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## IRON CONTENT IN PSEUDOGLEY OF WESTERN SERBIA AS DETERMINED BY DIFFERENT EXTRACTION METHODS

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**Abstract:** *This study was conducted on pseudogley soil having different physico-chemical characteristics. Soil samples were collected from tilled fields and meadows at six different locations in Western Serbia. A extraction methods was applied with the extraction of total iron ( $\text{HNO}_3\text{-HClO}_4\text{-HF}$ ) and available forms (0.1 M HCl- and 0.005 M DTPA-extractable). The physico-chemical characteristics of the test pseudogleys had a significant effect on the content and forms of iron in different locations in Western Serbia. Soil pH, CEC and the content of finer fractions (silt and clay) had the highest effect on the distribution of different forms of iron. The extraction methods showed similar forms of iron in tilled field and meadow pseudogleys. However, the content of DTPA-extractable iron did not correspond to the total content, which led to the common incidence of iron deficiency in Western Serbian pseudogleys regardless of the high levels of total iron in the soil.*

**Key words:** *Content, Extraction method, Iron, Location, Pseudogley, Soil.*

### INTRODUCTION

Pseudogleys cover significant areas of Serbia, accounting for about 285,000 ha or 78.73% of the total land area in Western Serbia (Tanasijevic et al., 1966). Pseudogleys are rather poor in alkalis, being medium to strongly acid in reaction. They have a highly unfavorable structure, and a low content of organic matter. The acid reaction of pseudogley, its low humus content, and a low supply with available phosphorus and potassium are limiting factors for higher crop yields (Dugalic et al., 2005).

Iron is one of the most common elements in the Earth's crust, ranking fourth in abundance after oxygen, silicon and aluminium. In the soil, iron forms a variety of minerals such as hematite, goethite, limonite, notronite, and pyrite. Iron is also present in the form of grain-coatings in oxidized material, and in many secondary minerals (Kostic et al., 2002). Iron hydroxides play a key role in the biogeochemical cycle, in the bioavailability of iron itself and in the bioavailability of other elements (Hesterberg, 1998).

The bioavailability, mobility and chemical reactivity of heavy metals in soils are often associated with their distribution among certain soil fractions and the dynamic equilibrium among them (Kreamer, 2004; Sharma et al., 2008). It is well known that main factors affecting the mobility of heavy metals in soil include: pH, content and quality of soil organic matter, content and quality of clay fraction, iron and manganese oxides. Apart from soil pH, which is a key parameter, the content and mainly the quality of soil organic matter can influence the availability of heavy metals in soil (Makovnikova, 2000).

Iron is an important micronutrient whose availability could be significantly affected by soil properties. Generally, the total iron increases with increasing cation exchange capacity (CEC) and the clay and silt content (Sharma et al., 2008). Complexation of iron by soil organic matter may result in increased plant availability, and microbial exudates can supply additional iron to plant routes (Mackowiak and Grossl, 2001). Likewise, exchangeable iron absorbed onto inorganic sites and DTPA extractable iron increase with increasing soil organic matter but decrease with higher soil pH and calcium carbonate content (Sharma et al., 2008; Jakovljevic et al., 2005).

### MATERIAL AND METHODS

The investigations were conducted on pseudogley soil taken from the Ah horizon at six different localities in Serbia: Kraljevo, Koceljevo, Lajkovac, Gorobilje, Mionica and