

INFLUENCE OF MANURE RATES APLIED ON DIFFERENT NP BACKGROUND ON PH-VALUE OF BROWN LUVIC SOILS FROM NORTH-WEST PART OF ROMANIA

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Abstract

In Romania was elaborated since 1968 a stationary long term experiments with fertilizers and lime in all the Agricultural Research Stations belongs to Research Institute from Fundulea.

The experiments was set aup using a unitary schem for knowing the evolution of soil fertilizers and the influence of fertilizers and lime rates and combinations on level and quality yield of different crops.

The brown luvic soil from North-West part of Romania is a medium soil, provide with the principale nutritive elements, with a weak acid reaction in the ploughing horizon.

In this paper are presented the results regarding the influence of manure applied on different NP rates on pH values of brown luvic soil from North-West part of Romania.

Key words: manure, nitrogen, phosphorus, pH, brown luvic soil

INTRODUCTION

In Romania acid ploughing soils are spread on 2,0 millions ha which represent 20% from total agricol land.

The factors which has a negative influence on growing plants are: high level concentration by H^+ and Al^{3+} , high level soil content in Fe^+ and Mn^{2+} and low level soil content in principal nutrients elements, low activity of microorganisms, stagnation of water, because of unsatisfactory infiltration.

Much research on white luvic soil and brown luvic soil conditions (Bedo and Lang, 1977, Ciobanu and Nagy 1978, Nemeth 1996, Stefanescu 2003) has shown the negative effect of long-term application of nitrogen as ammonium nitrate on soil reaction, which became more acidic and led to growth of mobile aluminum and manganese soil content, which can determine phitotoxicity in the first part of vegetative period, with negative influence on yield level and quality.

For a better knowledge of application effect on time of manure rates on soil chemistry was set up in the network of Agricultural Research

Stations from Romania, long-term field experiments in different pedoclimatic conditions.

This paper presents the results regarding the influence of NP chemical fertilizers, manure and lime on evolution of brown luvic soil acidity.

MATERIAL AND METHOD

Experimental site

The research data was obtained at the Agricultural and Development Research Station Oradea, using a unique design in the all research network of Research Institute from Fundulea.

The investigation has been carried out beginning with the autumn of 1974 in Oradea, in a flat plain area on the third terrace of the Crisul Repede river, whose geographical coordinates are: 21°56' Eastern longitude, 47°03' Northern latitude and 136 m altitude.

The solidification rock consists of clay loam. The ground water is located at a depth of 6-8 m. the soil is a brown one with horizon disposition and the main physical and chemical characteristics are shown in table 1. The presence of clay migration, B horizon is to be remarked noticed on the thickness of the soil profile, with high and very high values of the bulk density and compaction level and low or very low total porosity and hydraulic conductivity.

The soil reaction is acid in the ploughing A horizon, then slightly acid. The lack of CaCO₃ in the soil profile is underlined. The mobile Al content in the A horizon may cause poor growth of some crops (clover). The soil is well provided with mobile potassium and phosphorus. The soil humus medium content may not cause distortions to the neutronic determination of the soil moisture.

Table 1.

The main properties of the brown luvic soil from Oradea, Romania

Soil depth cm	Sand	Silt	Clay	OC	Humus %	Ca CO ₃ %	Al mobile mg/100g soil	PH 1:2 H ₂ O	N Total %	P mobile ppm	Kmobile ppm
0 - 5	43,5	28,3	28,2	1,25	2.32	0.00	3.68	6,3	0.12	21.8	83.0
5 - 15	41,8	28,4	29,8	1,12	2.28	0.00	2.32	6,4	0.11	22.7	102.1
15 - 30	40,0	28,5	31,5	1,02	1.91	0.00	0.52	6,3	0.09	5.7	112.1
30 - 60	32,0	28,0	40,0	0,99	1.93	0.00	0.77	6,6	0.09	6.1	117.9
60 - 90	24,1	36,7	39,2	0,29		0.00	0.32	6,6			
90 - 150	35,1	27,3	37,6	0,17		0.00	0.59	6,5			

Field experiment with manure and NP fertilizers was set up in 1974. Was used a short plant rotation winter wheat-maize. The manure was applied once at four years in autumn for maize using the rates: 0, 20, 40, 60 to/ha.

The NP rates were: N₀P₀, N₅₀P₀, N₅₀P₅₀ and N₁₀₀P₁₀₀,

Sampling and analytical method

Soil samples from top soil (0-20cm) were collected from each experiment plot, in august 2000, after wheat harvesting. All samples were taken to the laboratory and used for routine soil chemical analysis. pH was determined in water suspension.

RESULTS AND DISCUSSION

Influence of manure applied on different NP backgrounds on brown luvic soil reaction (figure 1).

It is well known that the manure applied in acid soil conditions are increasing the degree of base saturation in the same time increasing the buffering capacity of the soil. On this way is possible to avoid unfavorable effect of chemical fertilizers with acid potential.

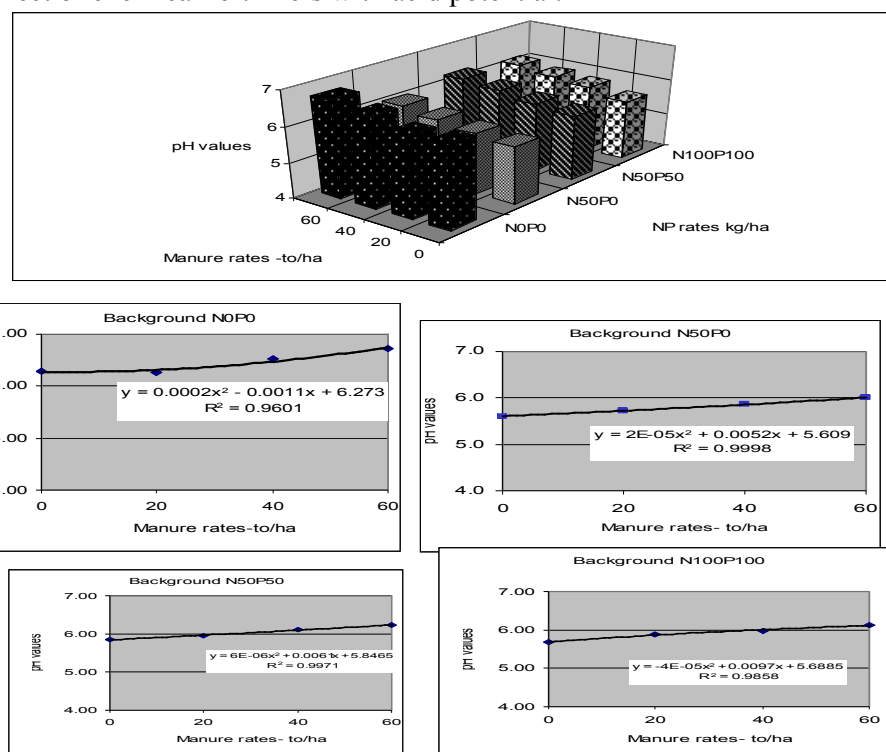


Figure 1. Influence of manure of brown luvic soil reaction from North-West part of Romania

In the brown luvic soil conditions the manure applied on different NP backgrounds had a significant positive effect on soil acidity. Applying manure in the rates of 20, 40 and 60 to/ha in the lack of N, P fertilizers the pH values are increasing from 6,29 to 6,76 units. In the case of the other NP backgrounds the manure determined an increase of pH values ranging between 0,4-0,6 units. The negative effect of nitrogen fertilizers application is lower in the case of manure application.

CONCLUSIONS

The results presented above let us come to the following conclusions:

1. Long term experiments are important tools for examining soil fertility
2. The soil reaction evolution is depends by fertilizers type and by the rates level applied
3. The manure applied alone or associated with NP fertilizers, favorable influenced soil reaction, pH values increasing with 0.3-0.4 units if the manure rates applied are 40 to/ha respectively 60 to/ha

REFERENCES

1. Bedo, Z.- Lang, L., 1977 - Growing and breeding of quality wheat. Agro-21 Fuzetek, 97/14, 8-28.
2. Ciobanu Gh.,1999 - Influenta ingrasamintelor organice si minerale asupra productiei si calitatii graului si porumbului. "Agricultura durabila- performanta". Edit. Agric-Bucuresti.
3. Nemeth, T., 1996 - Environment friendly fertilizer recommendation for sustainable agriculture. In: Environmental Pollution, Ed. B. Nath et. All ECRP, Queen Mary and Westfield, college, London, 99-105.