

## THE TAXONOMIC DIVERSITY OF CLADONIACEAE, STEREOCAULACEAE AND BAEOMYCETACEAE FROM THE SUBMOUNTAINOUS AND MOUNTAINS LEVELS IN IEZER-PAPUSA MOUNTAINS

MARIA BORCILĂ

**Abstract.** The totally sporadic feature of the lichenology research in this area (FUSS M, 1857, LOITLESBERGER K, 1897, MORUZI CONSTANȚA, MANTU ELENA 1962, 1963, ALEXIU V., 1998) turns the quasi total information into something original. The data presented stand for the research output related to the taxonomic diversity of the families mentioned above in this massif. In compliance with the new taxonomy (PURWIS O. W et al., 1992, CIURCHEA MARIA 2004,) the species identified as 38 in amount, are classified as follows: the Order **Lecanorales**, NAMF 1923 Fam. **Cladoniaceae** ZENKER (1827) genus **Cladonia** HILL & BROWNE 1756 – 31 species, **Pycnothelia** (ACH.) DUF -1821, Fam. **Stereocaulaceae** CHEV (1826) genus **Stereocaulon** HOFFM. 1796 – 3 species and the Order **Leotiales** CARPENTER Fam. **Baeomycetaceae** DUMORT (1829), genus **Baeomyces** PERS 1794 – 2 species and **Dibaeis** CLEMENTS – 1 species. The quasi total amount of the taxons found, are described, for the first time, in this area. The preponderant biological form is that of type ChCl (89,7%) compared to H Ba (7.6%). By comparing these data to those published in the literature of specialty there has been an occurrence of great similarities in virtue of the taxonomic diversity of these families to other mountainous areas in the Southern and Eastern Carpathians. Whether qualitative variations may be unimportant the quantitative ones are significant in favor of the area explored, which proves the presence of some conditions favorable to t140 the development of lichens in the sub alpine and alpine areas of the Iezer-Păpușa Mountains, the influence of the anthropogenic factors being insignificant.

**Key words:** The Iezer Mountains, lichens, Cladoniaceae, Stereocaulaceae Baeomycetaceae.

**Rezumat. Diversitatea taxonomică a familiilor Cladoniaceae, Stereocaulaceae și Baeomycetaceae în etajele subalpin și montan din Masivul Iezer-Păpușa.** Munții Iezer-Păpușa fac parte din Carpații Meridionali dintre bazinul superior al râului Argeș și cel al râului Dâmbovița, la vest fiind despărțiți de Masivul Ghițu (1622 m. alt.) prin afluenți ai râului Argeș (Vâlsan și Râul Doamnei) și la est de masivul calcaros Piatra Craiului de către pârâul Văsălat (afluent al Râului Doamnei); se învecinează spre Nord cu Munții Făgărașului și la Sud cu Muscelele Argeșului (Subcarpații Getici). În partea nordică a Munților Iezerului se formează bazinul superior al râului Dâmbovița care după ce parcurge lacul Pecineagu face un cot delimitând la est Munții Iezerului de Munții Piatra Craiului. Munții Iezer - Păpușa se încadrează ca tip de relief în tipul Sebeș, caracterizat prin munți cu înălțimi mari și mijlocii, alcătuiți din șisturi cristaline, cu relief glaciar redus și cu întinse suprafețe de denudație dispuse în trepte. Se deosebesc de Munții Cozia, Ghițu, Frunți cu tip de relief Cozia caracterizat prin munți joși, cristalini, cu aspect insular, care apar ca iviri ale fundamentului, înecate în depozite terțiare. Munții Iezer-Păpușa sunt temeinic cercetați din punct de vedere al diversității floristice, ecologiei și fitocenologiei fanerogamelor publicându-se monografiile: (ALEXIU V., 1994-1998) și studii despre pășunile alpine și metode de îmbunătățire a lor, BĂRBULESCU C., 1961, BĂRBULESCU & BURCEL, 1962 și BOȘCAIU N., 1973, însă din domeniul lichenologiei avem numai date răzlețe despre existența a 35 specii publicate. CRETZOIU P., 1933, la începutul secolului XX ZAHLBR A., 1904, STAMATIN M., (1904), 1907, și lipsesc cu desăvârșire cele asupra corologiei, ecologiei și cenologiei lor. Datele prezentate reprezintă, rezultatele investigațiilor vizând diversitatea taxonomică a familiilor mai sus menționate din acest masiv. După noua taxonomie (PURWIS O. W et al., 1992, CIURCHEA MARIA 2004, Checklistul 2005) speciile identificate în număr de 38 specii sunt încadrate după cum urmează: Ordinul Lecanorales NAMF 1923 Fam. Cladoniaceae ZENKER (1827) gen *Cladonia* HILL & BROWNE 1756 - 31 specii, Pycnothelia (ACH.) DUF -1821, Fam. Stereocaulaceae CHEV (1826) gen *Stereocaulon* HOFFM. 1796-3specii și Ordinul Leotiales CARPENTER Fam. Baeomycetaceae DUMORT (1829), gen *Baeomyces* PERS 1794-2 specii și Dibaeis Clements –specie. Cvasitotalitatea taxonilor identificați sunt descriși pentru prima dată din acest teritoriu. Forma biologică preponderantă este de tipul ChCl (89, 7%) față de H Ba (7,6% ). Raportarea datelor la cele publicate în literatura de specialitate relevă existența unei mari similitudini în privința diversității taxonomice a acestor familii, cu alte masive muntoase ale Carpaților Meridionali și Orientali. Dacă variațiile calitative sunt nesemnificative cele cantitative sunt considerabile în favoarea teritoriul investigat, ceea ce reflectă existența unor condiții propice dezvoltării lichenilor în etajele subalpin și alpin al munților Iezer, influența factorilor antropici fiind nesemnificativă.

**Cuvinte cheie:** Munții Iezer, licheni Cladoniaceae, Stereocaulaceae, Baeomycetaceae

### INTRODUCTION

Because of a wrong evaluation the taxonomic research were marginalized in the last decades both on a national and international level. The over evaluation of the studies of molecular biology correlated with the underestimation of the taxonomic ones led to a real crisis of taxonomy (COURTECUISE R. 1995; WOESE C.R. and DOOLITTLE R.F. 2001). For Romania the taxonomic crisis was and continues to be acute: thus the studies regarding the biodiversity on Romania's territory constitutes one of the major priorities for the Romanian biological researches.

Our investigations are on this trajectory having as fundamental objective the taxonomic, chorological, enological and ecological identification and characterization for all the taxons and elotaxons of lichens that are in the Iezer Mountains-Papusa. The data to be registered will amplify the degree of knowledge of the biodiversity of this mountain thus being created favourable conditions for a more corrective evaluation and implicitly for the elaboration of some efficient methods to preserve it.

The note given represents our contribution to the complex knowledge of the lichens on this mountain giving an essay for the Cladoniaceae and Stereocaulaceae on the sub mountainous and mountainous levels of the Iezer Mountains. sub mountainous and mountainous levels of the Iezer Mountains



**Figure 1.** Iezer Mountains (. IONESCU-DUNĂREANU, 1984)

**Figura 1.** Munții Iezer (IONESCU-DUNĂREANU, 1984)

## MATERIALS AND METHODS

In order to achieve the proposed objectives there were elaborated specific protocols for the taxonomic research in which the classical methods mix with the modern ones validated by the international scientific community. The research activities were developed both in the field and the laboratory.

The activities in the field were materialized by: establishing the transects, crossing them in order to collect biological evidence, and writing down some data that refer to the: type of substrate, the value of ecological factors (exposition, height, temperature and humidity of the air and soil, the light's intensity), the family of plants to which belongs the lichenological evidence, the morph-physiological parameters of the lichens in different microhabitats; determining the geographical coordinates (by the help of GPS) in order to establish the distribution of the species in the territory; creating sketches and photos. For each collected evidence a chart was done in which there were written all these data fundamental not only for the taxonomic and chorological research but also for the enological and ecological ones.

The lab activities consisted of: the identification of the lichenological taxons, the chemical analysis of the substrate evidence (soil, rock, cortex, wood) and the statistical processing of data representing the results in graphics and synthetical diagrams. To identify the lichenological taxons the classical procedures were done according to the ones promoted by the specialty literature. The species' nomenclature was updated after SANTENSON R. (1993) and PURVIS O.W. et al. (1994) and the chorological elements were established after BARKMAN J.J. (1964), SMITH A.J.E. (1978), WIRTH V. (1995), CIURCHEA M. (2004.).

## RESULTS AND DISCUSSIONS

The study of taxonomic, enological and ecological diversity of the lichens in the Iezer-Papusa massif represents the theme of our doctorate thesis. The data presented in this note constitute a contribution in order to achieve the above objectives. Taking into consideration the taxonomic diversity, the vigor and length of the classes/families and the phytocenotic significance of Cladoniaceae, Baemycetaceae, Stereocaulaceae on the submountainous and mountainous levels of the Iezer Mountains, we considered useful their presentation in other paper. Thus there are created favourable conditions to integrate the lichenological taxons in the phytocenotical studies by evaluating correctly their position regarding different phytocenotaxoni. The association of these 3 families had on the basis the inclusion of the type *Stereocaulon* HOFFM., 1976 and the type *Baeomyces* PERS. 1784 after the old classification (The Catalogue of Lichens in Romania, MORUZI, 1967) in the class of Cladoniaceae, their separation in distinctive families according to the new classification (The Catalogue of Lichens in Romania 1998 and The Determinator of Lichens in Romania, CIURCHEA M. 2004), Stereocaulaceae Chev., 1826 and Baemycetaceae, Dumort (1829) being quite recent (PURVIS O.W. et al., 1992, 1994).

**The taxonomic summary**

We present below the summary of the species that are on the investigated territory in a taxonomic and alphabetical order. For each species we have mentioned the following data: the substrate, the station, the altitude, the geo element, some sociological and chorological data.

**Fam. Cladoniaceae ZENKER, 1827**

According to the actual structure the family has 2 types: *Cladonia* Hill ex Browne, 1756 and *Pycnothelia* (ACH.) DUF., 1821. On the sub mountainous and mountainous levels of the Iezer Mountains the first type is represented by 33 species and the second one by 1. Our summary is according to the current nomenclature promoted by the specialty literature, giving up the subdivision of the type *Cladonia* in 2 sub types: *Cladina* (NYL.), LEIGHTON, 1871 and *Cladonia* HILL ES BROWNE, 1756.

Type *Cladonia* Hill ex Browne, 1756

1. *Cladonia amaurocraea* (FLK.) SCHAER, 1823 sporadic in detritus and on the sub mountainous and mountainous meadows on acid soils; Culmea Iezeru Mare (The Top of the Iezerul Mare), on the eastern and southern slope (2100-2400 m), Iezerul Mic, the northern and southern slope (2000-2350 m); moderate extremely acid; the northern tundra area and the boreal coniferous forest, the middle area of central Europe ( the leafy forest and the resinous), characteristic of *Cladonietum stellaris* DU RIETZ, 1925; frequently on high altitudes (over 2000 m) in the cold areas, circumpolar; Europe, North and South America, Asia and Antarctic.

2. *Cladonia arbuscula* (WALLR.) FLOTOW., 1839, tericol, on acid, sandy soils; sporadic in sub mountainous and mountainous meadows (2100-2400 m), regularly on the northern and eastern slopes peak. Iezerul Mic, 2400 m, peak Iezerul mare, 2408 m, peak Rosu, 2386 m; moderate extremely acid; the northern tundra area and the boreal coniferous forest, the middle area of central Europe ( the leafy forest and the resinous), moderate sub mediterranean ( the dry leafy forest and the steppe bushes in the north mediterranean area); characteristic of *Cladonion arbusculae* KLEM., 1950; Europe ( especially in the northern parts), North and South America, Asia.

3. *Cladonia bellidiflora* (ACH.) SCHAERER, 1823, tericol, acid spodosoils, among the edges of the fixed soil in the rocks of the detritus; frequently Caldarea Iezerului Mare and Mic, 2100-2344 m, Culmea Iezer Mare, the northern slope, 2089-2300 m; the northern tundra area and the boreal coniferous forest, the middle area of central Europe (the leafy forest and the resinous), moderate sub mediterranean (the dry leafy forest and the steppe bushes in the north mediterranean area); alpine; characteristic of *Empetro-Cladonietum stellaris* DU RIETZ, 1925; spread in Europe, North and South America, Asia, New Zealand, Antarctic.

4. *Cladonia cenotea* (ACH.) SCHAER, 1823, tericol, on brown acid soils, moss and lichens ( on rotten branches) of Mountain Pines caldarea Iezerului Mare, 2100-2300 m; caldarea Iezerului Mic, 2000-2280 m; the northern tundra area and the boreal coniferous forest, the middle area of central Europe (the leafy forest and the resinous), moderate sub mediterranean ( the dry leafy forest and the steppe bushes in the north mediterranean area); moderate mediterranean (the green forest area, the coniferous forest, the steppes and semi desserts); characteristic of *Cladonietum cenoteae* FREY, 1927; Europe, North and South America, Asia.

5. *Cladonia chlorophea* (FLK.ex.SOMMERF.) SPRENGEL, 1827 on rotten branches of Mountain Pines on moraines and the soil between the detritus, in dry and often humid places, swampy; Caldarea Iezerului Mare and Mic, 1868-2200 m; moderate basophile on a sub neutral substrate, moderate dry air; the northern tundra area and the boreal coniferous forest, the middle area of central Europe ( the leafy forest); in *Cladonietum arbusculae* KLEM., 1950, *Toninion sedifoliae* HADAC, 1984 Europe, North and South America, Asia, New Zealand, Antarctic.

6. *Cladonia coccifera* (L) WILLD., 1787 tericol, on siliceous, swampy soil rarely on the rocks covered with moss or on rotten branches of Mountain Pines frequently on a sub mountainous level; Caldarea Iezerului Mare (850-2200 m); moderate medium acidophil, a very high air humidity; the south boreal part (the sub atlantic-the leafy forest area in central and western Europe) moderate mediterranean (the green forest area, the coniferous forest, the steppes and semi desserts); in *Cladonietum arbusculae* KLEM., 1950; spread in all Europe, North and South America, Asia, New Zealand, Antarctic.

7. *Cladonia coniocraea* (FLK.) SPRENGEL, 1827 frequently on, Mountain Pines on green branches or about to rotten, rarely on acidophil soils with an excess of humidity or mossy; Caldarea Iezerului Mare and Mic round the lakes (1850-2200), Culmea Iezer-peak Rosu (2280-2400 m) moderate acidophil-on a sub neutral substrate; the boreal coniferous forest, (the dry leafy forest and the steppe bushes in the north mediterranean area); characteristic of Europe, North and South America, Asia, New Zealand, Africa, Antarctica.

8. *Cladonia convoluta* (LAM.) COUT., 1913 tericol on limestone soil on the sub mountainous meadows on the Culmea Iezerand Piciorul Iezer (2100-2300 m) and on the mountainous meadows on the peak Iezerul Mare and Mic peak Rosu (2380-2470 m); on a sub neutral substrate-basophile, dry moderate air, the middle area of central Europe (the leafy forest and the resinous; sub continental (steppes and semi desserts in the east of Europe and Asia) mediterranean (the green forest area, the coniferous forest, the steppes and semi desserts); characteristic of *Cladonietum convolutae* KAISER, 1926, *Toninion sedifoliae* HADAC, 1948; rarely and very strictly localized: Europe, The north of Africa, South-West Asia.

9. *Cladonia crispata* (DELISE) VAINIO, 1887- tericol, on siliceous acidophil soil in the detritus; sporadic; Caldarea Iezerului Mare 2140-1200 m; on a medium-extremely acidophil substrate; - the northern tundra area and the boreal coniferous forest, the middle area of central Europe (the leafy forest and the resinous); *Cladonietum mitis* KRIEGER, 1937; characteristic of *Cladonietum arbusculae* KLEM., 1950; rare in Europe, North and South America, Asia, New Zealand, Africa.

10. *Cladonia deformis* (L) HOFFM., 1976 sporadic; tericol on soils rich in humus, damp or swampy and on humid wood like Mountain Pines in the valley of the Iezerul Mare (1750-2100 m) extremely-medium acidophil



substrate, on humid substrate; *Cladonion stellaris* DU RIETZ, 1925, subsequently *Cladonietum cenoteae* FREY 1927 ex Frey 1959; rare; Europe, North America, Asia, New Zealand.

11. *Cladonia digitata* (L) HOFFM., 1796-sporadic on rot ness from the sub mountainous, Mountain Pines the valley of Iezerul mare 1985 m; Caldarea Iezer Mare 2060; extremely-moderate acidophil, medium humid substrate; characteristic of *Cladonion convolutae* Kaiser, 1926; Europe, North America, Africa, Asia.

12. *Cladonia ecmocyna* (GRAY) LEIGHT., 1871, tericol on the sub mountainous and mountainous meadows on the peak Iezerul Mare, Iezerul Mic and Rosu, 2380-2440, rarely lichenological in a *Rhodoretum*, Caldarea Iezer Mare, 2200 m; extremely-moderate acidophil; the boreal coniferous forest, the green forest area, the coniferous forest, the steppes and semi desserts; characteristic of : *Cladonion convolutae* Kaiser, 1926; sporadic in Europe, North America and Asia.

13. *Cladonia fimbriata* (L) FR. EM SANDST., 1831, lichenological, tericol and mossy from Mountain Pines, 1800-2169 m; medium-very acidophil ; (the northern tundra area)- the green forest area, the coniferous forest, the steppes and semi desserts; characteristic of *Cladonietum cenoteae* FREY 1927 ex Frey 1959; Europe, North and South America, Asia, Australia, New Zealand, Antarctic.

14. *Cladonia floeckea* (Fr.) Flk., 1828 - tericol, lichenological and mossy; frequently on Mountain Pines, sporadic on the alpine meadows; the valley of the Iezer Mic, 1993 m, Culmea Iezer Mare, 2340 m; extremely-medium (moderate) acidophil; south boreal – (the dry leafy forest and the steppe bushes in the north mediterranean area); characteristic of *Cladonietum coniocaeae*; frequently in Europe, North America, Asia, Australia.

15. *Cladonia furcata* (Huds) Schrader, 1794 frequently in acidophil habitats: tericol, lichenological and mossy; the Valley of Caltunului, 1983 m, the Valley of Iezer Mare, Mountain Pines, 1980 m; Caldarea Iezer Mare, 2240 m; on the rocks by the lake, 2142 m; the northern slope of the Iezer Mare, 2318 m; moderate-extremely acidophil; the boreal coniferous forest - the green forest area, the coniferous forest, the steppes and semi desserts; *Cladonion arbusculae*; Europe, North and South America, Asia, Australia, New Zealand.

16. *Cladonia gracilis* (L) WILLD, 1797 - frequently on soil and acidophil rocks on the alpine level (1980-2400); frequently tericol, on the soil under the Mountain Pines and between the rocks, rarely on rottenness of Mountain Pines, often together with other species of lichens (ex. *Cetraria islandica*, *C. cuculata*) and edges ( ex. *Dicranium scoparium*); Caldarea Iezer mare, 2174m, Culmile Iezer Mare and Mic (1800-2380), peak Iezer mare, 2400 m and peak Rosu 2400m; extremely-moderate acidophil; the northern tundra area - moderate the dry leafy forest and the steppe bushes in the north mediterranean area; *Cladonietum mitis* Krieger, 1937; characteristic *Empetro-Cladonietum stellaris* DU RIETZ, 1925; Europe, North and South America, Asia, Australia, New Zealand, Antarctic.

17. *Cladonia macilenta* HOFFM., 1796 tericol and mossy: Coama Iezer Mare, close to the peak Iezer Mare, 2400m; extremely-medium (moderate) acidophil; the boreal south part- the dry leafy forest and the steppe bushes in the north mediterranean area; characteristic of *Cladonietum coniocraeae* DUVIGN., 1942 ex JAMES and al., 1977; *Cladonietum mitis* KRIEGER, 1937; in : Europe, North and South America, Asia, Australia, New Zealand, Australia.

18. *Cladonia macrophilla* (SCHAER.) STENH., 1865 - tericol and on alpine meadows and in detritus, Caldarea Iezer mare, Caldarea Iezer Mic, Piciorul si Culmea Iezer, peak Rosu from 1900-2400 m; extremely-medium acidophil; the northern tundra area-alpine; characteristic *Stereocaulon alpinii* FREY, 1937; Europe (Scotland), North America, Asia.

19. *Cladonia mitis* (SANDST.) HUSTICH., 1951 - tericol, sporadic on the sub mountainous and mountainous meadows and the bushes of *Rhododendron*; Culmea Iezer Mare, eastern slope, 2204; Culmea Iezer Mic, eastern and northern slope 2230m; moderate-extremely acidophil; (the northern tundra area), the boreal coniferous forest- the middle area of central Europe (the leafy forest and the resinous) ( the dry leafy forest and the steppe bushes in the north mediterranean area-moderate); characteristic of *Cladonion arbusculae* KLEM., 1950; circumpolar: Europe, North and South America, Asia, Antarctica.

20. *Cladonia ochrochlora* Flk, 1828, frequently on rotten branches of Mountain Pines in places with a high degree of humidity: the Valley of the Iezer Mare and Mic, 1900-2220m; moderate acidophil; neutrophil; the boreal coniferous forest- the green forest area, the coniferous forest, the steppes and semi desserts; *Cladonietum cenoteae* FREY 1927; in Europe, North and South America, Asia, Australia, New Zealand.

21. *Cladonia phyllophora* HOFFM., 1796 - tericol, on sandy, acid soil often among edges or other species of lichens; the Valley of Iezer Mare, 1800-1950m, Culmea Iezer Mic, the northern and eastern slope, 1780-2200m; moderate-medium acidophil; the boreal coniferous forest - the middle area of central Europe (the leafy forest and the resinous); *Cladonietum mitis*; frequently in Europe, North America and Asia; sporadic in South America and Australia.

22. *Cladonia pleurota* (FLK.) SCHAERER, 1850 frequently saxicol, on acid, soil rocks, on sandy soil, mossy and lichenological; peak Rosu, 2405m, peak Caltunu, 2398m, Coama Iezer Mare, close to peak Iezer Mare, 2400m; moderate-medium acidophil, moderate air humidity to the dry air-medium substrathygraphical; the northern tundra area-the middle area of central Europe (the leafy forest and the resinous); *Cladonion arbusculae* KLEM., 1950; characteristic of *Cladonietum mitis* KRIEGER, 1937; Europe, North and South America, Asia, Australia.

23. *Cladonia polydactyla* (FLK) SPRENG., 1827 - rare lichenological on rotten wood on Mountain Pines; on soil and edges in the alpine meadows, 2200-2300 m, Caldarea Iezerului Mare and Mic, 1984m, peak Catunul, 2340m; characteristic of *Cladonietum cenoteae* FREY, 1927 ex FREY, 1959; sporadic in: Europe, North America and Asia.

24. *Cladonia portentosa* (DUFOUR) COEM., 1865- tericol, sporadic on the sub mountainous and mountainous meadows and among the bushes of *Rhododendron*; Culmea Iezer Mare, eastern slope 2204 m; Culmea Iezer Mic, eastern and northern slope 2230m; moderate-medium acidophil; (the northern tundra area) - the boreal coniferous forest - the middle area of central Europe (the leafy forest and the resinous) (moderate the dry leafy forest and the steppe bushes in the north mediterranean area); characteristic of *Cladonietum mitis* KRIEGER, 1937; circumpolar: Europe, North and South America, Asia, Antarctic.

25. *Cladonia pyxidata* (L.) HOFFM., 1796- tericol, lichenological, cortical (on thick branches of Mountain Pines) and saxicol (on siliceous rocks and metamorphic lime stones); frequently on the sub alpine level, sporadic on the alpine one; moderate basophile-moderate (medium) acidophil; the northern tundra area-medium; *Cladonion arbusculae* KLEM., 1950, *Cladonietum arbusculae* KLEM., 1950; in: Europe, North and South America, Asia, Australia, New Zealand.

26. *Cladonia rangiferina* (L.) WEBER ex WIGG., 1780- tericol, frequently on the sub mountainous and mountainous meadows and among the bushes of *Rhododendron*; Culmea Iezer Mare, eastern slope, 2204-2387 m; Culmea Iezer Mic, northern and eastern slope, 2000-2230 m; Caldarea Iezer Mare on soil on detritus, 2140m, peak Rosu, 2400m; moderate-extremely acidophil; - (the northern tundra area) the boreal coniferous forest - the middle area of central Europe (the leafy forest and the resinous) (the dry leafy forest and the steppe bushes in the north mediterranean area. moderate); *Cladonietum mitis* KRIEGER, 1937; *Cetrarion nivalis* KLEM., 1955, *Empetro-Cladonietum stellaris* DU RIETZ 1925; circumpolar: Europe, North and South America, Asia, Australia, New Zealand, Antarctic.

27. *Cladonia squamosa* (SCOP.) HOFFM., 1796 - tericol on rottenness, on rocks' edges and fallen trunks, in the sub alpine level; Caldarea Iezer mare, Caldarea Iezer Mic, Piciorul Iezer Mare 1920-2260m; medium-extremely acidophil, extremely-hygrophil; the northern tundra area - the green forest area, the coniferous forest, the steppes and semi desserts: *Cladonietum mitis* KRIEGER, 1937 and *Cladonietum cenoteae* FREY 1959; characteristic of *Cladonion arbusculae* KLEM., 1950, *Empetro-Cladonietum stellaris* DU RIETZ, 1925; spread in all Europe, North and South America, Africa, Asia, Australia, New Zealand.

28. *Cladonia subulata* (L.) WEBER ex. WIGG., 1780 - tericol on the soil among the detritus, Caldarea Iezer Mare, 2230m; Caldarea Iezer Mic, 2211m; moderate-medium acidophil; - the boreal coniferous forest - the green forest area, the coniferous forest, the steppes and semi desserts; *Lecideetum uliginosae* LANGER ex KLEM., 1955; Europe, North and South America, Asia.

29. *Cladonia uncialis* (L.) WEBER ex WIGG., 1780- tericol and saxicol on acid soils and rocks; frequently on both levels of vegetation, in places with a higher degree of humidity; moderate-extremely acidophil; the northern tundra area- the middle area of central Europe ( the leafy forest and the resinous); characteristic of *Cladonion arbusculae*; only in Europe , North America and Asia.

Type *Pycnothelia* (ACH.) DUF., 1821 (monotypic type)

*Pycnothelia papillaria* (EHRH.) DUF., 1821, sporadic; tericol, on sandy soil on plain rocks, humid places and acid peat bogs; peak Iezer Mare, peak Rosu, Culmea Iezer Mic, 2358m, Caldarea Iezer Mare 2174 m; moderate-medium acidophil; substrate and rather high air humidity; the boreal coniferous forest - the middle area of central Europe ( the leafy forest and the resinous) ( the dry leafy forest and the steppe bushes in the north mediterranean area); *Baeomycion roseis* KLEM., 1950; rarely in Europe, North America and Asia.

#### Fam. *Stereocaulaceae* CHEV., 1826 (monotypic family)

Type *Stereocaulon* HOFFM., 1796

1. *Stereocaulon alpinum* LAURER, 1827 tericol, frequently on the soil of the siliceous rocks, on the sub mountainous and mountainous meadows of the eastern and southern slopes of the Culmea Iezer Mare and Mic 1978-2430 m; medium-very acidophil, extremely-very much light; the northern tundra area - the middle area of central Europe (the leafy forest and the resinous) - alpine; characteristic of *Stereocaulum alpinii* FREY, 1923, *Solorion croceae* KLEM., 1955; the northern tundra area - the middle area of central Europe ( the leafy forest and the resinous)-alpine; rarely in Europe, North and South America, Asia (China and India), Antarctic.

2. *Stereocaulon dactylophyllum* FLK., 1819 - tericol, on the sub mountainous and mountainous meadow Caldarea Iezer Mare, 2173 m, Culmea Iezer Mic, southern slope, 2248 m; medium acidophil, medium with rather high air humidity, humidity due to rain, poor in nutritious substances; the boreal coniferous forest- the middle area of central Europe (the leafy forest and the resinous); *Porpidion tuberculosa* Wirth., 1972; sporadic in Europe. North America(Canada), Asia.

3. *Stereocaulon tomentosum* Fr. Saxicol, on the detritus from Caldarea Iezer Mare and Mic 2170-2340 m; medium-extremely acidophil., medium-very much light; the boreal coniferous forest- the middle area of central Europe (the leafy forest and the resinous) *Baeomycion rosei* Klem., 1925; sporadic in Europe (Islanda, Groenland, Scotland), Asia (Russia, China), North and South America.

#### Fam. *Baeomycetaceae* DUMORT. (1829)

Type *Baeomyces* PERS. (1794)

*Baeomyces rufus* (HUDS.) RABHN.- tericol on acid soil, moss and old woods on Culmea Iezer Mic, 2217 m; moderate-very acidophil, very much light, humid substrate the boreal coniferous forest- the dry leafy forest and the steppe bushes in the north mediterranean area(medium-moderate) in *Stereocaulum condensati* LANGERF ex KLEM. 1955 sporadic; circumpolar, in the temperate areas of Europe and North America.Col.

Type *Dibaeis* CLEMENTS

*Dibaeis baeomyces* (L) RAMBOLD and HERTEL – tericol on the rocks' soil especially in the forests around the Iezer lake and shelter over 2000m moderate-medium acidophil, medium-very much light; (the northern tundra area) the boreal coniferous forest(the leafy forests area in central and western Europe )- the middle area of central Europe (the leafy forest and the resinous) (the dry leafy forest and the steppe bushes in the north mediterranean area-moderate) characteristic of *Baeomycion roseis* KLEM. 1955, *Stereocaulum alpini* Frey 1923 circumpolar in Europe, North and South America, Asia ,Antarctic.

## CONCLUSIONS

The numerous white spots on our country's map and the absence of some consistent studies on some taxonomic groups of organisms lead to the fact that the taxonomic, chorological, ecological and sociological researches in general and especially those on algae, mushrooms, lichens and Bryophyta constitute one of the major priorities of the Romanian biological researches.

The complex study of the lichens in the Iezer-Papusa massif welcomes this desideratum being the first of this type.

The 76 specific taxoni identified only on the sub mountainous and mountainous levels in the Iezer massif show a pronounced diversity of *Cladoniaceae* and *Stereocaulaceae* on this altitude.

If the taxonomic diversity of *Cladoniaceae* and *Stereocaulaceae* is similar to the one reported in other mountains, the quantitative differences are considerable this reflecting the existence of some ecological conditions favourable to the development of lichens on the sub mountainous and mountainous levels in the Iezer Mountains due to some minor anthropic influences.

## REFERENCES

- ALEXIU V. 1996. *Cenotaxonomia grupărilor vegetale din Masivul Iezer-Păpușa și complexul de chei al Dâmboviței*. Naturalia. Pitești. **II-III**: 179-192.
- ALEXIU V. 1998. *Vegetația masivului Iezer- Păpușa. Studiu fitocenologic*. Edit. Cultura. Pitești. 362p.
- BARKMAN J.J. 1946. Over Oecologie en Sociologie der cryptogame Epiphyten. Vakbl voor Biologen. **20**.
- BARKMANN J.J. 1958. *Phytosociology and ecology of cryptogamic epiphytes*. Assen.
- BARTOK K. 1987. *Cercetări lichenologice în unele Făgete din Nordul Transilvaniei*. Contrib. Bot. Cluj-Napoca: 55-60
- BARTÓK K., 1994. *Studiul florei de licheni din Sud-Estul Munților Zarandului*. Studia Univ. Vasile Goldiș. Arad: 36-47.
- BARTOK K. & GUTTOVA LOKOS L. 2005. *Contributions to the epiphytic lichen flora of Poiana Rusca Mts., Southern Carpathians (SW Romania)*. Contrib. Bot. **XL**, Gradina Botanica "Alexandru Borza" Cluj-Napoca: 105 -111.
- BARTOK K., LOKOS L. 2004. *Contributions to the lichen flora and lichen ecology in the Parâng and Lotru Mountains (Southern Carpathians)*. Contrib. Bot. **XXXIX**. Gradina Botanica "Alexandru Borza" Cluj-Napoca: 41-49.
- BĂRBULESCU C. 1961. *Pășunile alpine din munții Iezer-Păpușa*. Natura, s. Biol. **13**(3): 16-22.
- BOȘCAIU N., 1973. *Perspectivile cercetării operaționale pentru conservarea ecosistemelor și al mediului ambiant*, *Ocot. Nat. med. Înconj.* **19**(1): 17-21.
- CIURCHEA M. 1998. *Lichenii din România – Ascomycotina: Pyrenocarpi*. Presa Universitară Clujană. **I**. 333p.
- CIURCHEA M. 2004. *Determinatorul lichenilor din România*. Edit. BIT. Iași.
- CRETZOIU P. 1933. Neue Beitrage zur Flechten von Rumanien, Fedd'e Repert sp. nov. regni veget. **31**. Berlin.
- IONESCU-DUNĂREANU I. 1984. *Munții Iezer. Ghid turistic*. Ed. Sport-Turism, București, 127 pg.
- MORUZI C. & MANTU E. 1962. *Lichenii saxicoli din Munții Retezat*. An. Univ. Buc., ser. Șt. Nat. Biol. **XI**. 33: 169-177.
- MORUZI C. & MANTU E. 1963. *Lichens corticoles et terricoles du massif Retezat*. Travaux du Museum d'histoire naturelle „Gr. Antipa” Bucharest, **4**:563-577.
- MORUZI C. & TOMA N. 1965. *Contribuții la cunoașterea Cladoniaceelor din Munții Cibilului*. Acta Bot. Horti Bucursteniensis, 1964-1965. București: 325-333.
- MORUZI C., PETRIA E., MANTU E. 1967. *Catalogul lichenilor din România*. Acta Bot. Hort. Bucurestiensis, București, 388p.
- MORUZI C. & TOMA N. 1967. *Noi contribuții la cunoașterea lichenilor din Muntii Cibinului (II)*.- Acta Bot. Horti Bucurestiensis, 1966, București: 259-303.
- MORUZI C. & TOMA N. 1971. *Licheni*. Edit. Didactică și Pedagogică. București. 221p + 45 planșe.
- MORUZI C. & TOMA N. 1973. *Contribuții la cunoașterea florei lichenologice corticole, tericole și muscicole din zona Porțile de Fier*. Acta Bot. Horti Bucurestiensis, 1970-1971, București: 433-467.
- PURVIS O.W., COPPINS J., HAWKSWORTH D.L., JAMES P.W., MOORE M.D. 1994. *The lichen Flora of Great Britain and Ireland*. The British Lichen Society. London. 710p.
- SANTESSON R. 1993. *The Lichens and lichenolous fungi of Sweden and Norway*, Lund. 634p.
- SAVA GH. 1972. *Taxoni noi și rari pentru flora lichenologică a României*. Stud. și Com., Muz. St. Nat. Bacău: 68-69.
- SIMEANU V., TOMA N., OLIMID V. 1970. *Contribuții la cunoașterea florei lichenologice din Oltenia*. Analele ser. III a, **II (XII)**, Biol-Șt. Agricole, Craiova: 129-133.
- STAMATIN M., (1904), 1907, Contribution a la flore lichenologique de la Roumanie. Ann. Scientifiq de l' Univ. de Jassy **4**(3-4): 78-94.
- WIRTH V. 1995. *The Flechten Baden Wurttembergs, Teil I, II*. Stuttgart. 660p.
- WIRTH V. 1995. *Die Flechten Baden Wurttembergs, Teil I, II*. Stuttgart. 1008p.
- ZAHLEBRUCKNER A. 1904. *Verzeichnis der gelegentlich einer Reise im Jahre 1897 von Prof. K. Loitlesberger in den Rumanischen Karpathen gesammelten Lichenen*. Annalen des K.K. Naturhist. Hofmuseums. **19**. Wien.