THE GROWTH INDICES APPLE TREES IN „V" SYSTEM ORCHARD

INDICATORII DE CREŞTERE A POMILOR DE MĂR ÎN PLANTAŢIA CU CORONAMENTUL ÎN DOUĂ PLANURI OBLICE

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Abstract. *The productivity of an orchard depends in part on how well it collects sunlight. One system that achieves the goal of accelerated planting density without inhibiting canopy light penetration is the „V" system. A trial was established in the spring of 2004, one-year-old scab-resistant apple cultivars grafted on dwarfing M.9 rootstock, were planted in the Experimental Station "Criuleni" in central Republic of Moldova. Apple trees of the cultivar Generos and Florina were trained different crown, with trees leaned to 40^0 from vertical, each in an alternate direction down the row ("V" system). The higher value indices was obtained in the variant were trees was planted two in one place and angle of approximately 40^0 from vertical.*

Rezumat. *Gradul de captarea a radiaţiei solare are o influenţă majoră la productivitatea plantaţiei pomicole. O structură care ar asigura o accelerare a densităţii pomicole şi nu ar inhiba penetrarea luminii in coronament este structura plantaţiei cu coronamentul în două planuri oblice. Lotul experimental a fost înfiinţat în centrul Republicii Moldova la Staţiunea Didactică Experimentală „Criuleni" în primăvara anului 2004, cu pomi de măr în vârstă de un an, soiurile au o rezistenţă genetică la rapăn şi sunt altoite pe portaltoiul de vigoare slabă M9. Pomii de soiurile Generos şi Florina au fost conduşi după diferite forme de coroană, fiind înclinaţi la 40^0 faţă de verticală în direcţia intervalelor dintre rânduri formând un gard fructifer în formă de „V".*

Cea mai mare valoare a indicatorilor de creştere la o unitate de suprafaţă, a fost obţinută în varianta unde pomii au fost plantaţi doi într-o groapă, unghiul de înclinare al pomilor de la verticală fiind de circa 40^0.

Light intensity is a critical factor in yield and fruit quality. It is possible to provide trees with adequate water and mineral nutrients even in super-densely planted orchards. In young orchards which are planted moderately densely, light interception is insufficient, which reduces yield. In densely planted orchards, 60-70% of the light reaching the canopies is intercepted within two or three years after establishing the orchard. The must interception, of light intensity, in open canopy or V system orchards (*Buler Z. et al., 2004; Czynczyk A. et. al. 2004; Robinson T.L., 2005)*. In our country, with advanced fruit growing, in various it is soil - climatic conditions, researches and formations of trees have shown the studying of new systems of accommodation lead with the purpose, that efficiency of gardens increases proportionally to increase in number of plants at units of the area, most dwarf and semi-dwarf apples trees are trained as spindles *(Cimpoieş Gh. 2000, Babuc V. 2000, Pe□teanu A. 2007)*. Many tree-training methods have recently

been modified with attention to tree planting density, light intensity patterns in the orchard and fruit quality (*Cimpoieş Gh. 2000).*

Recent studies have shown that trees planted and trained at an angle have higher growth indices and better light interception at scab-resistant apple cultivars Generos and Florina grafted on dwarfing M.9 rootstock, in central Republic of Moldova

MATERIALS AND METHODS

The experiment was conducted at the Experimental Station "Criuleni" in central Republic of Moldova. Apples trees of the cultivars Generos and Florina grafted on dwarfing M.9 rootstock, was planted in spring 2004. The trees rows were aligned north-south.

The experiment was designed as a randomized block with three replicates. Each plot consisted of ten trees. The site was drip irrigated.

The experiment plots was divided in 5 variants:

- 1 variant (control) - one-line with vertical accommodation of trees and their formation as spindle. The scheme of planting 4 x 1,5 m (1666 trees per ha);
- 2 variant - two-plane V - figurative with formation of trees as a spindle and their inclination under a corner 60^0 in the opposite sides. The scheme of planting 4,5 x 1 m (2222 trees per ha);
- 3 variant - two-plane V - figurative with formation of trees as palmet system (central lider) and their inclination under a corner 60^0 in the opposite sides. The scheme of planting 4,5 x 1 m. (2222 trees per ha);
- 4 variant - two-plane V - figurative with formation of trees as palmet system (central lider), two trees in one place and an inclination in the opposite sides under a corner 60^0. The scheme of planting 4,5 x 1 m (4444 trees per ha);
- 5 variant - two-plane V - figurative with formation of trees on system Tatura. The scheme of planting 4,5 x 1 m (2222 trees per ha).

RESULTS AND DISCUSSIONS

The analysis of the received results shows, that the design of plantings has rendered essential influence on parameters of crones of trees. The greatest height on both grades was reached with a plant in the control (tab.1) where trees had vertical position. However if a difference in height by variants made within the limits of 10 - 50 cm values of diameter of a crone, especially top part made 150 - 170 cm that is connected with design features of crones in variants 2 - 5 where two adjacent trees are inclined in the opposite sides. Such system of accommodation promotes increase in density of planting of trees in 2,6 times in comparison with the control and allows to land on 1 hectares up to 4444 trees without damage of their light exposure.

The high density of planting promotes also to more intensive accumulation vegetative-growth at young age. So the area of a sheet surface of a grade of the Florina has made in 4-th variant 6800 m^2 per ha while in the control the given parameter was in 2,5 times below and 2700 m^2 per ha has made all.

Table 1

The growth indices and parameters of crown an apple-tree

Variants	Parameters of a crone			The leaf area, m^2/ha	The Lateral surface m^2/ha	Productive volume of a crone , m^3/ha
	Height of a tree, m	Diameter of a crone, m				
		At bases.	In top			
Generos						
Variant 1(c)	2,60	1,45	0,30	2483	9996	2615
Variant 2	2,20	1,75	2,00	3650	13800	3325
Variant 3	2,50	0,50	2,00	3300	13350	3600
Variant 4	2,50	1,50	2,00	6500	18200	4400
Variant 5	2,10	0,50	1,80	3175	9950	3325
Florina						
Variant1 (c)	2,70	1,50	0,35	2716	10635	2809
Variant 2	2,40	1,80	2,00	3975	14560	3525
Variant 3	2,60	1,70	2,00	3825	14500	3894
Variant 4	2,60	1,80	2,00	6800	19130	4670
Variant 5	2,40	0,70	1,50	2400	10780	3614

Two-plane designs not only promote accumulation of a lot of a sheet surface, but also their productive work. So the lateral surface and productive volume of a crone in V - figurative designs were on 25,2 - 55,1 % above than in the control.

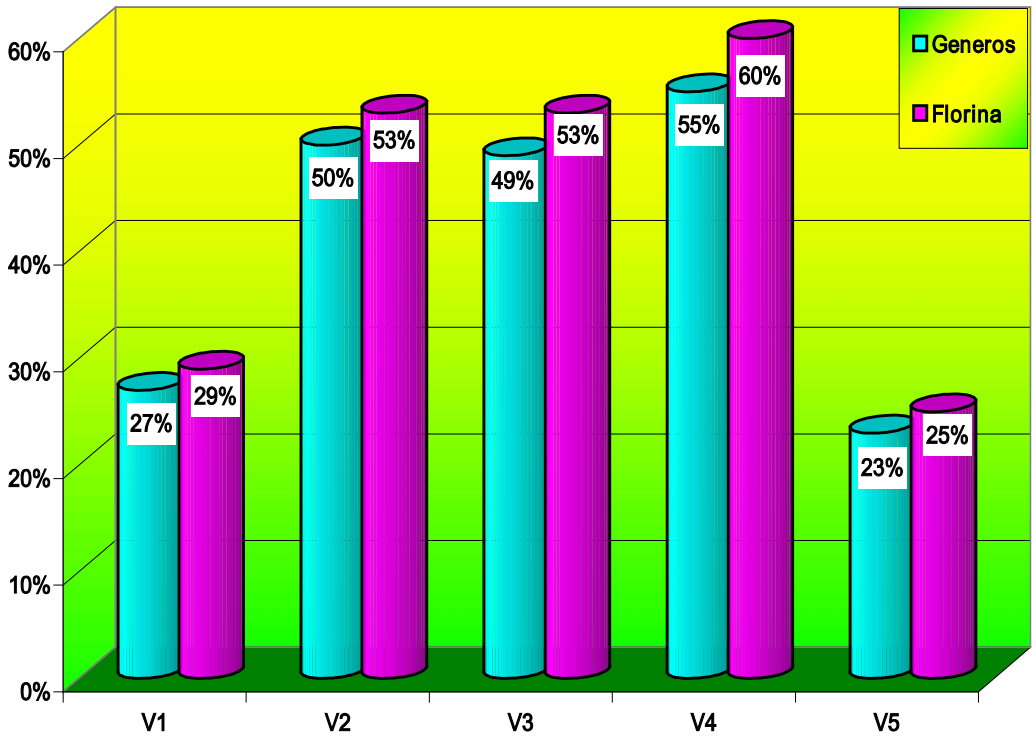

Fig. 1 - Development of the area of a garden depending on a design of a crone.

The important parameter of efficiency of the form of a crone is also fast development of the area of a meal allocated to trees. Among investigated designs the highest values of the given parameter are noted in two-plane V - figurative system with accommodation in two trees in one place. Already at four-year-old age they mastered on grade Generos of 55 % of the area allocated by it, and at a grade of the Florina the given parameter has reached 60 %.

CONCLUSIONS

Thus the optimal parameters of crown apple-tree develop in two-plane V - a figurative design of a crone. Among them the variant 4 in which owing to planting of two plants in one hole the maximum quantity of trees per hectare (4444 trees per ha) is placed is allocated. Among grades the highest values of investigated parameters are noted at the Florins, a growth differing by greater force.

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