THE INFLUENCE FERTILIZERS UPON SOIL HUMUS CONTENT AND PRODUCTIONS IN THE DIDACTIC STATION TIMIŞOARA TREE-PLANTATION IN INTENSIVE SYSTEM

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Abstract: *This paper aims to improve the humus content of soil planting Teaching Station of Timisoara to achieving higher production and better quality. Research has been conducted over a period of three years, that in 2007, 2008 and 2009. It will consider the continuation of this research, a longer period in order to offer better solutions to everyone in the area. Humus content in the soil (%) was determined by titrimetrice respectively Tiurin method. Principle of the method consists of oxidation of carbon in humus with a solution of anhydrous chromium or potassium dichromate in the presence of sulphuric acid. Production theory to determine the number of fruit per tree multiplied by the average weight of fruit. In the following years production increased, but the determination was similar, whereas the determination by weighing the harvest is affected by errors of thefts that are found every year. The research was conducted in the same direction, all for a period of three years (years 2007 to 2009), but results in this regard can be observed only after a greater number of years, as the humus content of soil is disrupted following its use by Apple. Research is in its early stages, taking into account the fact that the humus content of soil is disrupted essential, especially in fruit plantations, trees ocolo where consumption is increased, hence the need for fertilization is necessary, and changes may be observed only on longer. In Romania, investigations are limited, a fact due in part to the lack of financial resources, especially in fruit growing, where the areas are quite large, and due to increased consumption of trees in nutrients, especially superintensiv system. Following these investigations, it may occur through the application of mineral and organic fertilizers in appropriate doses, without involving large expenditure, to pollute the soil or fertilize with amounts too low which would reduce production and to obtain low-quality fruit, which would remain sufficiently so high crop loss and financial resources.*

Key words: *fertilizers, culture system, humus content, productions*

INTRODUCTION

This paper aims to improve the humus content of soil planting Teaching Station of Timisoara to achieving higher production and better quality.

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MATERIAL AND METHOD

Soil humus content (%) was determined by titrimetric methods, respectively Tiurin method.

Principle the method consists in oxidation of humus carbon dioxide solution with a chromium or potassium dichromate in presence of sulfuric acid.

A humus content of soil samples was calculated with the following formula:

$$\text{Humus\%} = \frac{(V1\ \ V2) \text{ x f x } 0{,}0005181 \text{ x } 100}{m} \text{ x K}$$

Production was determined theoretically based on the number of fruit per tree multiplied by the average weight of fruit. In the following years the production was increased, but the determination was similar, because of the determination by weighing the harvest is affected by errors related to thefts that are found every year.

RESULTS AND DISCUSSIONS

Cambic chernozem humus content of the apple plantation in the Timisoara Didactic Station is located at higher levels in the 0-25 cm depth horizon Amp to respectively 3.10% in the horizon I at 25-51 cm depth, the amount of humus was 2.64% and Bv horizon at 51-70 cm depth, quantity of humus was 2.32% for unfertilized variant, as can be seen in Table 1.

Table 1.

Influence of mineral and organic fertilizers on the humus content (%) soil, the intensive system

Horizon/ Depth cm	Anul	B Factor						Average %	Difference %
		$N_0P_0K_0$	$N_{70}P_{30}K_0$	$N_{100}P_{50}K_{20}$	$N_{150}P_{100}K_{50}$	g.g.	g.g. + $N_{50}P_{30}K_{10}$		
Amp (0-25)	2007	3,10	3,20	3,22	3,38	3,43	3,45	3,34	0,24
	2008	2.86	2.98	3,26	3,40	3,42	3,43	3,30	0,44
	2009	2,78	3,02	3,34	3,52	3,35	3,40	3,33	0,55
Am (25-41)	2007	2,64	2,65	2,70	2,79	2,82	2,84	2,76	0,12
	2008	2,63	2,66	2,73	2,81	2,81	2,83	2,76	0,13
	2009	2,58	2,60	2,65	2,70	2,65	2,80	2,77	0,19
Bv (51-70)	2007	2,32	2,34	2,36	2,40	2,44	2,46	2,40	0,06
	2008	2,31	2,33	2,40	2,46	2,43	2,45	2,41	0,10
	2009	2,12	2,20	2,32	2,42	2,40	2,41	2,35	0,23

In 2007, the Amp horizon at 0-25 cm depth, humus content of the chernozem cambic, values ranged from 3,10% in control variant and 3,45% for B5 variant, with an average of 3 , 34, the difference being 0,24% of control; the horizon I, at 25-41 cm depth, humus content values were ranged between 2,64% and 2,84% in the variant where B0 B5 variant; the Bv horizon at 51-70 cm depth, values were between 2,32% humus for version control and 2,46%, if the variant B5.

In 2008, the Amp horizon at 0-25 cm depth, humus content ranged between 2,86% and 3,43% in control variant where the variant B5; the horizon I, at a depth of 25-51 cm soil humus content was between 2,63% and 2,83% in the control variant the variant B5, and Bv horizon at 51-70 cm depth, humus content ranged from 2,31% in the control variant and 2,45% in the variant B5.

In 2009, the Amp horizon at 0-25 cm depth, humus content ranged between 2,78% and 3,40% in control variant where the variant B5; the horizon I, at a depth of 25-41 cm soil humus content was between 2,58% and 2,80% in the control variant the variant B5, and Bv horizon at 51-70 cm depth, humus content ranged from 2,12% in the control variant and 2,41% in B0 version.

Application of mineral and organic fertilizers has resulted in increased production in all fertilized variants. Fertilization levels were essential growth factor production in differentiated from one variant to another. The system intensive fruit productions per hectare are presented in Tables 2, 3 and 4.

In 2007, the highest yields were obtained in variant B5, ie 14.251 t/ha, with a difference of 1,751 t/ha higher than version control, yields obtained significant positive variant B5 being distinct from variant B0.

In 2008, higher yields were obtained for variant B5, ie 12,404 t /ha, with a difference of 0,704 t/ha and B3 variant, with 12,370 tonnes/ha, with a differenceof 0,670 t/ha in May than the control version that had a production of 11,700 t / ha.

In 2009, the highest yields were obtained when variants B5, B4 and B3 and the lowest in the B1 variant. In the variant B5, yields were 13,099 t / ha with a difference of 1,278 t/ha higher than in version control, version b4 had a production of 13,073 t/ha, with a distinction of 1,252 t/ha and variant b3 recorded production of 13,042 t/ha, with a distinction of 1,221 t/ha, compared with B0 version which had a production of 11,821 t/ha, all three variants, namely B5, B4 and B3, were significantly positive by witness. Highest yields were obtained in 2007, followed by 2009 and then of 2008, in all variations.

Table 2.

Fruit production from Apple by witness (t/ha) in the intensive system

Years	Variants	Production (t/ha)	%	Production difference (t/ha)	Significance of the difference
2007	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	*
	b_5 - g.g.+$N_{50}P_{30}K_{10}$	14,251	114,01	1,751	**
2008	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	-
	b_5 - g.g.+$N_{50}P_{30}K_{10}$	12,404	106,02	0,704	-
2009	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

Average production in tonnes per hectare apple, during the three years of research, namely 2007, 2008 and 2009 are presented in table 3.

Table 3.

Average production results from Apple (t/ha) in years 2003-2005, in the intensive system

Studing years	Medium production		%	Differences	Significance
2008 – 2007	12,1607	13,5282	89,89	-1,3675	0
2009 – 2007	12,6857	13,5282	93,77	-0,8424	-
2009-2008	12,6857	12,1607	104,32	0,5251	-

DL 5% = 1,328 DL 1% = 2,198 DL 0,1% = 4,113

From Table 3 it appears that the average productions in 2007-2009 were higher in 2007, followed by 2009 compared to 2008.

We can observe an increase in production for variants B5 and B4, which are distinctly positive significant to variant B0, B2 and B3 variants being significantly positive only to witness.

When comparing variants B1 and B5 (Table 4), yields obtained were significantly positive for B5 version-to-version B1. Among other options there were no differences in yields between the variant. Highest yields were obtained in 2007, followed by 2009 and then of 2008, in all variations.

Table 4.

Influence of the fruit production (t/ha) from Apple, according to the variation in the intensive system

Variants		Average productions (t/ha)	%	Production differences	Significance of the differences
b_0 - $N_0P_0K_0$	b_0 -$N_0P_0K_0$	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

CONCLUSIONS

Following research carried out on chernozem cambic, batigleic, ortocalcic of Apple plantation from Timisoara Didactic Station in 2007-2009 were the following conclusions:

- Cambic chernozem humus content of the plantation was bioaccumulative than the horizon, the horizon that I (0-25 cm) and decreases along with the depth being agrofond maximum and minimum mineral + organic Bv horizon (51-70 cm) on the $N_{70}P_{30}K_0$ agrofond;
- Values in humus content is between 2,32-3,46% at 0-20 cm depth and decreased to 2,12-2,80% at 40-60 cm depth;
- Having regard to soil texture is clay loam, humus content of this type of soil is low to medium;
- Fruit productions varied between 12,059 t/ha in 2008 and 14,251 in variant b1 t/ha in 2007 B5 variant compared to 11,821-12,500 t/ha but was fertilized variant (control);

- Average production per hectare in intensive fruit were 12.1607 t/ha in 2008; 13,5282 t/ha in 2007, respectively 12,6857 t/ha in 2009 to 2008 is significantly negative from 2007;

- The highest yields were obtained for variants B3 and B5 and the lowest in variant B1, higher yields were recorded in 2007, followed by the years 2009 and 2008.

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