

THE STUDY OF VEGETAL COMMUNITIES IN
CODRU-MOMA MOUNTAINS

Pășcuț Călin Gheorghe*

* University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea;
Romania, e-mail: pascutcalin@yahoo.com

Abstract

In this study we present a syntaxonomic review of the vegetal associations in the area of Codru-Moma Mountains. The Codru-Moma Mountains are situated in the North-West part of Romania and spread on the area of Bihor and Arad Counties. Physiologically, the vegetation in this area has three main forms: forest, glades and river meadows. In this paper we present the vegetal associations identified in all vegetation forms from Codru-Moma Mountains, study performed during 2008 and 2010.

Key words: Codru-Moma Mountains, class, order, alliance, suballiance, association, phytocoenoses.

INTRODUCTION

The area of Codru-Moma Mountains lies on the western margin of Apuseni Mountains placed between Crișul Negru River and Crișul Alb River (Paucă A., 1941).

The area is well individualized from the morphological and geological point of view and consists of two distinct massifs, known as the Codru Mountains and Moma Mountains.

From the geological point of view, Codru-Moma Mountains are formed of permocarboniferous and mezozoic sedimentary rocks and of eruptive rocks of Paleozoic and neogene age (Paucă A., 1941).

The largest area of Codru-Moma Mountains is occupied by forestry (80%) formations, the rest being occupied by grass lands and non-productive lands (20%).

In Codru-Moma Mountains we can notice a difference of vegetation depending on the climate and edaphic factors. Thus, we can differentiate between the following vegetation floors:

The floor of turkey oak forests, present in the low hills, near the villages bordering the studied area. The largest areas occupied by turkey oak forests can be found in the western and north-western part of the territory where there is a microclimate with Mediterranean influences. The main association that can be found in this floor is: *Quercetum petraeae-cerris* association Soó.

The floor of sessile oak forests and sessile oak blended with european beech forests, situated in sunny places where they form massive forests. The main types of associations that can be found at this floor are: *Genisto tinctoriae-Quercetum petraeae* association Klika 1932, *Petraeo-Fagetum* association Scamoni (1956) 1959, *Cytiso nigricantis-Quercetum petraeae* association Paucă 1941, *Festuco drymejae-Quercetum petraeae* association Morariu et al. 1970

The floor of common hornbeam forests blended with european beech occupies the largest area along valleys. The main types of associations that can be found at this floor are: *Carpino-Fagetum* association Paucă 1941.

The floor of european beech forests occupies the upper part of Codru-Moma Mountains. The main types of associations that can be found at this floor are: *Phyllitidi-*

Fagetum association Vida (1959) 1963, *Symphyto cordati-Fagetum* association Vida 1963, *Festuco drymejae-Fagetum* association Morariu et al. 1968, *Geranio robertianae-Fagetum* association (Burduja et al. 1974) Chifu et Ștefan. 1994 em. Chifu et Zamfirescu 2001, *Luzulo albidiae-Fagetum sylvaticae* association Zólyomi 1955.

The small depressions formed along some valleys and watercourses have **paluster cenoses** built on the following associations: *Parietarium officinalis* association Csűrös 1958, *Scirpetum sylvatici* association Ralski 1931, Maloch 1935 em. Schwick 1944, *Junco inflexi-Menthetum longifoliae* association Lohmeyer 1953, *Sambucetum ebuli* association Felföldy 1942, *Telekio-Petasitetum hybridi* association (Morariu 1967) Resmeriță et Rațiu 1974, *Aegopodio podagrariae-Alnetum glutinosae* association Kárpáti et Jurko 1964.

The relief is dominated by deep or less deep valleys, margined by flanks with a steep inclination, fact that led to the installment of a **saxicole vegetation** of xero-calcofil type, built on the following associations: *Asplenietum rutae-murariae-trichomanis* association R. Tüxen 1937, *Asplenietum septentrionali-adianti-nigri* association Oberdorfer 1938, *Asplenio quadrivalenti-Poëtum nemoralis* association Soó ex Gergely et al. 1966, *Asplenio trichomani-Poëtum nemoralis* association Boșcaiu 1971, *Ctenidio-Polypodietum* association Jurko et Peciar 1963.

The **grass lands** also occupy a significant area in this mountain, being used by dwelling people as hay and grass lands. The main associations that can be found in these areas are: *Festuco rubrae-Agrostetum capillaris* association Horvat 1951, *Anthoxantho-Agrostietum capillaris* association Sillinger 1933.

In the studies territory there occur inversions of forestry vegetation determined by the stational conditions, especially humidity. Thus, in many situations the european beech (*Fagus sylvatica*) descends on the bottom of the cold, wet valleys, in shady places, and the sessile oak (*Quercus petraea*) rises in the european beech's place.

MATERIAL AND METHODS

In the study of vegetation from Codru-Moma Mountains we used methods of phyto-sociologic research in the spirit of the Central-European school, on the basis of the principles and methodology elaborated by J. Braun-Blanquet and adapted to A. Borza at the particularities of the vegetal carpet in our country (Braun-Blanquet J., 1928; Borza Al., Boșcaiu N., 1965; Ellenberg H., 1974).

In the study we adopted the vegetal association as the basic syntaxonomic unit. The name and classification of the vegetal associations were adopted according to the newer synthesis work (Sanda V. et al., 2008), as well as to the articles that deal with some cenotaxonomic units (Cristea V., 2004; Mihăilescu S., 2001; Groza G., 2008; Sanda V. Et al., 2007).

In relation to the vegetal associations we included them in cenotaxoni (syntaxoni): suballiance, alliance, order, class (Burescu P., 2003).

RESULTS AND DISCUSSION

Following the research performed in Codru-Moma Mountains during 3 years and after making over 600 phytocoenoses surveys, we identified 50 associations, included cenotaxonomically in 15 classes.

The syntaxonomic classification of the vegetal association in Codru-Moma Mountains is the following:

I. *Phragmitetea australis* class R. Tüxen et Preising 1942

Nasturtio-Glycerietalia order Pignatti 1953

Sparganio-Glycerion fluitantis alliance Br.-Bl. et Sissingh 1942

- Glycerietum fluitantis* association Egger 1933
Phalaridion arundinaceae alliance Kopecký 1961
Agrostetum gigantei association Sanda et al. 1994
Oenanthetalia aquatica order Hejný in Kopecký 1961 ex Heyný 1965
Oenanthion aquaticae alliance Hejný ex Neuhäusl 1959
Eleocharitetum palustris association Schennikov 1919
- II. Montio-Cardaminetia** class Br.-Bl. et R. Tüxen 1943
Montio-Cardaminetalia order Pawlowski 1928
Cardaminion-Montion alliance Br.-Bl. 1926
Carici remotae-Calthetum laetae association Coldea (1972) 1978
- III. Asplenietea trichomanis** class (Br.-Bl. in Meier et Br.-Bl. 1934)
Oberdorfer 1977
Tortulo-Cymbalarietalia order Segal 1969
Cymbalario-Asplenion suballiance Segal 1969 em. Mucina 1993
Asplenietum rutae-murariae-trichomanis association R. Tüxen 1937
Cystopteridion alliance Richard 1972
Asplenio quadrivalenti-Poëtum nemoralis association Soó ex Gergely et al. 1966
Androsacetalia vandelli order Br.-Bl. in Maier et Br.-Bl. 1934
Asplenion septentrionalis suballiance Oberdorfer 1938
Asplenietum septentrionali-adianti-nigri association Oberdorfer 1938
Asplenio trichomani-Poëtum nemoralis association Boşcaiu 1971
Hypno-Polypodion alliance Mucina 1993
Ctenidio-Polypodietum association Jurko et Peciar 1963
- IV. Thlaspietia rotundifolii** class Br.-Bl. 1926
Thlaspietalia rotundifolii order Br.-Bl. 1926
Achnatherion calamagrostis alliance Br.-Bl. 1918
Parietarietum officinalis association Csűrös 1958
- V. Nardo-Callunetia** class Preising 1949
Nardetalia order Oberdorfer 1949
Potentillo-Nardion alliance Simon 1959
Scorzonero roseae-Festucetum nigricantis association (Puşcaru et al. 1956) Coldea 1987
Violo declinatae-Nardetum association Simon 1966
Genistion pillosae alliance Duvigneaud 1942
Festuco-Genistelletum association Issler 1927
- VI. Molinio-Arrhenatheretia** class R. Tüxen 1937
Molinietalia caeruleae order Koch 1926
Molinion caeruleae alliance Koch 1926
Junco-Molinietum association Preising 1951
Calthion palustris alliance R. Tüxen 1937
Scirpetum sylvatici association Ralski 1931, Maloch 1935 em. Schwick 1944
Arrhenatheretalia order R. Tüxen 1931
Cynosurion alliance R. Tüxen 1947
Festuco rubrae-Agrostetum capillaris association Horvat 1951
Anthoxantho-Agrostietum capillaris association Sillinger 1933
Potentillo-Polygonetalia order R. Tüxen 1947
Potentillion anserinae alliance R. Tüxen 1937
Juncenion effusi suballiance Westhoff et van Leeuwen ex Hejný et al. 1979
Juncetum effusi association Soó (1931) 1949
Junco inflexi-Menthetum longifoliae association Lohmeyer 1953
Lythro-Calamagrostetum epigei association I. Pop 1968

- Lythro salicariae-Juncetum effusi-inflexi* association Todor et al. 1971
- VII. Festuco-Brometea** class Br.-Bl. et R. Tüxen in Br.-Bl. 1949
- Stipio pulcherrimae-Festucetalia pallentis* order I. Pop 1968
- Thymio comosi-Festucion rupicolae* alliance Pop 1968
- Thymo comosi-Festucetum rupicolae* association (Csűrös et Gergely 1959) Pop et Hodişan 1985
- Brachypodio-Chrysopogonetalia* order (Horvatic 1958) Boşcaiu 1972
- Danthonio-Brachypodion* alliance Boşcaiu 1972
- Festuco rubrae-Danthonietum* association Csűrös et al. 1968
- VIII. Koelerio-Corynephoretea** class Klika in Klika et Novák 1941
- Corynephoretalia canescentis* order Klika 1934
- Thero-Airion* alliance T. Tüxen ex Oberdorfer 1957
- Filagini-Vulpietum* association Oberdorfer 1938
- Vulpio-Airetum capillaris* association Paucă 1941
- IX. Galio-Urticetea** class Passarge 1967 em. Kopecký 1969
- Lamio albi-Chenopodietalia boni-Henrici* order Kopecký 1969
- Galio-Alliarion* alliance Lohmeyer et Oberdorfer 1967 in Oberdorfer et al. 1967
- Sambucetum ebuli* association Felföldy 1942
- Convolvuletalia sepium* order R. Tüxen em. Mucina 1993
- Petasition officinalis* alliance Sillinger 1933 em. Kopecký 1969
- Telekio-Petasitetum hybridi* association (Morariu 1967) Resmeriță et Rațiu 1974
- X. Epilobietea angustifolii** class R. Tüxen et Preising in R. Tüxen 1950
- Atropetalia* order Vlieger 1937
- Carici piluliferae-Epilobion angustifolii* alliance R. Tüxen 1950
- Calamagrostietum epigei* association Juraszek 1928
- Atropion belladonnae* alliance Br.-Bl. et R. Tüxen 1937 em. Oberdorfer 1957
- Eupatorietum cannabini* association R. Tüxen 1937
- Sambucetalia racemosae* order Oberdorfer 1957
- Sambuco racemosae-salicion capreae* alliance R. Tüxen et Neumann in R. Tüxen 1950
- Fragario-Rubetum idaei* association Gams 1927
- Spireio chamaedryfoliae* alliance Sanda et Popescu 1999
- Spiraeo-Coryletum* association Ujvárosi 1944
- XI. Trifolio-Geranietea sanguinei** class Th. Müller 1961
- Origanetalia vulgaris* order Th. Müller 1961
- Trifolion medii* alliance Th. Müller 1961
- Clinopodio-Pteridietum aquilini* association Dihoru 1975
- XII. Alnetea glutinosae** class Br.-Bl. et R. Tüxen ex Westhoff et al. 1946
- Salicetalia auritae* order Doing ex Westhoff et Den Held 1969
- Salicion cinereae* alliance Th. Müller et Görs ex Passarge 1958
- Frangulo-Salicetum cinereae* association Malcuit 1929
- XIII. Querco-Fagetea** class Br.-Bl. et Vlieger in Vlieger 1937 em. Borhidi 1996
- Fagetalia sylvaticae* order Pawlowski in Pawlowski et al. 1928
- Alno-Ulmion* alliance Br.-Bl. et R. Tüxen 1943 em. Th. Müller et Görs 1958
- Alnenion glutinosae-incanae* suballiance Oberdorfer 1953
- Stellario nemori-Alnetum glutinosae* association (Kästner 1938) Lohmeyer 1957
- Ulmion* suballiance Oberdorfer 1953
- Carici acutiformis-Alnetum* association (Dostál 1933) Soó 1968

- Symphyto cordati-Fagion* alliance Vida 1959
Symphyto-Fagenion suballiance Boşcaiu et al. 1982
Symphyto cordati-Fagetum association Vida 1963
Festuco drymejae-Fagetum association Morariu et al. 1968
Calamagrostio-Fagenion suballiance Boşcaiu et al. 1982
Luzulo albidiae-Fagetum sylvaticae association Zólyomi 1955
Moehringio muscosae-Acerenion suballiance Boşcaiu et al. 1982
Phyllitidi-Fagetum association Vida (1959) 1963
Acereto-Ulmetum association Beldie 1951
Epipactido-Fagenion suballiance Boşcaiu et al. 1982
Geranio robertianae-Fagetum association (Burduja et al. 1974) Chifu et Ştefan. 1994 em. Chifu et Zamfirescu 2001
Lathyro hallersteinii-Carpinenion suballiance Boşcaiu et al. 1982
Carpino-Fagetum association Paucă 1941
Quercetalia roboris order R. Tüxen 1931
Genisto germanicae-Quercion alliance Neuhäusl et Neuhäuslová-Novotná 1967
Genisto tinctoriae-Quercetum petraeae association Klika 1932
Sorbo-Betuletum pendulae association Dihoru 1975
Petraeo-Fagetum association Scamoni (1956) 1959
Castaneo-Quercion alliance Soó 1962 em. Soó 1971
Castaneo-Quercetum association Horvat I. 1938
- XIV. *Quercetea pubescenti-petraeae* class** (Oberdorfer 1948) Jakucs 1960
Fraxino orni-Cotinetalia order Jakucs 1960
Quercion petraeae alliance Zólyomi et Jakucs in Soó 1963
Quercetum petraeae-cerris association Soó 1963
Cytiso nigricantis-Quercetum petraeae association Paucă 1941
Festuco drymejae-Quercetum petraeae association Morariu et al. 1970
- XV. *Rhamno-Prunetea* class** Rivas Goday et Borja Carbonell 1961
Prunetalia spinosae order R. Tüxen 1952
Prunion spinosae alliance Soó 1951
Pruno spinosae-Crataegetum association (Soó 1927) Hueck 1931
Research in the area of Codru-Moma Mountains was made by the botanist A. Paucă during 1935 and 1941. She identified a number of 19 vegetal associations in the main types of vegetation in the area.

CONCLUSIONS

The vegetation in Codru-Moma Mountains is complex as regards the composition and the floristic diversity. There were identified vegetal associations with a narrow spreading which must be protected and preserved.

The complexity of the relief and the pedoclimatic factors led to the installment in Codru-Moma Mountains of a vegetal carpet especially heterogeneous, where the forests with mezophyle grass lands are predominant.

In this study we can notice that the associations from *Querco-Fagetea* class Br.-Bl. et Vlieger in Vlieger 1937 em. Borhidi 1996 have the biggest percentage, in a number of 13, followed by the associations from *Molinio-Arrhenatheretea* class R. Tüxen 1937, in a number of 8 associations.

It can be noticed that fact that the forest associations occupy the largest area in the studies place, with a plus for common hornbeam-european beech forests which have the biggest spread.

In the past the spreading area of forests was bigger, but the continuous exploitation of the wood, many times irrational, led to a significant regress of forests in favor of secondary grassy cenoses, the agricultural lands, grass lands and degraded lands.

REFERENCES

1. Borza Al., Boşcaiu N., 1965, Introducere în studiul covorului vegetal. Editura Academiei R.P.Române, Bucureşti.
2. Braun-Blanquet, J., 1928, Pflanzensoziologie, Springer Verlag, Wien-New York, 3, Aufl.
3. Burescu P., 2003, Flora şi vegetaţia zonelor umede din nord-vestul României. Editura Academiei Române, 474 p., Bucureşti.
4. Cristea, V., Gafta, D., Pedrotti, F., 2004, Fitosociologie. Editura Presa Universitară Clujeană, Cluj-Napoca.
5. Ellenberg, H., 1974, Zeigerwerte der Gefäßpflanzen Mitteleuropas -Scripta Geobotanica, Göttingen, 9:1-97.
6. Groza, G., 2008, Flora şi vegetaţia Munţilor Pădurea Craiului. Editura Risoprint, Cluj-Napoca.
7. Mihăilescu, S., 2001, Flora şi vegetaţia Masivului Piatra Craiului. Editura Vergiliu, Bucureşti.
8. Paucă Ana, 1941, Studiu fitosociologic în Munţii Codru şi Muma. Teză de doctorat M.O., Imprimeria Naţională, Bucureşti.
9. Paucă Ana, 1941, Recherches géologiques dans le Monts du Codru et de Muma. Anuarul Inst. Geol. al României, vol. XXI, Bucureşti.
10. Sanda, V., Burescu, P., Răduţoiu, D., Irimia, I. B., 2007, Breviar fitocenologic vol IV. Editura Sitech, Craiova.
11. Sanda V., Öllerer Kinga, Burescu P., 2008, Fitocenozele din România, sintaxonomie, structură, dinamică şi evoluţie. Editura Ars Doceni, Bucureşti.