

# Peatlands from Apuseni Mountains - Conservation and protection

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**Abstract** In the present paper, the objectives were: to identify the most representative perimeters with peatlands in the Apuseni Mountains, to analyze their chemical properties, to identify the predominant flora and to establish measures for the conservation and protection of peatlands.

**Key words** peatland, biodiversity, biomass, conservation, Apuseni Mountains

Histosols are organic soils with particular characteristics determined by excess humidity (hydromorphs) named gleiosols, histosols [3]. In the Romanian Soil Classification System it is named peat soil, and Munteanu I. and Florea N., in the Romanian Soil Taxonomy System [4] they named them histosols and they belong to the Histosols Class, but Joosten and Clarke [5] define peat as „acumulated sedimentary

matter, consisting of at least 30% dry mass of organic plants”, being included in the classification system of peat soils, vines, and organic soils.

They cover an area of 400 million ha in approximately 180 countries (Fig. 1), representing 1/3 of the global water resources. The largest area covered by peatlands include Russia, Canada, the USA and Indonesia [9].

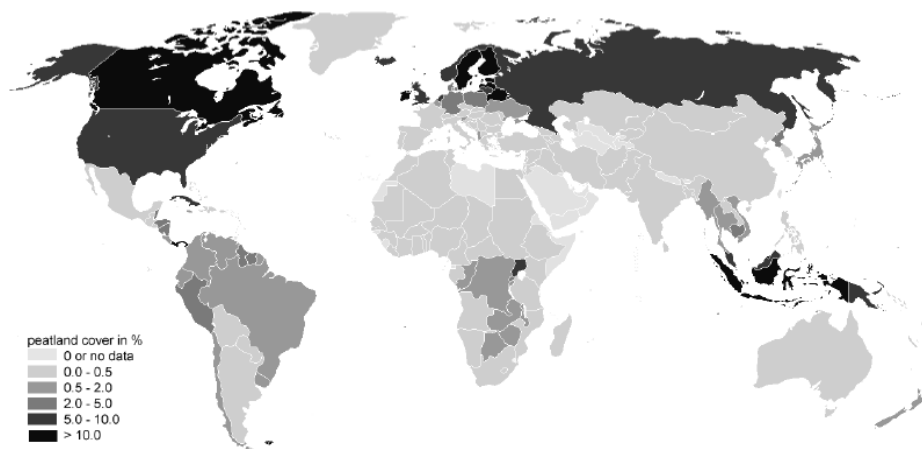


Fig. 1. Global distribution of peatlands  
(Source: imcg.net)

The Apuseni Mountains are found 99 of the 265 high peatlands ( oligotrophs) in our country [8].

## Materials and Methods

The objective of this study is to obtain the most complex information regarding the peatlands in the Apuseni Mountains, in terms of biodiversity. The followed stages were: identification of the most representative perimeters with peatlands in the Apuseni Mountains. The chemical properties were established by determining of the pH, hydrolytic acidity, humus and phosphorus and potassium. The predominant flora was identified by using of „Determinator pentru Flora

Pajistilor” [1]. After the identification of the areas with peatland were established the conservation and protection measures.

## Results

In Fig.2 are the most representative perimeters with peatlands in the Apuseni Mountains. These have been repatriate on five regions with the related areas.

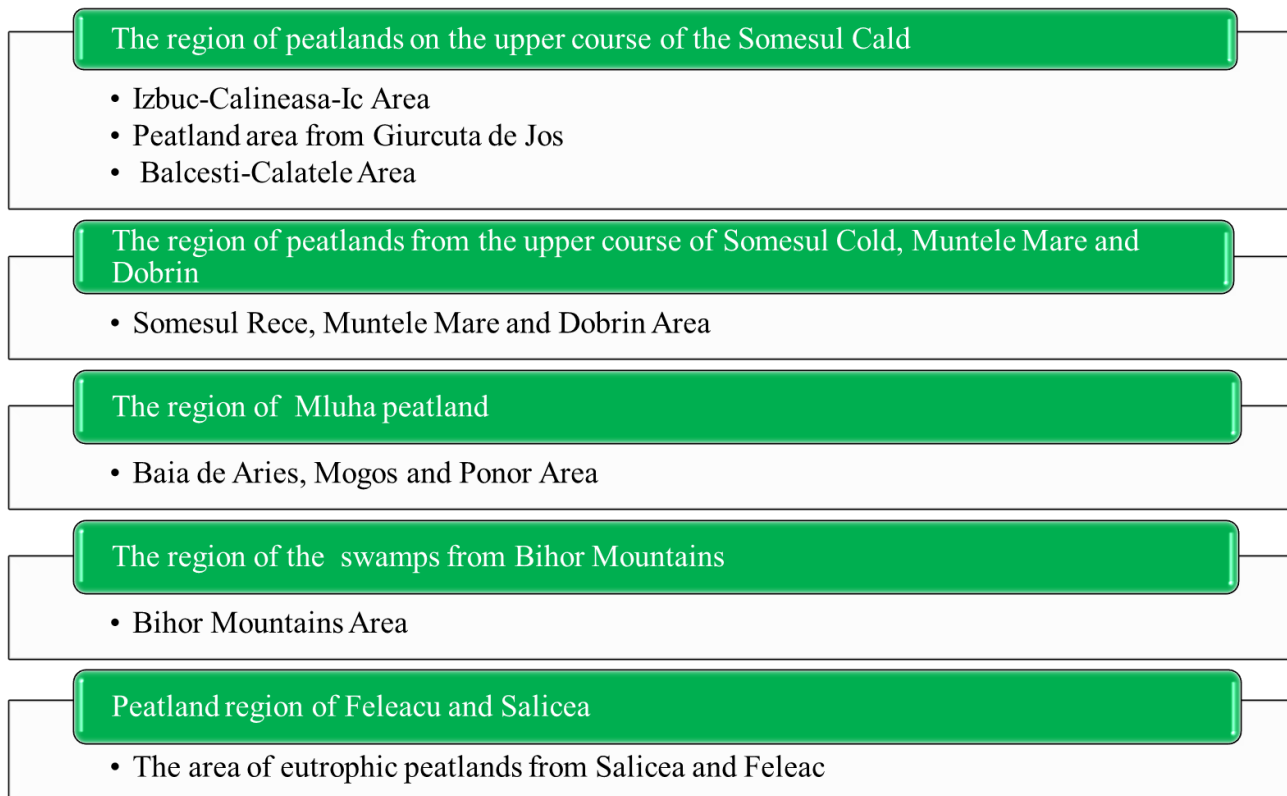


Fig. 2. Results regarding the peatlands in the Apuseni Mountains grouped by regions and areas

Regarding the identification of the peatlands and the analysis of the chemical properties, three peatlands from the Izbuc-Calineasa-Ic area and the area on the upper course of the Somesul Rece, which belong to these two selected regions, were taken into

consideration: The peatland region on the upper course of the Somesul Rece and the peatland region from the upper course of Somesul Cald, Muntele Mare and Dobrin.



Fig.3. Izbuc-Calineasa-Ic area  
(Source: Păcurar Ioan)



Fig.4. Somesului Cald area, Muntele Mare  
(Source: Păcurar Ioan)

The observations regarding the predominant vegetation of the peatlands chosen in the study, focused on the study of the plant association. The association is understood as „a combination of plants with a certain composition, presenting an uniform physiognomy and vegetating in uniform stationary conditions” [7].

Associations have a great importance, reflecting the existence of a reciprocal link between species and ecological factors. Based on field research, a comparison was made between the two regions regarding the vegetation, which is largely represented by an oligotrophic flora with dominant species from the genus *Sphagnum*, *Drosera* and *Carex*, including the spruce (*Picea abies*).

Following the field investigations, a number of species present in the National Red Lists [3,6] specific to the Apuseni Mountains were identified. In the Izbuc-Călineasă-Ic area, the characteristic vegetation is given by the presence of the species *Empetrum nigrum*, *Andromeda polifolia*, *Carex linosa*, *Drosera intermedia*. The peatland of Giurcuta de Jos have much smaller areas of vegetation due to the anthropic activities, but the species *Andromeda polifolia* and *Empetrum nigrum* are present. In the

peatlands of the Balcești-Calatele area are found the species *Drosera rotundifolia*, *Vaccinium oxycoccus* and *Empetrum nigrum*. In the area of Somesul Rece, Muntele Mare and Dobrin, the characteristic vegetation is made up of *Andromeda polifolia*, *Vaccinium oxycoccus* and *Empetrum nigrum*, but regarding the floristic characteristic of this area there are species of *Drosera intermedia* species. The peatland from Ponor is mostly represented by *Sphagnum* moss species, but there can be found specimens such as *Picea abies*, *Abies alba*, but also herbaceous species such as *Drosera rotundifolia*, *Carex limosa*, *Vaccinium oxycoccus*. The Bihor Mountains area is made up of eutrophic spheres with wetlands. In Feleacu area there are floristic rarities, glacial relics such as: *Cladium mariscis*, *Swertia pereni*.

The chemical properties of the peat from the analyzed areas were identified in Tab. 1 and Tab 2. It can be observed that peat has a very acidic reaction (the pH is in the range 3,6-4,3), a very high hydrolytic acidity, the content of organic substance is very high, it is poor in mineral elements, which results from the content low P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O.

Table 1

**The chemical properties of the peat in the Izbuca-Calineasa-Ic area**  
(Source: Păcurar Ioan)

<i>Peatland</i>	<i>Depth (cm)</i>	<i>pH (H<sub>2</sub>O)</i>	<i>Hydrolytic acidity (me/100g sol)</i>	<i>Organic matter</i>	<i>Ashes (%)</i>	<i>C:N</i>	<i>P<sub>2</sub>O<sub>5</sub></i>	<i>K<sub>2</sub>O</i>
<b>Izbuca Molhas</b>	0-20	3,8	75,21	84,23	15,77	41,37	0,071	0,032
	80-100	3,7	87,10	83,51	16,49	55,96	0,052	0,029
	180-200	3,6	101,27	87,20	12,80	56,42	0,063	0,010
<b>Mare Molhas</b>	0-20	4,3	83,23	82,17	17,83	50,75	0,040	0,045
	80-100	4,1	87,10	97,32	2,68	59,44	0,031	0,037
	180-200	3,9	93,62	95,10	4,90	59,51	0,057	0,030
<b>Tinov from Ic</b>	0-20	4,1	110,51	87,11	12,89	48,69	0,051	0,051
	80-100	4,0	98,73	89,05	10,95	48,47	0,065	0,025
	180-200	4,2	96,18	92,15	7,85	49,56	0,076	0,016

Table 2

**The chemical properties of the peat on the upper course of the Somes River**  
(Source: Păcurar Ioan)

<i>Peatland</i>	<i>Depth (cm)</i>	<i>pH (H<sub>2</sub>O)</i>	<i>Hydrolytic acidity (me/100g sol)</i>	<i>Organic matter</i>	<i>Ashes (%)</i>	<i>C:N</i>	<i>P<sub>2</sub>O<sub>5</sub></i>	<i>K<sub>2</sub>O</i>
<b>Zapodie Peatland</b>	0-20	4,0	85,21	92,15	7,85	77,57	0,0470	0,071
	40-60	4,1	87,90	98,07	1,93	72,09	0,0375	0,057
	80-100	3,9	90,11	97,21	2,79	61,88	0,0521	0,053
<b>Smida Peatland</b>	0-20	3,8	97,32	90,67	9,33	56,73	0,0521	0,063
	40-60	4,0	92,90	93,15	6,85	61,74	0,0721	0,069
	80-100	3,7	102,30	98,02	1,98	56,13	0,0691	0,051
<b>Muntele Mare Peatland</b>	0-20	3,6	107,80	90,70	9,30	64,47	0,0521	0,034
	46-60	3,8	95,60	95,16	4,84	76,01	0,0529	0,042
	80-100	3,7	97,01	98,70	1,30	65,88	0,0627	0,039

## Conclusions

Peat is an accumulation of plants (biomass) formed in peatlands in which the activity of decomposition organisms is conditioned by the presence of water. The accumulation rate of the peat depends on certain factors such as: water, the thermic regime and falls within the rate of 20-60 cm / 1000 years. In Apuseni mountains are found 99 of the 265 tall peatlands (oligotrophs) in our country.

Regarding the conservation and protection of the histosols for the five regions analyzed in the Apuseni Mountains, the following measures have been established: creating niches (small pools); improve habitat conditions; introduce target species; reduce human impact; targeted education; prevent access by regulation.

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