

RESPONSE OF BARLEY GENOTYPES TO LIMING AND FERTILIZATION ON PSEUDOGLEY SOILMiodrag Jelić^{1*}, Milan Biberdžić¹, Olivera Nikolić², Goran Dugalić³, Nebojša Gudžić¹¹Faculty of Agriculture, Lešak, University of Priština, Serbia²Faculty of Ecological Agriculture, University of EDUCONS, Svilajnac, Serbia,³Faculty of Agronomy-Cacak, University of Kragujevac, Serbia

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Abstract

In this study evaluated the response of four barley genotypes (Rekord, Jagodinac, Kristal and Premijum) to three fertilization method (120 kg N ha⁻¹, 80 kg P₂O₅ha⁻¹, 53 kg K₂O; 120 kg N ha⁻¹, 160 kg P₂O₅ha⁻¹, 53 kg K₂O; 120 kg N ha⁻¹, 80 kg P₂O₅ha⁻¹, 53 kg K₂O + 5 t ha⁻¹"Njival Ca" ha⁻¹ + 20 t manure ha⁻¹) on pseudogley soil. The results showed that the examined genotypes gave poor yields at low soil pH, under low phosphorus and low humus content. The use of NPK fertilizer with a higher content of phosphorus had a positive effect on the yield that was increased twice. The combined ameliorative use of lime, manure and NPK fertilizers led to a significant increase in grain yield, particularly in cv. Kristal. Barley productive traits were highly significantly and positively correlated with soil pH and P₂O₅ and CaO content, while correlations with Mn and Al soil content were significant, but negative.

Key words: barley, fertilizer, genotype, liming, pseudogley soil.

Introduction

Soil acidity influences many chemical and biological reactions that control plant nutrient availability and element toxicity (Sumner et al., 1991; Lavelle et al., 1995). Worldwide, soil acidification affects an estimated 30% of the total topsoil (Sumner and Noble, 2003). Furthermore, 75% of acid topsoils are also affected by subsoil acidity, and failure to address topsoil acidity may result in subsoil acidification of even neutral to alkaline soils (Sumner and Noble, 2003). Pseudogley and other types of acid soils are widespread in the Republic of Serbia, accounting for over 60% of total arable land (Stevanović et al., 1995). The acidity of these soils, their high contents of H⁺ ions and low contents of essential plant nutrients, primarily P and Ca, are constraints to high and stable wheat yields. Low calcium levels, phosphorus deficiency and aluminum toxicity affect root growth, the absorption of water and nutrient uptake by plants, generally causing crop yield reduction in acid soils (Pavan et al., 1982; Sumner, 2004). The effect of fertilization and liming on crop yield has been observed in many studies; the trials, however, show differences in the intensity of the effect. Crop yield is also significantly affected by soil conditions, climatic factors and weather conditions in a given year (Eduardo et al., 2005; Ito et al. 2009; Chimdi et al., 2012). A large effect on the grain yield of cereals has been reported at combined application of manure, lime and mineral fertilizers (Manna et al. 2005). The objective of the present study was to evaluate the effect of