

THE INFLUENCE FERTILIZATION OF PRODUCTION UPON THE APPLE TREE IN DIFFERENT CULTURE SYSTEM FROM S.D. TIMISOARA

INFLUENȚA FERTILIZĂRII ASUPRA PRODUCȚIEI DE MĂR ÎN DIFERITE SISTEME DE CULTURĂ DE LA S.D.TIMIȘOARA

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Abstract: The research made in the fruit trees plantation of Didactic Station in Timisoara cultivated in intensive system observed the growing of apple tree yield after mineral and organic fertilization during three years (2005, 2006 and 2007). The experience was made on the Generos de Voinești variety grafted on M26 and planted at 2 m distance on the row and 4 m distance between the rows. M26 rootstock, used mainly in super intensive system, gives to the tree high productions and good quality fruits.

Rezumat: Cercetările efectate în plantația de măr de la Stațiunea Didactică Timișoara în sistem intensiv au urmărit creșterea producțiilor de măr în urma aplicării de îngrășăminte minerale și organice în cei trei ani de cercetare, respectiv anii 2005, 2006 și 2007. Soiul luat în studiu a fost Generos de Voinești, altoit pe portaltoiul de vigoare mijlocie M₂₆ și plantat la distanța de 2 m pe rând și 4 m între rânduri. Portaltoiul M₂₆ utilizat în special în sistemul superintensiv, este un portaltoi ce imprimă productivitate și fructe de bună calitate.

Key words: soil, production, intensive system, super intensive system
Cuvinte cheie: sol, producții, sistem intensiv, sistem superintensiv

INTRODUCTION

Mineral and organic fertilizers help to increase the fruit yield per hectare according to the applied doses, type of fertilizer (mineral or organic).

Organic fertilizers, which is manure is recommended to be given to the apple trees once at 3 years, late autumn, after stopping of vegetation in a doses of 30-40t/ha. That is why we have given a dose of 20 t/ha manure to the apple trees in the first year of research, in autumn 2003.

MATERIAL AND METHOD

The production was determined theoretically considering the number of fruits on the tree multiplied to the medium weight of fruits. During the next years the production increased and the determination was made in the same way because the determination by weighting when we harvest has many errors because of the losses and circumvents each year.

The experience is polyfactorial of type 2 x 6, having the following factors:

Factor A – culture system: a_1 – intensive system (4x2);

a_2 – super intensive system (4x1).

Factor B – doses of the mineral and organic fertilizers

Factor B has 6 variants and 4 repetitions:

b_0 – not fertilized witness (Mt)

b_1 – N₇₀P₃₀K₀

b_2 – N₁₀₀P₅₀K₂₀

b_3 – N₁₅₀P₁₀₀K₅₀

b_4 – manure (20t/ha)

$b_5 - N_{50}P_{30}K_{10} + \text{manure}$

RESULTS AND DISCUSSIONS

Giving organic and mineral fertilizers had a great impact upon the increasing of production for each variant. The fertilization level was important for this increasing, being different for each variant and for each culture system.

In intensive system the fruit yield per hectare are presented in tables and figures 1,2,3, and 4.

Table 1.

The apple fruit production (t/ha) face to the witness, in the intensive system

Years	Variant	Production (t/ha)	%	Difference production (t/ha)	Signification deference
2005	$b_0 - N_0P_0K_0$	12,500	100		
	$b_1 - N_{70}P_{30}K_0$	12,900	103,20	0,400	-
	$b_2 - N_{100}P_{50}K_{20}$	13,590	108,72	1,090	-
	$b_3 - N_{150}P_{100}K_{50}$	13,850	110,80	1,350	-
	$b_4 - g.g.$	14,078	112,63	1,578	*
2006	$b_0 - N_0P_0K_0$	11,700	100		
	$b_1 - N_{70}P_{30}K_0$	12,059	103,07	0,359	-
	$b_2 - N_{100}P_{50}K_{20}$	12,180	104,11	0,480	-
	$b_3 - N_{150}P_{100}K_{50}$	12,370	105,73	0,670	-
	$b_4 - g.g.$	12,250	104,70	0,550	-
2007	$b_0 - N_0P_0K_0$	11,821	100		
	$b_1 - N_{70}P_{30}K_0$	12,139	102,69	0,318	-
	$b_2 - N_{100}P_{50}K_{20}$	12,940	109,47	1,119	-
	$b_3 - N_{150}P_{100}K_{50}$	13,042	110,33	1,221	*
	$b_4 - g.g.$	13,073	110,59	1,252	*
	$b_5 - g.g.+N_{50}P_{30}K_{10}$	13,099	110,81	1,278	*

DL 5% = 1,200

DL 1% = 1,710

DL 0,1% = 2,501

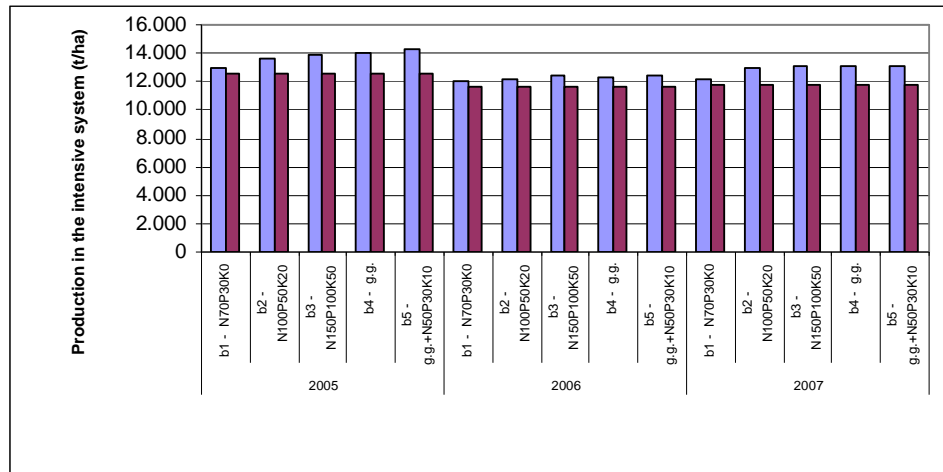


Figure 1. The apple fruit production (t/ha) face to the witness, in the intensive system

In 2005 the highest yields were obtained in variant b5, which is 14,25 t/ha, having a difference of 1,751 t/ha bigger than the witness, the productions obtained in variant b5 being distinct significant positive than the witness. Higher productions were obtained in variant b4,

which had 14,078 t/ha with a difference of 1,578 t/ha bigger than the witness, which had a production of 12,500 t/ha. Variant b4 had a production significant positive towards the witness and this thing happened because of the climatic conditions of the year 2005 and because of the manure given in autumn 2004, variants b4 and b5 being fertilized with organic fertilizers (b4) and organic and mineral fertilizers in higher doses.

In 2006, higher productions were obtained in variant b5 of 12,404 t/ha with a difference of 0,704 t/ha and in variant b3 of 12,370 t/ha with a difference of 0,670 t/ha bigger than the witness variant, which had a production of 11,700 t/ha.

In 2007, the highest productions were obtained for variants b5, b4 and b3, and the lowest in variant b1. in variant b5 the production was of 13,099 t/ha with a difference of 1,278 t/ha bigger than b0, variant b4 had a production of 13,073 t/ha with a difference of 1,252 t/ha and variant b3 had a production of 13,042 t/ha with a difference of 1,221 t/ha than the witness variant, which had a production of 11,821 t/ha. All the three variants have a significant positive difference to the witness.

The highest productions were obtained in 2005, than in 2007 and than in 2006 in all the variants.

The medium productions obtained in apple tree in tones per hectare, on the three years of research (2005, 2006 and 2007) are presented in table and figure 2.

In table and figure 2 we can observe that the medium productions obtained during the years 2005-2007 were higher in 2005, then in 2007 comparative to those in 2006. Comparing the productions of the years 2005 and 2006 were observed the following: 12,1607 t/ha in 2006 and 13,528 t/ha in 2005, the difference being of -1,3675 t/ha, which means that the year 2006 had values significant negative than the year 2005. This happened because of the bad climatic conditions in 2006 and because of the fruiting alternation.

Table 2.

The medium productions obtained to the apple (t/ha) in period 2005-2007, in the intensive system

Years	Medium production		%	Difference	Signification
2006 – 2005	12,1607	13,5282	89,89	-1,3675	0
2007 – 2005	12,6857	13,5282	93,77	-0,8424	-
2007-2006	12,6857	12,1607	104,32	0,5251	-

DL 5% = 1,328

DL 1% = 2,198

DL 0,1% = 4,113

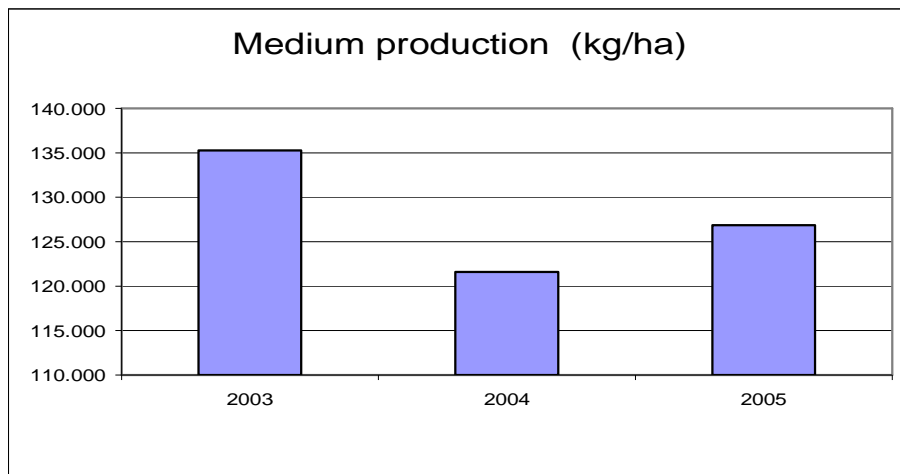


Figure 2. The medium productions obtained to the apple (t/ha) in period 2005-2007, in the intensive system

In table 3 there was made a comparison of the productions obtained in apple tree according to the experimented variants.

Table 3.

The apple fruit production compare to variant in the intensive system

Variants		Medium production (t/ha)	%	Difference production	Signification	
b ₀ - N ₀ P ₀ K ₀	b ₀ -N ₀ P ₀ K ₀	12,007	100	-	-	
b ₁ - N ₇₀ P ₃₀ K ₀		12,366	102,99	0,359	-	
b ₂ - N ₁₀₀ P ₅₀ K ₂₀		12,904	107,47	0,897	*	
b ₃ - N ₁₅₀ P ₁₀₀ K ₅₀		13,087	109,00	1,080	*	
b ₄ - g.g.		13,134	109,38	1,127	**	
b ₅ -g.g.+N ₅₀ P ₃₀ K ₁₀		13,251	110,36	1,244	**	
b ₁ - N ₇₀ P ₃₀ K ₀	b ₁ -N ₇₀ P ₃₀ K ₀	12,366	100	-	-	
b ₂ - N ₁₀₀ P ₅₀ K ₂₀		12,904	104,35	0,537	-	
b ₃ - N ₁₅₀ P ₁₀₀ K ₅₀		13,087	105,83	0,721	-	
b ₄ - g.g.		13,134	106,21	0,768	-	
b ₅ -g.g.+N ₅₀ P ₃₀ K ₁₀		13,251	107,16	0,885	*	
b ₂ - N ₁₀₀ P ₅₀ K ₂₀		b ₂ - N ₁₀₀ P ₅₀ K ₂₀	12,904	100	-	-
b ₃ - N ₁₅₀ P ₁₀₀ K ₅₀	13,087		101,42	0,184	-	
b ₄ - g.g.	13,134		101,78	0,230	-	
b ₅ -g.g.+N ₅₀ P ₃₀ K ₁₀	13,251		102,70	0,348	-	
b ₃ -N ₁₅₀ P ₁₀₀ K ₅₀	b ₃ -N ₁₅₀ P ₁₀₀ K ₅₀		13,087	100	-	-
b ₄ - g.g.			13,134	100,36	0,047	-
b ₅ -g.g.+N ₅₀ P ₃₀ K ₁₀		13,251	101,26	0,164	-	
b ₄ - g.g.		b ₄ - g.g.	13,134	100	-	-
b ₅ -g.g.+N ₅₀ P ₃₀ K ₁₀			13,251	100,90	0,118	-

DL 5% = 0,807

DL 1% = 1,088

DL 0,1% = 1,444

Comparing variants b1 and b5 the productions obtained were significant positive for variant b5 than b1. Between the other variants there were no differences concerning their productions.

The medium productions obtained in apple tree during the three years of research (table and figure 4) were higher in 2005, which is 25,4663 t/ha, than 2006 which had a medium production per hectare of 17,4724 t/ha. The year 2006 had a difference of -7,9939 t/ha than the year 2005, being a significant negative difference.

Out of the data in the table above we can see an increase of the productions in variants b5 and b4 , being distinct significant positive than the witness variant, variants b2 and b3 being only significant positive than b0.

Table 4.

The medium productions obtained to the apple (t/ha), in period 2003-2005, in the super intensive system

Years	Medium production		%	Difference	Signification
2006 – 2005	17,4724	25,4663	68,61	-7,9939	000
2007 – 2005	22,2241	25,4663	87,27	-3,2422	00
2007-2006	22,2241	17,4724	127,20	4,7517	***

DL 5% = 1,251

DL 1% = 2,070

DL 0,1% = 3,87

The medium productions obtained in 2005 had a difference of 3,2422 t/ha than those obtained in 2007, the year 2007 being distinct significant negative than the year 2005.

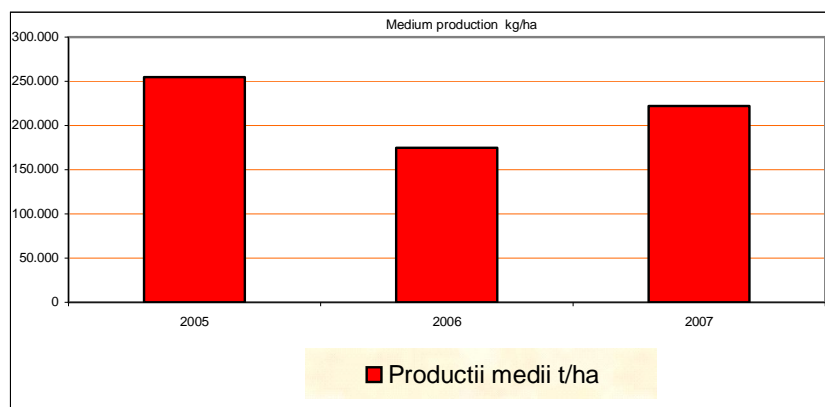


Figure 4. The medium productions obtained to the apple (t/ha), in period 2005-2007, in the super intensive system

The medium productions obtained in 2006 were of 17,4724 t/ha than those obtained in 2007, which were of 22,2241 t/ha, the year 2007 having a positive difference of production of 4,7517 t/ha than the year 2006, the productions of the year 2007 being very significant positive than those in the year 2006.

CONCLUSIONS

After the research made on the cambic, batigleic, ortocalcic chernozem in the apple tree plantation of Didactic Station Timisoara during the years 2005-2007 we observed the following:

1. The fruit yield oscillated between 12,059 t/ha in 2006 in variant b1 and 14,251 t/ha in 2005 variant b5, than 11,821-12,500 t/ha that were obtained in the witness variant.
2. The medium yield/hectare in intensive system were of 12,1607 t/ha in 2006; 13,5282 t/ha in 2003 and 12,6857 t/ha in 2007, the year 2006 being significant negative than the year 2005.
3. The highest productions were obtained for variants b5 and b3 and the lowest productions were obtained for variant b1.
4. Higher productions were obtained in 2005, than 2007 and 2006.

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