the branches is a key measure in the regulation of growth and the formation of tree trunks. In addition, it serves as a key factor in the full functioning of the leaves during photosynthesis and in the regulation of branch lighting [14,15,16,17].

A number of studies have shown that when the branches of fruit trees are shortened at weak (long) or medium norms, the process of formation of plastic substances in them is found to be high. When the branches were strongly

(shortly) shortened, these figures were low. In order to more intensively regulate their growth process, it is possible to achieve low consumption of plastic substances in trees by short pruning of branches.

When the branches are cut long in the orchards that have entered the harvest, as before, the rejuvenating pruning measure retains its importance. The productivity of a garden largely depends on the efficiency of solar radiation per unit area and how it is used [18,19,20].

According to modern notion, an intensive orchard is a orchard with an early harvest, high quality and stable yields every year, maximum use of machinery, low production costs and low cost of crops. Also, the improvement of crop quality after pruning and the growth of twigs are clearly visible on old trees, the twigs are rejuvenated, which has a positive effect on next year's harvest.

In general, there is no doubt among researchers engaged in fruit growing that the method and extent of pruning in intensive orchards, the importance of determining the specific shape of the body of the apple tree. Given the biological characteristics of the combination of varieties and grafts and the level of agrotechnics, when and which cutting method should be used, which cutting method is preferred. Therefore, it can be said that giving scientifically based recommendations for the application and development of measures to rejuvenate, normalize, restrict the cutting requires a high level of special scientific experiments in specific conditions.

**Conditions, methods and object of research.** Scientific research was carried out in 2009-2014 at the farm "Amin Hayot Boghi" in Bukhara region, Bukhara district. The climate of Bukhara region is sharply continental, with an average of 125-175 mm per year. precipitation, the average air temperature is 26-300S. Winters are dry and cold, with average temperatures in January ranging from 4.00S to -130S. The average relative humidity is 40-60%. The soil of Bukhara region is composed of 56.9% of clayey, heavy and loamy soils, which are mainly irrigated. Of the total irrigated area, light loam soils occupy 35.6%, desert and sandy soils 75%, layers 0-125 cm and 200-250 cm are combined with medium loam soils, and layers 125-200 cm - heavy soils. The volumetric weight of soils is 1.40g / cm<sup>3</sup> in the 0-70cm layer and 1.32g / cm<sup>3</sup> in the 0-100cm layer.

The main goal of the research is to ensure the sustainable and continuous increase of fruit yield in serum intensive orchards, increase the efficiency of high and quality fruiting by applying the most effective rejuvenating periodic pruning method and levels on the branches, as well as studying the reduction rates on the remaining yielding branches. and recommend production to the most positive results obtained.

The following tasks will be performed to positively address the set goals:

- To study the main indicators of growth and yield of trees depending on the method and level of pruning on growing branches;
- Determination of light and pure photosynthetic productivity in the trunk depending on the method and level of pruning;
- To determine the characteristics of the formation and location of generative organs in tree branches, as well as the quality of fruits and berries.

In agrochemical analysis, humus content in ancient irrigated meadow soils was 0.8-1.4%, nitrogen 0.06-0.12%, total phosphorus 0.1-0.18% and potassium 1.22-1.45%. Groundwater is located at a depth of 2.5-2.7 meters.

**Object of research.** The object of study is the apple varieties Pervenets Samarkanda, Renet Simirenko and Golden Delishes, which differ from each other by three different biological properties. The weld is a medium-growing MM-106 weld. Apple seedlings were planted in 1977 and placed in a 6x4m scheme. The branches of the tree are shaped in a semi-sparse manner. Irrigated 4-5 times a year, at a rate of 750-850m<sup>3</sup> / ha.

**Experimental system.** In order to study the methods and levels of pruning of branches located on apple tree varieties, a scientific experiment was conducted in the field.

**Table -1**

Options for applying rejuvenating pruning method on growing branches that have already yielded	The amount of fruit-bearing buds left, pcs
Recommended cutting method used in production conditions (control)	Without abbreviations
Rejuvenating cutting method on 3-year cyclic rotation	4-8 8-12 12-16 without abbreviations
Rejuvenating cutting method on 4-year cyclic rotation	4-8 8-12 12-16 without abbreviations

In the experiment, the determination of the degree of pruning and shortening of fruiting branches on three- and four-year cyclic alternation of the rejuvenating pruning method in yielding growing branches was studied, and the options on returns were placed by randomization.

Experimental methods: generally accepted manuals on apple varieties studied during the experiment, calculations and methods developed by the All-Union Research Institute of Horticulture (1982) to study the phytometric characteristics of the apple tree, light and photosynthesis productivity, as well as productivity and its quality. Calculations were made on the study of the surface parts of apple trees by varieties - the thickness of the

stem body, the growth of average and total annual branches, the size of the branches. Factors determining the yield of apples in fruit orchards, including intensive orchards, along with the biological characteristics of the variety, include the age of the trees, agro-technical measures, soil and climatic conditions, method of pruning and shaping and application.

Nowadays, intensive orchards are said to be orchards where the trees start to bear fruit early, produce high and consistently high quality crops, use the machinery efficiently and reduce production costs, and the recognized cost of the crops grown is low.

It shows that the productivity of the garden depends not only on the productivity of each tree, but also on the level of its use, depending on how the tree trunk is located in the garden [26,27,28,29,30].

When pruning methods and levels are used on older trees, it improves their overall condition, reduces the number of excess flower buds, significantly increases productivity, and improves fruit quality [21,22,23,24,25].

The use of methods and levels of effective pruning of tree trunks in intensive diamonds creates a favorable environment for the emergence and active growth of generative organs. The annual length of the branches is 40-60 cm, the average yield is 84.0-191.0 ts / ha.

Table 2.

Rejuvenating pruning options on yielding growing branches	Number of buds on left branches (pieces)	Productivity, t / ha				
		2007	2008	2009	2010	average
Golden Delishes navi						
Control		13.2	14.7	15.9	16.8	15.1
Cutting with a three-year periodicity of replacement	4-8	15.1	16.3	18.2	19.3	17.3
	8-12	15.9	17.5	19.3	20.5	18.3
	12-16	16.5	18.7	20.1	21.2	19.1
	will not be shortened	14.7	15.9	16.4	17.5	17.4
Cutting with a four-year periodicity of replacement	4-8	14.5	15.2	17.3	18.0	16.4
	8-12	15.0	15.9	18.5	19.2	17.1
	12-16	15.4	16.7	19.2	20.5	18.0
	will not be shortened	13.9	14.2	15.8	16.8	15.2
Renet Simirenko navi						
Control	4-8	12.3	3.2	14.1	5.0	8.4
Cutting with a three-year periodicity of replacement	8-12	14.0	5.1	17.0	8.3	11.1
	12-16	14.9	6.0	17.8	8.5	11.8
	will not be shortened	15.3	7.2	18.5	9.0	11.7
		13.0	4.8	15.2	7.0	10.0
Cutting with a four-year periodicity of replacement	4-8	13.2	4.6	16.0	7.4	10.3
	8-12	14.0	5.3	16.6	8.0	11.0
	12-16	14.6	6.5	17.2	8.6	11.7
	will not be shortened	12.8	4.0	15.0	6.2	9.5
Pervenets Samarkanda navi						
Control		12.9	14.0	14.8	15.9	14.4
Cutting with a three-year periodicity of replacement	4-8	14.6	15.2	17.0	18.0	16.2
	8-12	15.0	15.5	17.8	18.5	16.7
	12-16	15.6	16.5	18.5	19.2	17.5
	will not be shortened	13.6	15.0	15.8	16.5	15.2
Cutting with a four-year periodicity of replacement	4-8	14.2	15.0	16.2	17.2	15.6
	8-12	14.8	15.2	17.0	18.0	16.2
	12-16	13.3	16.0	18.0	18.8	16.9
	will not be shortened	13.2	14.8	15.8	16.2	15.0
Nsr095		1.5			2.0	2.1
R.%		3.0			4.0	4.2

Influence of cutting methods and levels on apple yield.

Thus, in the studied varieties, the percentage of useful pollination was high in the cut variants, leaving 4-8, 8-12 and 12-16 fruit buds on the three- to four-year-old branches on a cyclical basis in order to rejuvenate the yielding and growing branches, fruit shedding decreased.

## CONCLUSION.

Rejuvenation of yielding branches as a successor and shortening by leaving crop buds on fruiting branches, improved light in the conducted variants, increased photosynthetic productivity, increased leaf number and surface area, resulting in increased productivity.

The above data show that the average yield during the years of the study was 0.1-4.0 ts / s in the Golden Delishes variety and 0.9 in the Renet Simirenko variety when the branches yielding average yields were rejuvenated on a 3-4 year cycle and left with 4 to 16 fruiting buds on the fruiting branches. -3.5 ts / ha, Pervenets Samarkandda variety yielded 0.6-3.1 ts / ha more than the control variant. The best results were obtained in the variants, which left 8–16 fruiting buds on the fruiting branches on the background of 3–4-year rejuvenation of fruiting branches.

The method of rejuvenating the growing branches in a 3-4-year cycle and cutting 4-16 buds on the fruit-bearing branches has a positive effect on the growth and development of the apple tree and the formation of yield elements, resulting in increased yields and improved product quality. In the studied cutting variants (2009-2014), the average weight of one apple increased to 41-56g in the Golden Delishes variety, 16-35g in the Renet Simirenko variety and 35-49g in the Pervenets Samarkand variety compared to the control variant, and high economic efficiency was achieved.

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