THE INFLUENCE OF SOIL MAINTENANCE SYSTEM ON THE PRODUCTIVITY OF A FEW APPLE VARIETIES IMPORTED FROM THE EU

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Abstract

To assess the influence of the soil maintenance on the apple varieties, there were considered values of the vigor and of the productivity of the trees. This survey was made on Rajka, Rubinola, Topaz, Otava and Goldstar apple varieties, from fruit plantation from Bihor County.
In terms of trees vigor, Rajka and Rubinola varieties were high vigorous, Otava variety was middle vigorous, and Topaz and Goldstar were less vigorous.
Best results concerning the production of fruit were obtained from variety Rajka, followed by Rubinola with 33.7 t / ha respectively 30.4 t / ha.

Key words: Apple, varieties, force growth, productivity

INTRODUCTION

Choosing the right place for high intensive culture of apple is very important, is an obligation of responsibility, which is a guarantee for long term production.
The long term production is influenced by soil maintenance in trees plantation.
The current fruit plantations where tree density / ha is very high is recommended to use soil by these systems work: working field, herbicides, combined catch crops, green manure crops, grassing or permanent (temporary) and soil mulching.

MATERIAL AND METHOD

Were studied in the survey in terms of several features of tree development, productivity and fruit quality of five varieties of apple less prevalent in the culture in Romania but widespread in European community countries.

These varieties are *Rajka, Rubinola, Topaz, Otava, Goldastar* and are planted in SC. Delifood srl orchard from Urvind, Bihor County.

The plantation was established in 1999, trees were grafted on M9 graft and the planting distances used is 4 x 1.20 m, a density of 2083 trees / ha.

Experience includes 4 variants. Each version includes 3 repetitions of 5 trees per repetition.

The experience was:

A factor - soil maintenance system with a_1 black soil
a_2 grass between the lines and worked on all
a_3 grass between rows and worked around trees
a_4 total grassing

B factor – varieties as follow: b_1 Rajka
b_2 Rubinola
b_3 Topaz

b_4 Otava

b_5 Goldstar

They were perform following measurements and determinations: Sectional area of the trunk to 25 cm from the point of grafting annually by measuring the diameter with callipers to the direction perpendicular to the row and to the row direction and applying the formula πr^2, expression is in cm^2.

Fruit, by weighing them on each tree and expressed in t / ha.

RESULTS AND DISCUSSIONS

Table 1 is shown the number of trees vigor expressed by cross-sectional area of the trunk in 5.7 years after planting.

Compared to control (media system for maintenance of soil x variety) with a value of 30.4 cm^2 only the average on black soil varieties is ensured significant statistic positive value of 34.3 cm^2.

Variety Rajka with 34.8 cm^2 averaged over all systems maintenance and variety Rubinola with 34.2 cm^2 are provided positive and statistically significant with 25.8 cm^2 .

Goldstar variety is provided significantly negative.

As expected, the varieties Rajka and Rubinola with 39.6 cm^2 to 39.2 cm^2 respectively black soil are provided statistically very significant positive.

Variety Goldstar with 24.7 cm^2 system worked grass between rows and worked around trees is provided separately statistically significant and negative on the system overall grassing, by 22.6 cm^2, is provided statistically very significant distinctly negative.

Also provided negative and statistically significant variety Topaz with 26.3 cm^2 on grass between rows and worked around trees system and significantly distinct negative on overall grassing system.

It can be concluded that Rajka and Rubinola varieties have high vigor, Otava variety has middle vigor, and Topaz and especially Goldstar have reduced vigor.

Numbers are presented in Table 2, the fruit production for the three years of fructification at 5 apple varieties on different maintenance soil systems.

Compared to control - the system of maintenance medium soil x variety, of 21.6 t / ha, the high average production is recorded on black soil, of 26.6 t / ha, provided statistically significant distinct positive and the lowest production on total grassing system of 18.1 t / ha, provided statistically significantly negative.

On variety, production of 33.7 t / ha, 30.4 t / ha respectively 27.0 t / ha all statistically highly significant positive provided we have on Rajka, Rubinola and Goldstar on black soil and 26.8 t / ha on variety Rajka on the system grass between the lines and worked on all, also provided the same degree of statistical significance.

Very significant negative values we have Topaz variety on system maintenance total grassing of 16.1 t / ha, significantly negative distinct variety.

Rubinola grassing on the corporate total 18.4 t / ha, the varieties Topaz with 17.8 t / ha, Otava with 17.9 t / ha and Goldstar by 17.4 t / ha system grass between rows and worked around trees, and the varieties Rubinola with 18.4 t / ha, Otava with 16.9 t / ha and Goldstar of 16.9 t / ha in total grassing system maintenance.

In Table 3 we present the index of size of fruit on the four soil maintenance systems in the five varieties of apple.

From this point of view are provided statistically significant positive varieties Rajka with 86.9 mm by 85.3 mm and variety Rubinola Goldstar with 84.1 mm of soil maintenance system black soil.

Varieties, Otava with 63.0 mm by 62.0 mm Topaz that are insured separately semnificatv statistically negative, both on total grassing soil maintenance system.

Table 1

Nr crt.	Sectional area of the trunk (cm^2)																					Soil maintenance system average
	soiul	Rajka				Rubinola				Topaz				Otava				Goldstar				
	Soil maintenance system	2006	2007	2008	Average	2006	2007	2008	Average	2006	2007	2008	Media	2006	2007	2008	Average	2006	2007	2008	Average	
1	black soil	32,7	38,8	46,1	**39,2*****	34,8	39,1	44,9	**39,6*****	23,6	28,8	38,0	30,1	28,1	33,6	40,0	33,9	20,5	29,2	36,6	28,8	**34,3***
2	Grass between the lines and worked on all	27,9	35,1	43,0	**35,3***	31,4	34,7	40,3	**35,5****	21,9	28,1	35,6	28,6	25,2	30,7	36,2	30,7	19,7	27,1	34,1	27,0	31,4
3	Grass between rows and worked around trees	26,0	31,9	39,9	32,6	27,1	30,0	38,8	31,9	19,6	27,0	32,4	**26,3**^{o}	22,4	29,5	34,7	28,9	18,4	23,4	32,4	**24,7**^{oo}	28,9
4	Total grassing	27,1	31,7	37,7	32,2	25,2	29,6	34,5	29,8	19,0	23,9	29,8	**24,2**^{oo}	21,5	26,4	31,9	**26,6**^{o}	17,7	20,4	29,8	**22,6**^{ooo}	27,1
Variety average		28,4	34,4	41,7	**34,8***	29,6	33,4	39,6	**34,2***	21,0	27,0	33,9	27,3	24,3	30,1	35,7	30,0	19,1	25,1	33,2	**25,8**^{o}	30,4

LSD 5% = 3,6
LSD 1% = 5,1
LSD 0,1% = 7,1

Table 2

Nr crt.	Fruit production (t/ha)																					Soil maintenance system average
	soiul	Rajka				Rubinola				Topaz				Otava				Goldstar				
	Soil maintenance system	2006	2007	2008	Average	2006	2007	2008	Average	2006	2007	2008	Average	2006	2007	2008	Average	2006	2007	2008	Average	
1	black soil	25,1	33,3	42,7	**33,7*****	23,3	29,7	38,1	**30,4*****	16,1	21,1	27,5	21,6	15,2	19,8	26,4	20,5	19,0	26,2	35,8	**27,0*****	**26,6*****
2	Grass between the lines and worked on all	20,2	26,2	34,1	**26,8*****	14,9	24,9	33,5	**24,4***	14,8	19,2	25,1	19,7	14,1	18,9	24,7	19,2	14,9	19,3	26,9	20,4	22,1
3	Grass between rows and worked around trees	18,2	23,6	31,5	24,4*	16,1	20,3	28,7	21,7	13,4	17,2	22,9	**17,8**^{oo}	13,2	16,8	23,8	**17,9**^{oo}	12,6	16,2	23,5	**17,4**^{oo}	19,8
4	Total grassing	16,2	20,8	28,6	21,9	13,8	17,6	23,7	**18,4**^{oo}	11,6	15,2	21,4	**16,1**^{ooo}	12,2	16,2	22,4	**16,9**^{oo}	11,3	17,3	22,2	**16,9**^{oo}	**18,1**^{o}
Variety average		19,9	25,9	34,2	**26,7****	18,1	23,1	31,0	23,7	14,0	18,2	24,2	**18,8**^{o}	13,7	17,9	24,3	**18,6**^{o}	14,5	19,7	27,1	20,4	21,6

LSD 5% = 2,6
LSD 1% = 3,6
LSD 0,1% = 5,1

Table 3

Nr crt.	Size parameter (mm)																				Soil maintenance system average
	soiul	Rajka				Rubinola				Topaz				Otava				Goldstar				
	Soil maintenance system	2006	2007	2008	Average	2006	2007	2008	Medie	2006	2007	2008	Average	2006	2007	2008	Media	2006	2007	2008	Average	
1	black soil	85,4	85,8	89,6	86,9	85,4	84,2	86,4	**85,3***	69,9	70,3	74,6	71,6	68,5	68,7	71,5	69,5	82,6	83,2	86,6	**84,1***	79,5
2	Grass between the lines and worked on all	81,2	80,6	84,1	82,0	83,0	83,2	84,0	83,4	68,2	68,2	71,9	69,4	67,7	68,1	69,4	68,4	82,5	82,3	82,5	82,4	77,1
3	Grass between rows and worked around trees	76,2	75,8	79,6	77,2	79,0	78,4	81,4	79,6	64,6	64,8	69,7	66,4	66,2	66,4	67,8	66,8	79,3	78,7	79,1	78,9	73,8
4	Total grassing	72,7	73,9	77,7	74,8	71,6	71,4	75,2	72,8	59,6	59,2	67,3	**62,0**^{oo}	62,1	61,4	66,6	**63,0**^{o}	71,5	71,7	75,1	72,8	69,1
Variety average		78,8	79,0	82,8	80,2	79,7	79,3	81,8	80,3	65,6	65,6	70,9	67,4	65,9	66,1	68,8	66,9	79,0	79,0	80,8	79,6	74,9

LSD 5% = 9,0
LSD 1% = 12,6
LSD 0,1% = 17,8

CONCLUSIONS

1. In terms of growth vigor of trees, Rubinola Rajka varieties are very vigorous on all ground maintenance systems, Otava and Topaz are middle vigorous and Godstar is less vigouros.
2. Highest average fruit production for the three years were recorded on the variety Rajka with 33.7 t / ha, Rubinola 30.4 t / ha and Goldstar by 27 t / ha, on black soil maintenance system, provided statistically very significant positive.
3. Topaz and Otava varieties, the differences between average production on black soil and grass between the lines and worked on all soil maintenance systems are very low, from 21.6 t / ha to 19.7 t / ha and from 20.5 t / h to 19.2 t / ha.

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