



## Productivity Of Intensive Varieties In Apple Trees Depends On Density Of Trees In Orchards

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### ABSTRACT

In this article, the productivity of intensive apple varieties was studied, grafting on vegetatively propagated medium-sized stock MM - 106 Golden Delicious and Korey. In a long-term watering experience, it was revealed that in the optimal planting scheme of  $6 \times 4$ , the yield of apple fruits increased by 12-15%, the quality of apple fruits improved significantly.

### KEYWORDS

Intensive orchards, apple trees, semi-dwarf trees, trunk circumference, average shoot length, crown size, yield, fruit weight.

### INTRODUCTION

The soil climatic and natural conditions of Uzbekistan, in particular the Bukhara region fully allow the cultivation of high-quality

varieties of apple fruits with good taste in intensive gardens (5.6.7)

At the same time, the development of intensive horticulture using semi-dwarf trees grafted on a medium-sized rootstock MM-106 is profitable and dramatically affects the development of the intensive horticulture industry, when a high-yielding apple variety is cultivated, like Golden Delicious from Korea. Therefore, when creating large industrial plantings, it is necessary to use scientifically based recommendations for the cultivation of apple trees in intensive orchards, in particular highly profitable varieties. And here one of the main agrotechnical issues is the choice of the optimal scheme for placing trees in an apple orchard, on which the durability and productivity of orchards directly depends in many ways (1.2.3.4). For this purpose, we have carried out long-term experiments on the irrigated lands of the experimental fruit-growing state farm, the city of Bukhara. The orchard was planted in 2013 with annual apple seedlings, Golden Delicious and Korey, grafted on a medium-sized rootstock MM-106. The type of soil is old irrigated aluvial meadow soils, poorly washed out, and with a heavy texture. In the arable horizon, the humus content ranges from 0.8-1.2%, sunny days last up to 240 days, the average temperature is 26-30 °C. The hottest days are observed in summer, where daytime temperatures range from 38 °C to 45.5 °C. The winters are cold and dry. In January, the average temperature is -4 °C to 13 °C. The average relative humidity is 40-60%. During the growing season, 5-6 furrow irrigations are carried out with an irrigation rate of 600-800 m / ha, while the reflective rate is 3000-4800 m / ha per year.

## THE MAIN FINDINGS AND RESULTS

In this payment, from 2013 to 2020, the following tree planting schemes were tested with the following schemes. The width between the rows is 6.0 m, the distance between the trees is 3.5, 4.0 m, 4.5 m, and 5.0 m. The control options are the 5.0 × 3.5m landing pattern. The experiment was repeated three times. There are 4 rows in the division, of which 2 are internal accounting. Trees are formed in the form of a volumetric crown with minimal pruning during the formation period. With the arrival at the time of mass fruiting, the growth of trees will slow down to a certain extent. In our experience carried out. The observation showed that up to the age of three, the influence of the placement scheme on the thickening of the stem was not revealed, i.e. in all variants of the experiment, the trees had approximately the same trunk size.

From the fifth year after planting (2017), there is a tendency to a decrease in the thickness of the trunk as the density of tree planting increases. Significant differences in stem thickness have been observed since the age of six trees (2018). Table 1 shows the data on the diameter of the stem of the Golden Delicious and Korean apple trees, depending on the planting density. Apple tree stem diameter depending on planting density, cm.

**Table 1**

Landing scheme, m	2015y.	2016y.	2017y.	2018y.	2019y.	2020y.
<b>Golden Delicious variety</b>						
6,×3,5	4,0	6,58	7,8	10,6	11,5	11,8
6,×4,0	4,8	7,0	9,1	11,0	12,0	13,0
6×4,5	4,6	6,8	8,1	9,8	11,8	12,1
6×5,0	,5	6,7	8,2	9,9	11,9	12,2
<b>Variety Korey</b>						
6×3,5	5,0	7,0	9,4	11,0	12,2	12,4
6×4,0	5,8	7,7	10,0	12,0	12,8	13,6
6×4,5	6,3	7,2	9,8	11,6	12,2	12,6
6×5,0	6,5	7,3	9,9	11,8	12,3	12,8

During the period of performance, the gardens were based on the annual growth of shoots, from the analysis of which the influence of planting density on the average length of annual shoots is clearly traced.

Before the appearance of trees at the time of mass fruiting (2015-2019), a strong growth of shoots was observed, with its preservation lowered in subsequent fruitful years.

**Table 2**

Crown diameter of apple trees depending on planting density, m.

Landing scheme, m	2015y.	2016y.	2017y.	2018y.	2019y.	2020y.
<b>Golden Delicious variety</b>						
6×3,5	1,1	1,6	2,1	3,0	3,0	3,7
6×4,0	1,6	2,0	2,34	3,3	3,2	3,8
6×4,5	1,3	1,8	2,3	3,0	3,1	3,9
6×5,0	1,4	2,0	2,2	3,2	3,3	4,0
<b>Variety Korey</b>						
6×3,5	1,0	1,3	2,0	2,6	2,9	3,5
6×4,0	1,5	1,8	2,2	2,7	3,1	3,5
6×4,5	1,2	1,7	2,1	2,5	3,0	3,7
6×5,0	1,3	1,8	2,0	2,6	3,1	3,8

Table 2 shows that during the period when the apple orchard entered the period of fruiting of tree crowns in a row in neglected variants, starting from 2018, the diameter of the crown of apple trees gradually decreased depending on the planting density, but differed slightly.

Placing trees at different distances in a row, having said the influence on the growth of their aboveground part, affected the size of the crop and its quality (table 4)

**Table 4**

Influence of tree planting density on the yield of apple trees, c / ha

Landing scheme, m	2015y.	2016y.	2017y.	2018y.	2019y.	2020y.
<b>Golden Delicious variety</b>						
6×3,5	20,7	45,7	65,0	138,0	162,0	178,0
6×4,0	23,6	50,4	69,0	140,0	165,0	186,6
6×4,5	23,5	48,2	67,0	132,2	163,0	183,6
6×5,0	23,0	48,6	67,4	139,0	163,2	180,2
<b>Variety Korey</b>						
6×3,5	21,6	46,8	67,0	141,0	165,0	183,0
6×4,0	25,4	56,0	74,0	152,0	171,0	192,0
6×4,5	24,2	52,2	71,2	146,0	168,0	185,4
6×5,0	24,8	53,0	71,4	146,5	169,2	184,0
H cP 05						6,0
P, %						2,7

The data in the table indicate that the trees began to bear fruit from the third year after planting (2015). With the onset of mass

fruiting (2019 and subsequent years), a significant decrease in the productivity of trees in more dense plantings was noted, i.e.

there is a pattern with an increase in planting density, a decrease in tree yield over the past four years from 2016-2019.

In 2019-2020, the yield in all distribution schemes has increased significantly and ranges from 162.0-192.0 c / ha.

The difference in planting density, having an effect on the growth and productivity of trees, also influenced the average weight of fruits (table 5).

**Table 5**

Average weight of apple fruits depending on the tree planting scheme (y)

Landing scheme, m	2016y.	2017y.	2018y.	2019y.	2020y.	Average for 2016-2020
<b>Golden Delicious variety</b>						
6×3,5	210	130	105	98	120	106
6×4,0	218	140	117	105	122	132
6×4,5	212	136	110	102	124	128
6×5,0	211	131	112	101	125	121
<b>Variety Korey</b>						
6×3,5	218	141	113	100	120	
6×4,0	221	141	114	104	122	
6×4,5	215	138	105	103	122	
6×5,0	210	130	106	102	123	

Carrying out the data in table 5 indicate that the size of the fruit directly depends on the density of tree planting. The average weight of one fruit is much less in variants with a denser arrangement of trees, m at 6x3.5 and 6x4.0 m.

## CONCLUSION

As the planting density of apple trees increases, there is a steady decrease in the size of the stem, the volume of the crown, an increase in shoots, these indicators deteriorate especially sharply when placing trees over 500 pcs / ha.

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