MONITORING OF THE SOIL FERTILITY INDICATORS IN BARZAVA PLAIN

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Abstract. *The researches made to publish this paper were located in Barzava Plain (Timis and Caras Severin departments). The purpose of this research was to observe and monitor some of the soil fertility indicators,directly related by crop production in this area. Also, is very important to monitorise soil parameters in order to maintain soil fertility and to prevent soil pollution from different sources (agricultural or non-agricultural ones). For a correct and balanced fertilization, it is absolutly necessary to know in which category are the soil fertility indicators included. In Barzava Plain we identify many soil types, some of them are fertile and suitable for different crops, some of them have different restrictions regarding the water content or nutrients content. Soil pH and degree in base saturation values are included in different classes (from acid to alkalin). Soil phosphorus supply is poor in most of the studied cases, but potassium content is normal.*

Key words: *monitoring, fertility, soil properties, nutrients*

INTRODUCTION

Soil health is the most important factor to increase agricultural production. Continuous use of balanced fertilizers is absolutely necessary to sustain and to increase soil fertility and crop production. Uncontroled long - term fertilization is able to produce changes of soil properties, and the crop production is depending upon the type of soil fertilization management practices. (VERMA G. ET. ALL., 2012)

The soil resource must be recognized as a dynamic living system that emerges through a unique balance and interaction of its biological, chemical and physical components. (KARLEN D.L., ET. ALL., 1995)

Soil quality should not be limited to soil productivity, but should encompass environmental quality, human and animal health, and food safety and quality. Changes in soil quality directly affect food quality and indirectly affect human and animal health. (PARR J.F. ET. ALL., 2009)

In order to maintain soil fertility and health, the supply of soil with nutrients must be made in accordance with the plant demends and the planned yield, in this way being kept a balance between the soil supplying and the neccesaries nutrients. (BORZA I., ET. ALL., 2007)

MATERIAL AND METHODS

Our research was carried out in the field and in the laboratory, in order to identify, to monitorize and to establish the soil properties. Barzava Plain is located in the south part of Banat Plain, laying as a fan on two departments area (Timis and Caras-Severin).

Soils coverage is as a mosaic, being finded fertile soil types but also non-fertile ones. On the Barzava Plain territory are identified two types of climate: cold and wet one in the west part of the plain, and warm-dry onein the south part, which determine a large variety of chemical and physical properties of the soils in the area (LATO K.I., ET. ALL., 2009).

Soil samples were collected from the entire area of Barzava Plain,during 2016 spring at 20 cm depth, and it were analysed according to the national and international methodology (BENTON JONES J. JR., 2001).

Soil pH was determinate by potentiometric method, in water extract 1:2.5 ratio. Mobile potassium content was determined in ammonium-acetate lactate solution and the values were measured with and atomic absorption spectrophotometer at wavelength of 766 nm. Mobile phosphorus content was determined by the Egner-Rhiem-Domingo method and the sample values were measured by a spectra-photo-colorimeter at 660 nm wavelength.

The degree in base saturation was calculated using a standard formula, in function of the exchange acidity and the sum of exchangeable bases.

RESULTS AND DISCUSSION

As it is presented in the following figures, we monitorize soil fertility indicators for 55 soil samples.

Soil pH values indicate that 17samples are included in moderate acid category, 33 are weak acid, 2 are weak alkalin and 3 are neutral, as shows the figure 1.

Soil pH is an important fertility indicator, because crops prefer to grow on a weak acid or neutral soil. Maximum plant sensivity to soil pH appears in the early stages of the vegetation period.

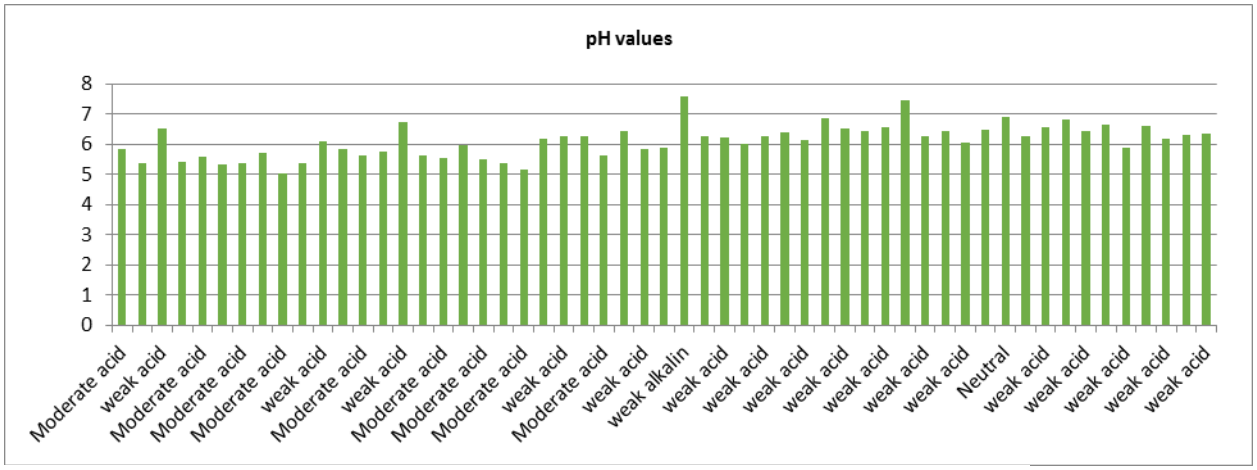

figure 1. Soil pH graphical representation

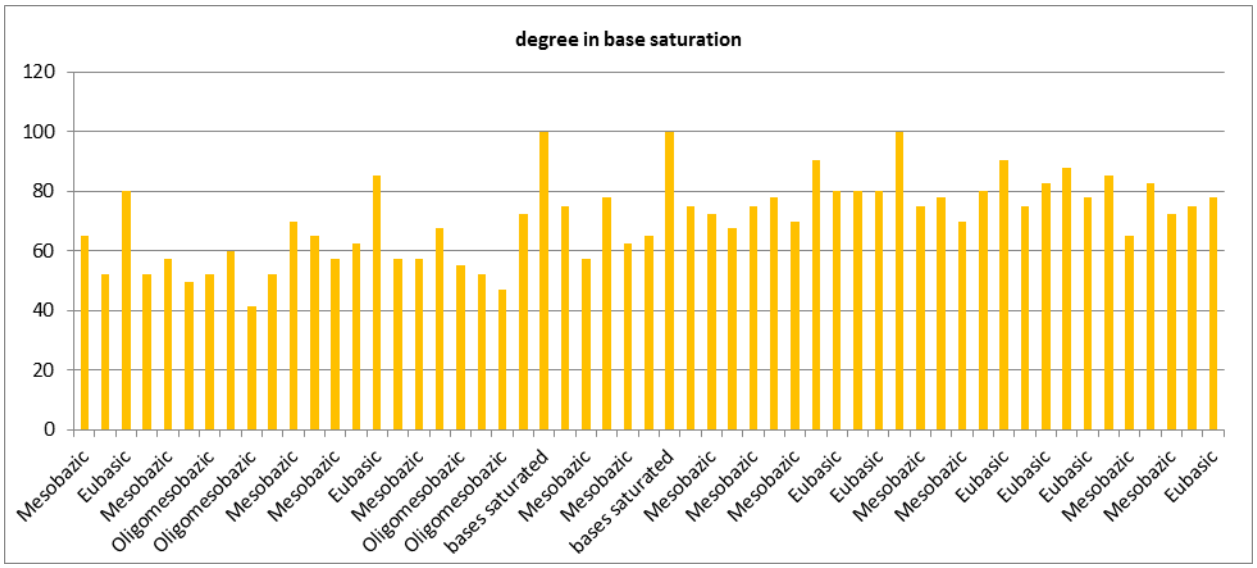

figure 2. Graphical representation of degree in base saturation

The degree in base saturation values are strongly related by the pH values. In this case 9 samples are oligomesobazic, 24 are mesobasic, 19 are eubasic and 2 are saturated in bases (figure 2). Degree in base saturationis one of the soil quality indicators that is necessary to establish the amendment doses, in order to correct the soil reaction.

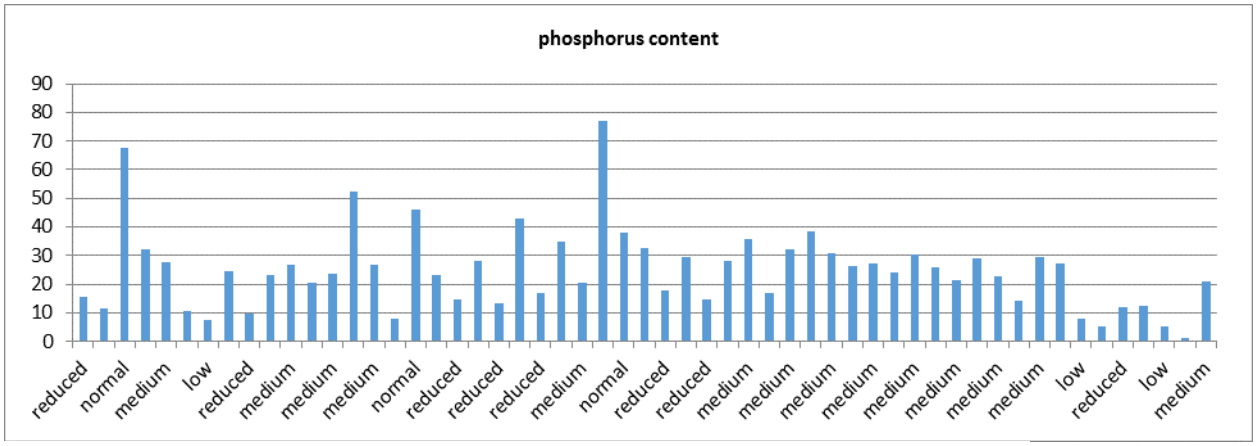

figure 3. Soil phosphorus content graphical representation

Phosphorus soil supply indicate a large variety in the research area. We found that 6 soil samples have a low phosphorus content, 13 are included in a reduced category, 28 have medium content and 8 have normal values (figure3).

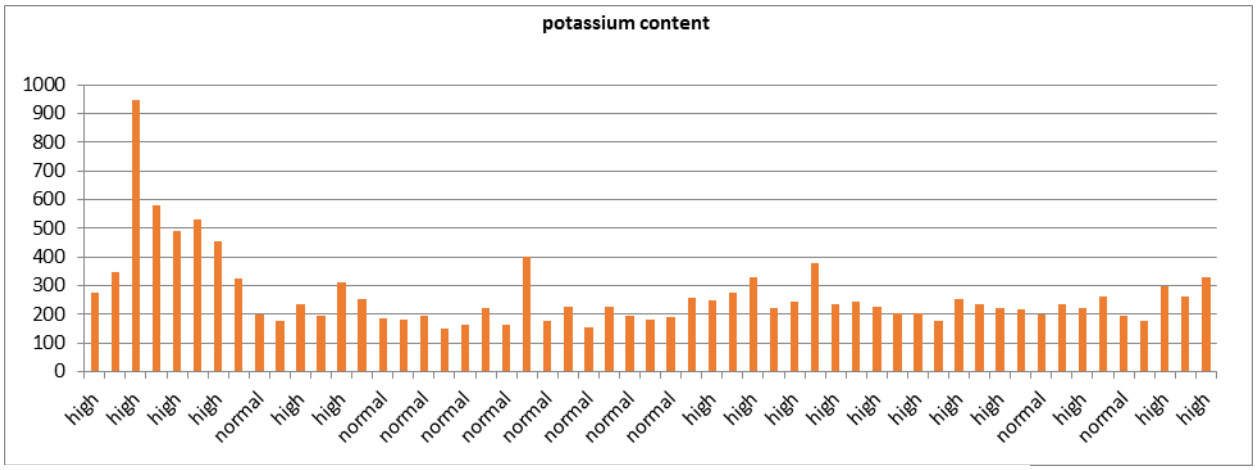

figure 4. Potassium soil content graphical representation

Regarding the soil potassium content, we conclude that 18 soil samples are included in normal supply category and 37have a high concentration in this nutrient. Phosphorus together with potassium are two of the macronutrients, cannot being replaced by other elements in plant nutrition processes.

CONCLUSIONS

Because of the location, in high plain area, of the soil material, climat conditions in the research area and because of the agricultural practices, soils from Barzava Plain present a large variety of physical-chemical properties.

Soil reaction is influenced by altitude, by soil fine parental materials, by the non-rational chemical fertilization practices, by the depth of underground water, in this case being included from moderat acid class to weak alkalin class.

In close concordance with soil pH are the values of the degree in base saturation, the soils from the research area having a low content in bases cations.

Phosphorus content of soils in Barzava Plain is directly influenced by the reduced inputs with this nutrient practiced by the local farmers.

Soils from the researced area have a normal or a high content in potassium, due to the parental materials on which this soils were formed.

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