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THE VALUE OF DIFFERENT TYPES OF ACIDITY OF PSEUDOGLEY SOILS IN THE KRALJEVO BASIN UNDER DIFFERENT LAND USES

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MATERIALS AND METHODS

Soil samples for laboratory tests were taken using the open pit method during 2001 (forest pseudogley) and during 2012 (meadow and arable land pseudogley soils),in districts of 10 villages (Jarčujak, Ratarsko imanje, Mrsać, Kovanluk, Drakčići, Ratina, Samaila, Bapsko polje, Konarevo). There were 54 open pits (14, 16 and 24 with forest, meadow and arable land profiles, respectively) that were dug to a depth of 100 cm. Disturbed soil samples for laboratory analyses were obtained from the depths of the humus or the plough-field horizon, while in subhumus horizons the samples were taken successively every 15-20 cm along the entire depth of the dug profile.

The laboratory analyses encompassed the determination of active (pH/H_2O) and exchangeable (pH/KCl) soil acidity and hydrolytic and total acidities.

RESULTS AND DISCUSSION

The acidity status of observed Pseudogley Soils of the Kraljevo Basin, whose all analysed profiles (with the exception of Ahp and Eg horizons of the profile number 2 from Ratarsko imanje - the experimental filed of the Agricultural School where calcification had probably been used), in all three most important horizons (Ah, Eg and Btg), showed poorer or stronger acidification. Active acidity of these soils in the humus horizon, with the exception of the profile in the experimental filed in Ratarsko imanje, varied from pH 4.45 to 6.10, i.e. from the very weak to the extremely strong acid chemical reaction, most frequently pH 4.7-5.0. A significantly narrow range of variation (pH/H_2O 4.78 to 5.98) was shown by the humus horizon of meadow Pseudogley Soils.

The first subhumus (Eg) horizon showed rather high active acidity that varied from pH 4.46 to 5.74. In this horizon, the highest acidity was recorded in forest profiles of Pseudogley Soils. On the other hand, meadow and arable land varieties were quite similar, which is understandable because these soils were largely used alternately as fields and meadows. Active acidity in observed Pseudogley Soils was, as a rule, high in the upper part of the Btg horizon, which usually started at a depth of 40-50 cm, less often at a much greater depth. Active acidity at the depths of 30-40 and 50-80 cm varied from 4.8 to 5.7 in 43 displayed profiles. The highest active acidity in the Btg horizon was recorded in forest profiles of Pseudogley Soils.

The exchangeable acidity (pH in KCl) in the humus horizon varied from 3.7 to 4.9. In the Eg horizon, exchangeable acidity increased except in the profile in the experimental fieldof the Agricultural School. The highest exchangeable acidity in the Eg horizon was recorded in the forest profile, while this acidity was the highest in approximately 2/3 of observed profiles in the Btg horizon.

In addition to high active and exchangeable acidity, Pseudogley Soils of the Kraljevo Basin are also characterised by high values of hydrolytic and total acidity not only in eluvial but also in illuvial horizons. The highest hydrolytic acidity, both in the Ah horizon and the Eg and Btg horizons, was recorded in the forest profile of Pseudogel soils.

The meadow profiles of Pseudogley Soils had lower hydrolytic acidity than forest profiles in Ah and Eg horizons, while the difference in hydrolytic acidity between forest and meadow profiles in the Btg horizons was insignificant. Values of hydrolytic acidity in arable land profiles in the Ah horizon were lower than in meadow and especially forest profiles. These data showed that the conversion of forest into arable lands Pseudogley Soils significantly reduced hydrolytic acidity in the Ah, i.e. Ahp horizon, but also in the Eg horizon. Observed by Y_1 values, meadow Pseudogley Soils ranked between forest and arable landPseudogley Soils, although they were much closer to arable landPseudogley Soils, which can be explained by the fact that the majority of today's Pseudogley Soils had been occasionally used as arable land.

Total acidity of Pseudogley Soils in the Kraljevo Basin is quite high. It ranged from 6.2 to 24.8, 6.9 to 15.9 and from 6.2 to 18.0 meq/100 g soil in Ah, Eg and Btg horizons, respectively. Similarly to hydrolytic acidity, effects of the methods of Pseudogley Soils use reflected upon the value of total acidity.

CONCLUSION

Acidification was more or less pronounced in the three most important horizons (Ah, Eg, Btg) in observed Pseudogley Soils in the Kraljevo Basin covered by forest, meadow and arable land vegetation. The highest active and exchangeable acidity was determined in forest profiles in all observed horizons. The difference between meadow and arable landPseudogley Soils in the values of their active and exchangeable acidity was less pronounced. In addition to high active and exchangeable acidity, Pseudogley Soils of the Kraljevo Basin were characterised by high values of hydrolytic and total acidity, not only in eluvial but also in illuvial horizons.