

THE EFFECT OF DIFFERENTIAL FERTILIZATION UPON GOLDEN DELICIOUS AND STARKRIMSON APPLES PRODUCTION ON TYPICAL PRELUVOSOL SOIL

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Abstract: From ecological point of view, the fertilization using manure, animal urine, compost, manure juice is the most important for fruit trees growing. Fruit species store nutrients in the form of organic compounds on biological processes using them next year, and in case of failure in the same year for fruit producing achieving and perpetuating the species. Using differentiated fertilization on two varieties of apple: Golden Delicious and Starkrimson, we tried to determine the production depending on it. The soil on which we used the differential fertilization was typical preluvosol soil type and the experience is Farm 10, the farm is established in Reghin and the following fertilization treatments were applied: first possibility is considered as the control where no fertilization was made, the other treatments: manure 20 tons / ha annually, manure 20 t / ha annually + N60 P60 K60 kg as / ha, N100 P80 K100 kg as / ha, N120 P100 K120 kg as / ha, N60 P60 K60 + leaf fertilizer, N100 P80 K100 + leaf fertilizer, N120 P100 K120 + leaf fertilizer, N100 P80 K100 +40 t/ha manure to the three years. In order to maintain and raise the productive capacity of soils and to obtain economically efficient production of chemical fertilizers is recommended fertilization. The efficacy of organic fertilizer depends on the nitrogen index, clay content and soil pH. The use of manure has a positive influence on fruit production in apple orchards improving nutrition conditions for all species of trees. The largest apple production both Starkrimson and Golden Delicious variety were obtained from the following: N100 P80 K100 + 40t/ha manure in three years and N120 P100 K120 + leaf fertilizer. The effect of fertilizers application is due, in general, to adequate quantity and assortments that fertilization provides the necessary nutrients and not least, the interactions determined in soil-plant system through nutrient bioavailability. High doses of mineral fertilizers causes significant increases crop, but lower than that moderate doses organic - mineral (complete) and even if we apply manure + superphosphate.

Key words: apple, Golden delicious, Starkrimson, typical preluvosol soil, fertilization

INTRODUCTION

Apple is a species that has great possibilities of acclimatization to different environmental conditions and they are cultivated on every continent on the world, except in very cold areas. Most popular variety of apple in Europe is *Golden Delicious* (40-50% in Italy and France). In our country, the traditionally variety is *Jonathan* (20%), followed by *Golden Delicious* (15%), *Starkrimson* (15%), *Idared* (10%) and *Florina* (BRANIȘTE ȘI DRĂGOI, 1999).

The apple orchards fertilization is made all over surface, depending on fruit production. The nutrients needs for the species tree varies according to species, plantation age and climatic conditions. Fertilizers are much better capitalized by trees grafted on vegetative rootstock, but more dense root system cover faster soil (PASC, 1977).

The organic fertilizers up the mineral fertilizers have relevance and effect, first on soil fertility and then enhances and maintaining this quality to production of agriculture and horticulture crops (MĂRGHITAȘ MARILENA, 2005).

The organics and minerals fertilizers have a favorable effect on increasing the thickness of the trunk:

High measures of fertilizers causes significantly increases of the crops, but lower than we give moderate measures of (full) organo-mineral and even than we give only manure + superphosphate;

It establishes a direct effect of potassium fertilizer in increasing the acidity of fruit in conditions of not applied manure;

Nitrogenoses and photassium fertilizers causes a decrease in sugars content in comparison with organic fertilizers or organic fertilizers + potassium fertilizers, influencing the behavior of fruit in storage (ȘTEFAN și colab., 1968).

MATERIAL AND METHODS

Experience was founded in 2009 in an orchard production in the Reghin area. The biological material is represented by the varieties Golden Delicious and Starkrimson and the ground being typical preluvosoil.

The name of ground: forest brown clay-iluvial or typical preluvosoil, moderately, podzolic, weak pseudogleizat, clay loam to clay argillaceous.

The general conditions of training: northern slopes moderately inclined.

The ground with strongly acidic reaction, humifer moderately, well stocked with total nitrogen, low stocked with phosphorus mobile, middle stocked with mobile potassium, fine texture saturated moderately (mezobazic) in base. (Tabel 1).

Table 1

The physical and chemical analysis

Horizon and depth	pH	Humus%	Total N %	P2O5 Mobile mg / 100 g	K2O Mobile mg/100gr.	Mechanical analysis				Texture	SH	V%	
						Thick sand	Fine sand	Dust	Clay				
Aa	0-20	5.07	3.61	0, 199	2.2	1.31	3.2	23.1	35.3	38.4	LA	14.2	58.7
Of (A2)	25-40	4.86	3, 51	0, 188	1.0	7.9	3.2	24.3	36.3	36.2	LA	14.2	587
BTL (g)	41-58	5.04	1, 77				5.2	24.3	31.1	39.4	LA	12.3	560
Bt 2 (g)	70-90	5.27					4.0	25.6	16.8	53.6	A	12.6	656

During the experience I used 9 types of fertilization:

1. Nonfertilized probs;
2. Manure 20 t / ha per year;
3. Manure 20 t / ha annually + N60 P60 K60 kg s.a. / ha;
4. N100 P80 K100 kg s.a. / ha;
5. N120 P100 K120 kg s.a. / ha;
6. N60 P60 K60 + leaf fertilizer;
7. N100 P80 K100 + leaf fertilizer;
8. N120 P100 K120 + leaf fertilizer;
9. N100 P80 K100 + 40 t / ha manure to three years.

RESULTS AND DISCUSSIONS

Fruit production is influenced more significant for systems of fertilization and less than soil maintenance.

It is known that mineral foliar fertilizers make an important contribution to production associated with significantly better quality at fruit quality when applied at the optimal time.

The best production of apples on the ground typically preluvosoil have obtained variants: N₁₂₀: P₁₀₀: K₁₂₀ + leaf fertilizer (Agrofid N₁₄: P₁₄: K₂₈) and N₁₀₀: P₈₀: K₁₀₀ + 40 t / ha garbage at 3 years, so at the Golden Delicious variety and the Starkrimson variety.

The Golden Delicious variety in N₁₂₀: P₁₀₀: K₁₂₀ + leaf (Agrofid N₁₄: P₁₄: K₂₈) variant was obtained 27.59 t/ha, the difference from the witness is very significant (9.63 t / ha) the variant N₁₀₀ P₈₀K₁₀₀ + 40 t / ha manure at 3 years was obtained 28.18 t / ha, the difference from the witness is very relevant (10.22 t / ha) (table 2).

The soil maintaining with manure 20t/ha caused increases production of 0.48 t / ha in Golden Delicious variety are not different from the witness (table 2).

Table 2

Production results obtained by the effect of differentiated fertilization from Apple, the Golden Delicious variety (2009)

No. Crt.	Variation fertilization	Average yield of apple				
		Production t / ha	Production %	Difference t / ha	Significance difference	Test Duncan
1.	Witness	17,96	100.0	0.00	witness	A
2.	Manure 20 t / ha	18.44	102.7	0.48	-	A
3.	Manure 20 t / ha + N ₆₀ P ₆₀ K ₆₀ kg. as / ha	24.60	137.0	6.64	***	B
4.	N ₁₀₀ P ₈₀ K ₁₀₀ kg. as / ha	19.49	108.5	1.53	***	C
5.	N ₁₂₀ P ₁₀₀ K ₁₂₀ kg. as / ha	26.47	147.4	8.51	***	C
6.	N ₆₀ P ₆₀ K ₆₀ + leaf	25.15	140.0	7.19	***	D
7.	N ₁₀₀ P ₈₀ K ₁₀₀ + leaf	25.92	144.3	7.96	***	D
8.	N ₁₂₀ P ₁₀₀ K ₁₂₀ + leaf	27.59	153.6	9.63	***	E
9.	N ₁₀₀ P ₈₀ K ₁₀₀ + 40t/ha garbage to 3 years	28.18	156.9	10.22	***	E

DL (p 5%) 0.62
 DL (p 1%) 0.85
 DL (p 0.1%) 1.18

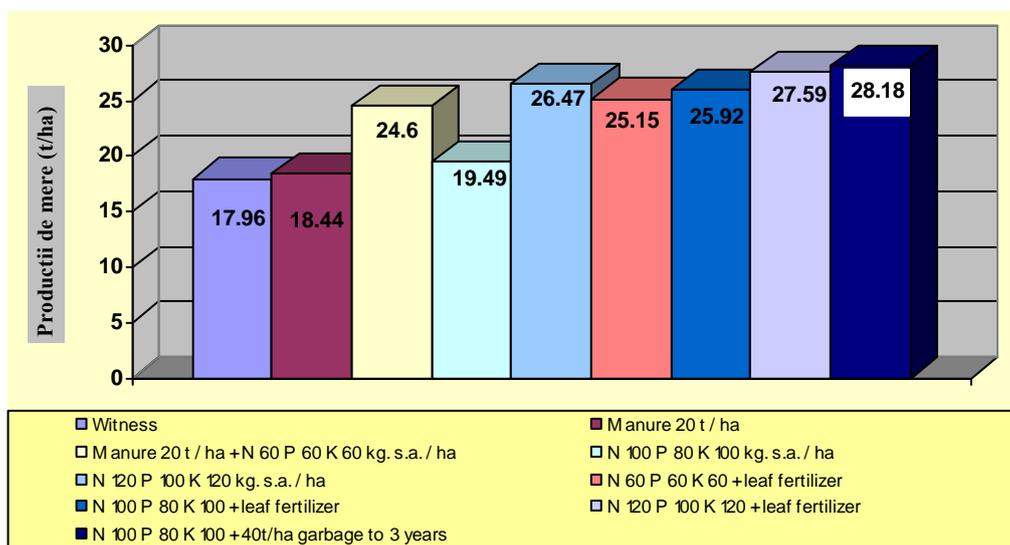


Fig. 1. Effect of differentiated fertilization on the production of Golden Delicious variety on typical Preluvsol of the Reghin areas (2009)

The Starkrimson variety the same variant N₁₂₀: P₁₀₀: K₁₂₀ + leaf fertilizer (Agrofid N₁₄: P₁₄: K₂₈) was obtained 28.01 t / ha, the difference from the witness is very significant (9.62

Production differences recorded between the two varieties, at the same fertilization system and maintenance of soil due to the biological potential of varieties, the Starkrimson variety yields being higher than the Golden Delicious variety (Fig. 1 and Fig. 2).

In this complex technology (fertilization systems and soil maintenance) fruit production is affected most important and significant for fertilization and then soil maintenance, at least on a brown soil argiloiluvian (typical preluvosoil) initially deficient nutrient and moderate acidity.

CONCLUSIONS

At apple, the fruit production was positively influenced by organic fertilization with manure, but also mineral fertilization compound fertilizers high dose ($N_{120}: P_{100}: K_{100}$) plus leaf fertilizer (Agrofid $N_{14}: P_{14}: K_{28}$), at both varieties Golden Delicious and Starkrimson.

The mineral complex fertilization increased the N- NO_3 content of soil, while organic fertilization with manure increased the reserves of phosphorus and mobile potassium.

The applied systems fertilization with organic intervening contribution by manure or moderate and balanced complex fertilizer emerges as effective in the increases statistically assured production, especially in plantations located on relatively poor soils in nutrients.

Positive change in the supply of P and K elements of balance for N, the dynamics and its effect, complete the systems sustainability, these elements contribute to the maintenance of nitrogen forms at nutrient level of the roots and reduce the potential of this pollutant.

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