Scientific Papers. Series A. Agronomy, Vol. LVI, 2013
ISSN 2285-5785; ISSN CD-ROM 2285-5793; ISSN Online 2285-5807; ISSN-L 2285-5785

PHYSICAL AND CHEMICAL CHARACTERIZATION OF DYSTRIC CAMBISOL FROM THE PIATRA CRAIULUI NATIONAL PARK

Elena-Mihaela EDU[1], Sevastian UDRESCU[1], Mircea MIHALACHE[1], Lucian DINCĂ[2]

[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, Postal Code 011464, Bucharest, Romania
[2]Forest Research and Management Institute, 13 Cloşca Street, Postal Code 500035, Braşov, Romania

Corresponding author email: elenaedu@ymail.com

Abstract

This paper presents the characterization dystric cambisol from Piatra Craiului National Park. Soil samples are collected from the Piatra Craiului National Park. Park has a surface of 14,800 ha.
This type of soil has the following diagnostic horizons: Ao, Bv, C are analyzed following parameters: pH, organic C, total N, SH, SB,
The soil is strongly acid reaction (pH = 3.45-4.57). High organic matter and total nitogen in the upper horizont.

Key words: *forest soil, organic carbon, nitrogen.*

INTRODUCTION

National Park extends over the counties of Brasov, Arges, including areas belonging localities Bran, Moeciu (villages Magura and Pestera), Bran, Rucar and Dambovicioara.
The total area of the Piatra Craiului National Park is 14,800 ha of which 7806 ha in Brasov and 6994 in Arges (Dumitru and Toader, 2004).

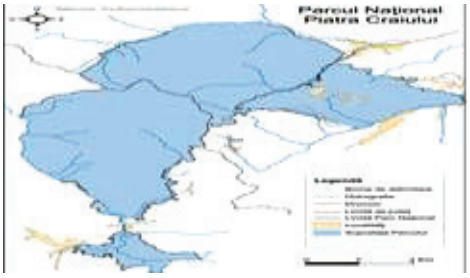

Figure 1. Map of Piatra Craiului National Park

Total carbon in forest ecosystems is given of existing content in biomass, dead wood, in the litter and soil. The highest amounts are found in living biomass and soil. Evolution of forest carbon stock in soil is influenced by natural factors and anthropogenic.
Globally, forests store large amounts of carbon sequestered from the atmosphere and retained in living and dead biomass and soil.

MATERIALS AND METHODS

The research was performed in the Piatra Craiului National Park and were followed some chemical indicators.
The soils pH was electri-chimically determinat in water, the reading being fulfilled wich Thermo Orion 3 pH-meter. The organic carbon was determined thoug the dry ignition method by using the Leco Tru Spect CN automatic analyser. The total nitrogen from de soil was established through the humid mineralization method and titrimetrical dosage-Kjeldahl method with the Gerhard mineralizor and still. (ICP forests, 2010) The exchange acidity the extract of potssium acetate. The basic cations (K^+, Na^+, Mg^{++}, Ca^{++}) were determined through the repeated blenders wiht ammonium acetat, total cationic exchange capacity (T), by summing SB + Ac, the saturation degree of base (V%), the formula V% = SB/T*100.

RESULTS AND DISCUSSIONS

The resultas regard distribution of values for physico-chemical indicators of surfaces with dystric cambisols from the Piatra Craiului National Park.

Table 1. Analytical data of the chemical features of the dystric cambisols from Piatra Craiului National Parks

No. profiles	Horizont	Depth cm	pH H_2O	pH $CaCl_2$	Nt (%)	Ct (%)	Ah (me/100g)	SB (me/100g)	K (me/100g)	Na (me/100g)	Mg (me/100g)	Ca (me/100g)	T (me/100g)	V (%)
1	Aou	0-10	3.27	2.49	1.173	12.09	61.54	4.97	2.25	0.11	0.09	2.52	66.51	7.47
	AB	10-20	3.39	2.76	0.363	7.06	37.43	1.52	0.52	0.08	0.66	0.25	38.95	3.89
	Bs1	20-40	4.07	3.43	0.223	4.36	24.38	0.93	0.28	0.05	0.53	0.06	25.30	3.66
	Bs2	40-80	4.36	3.81	0.168	4.06	21.71	0.54	0.16	0.06	0.28	0.04	22.25	2.42
2	Ao	0-10	4.01	3.14	0.476	7.82	21.66	5.00	1.06	0.05	0.48	3.40	26.65	18.75
	AB	10-20	4.40	3.66	0.112	2.06	11.43	2.67	0.15	0.03	0.64	1.85	14.10	18.95
	Bv1	20-40	4.60	3.76	0.056	1.10	9.25	2.46	0.14	0.04	0.23	2.05	11.70	20.98
	Bv2	40-80	4.86	3.85	0.035	0.59	7.45	2.02	0.14	0.06	0.30	1.52	9.47	21.31
3	Ao	0-10	4.81	3.79	0.363	4.78	15.51	11.76	0.66	0.05	0.77	10.29	27.27	43.13
	Bv1	10-20	4.94	3.84	0.111	1.45	9.03	4.25	0.22	0.04	0.64	3.35	13.28	31.99
	Bv2	20-40	4.93	3.75	0.055	0.90	11.48	3.48	0.18	0.03	0.41	2.85	14.96	23.28
	Bv/R	40-80	4.95	3.74	0.084	0.52	7.73	4.35	0.21	0.04	0.36	3.74	12.07	36.00
4	Ao	0-10	3.50	2.83	0.806	10.60	46.47	7.20	1.24	0.09	0.50	5.38	53.67	13.42
	Bv	10-20	4.40	3.60	0.334	3.60	18.17	2.10	0.28	0.05	0.68	1.10	20.28	10.37
	Bv/R	20-40	5.49	4.49	0.168	1.70	8.00	10.16	0.48	0.04	0.34	9.31	18.16	55.96
5	Ao	0-10	3.93	3.22	0.445	4.89	23.51	1.68	0.47	0.05	0.62	0.55	25.19	6.69
	Bv1	0-20	4.58	3.84	0.139	2.36	13.17	0.70	0.15	0.03	0.44	0.08	13.87	5.06
	Bv2	20-40	4.57	3.87	0.084	1.12	8.81	0.46	0.15	0.03	0.10	0.17	9.27	4.93
	Bv3	40-80	5.37	4.16	0.028	0.50	7.51	4.29	0.22	0.04	0.09	3.94	11.80	36.37
6	Ao	0-10	4.73	3.65	0.529	5.06	19.42	7.57	0.57	0.04	0.69	6.28	26.99	28.04
	Bv1	10-20	4.66	3.68	0.250	3.26	16.38	4.02	0.27	0.04	0.70	3.01	20.40	19.72
	Bv2	20-40	5.18	4.01	0.140	1.20	12.13	3.83	0.38	0.03	0.63	2.78	15.97	24.00

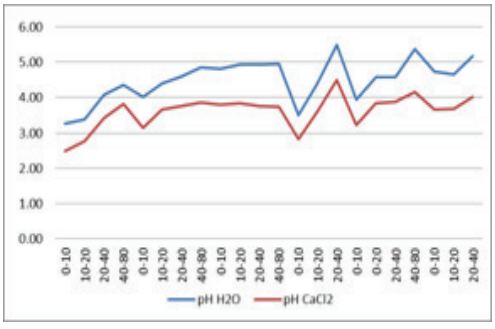

Figure 2. The depth variation of pH

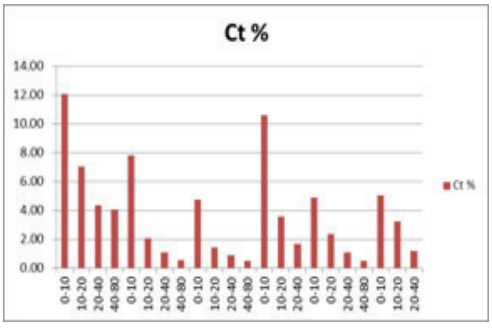

Figure 3. The depth variation of organic carbon

The results have shown that the mountain forest soils are strongly acidic, with a pH between 2.5–4.5 in saline extract

The largest amounts of organic carbon is in the top 20 cm of mineral horizons, due to more abundant crop residues and lignin rich in organic carbon decreases with depth.

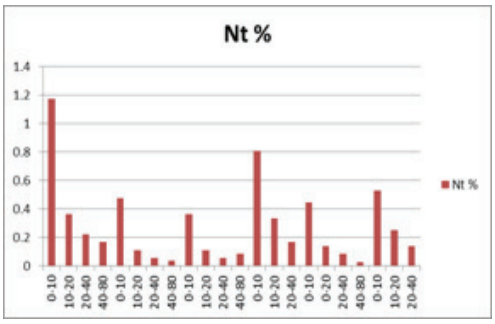

Figure 4. The depth variation of total nitrogen

Higher accumulation of total nitrogen in receive 10 cm of profile.

In the first 10 cm of soil is recorded greater amounts of Ca and K.

It is noted that among the six sections studied, which is the same type of soil there are some differences large and small, for some physico-chemical conditions caused by lithologic substrate, the composition of forest.

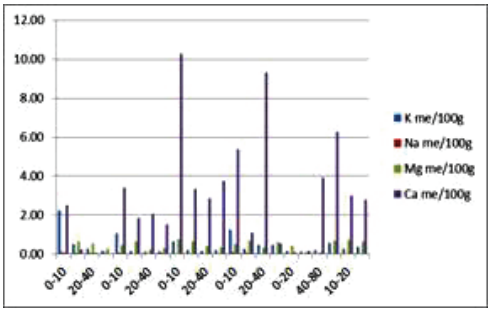

Figure 5. The depth variation of basic cations

CONCLUSIONS

The results have shown that the mountain forest soils are strongly acidic.

Organic carbon and total nitrogen is highest in the first 10 cm of the soil profile is increased due lignin-rich litter, and it decreases with depth.

ACKNOWLEDGEMENTS

This research work of was financed from Project POSDRU/107/1.5/S/76888 and also was carried out with the support of Forest Research and Management Institute.

REFERENCES

Cools N., De Vos B., 2010. Manual on methods and criteria for harmonized sampling, assessment, monitoring and analysis of the effects of air pollution on forests. Part X, ICP Forests, Belgium.

Dumitru I., Toader T., 2004. Padurile României, Parcurile Nationale si Parcurile Naturale. Editura Intact Bucuresti.

FAO, 1990. Guidelines for soil description. Edition a 3-a, Roma.

ICP forests, 2010. Manual on methods criteria for harmoniyed sampling, assessment, monitoring and analzsis of effects of air pollution on forests.

ISO 11464. 1994. Soil Quality – Pretreatment of samples for physic-chemical analysis. International Organization for Standardization. Geneva, Switzerland. 9, p. (available at www.iso.ch).

LECO, 1996. CNS-2000 Elemental Analyzer-Instruction Manual.

Mihalache M., 2006. Pedologie – geneza, proprietatile si taxonomia solurilor. Editura Ceres, Bucuresti;

Whitehead D., 2011. Forests as carbon sinks-benefits and consequences. Tree Physiology-31, p. 893-902.

***, 1981. Metodologie de analiza agrochimica a solurilor în vederea stabilirii necesarului de amendamente si îngrasaminte partea I, Bucuresti.