

The peculiarities of the development of apple varieties on the mm-106 weak tree stock depending on the ways of crown formation

Normurotov Ilkhom Turgunovich

Independent researcher, Candidate of Agricultural Sciences,
Department of Fruit Growing and Viticulture,
Tashkent State Agrarian University
E-mail: alp.lentinus@yandex.ru

Abstract: *The scientific paper presents experimental material which contains a study of the rootstock and ways of the formation of Renet Simirenko and Golden Delicious apple tree varieties during planting and fruiting, total productivity and quality of fruits.*

The research revealed the advantage of forming the crowns in the form of freely growing palms in comparison with rare and longlined crown.

Key Words: *Sort (variety), rootstock, scheme (pattern), location, stem, branch skeleton, growth, crop, fruit.*

1. INTRODUCTION:

In the farms of the republic, the crown of apple trees are very often formed on medium – tall, vegetative – sheltered trunks as when cultivated on vigorously grown seed substrates. This will lead to the low yield of the gardens of an intensive type of plant [1, 2].

In the modern industrial gardens intensive plants on low – growth stocks are planted with high density per unit area. For production it is important to know how the shape of the crown and the type of rootstock affect on the habitus of crown development and plant productivity [3,4,5].

2. MATERIALS AND METHODS:

On the experimental scientific research station of the Tashkent State Agrarian University in 2010-2017 years a research was conducted with the Renet Simirenko and Delicious apple varieties grafted on tree stock MM-106.

The experiment was held according to the following scheme:

1. Rare and long-lined crown with shortening of the annual increments of shoots.
2. The same type of crown without shortening the annual increments of shoots.
3. Freely growing palmette.
4. The same type of crown with the bending of the crown branches

Each variant of the experiment as experienced trees was planted ten typical trees. Test repetitions are four times.

Planted trees in the garden began to form in the spring of 2011. In the trees with rare and long-lined crown during four years made three lines having formed eight skeletal branches: the first (lower) left three- four lines, and next two made two-three through 70-80 cm. Annual increments was shortened in accordance with the current farming regulations.

Crowns with a rare and long -lined arrangement of branches without shortening annual increments were usually used to thin out shoots, cutting out rival shoots in the branches and those which were directed into-the crown.

When creating a palmette with inclined branches annual ones were cut in 70-75 cm so that trunks made a 55-60cm height.

From the shoots of those growing in the first year were chosen the two best, located on the surface of rows and one of them for central branch conductor. In the recent years on the central branches were laid another two lines with two branches in each.

The space between lines is a meter, the angle of the branches bending in the first line is 45-50; the following is 55-60. The shoots of the continuation of the main branches were not shortened, their rivals and adipies growing on the upper side of the skeletal branches that thickened the crown were removed. The branches growing on the trunk toward the aisle were cut off over a weak lateral branch or generative bud, and strong (uncontrolled) branches were removed.

When forming a freely growing palmette everything was done in the same way as in the formation of palmettes with inclined branches but it was allowable that the formation of a lower stem strictly did not maintain the accepted distances between the lines of skeletal branches, selecting the best in the plane of the row no matter how far away from the lower tier. Skeletal and semi-skeletal branches with an increase in yield and an increase in the thickening of the crown were shortened or completely eliminated during thinning. While pruning the tree, rivals of the main branches were removed, thickened places were thinned out.

3. RESULTS AND DISCUSSIONS:

Measurements of growth in annual shoots have shown that the methods are spared by the growth of the apple tree. If in the first two years after the planting shoot was almost equal, in the third years further it would be large in trees with rare and long-lined crown with shortening of growth and smaller palmette formations of the crown without shortening the increments.

The same regularity took place along the length of annual increments. On average, in five years of research, the growth of shoots on trees with a rare-longlined crown with a shortening of growth was 88-92 cm, and with palmette crowns only 72-78 cm. The shoots with a rare longlined crown had a shorter length of shoots without shortening the annual increments. This is due to the fact that during the formation period, annual shoots on trees with palmette crowns were not shortened, and with sparse-tiered, most were cut to a third or a quarter of the length, which influenced the redistribution of water and nutrients between the remaining growth points. In addition, on trees with palmettic crowns, the skeletal branches were deflected, which also affected the growth of shoots and a decrease in the growth of the diameter of the stem.

The comparison of the growth of the stem and the length of annual shoots of trees with a freely growing palmette with indices of palmettes with inclined branches shows that this apple index regardless of shape of the crown, was approximately the same. With a rare-longlined method without annual shortening of branches, the growth of the diameter of the stem was smaller, the annual increments are shorter, since it is the shortening that stimulates the growth processes (Table 1).

The third year apple trees blossomed for the first time and produced a low yield.

The methods of formation of crowns had a significant effect on the yield and commercial quality of fruits. The yield of the trees that form shape of palmette was higher than rare-longlined crown had with the annual shortening of increments was applied while creating it.

This pattern is maintained in the second and subsequent years although the harvest from the tree will significantly increase with all types of formation. Annual shortening of annual growths significantly reduced the yield of apple trees in the first years of fruiting. According to Renet Simirenko, from the tree, which was shortened every year, thied generation and vegetation were harvested. 3,6 kg, and without shortening 10,7 kg as much as with the palmetto crown. This pattern has been preserved in the future.

Table 1

Influence of the methods of apple tree crown formation on the medium-grown tree stock MM106 on shoot growth and yield, 2013-2015

Variants of tests	Counts and observations				
	Sum of annual increments of shoots	Medium length of annual increments of shoots	Mass of fruit (gr)	Crops of tree (kg)	Medium yield (c/ra)
<i>A Sort of Renet Simirenko</i>					
Rare and longlined crown with shortening the annual increments of shoots	10,5	84	150,7	12,2	93,6
Also without shortening the increments of shoots	9,3	62	129,3	28,3	128,3
Freely growing palmette	9,3	70	126,6	22,0	184,2
Palmette with bending branches	9,6	71	127,9	23,3	64,7
<i>A Sort of Golden Delicious</i>					
Rare and longlined crown with shortening the annual increments of shoots	9,6	86	181,3	7,5	88,7
Also without shortening the increments of shoots	8,8	74	167,1	9,7	97,9
Freely growing palmette	9,0	73	160,3	5,6	129,4
Palmette with bending branches	9,1	72	166,4	6,3	132,6
Sx, c/ha			5,2	1,2	1,5

The productivity of trees formed according to palmette system is very similar to that of the rare and longlined crown without shortening the growth of the young trees of apple it indicates that the yield of apple trees are not depends on the form of the crown and the characters are responsible for the ratio of the core and generative processes associated with this accumulation of photo synthetic products.

In a palmette garden, from an area unit a much more fruit was obtained than in plantations with a spherical rare-longlined crown. It is important for production, that the palmette formation makes it possible without significantly light degrading – therefore, without reducing the effect of photosynthesis; each hectare of the garden should accommodate a significantly larger number of trees than plantings with spherical crowns [1].

The comparison of the yields of young trees formed in the shape of a palmette with bending branches and freely growing, shows that at the beginning of fruiting there is no noticeable difference between them in the Renet Simirenko variety. Concerning the Delicious variety the differences between them were more clearly seen in favor of free-growing palmettes.

So the formation of the crown affects on the productivity of the plantations for a short time which makes it possible to apply production conditions to a less labor-intensive free-growing palm tree and growing apple trees on medium – sized stock.

Taking into account the mass of fruit shows that the trees with rare-longlined crowns with shortening on annual increments the fruits in trees form somewhat larger, are less colored and less sugary than on trees of the same formation, but without shortening increments and in trees with palmette crowns. This is explained by the fact that the fruit on the tree with an annual shortening of increments is smaller and they are in the worst lighting conditions.

The advantage of tree productivity with freely growing palmette in comparison with rare long-lined crown in the experiment was 1.5-1.9 times. This was achieved in the experiment mainly due to the greater density of trees in the areas of the freely growing palmette – 500 c /ha, with rare longlined crown with 238 pieces /ha.

4. CONCLUSION:

The central conductor of a one-year-old seedling must be cut out at a height of 70-50sm when creating palmette trees with bending branches. From the shoots that grew up in the first year two well – developed ones located in the plane of the row and one for the central conductor should be left, where two more lines of two branches in each are laid.

The formation of a freely growing palmette tree should include: the creation of a lower stem with a height of 40 – 45 cm. To do this, the central stem of the seedling should be cut at a height of 60-65 cm in the year of planting in the garden. The best branches selected in the tiers which are arranged along the row.

Skeletal and semi skeletal branches competitors with an increase in yield and the den sing crowns are shortened, and if necessary removed.

In a palmette garden for 4-5 years of vegetation, from a unit of a garden area, it is possible to obtain a crop that exceeds the plants formed by the rare-longlined system at 1,9 times from 129-132 centers/ha with a good commercial qualified fruits.

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