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SOIL TYPES IN MANAGEMENT UNIT RISTOVAČA IN PUBLIC ENTERPRISE VOJVODINAŠUME (SERBIA)

SUMMARY

This paper analyses the possibility of soil mapping perspectives and recent management options on local level and future perspectives. The dominant soil type in management unit Ristovaca was meadow black soil. The total area of this soil type was 268.82 ha. Meadow black soils are a subtype of chernozem. This type of soils situated in highest position with oscillation of ground water from 1 to 2 meter. Meadow black soils in the riparian zones of rivers are very similar to alluvial semigleys. The main soil processes represented there are humification and humization. This type of soil is clayly loams texture with a thick humus-accumulative horizon. The CaCO₃ concentration increases most frequently with the depth. The most common tree species is pedunculate oak. The second dominant soil type in management unit Ristovaca is salic chernozem. The most important species on meadow black soil in management unit are pedunculate oak on the area of 176.62 ha with volume of 56,291.4 m³. The highest volumes are determined in age of 81 -100 years (53.298 m³). The most endangered tree species in Serbia regarding to climate change scenarios are pedunculate oak.

Keywords: soil types, soil mapping, management unit

INTRODUCTION

Digital soil mapping involves research and operational applications to infer on patterns of soils across various spatial and temporal scales (Grunwald, 2010). In forestry, it is necessary to know distribution of soil and tree species, as well as their interaction in space. The study area is situated in defended part of alluvial plain of Danube near Plavna. Soils in this area are unfavorable for agricultural production due to one or more properties. This is the reason for using it for forestry. Similar areas are located along the defended part of the alluvial plain of Danube (Simić, 1987; Galić, 2011). At this site, limiting soil properties are affecting the potential production of this type of soils. It is essential to determine the distribution of each soil unit in the studied area.

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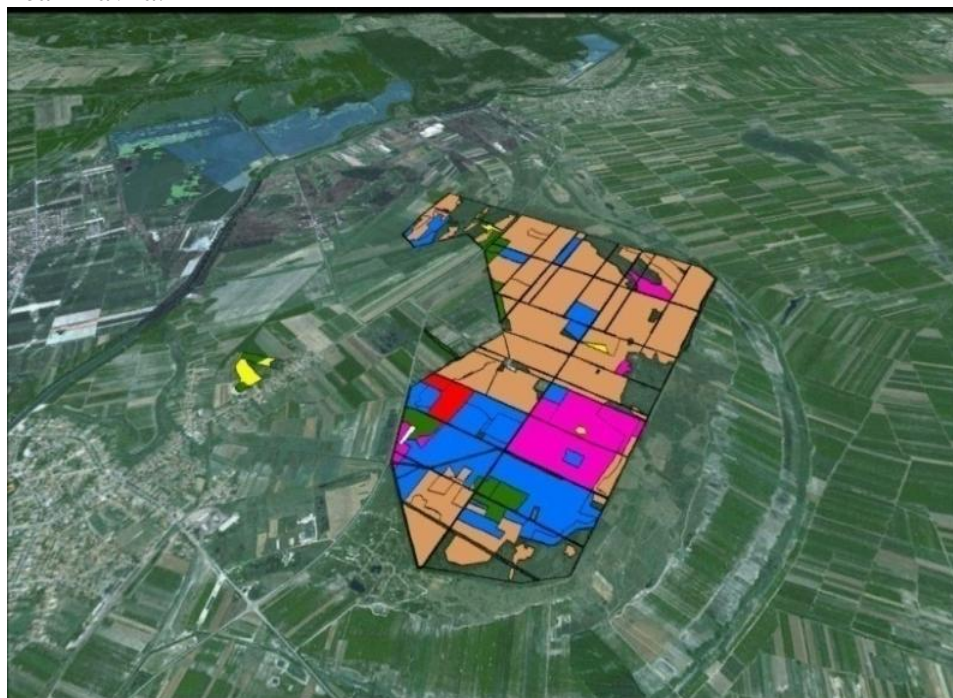
Notes: The authors declare that they have no conflicts of interest. Authorship Form signed online.

The second goal of the research is to determine the suitability of soil unit for different tree species growing. For this purpose, analyzed were the productivity of different tree species, their interaction in space and indicators of tree species productivity on different soil unit are shown.

The aim of the study was to analyze the production characteristics depending on the soil types in management unit Ristovača.

MATERIAL AND METHODS

The study area is situated in defended part of alluvial plain of Danube near Plavna.



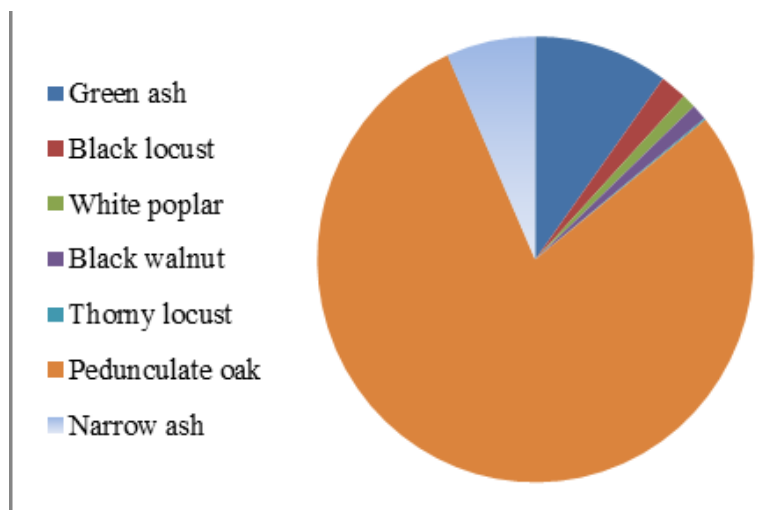
Depending on the micro-relief conditions, soil profiles were opened for the study of soil morphology and soil samples were taken for the laboratory analysis. Particle size composition (%) was determined by the international B-pipette method with the preparation in sodium pyrophosphate (Bosnjak et al., 1997). Soil particle classification in the particle size composition was based on Atterberg's classification.

Chemical characteristics were determined by the following methods (Hadžić et al., 2004); humus (%) by Turin's method, modification by Simakov 1957; CaCO_3 (%) volumetric method, by Scheibler unit calcimeter; pH in H_2O electrometric method with combined electrode on Radiometer pH meter. Production characteristics are based on a data for forest management unit Ristovača (Forest Management plan for period 2008-2017).

Spatial analysis of soil and species distribution was analyzed using the software package ArcMap 10.1.

RESULTS AND DISCUSSION

The total volume in management unit Ristovaca was 106.605 m³ (graph 1).

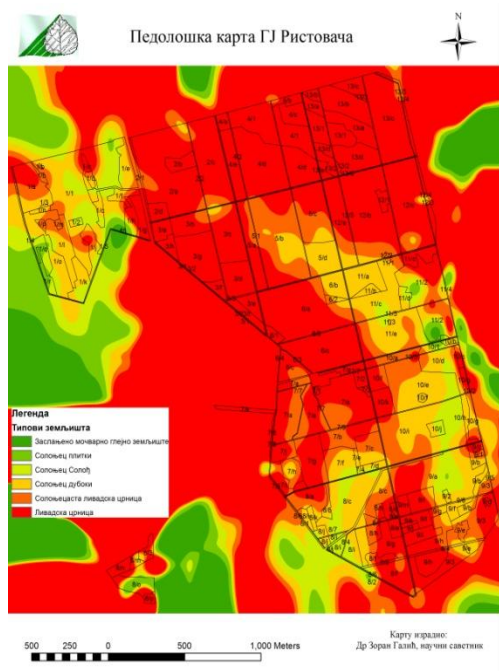


Graph 1. Total volume in management unit Ristovaca

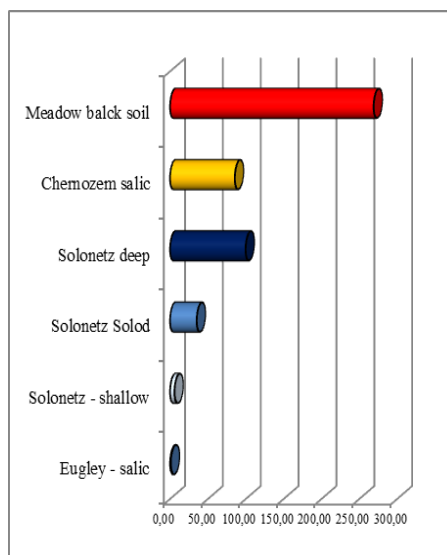
The dominant tree species was oak with a share in the total volume of 79.19 % or 84,424 m³ (graph 1.). Those characteristics confirm the fact that the forests in the protected part of the alluvial plain of Danube incurred as a result of the needs of the rural population of firewood (Simić, 1987; Galić, 2011). Participation of green ash in the total (*Fraxinus americana*) was 9.95 %, while the share of narrow ash was 6.58 %. Other species (black locust, black walnut, white poplar and thorny locust) have a share in the total of 4.28% or 4,561 m³. In the above analysis it is observed a high share of green ash (invasive species) in the total volume.

The most common soil unit in management unit Ristovaca was meadow black soil (picture 1, graph 2). This soil unit covered 268.82 ha or 54.23 %. The second most common soil type was solonetz. This soil unit covered nearly 20.5% area of management unit Ristovaca. Chernozem-salic covered 85.42 ha or 17.23 % of this area. The most unfavorable soil units (solonetz - shallow and deugley - salic) covered only 1.35% or 6.68 ha.

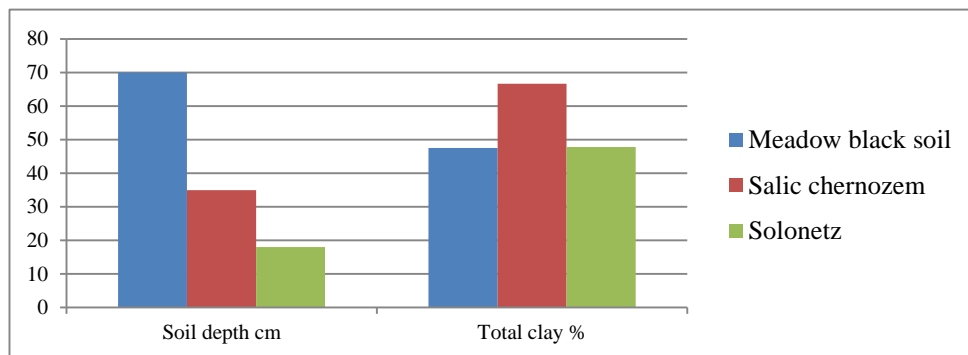
Meadow black soils are a subtype of chernozem. This type of soils situated in highest position with oscillation of ground water from 1 to 2 meter. Meadow black soils in the riparian zones of rivers are very similar to alluvial semigleys. The main soil processes are humification and humization. This type of soil is clayly loams texture with a thick humus-accumulative horizon. The CaCO₃ concentration increase the most frequently with the depth.



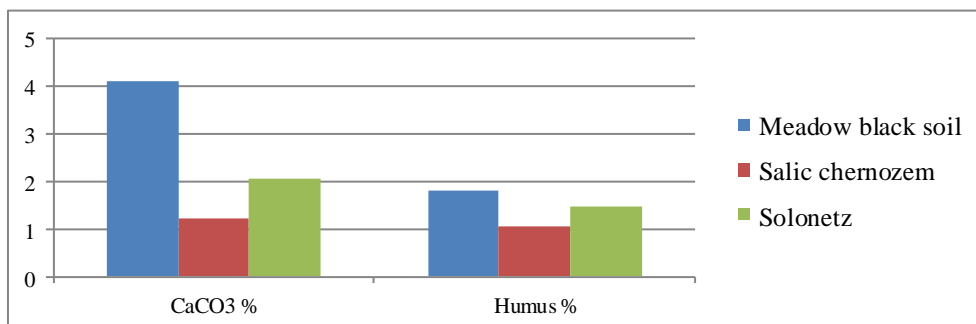
The second dominant soil type in management unit Ristovaca is salic chernozem.



Graph 2. Soil Characteristics

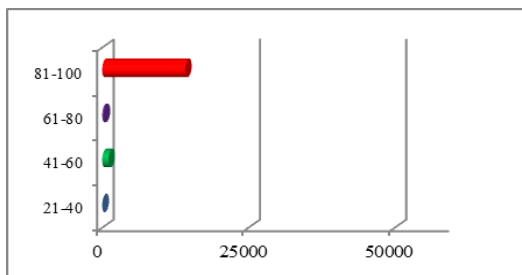


Graph 3. Soil depth and total clay contents

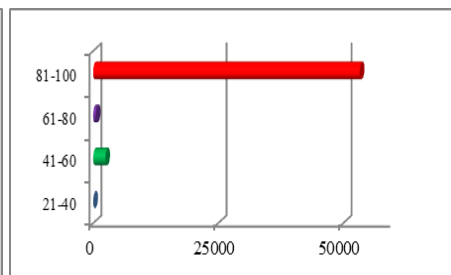


Graph 4. Soil CaCO₃ and humus contents

The most important species on meadow black soil in management unit is pedunculate oak on the area of 176.65 ha with total volume of 56,291.4 m³ (graph 4). The highest total volume are determined in age of 81 -100 (53,298 m³) on meadow black soil and chernozem salic (graph 5 and 6).



Graph 4. Total volume on chernozem - salic



Graph 5. Total volume on meadow black soil

CONCLUSIONS

The dominant soil type in management unit Ristovaca was meadow black soil. The total area of this soil type was 268.82 ha.

The most important species on meadow black soil in management unit are pedunculate oak on the area of 176.62 ha with volume of 56.291,4 m³.

The highest volume are determined in age of 81 -100 (53.298 m³).

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