

THE DESCRIPTION OF FOREST SOILS FROM BRĂILA COUNTY

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Abstract

The aim of this article is to provide a description of soils from Brăila Forest Directorate, an area characterized by a plain relief. The work material is represented by soil analysis reports from Brăila Forest Directorate. Furthermore, these reports are part of an extensive national database realized by INCDS “Marin Drăcea” based on forest management plans from after 1980. As a total, 116 soil profiles were analyzed for this area, with a sum of 334 genetic soil horizons. As such, the soils from Brăila Forest Directorate are specific to the plain area: the most common types of soils are fluvisols, solonchaks and gleysols; these are soils moderately supplied with humus, weakly acid to alkaline and eubasic.

Key words: forest soils, fluvisol, solonchak, acidity, humus.

INTRODUCTION

Brăila Forest Directorate is composed of 3 Forest District (Brăila, Lacu Sărat and Ianca), one 115 ha greenhouse (Lacu Sărat - Basca) and one herd (Râmnicelu). Based on the information from Romsilva website, this directorate manages a forest surface of 26190 ha.

The main tree species are diverse light ones, namely willow, local and eur-american poplar that occupy a total area of 15958 hectares (romsilva.ro), followed by diverse hard species that occupy 4243 hectares, with a predominance of black locust.

The administered surface is divided as follows: Brăila forest district manages 9291 hectares, Lacu Sărat Forest District manages 9097 hectares, while Ianca Forest District manages the remaining 7802 hectares.

The purpose of the present article is to realize a description of soils from Brăila county Forest Directorate, characterized by a plain relief.

MATERIAL AND METHODS

The work material is represented by soil analysis bulletins from this area. The analysis bulletins are part of an extended national database realized by INCDS “Marin Drăcea” based on forest management plans realized after 1980. These bulletins contain the physical and chemical properties of soils, such as pH, humus content, carbonate content, basis exchange capacity (Sb), hydrogen exchange capacity (Sh), total cationic

exchange capacity (T), base saturation degree (V) and texture. These analysis were realized based on renowned laboratory methods (Dincă et al., 2012a) in the Pedology Laboratory from INCDS Bucharest (for the analyses realized up to 2000) and in the Laboratory from INCDS Braşov (after 2000). The results from the analysis bulletins were then organized in a database, analyzed and processed and afterwards interpreted from a pedologic point of view.

For OS Brăila, the analysis bulletin from the last tree management plans were taken into account (namely 1992, 2008, 2013), for OS Ianca the management plans realized between 1994 and 2014, while for OS Lacul Sărat the ones realized in 1993, 2008 and 2013 (Table 1). As a total, 116 soil profiles were analyzed for DS Brăila, with a total number of 334 pedo-genetic horizons.

Table 1

The list of forest districts from DS Brăila taken into consideration for this study

O.S. Forest Districts:	1990-1999	2000-2009	2010-2015
Brăila	1992	2008	2013
Ianca	1994	-	2014
Lacul Sărat	1993	2008	2013

Microsoft Excel 2010 was used in order to organize the database, while Statistica variant 8 was used for analyzing the data.

RESULTS AND DISCUSSION

First of all, the soil types present in each forest district from DS Brăila was taken into account, together with its distribution. In OS Brăila, four types of soils were identified from three soil classes: chernozem and phaeozem (Cernisols class), fluvisol (Protisoil) and gleysol (Hidrisoil). A larger soil variety was observed in OS Lacul Sărat, namely five soil types from four classes: chernozem and phaeozem (Cernisoil), solonchak (Salsodisoil), fluvisol (Protisoils) and gleysol (Hidrisols). For OS Ianca, four types of soil belonging to Luvisol (luvisol), Protisol (fluvisol), Cernisol (phaeozem) and Salsodisol (solonchak) were identified.

For the entire county, the most widespread types of soils are fluvisols (66%), followed by solonchaks (13%) and gleysoils (13%) (Figure 1).

At the country's level, fluvisol occupies 330.564 ha in the forest fund, meaning 5% of the total forest soils, chernozem 46.026 ha (1%), while solonchak and solonetz are occupying insignificant surfaces (Dincă *et al.*, 2014). Vrînceanu 2009, has observed that the North Bărăgan Field has a low range of soil types relatively developed such as chernozems. Mocanu *et al.*,

2010, have inventoried a percentage of 2,7% solonchaks and 1,48% solonetz in the agricultural soils from Brăila Plain.

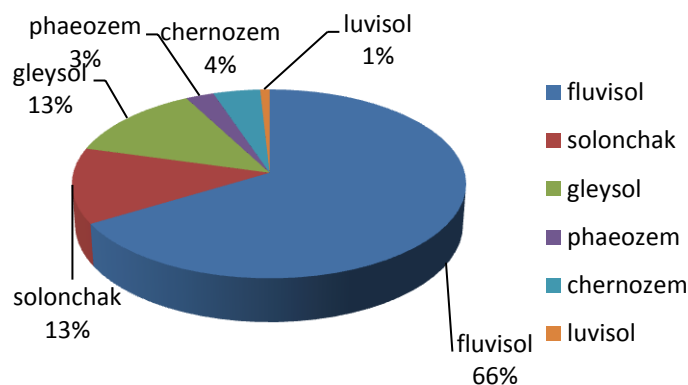


Fig.1. Percentage of soil types identified in Brăila County

The pH's variation was analyzed for the main types of soils (fluvisoil, solonchak and gleysoil). For each type of soil, the pH values were considered differentially, on genetic horizons (Figure 2). The lowest pH values for all horizons were found for fluvisols (7.15 in the A horizon, 5.51 in the C horizon) and gleysols (7 in the first A ocric horizon). The highest values were found for fluvisol (with the value of 8.7 in the A horizon and 9.0 in the C horizon - Figure 2). The average pH values on horizons are very close to 8.0 for all the three main soils. By interpreting the average pH values, the reaction varies from weakly alkaline to alkaline for all the three types of soils. The largest amplitude can be found in the fluvisol C horizon, where the pH varies between 5.5 and 9.0, respectively moderately-acid to alkaline.

Balaban *et al.*, 2008, have identified pH values ranging between 8.2 and 8.6 in the chernozems from North Bărăgan, East from Iencii Valley. Crişan *et al.*, 2017, have calculated average pH values of 7.05 in the Ao horizon and 7.21 in the C horizon for the forest fluvisols from Giurgiu County. In the case of phaeozem forest soils from Cluj county, the average pH is of 7.11 in the Am horizon and 7.72 in the A/C horizon (Enescu *et al.*, 2017), while for the chernozem from Botoşani County it is of 7.18 in the Am horizon and 8.21 in the A/C horizon (Scărlătescu and Vasile, 2017).

In regard with the humus content, an average value of the quantity of humus in the A horizon was calculated for each identified type of soil (Table 2). The highest content of humus is registered in the case of gleysol, followed by fluvisol and solonchak, both with a similar value (2.51 and

2.18). All the three soil types are situated in the category of moderately humiferous soils.

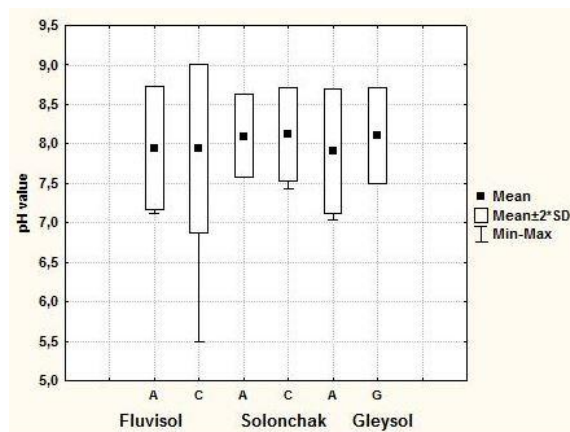


Fig.2. pH variation in the genetic horizons of soil for the most common types of soil in the Brăila County

Table 2

Average humus and nitrogen content for the soil types from Brăila county

Average humus content per soil type in the A horizon (%)		
Fluvisol	Solonchak	Gleysol
2.51	2.18	4.04
Nitrogen content per soil type in the A horizon (N-%)		
0.081	0.065	0.124

The average humus content of soils from DS Brăila is generally situated in the limits established in other forest soil investigations realized at the country's level (phaeozem = 30.2 g/kg, luvisol = 27.5 g/kg, chernozem= 24.8 g/kg, Dincă et al. 2012b). The average humus content is of 5.26% for luvisols and 4.55% for preluvisols for the forest soils from Bihor County (Dincă *et al.*, 2017).

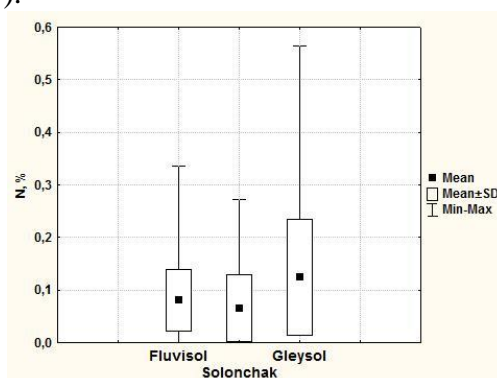


Fig 3. The variation of the medium nitrogen content in the A horizon per soil type from Brăila County

A diagram was also realized for the nitrogen content in the A horizon (N-%), with its variation for the most widespread type of soils from the county (Figure 3). As such, it can be observed that the largest variation amplitude can be found at gleysol, while the lowest at solonchak. By interpreting the average value of the base saturation degree, it can be observed that it is close to 100% for all three soil types. As such, the soils are eubasic.

Coteș *et al.*, 2009, have observed that the nitrogen content of soils from Brăila Plain frequently ranges between 0.15 – 0.25%, but it goes below 0.08% in sandy soil.

CONCLUSIONS

The most widespread types of soils from Brăila Forest Directorate are fluvisols, solonchaks and gleysols. Besides them, in much lower percentages, soils such as phaeozems, chernozems and luvisols can also be found.

The richest soils in humus from Brăila county are gleysols, followed by fluvisols and solonchaks.

The most acid soils from this area are fluvisols, while the most basic ones are solonchaks.

Furtermore, the pedological conditions of the field area are contributing to the apparition of a broad leaved stand and a silviculture oriented towards the fact that large flooding areas exist in the studied area.

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