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## INFLUENCE OF PLANTING SPACING OF APPLE CLONAL ROOTSTOCKS MOTHER PLANTS IN STOOLBED ON THE AMOUNT OF STANDARD ROOTED SHOOTS

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The article presents the results of three-year studies of the effect of compacted planting of mother plants of different apple clonal rootstocks on the amount of standard rooted shoots in the conditions of the western forest-steppe of Ukraine.

Apple is the main fruit crop in Ukraine. Its significant popularity is due to its high adaptive abilities, which allow growing of this crop in different climatic conditions of Ukraine. Modern intensive technologies of apple production are based on usage of dwarfing clonal apple rootstocks, which makes it possible to create fast-growing, highly productive plantings with a high density of trees. Demand for high-quality clonal rootstocks is constantly increasing [1].

To obtain a large number of standard rooted shoots from the mother plantation we must use a highly productive types of rootstocks and more efficient methods of their propagaion. Therefore, the development and implementation of the most promising and cost-effective methods of their propagaion is especially important [2].

Scientists at the Donetsk Experimental Nursery Station (Ukraine) studied the compacted planting patterns of apple clonal rootstocks 1.0 x 0.25 m, 0.45 x 0.2 m and 0.45 x 0.2-0.15 m and some results seemed to be promising [3].

Similar studies were carried out by K.G. Karychev In Kazakhstan. In Belarus, V.A. Samus studied various planting pattern for the placement of rootstocks in a stoolbed: 1.4 x 0.3 m, 1.2 x 0.3 m, 0.8 x 0.2 m and 0.4 x 0.1 m. In Russia, L.G. Trushnikov dealt with the issue of more compact planting for apple clonal rootstocks stoolbeds (Kirov Agricultural Institute) as well as Savin E.Z. (Orenburg Agrarian University) and Sedov A.E. (S.-Kh. Academy named after Timiryazev). All of them admitted that a greater compaction of mother plantations allows obtaining a higher ammount of rooted shoots but different rootstocks types shows different results in various places. With proper cultivation and propagation techniques, the quality of the cuttings does not deteriorate.

In order to study the effect of compacted planting of apple rootstocks mother plants in stoolbeds on amount of standard rooted shoots we studied 9 types of rootstocks: M.9, M.26 and MM.106 (England); 62-396, 54-118, 57-490 (Russia Michurinsk State Agrarian University), Don 70-456, D 70-49, D 69-135 (Russia, Don Zonal Research Institute of Agriculture). The trials with different apple clonal rootstock planting spacing were made in stoolbed with vertical method of propagation, established in 2012. Tested spacing were 1.5 x 0.3 m (standard), 1.2 x 0.2 m, 0.8 x 0.2 m and 0.4 x 0.12 m. The test plots were situated on the test field of HortDept of Lviv NAU in condition of Western Ukraine on semi-clay light grey soil (pH=6,2), humus content in the soil layer of 0-40 cm - 1.79%. The area was not irrigated.

The study object was apple clonal rootstocks productivity depending on planting spacing of mother plants in stoolbed. All measurements were done on the obtained rooted shoots (Table 1).

Analyzing the three-year results of studying the productivity of mother plants of clonal rootstocks of apple trees, planted at compacted patterns it can be concluded that different forms, with different planting schemes, belonged to one of the groups, in which the percentage of standard layering gradually increases with the degree of compaction. This group included rootstock type M.9, in which this index in the control variant was 34.5% and rised up to 63.8%, respectively, with the more dence spacing 0.4 x 0.12 m. In other group the highest percentage of standard rooted shoots was only in the variant with planting pattern 1.2 x 0.2 m and decreased with further compaction. This group of rootstocks includes forms 62-396 - 83.2%, D 70-456 - 89.4%, D 70-49 - 67.8%, Don 69-135 - 74.1%, 54-118 - 70, 8% and 57-490 - 74.5%.

Estimating productivity by the number of standard rooted shoots per hectare, two groups of rootstocks can be distinguished. In the first, productivity increased in proportion to the number of planted mother bushes such as M.9, 62-396, D 70-456, D 70-49, D 69-135, M.26, 54-118, MM.106.

Table 1

**Rootstocks productivity depending on stoolbed planting spacing,  
thous. per hectare**

Rootstock	Stoolbed planting spacing							
	1,5 x 0,3 m (standard)		1,2 x 0,2 m		0,8 x 0,2 m		0,4 x 0,12 m	
	Total rootstocks productivity	% of standard rootstocks	Total rootstocks productivity	% of standard rootstocks	Total rootstocks productivity	% of standard rootstocks	Total rootstocks productivity	% of standard rootstocks
M.9	64,4	34,5	129,2	44,9	262,6	46,7	625,0	63,8
62-396	168,9	78,4	370,8	83,2	443,9	74,7	1041,7	69,4
D 70-456	224,6	77,6	529,2	89,4	618,8	64,4	854,2	68,3
D70-49	173,3	62,9	325,0	67,8	400,2	59,8	541,7	46,3
D 69-135	166,7	70,8	333,3	74,1	425,2	72,3	583,3	49,1
M.26	66,7	43,5	133,3	40,5	243,8	46,4	479,2	46,0
54-118	171,1	64,2	333,3	70,8	456,3	60,8	854,2	61,2
MM.106	157,0	61,7	300,0	68,6	425,1	76,4	770,8	48,7
57-490	213,5	72,8	512,5	74,5	600,1	69,1	562,5	48,2

The second group includes form 57-490, the highest level of productivity of which was not at maximum compaction, but at a planting spacing of 0.8 x 0.2 m with average productivity around 600.1 thous. pcs / ha.

To achieve highest productivity of well rooted shoots of clonal rootstocks with rootstocks types M.9, D 70-456, D 70-49, 62-396, D 69-135, M 26, 54-118 and MM. 106 it is reccomended planting spacing 0.4 x 0.12 m and for rootstock type 57-490 - it is reccomended planting spacing 0.8 x 0.2 m.

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