THE STUDY OF VEGETAL COMMUNITIES IN THE ORASTIE RIVER BASIN (CENTRAL-WESTERN ROMANIA)

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Abstract

The present paper shows a syntaxonomic analysis of the vegetal associations identified in the Orastie river basin over the period 2009-2013. Within the studied territory the woodlands are prevalent, followed by meadows, then bushlands, aquatic and palustris vegetation. The vegetation of the Orastie river basin falls in the deciduous forest zone, wherein the hills and the mountains make room for a altitudinal distribution of the vegetal formations.

Key words: Orăstie river basin, phytocoenoses, association, class, order, suballiance, alliance.

INTRODUCTION

The Orastie river basin lies between the corresponding ones of Strei (to the south and west) and of Cugir (to the east). To the north the studied river basin ends up in the Mureş river, whose tributary is the river Orăştie, in fact. From the geographical viewpoint, there are three zones in the Orastie river basin, each one showing a distinct geographical landscape: the mountainous zone (the west-north-western sector of the Sureanu Mountains), the foothills zone (the Şureanu Piedmont) and the depressionary zone (the Orăştie Corridor).

The territory under analysis is part of the temperate climatic zone of its continental type, its maritime influenced climatic sector, the Southern Carpatians subdivision, the complex topoclimate of the Orăştie lowlands and Parâng highlands (Pătru I. et al., 2006).

The thermal differences between the outskirts of the mountains and the high ridges are of roughly 10 degrees Celsius on average. Towards their north-western limits, due to warm air incursions from the Banato-Crisana plains, the average temperatures range from 9 to 10 degrees Celsius. In winter, the average temperatures vary between minus 2 and minus 7 degrees Celsius, in spring they rise by 6 to 12 degrees, in summer they reach 8 degrees on the mountain tops and over 19 degrees on the outskirts, while in autumn the average temperatures decrease by 5.5 to 7 degrees as compared to those in the summer months (Trufaş V., 1986).

The rainfall amounts in multiannual average to approximately 550-600 mm in the outskirts and to over 1000 mm in the high altitude central

parts. In the whole of Transylvania the rainfall quantum is 500 to 700 mm per year (Pătru I. et al., 2006).

MATERIALS AND METHODS

The methodology we used for positioning the association into the superior coeno-taxonomic units, namely suballiance, alliance, order, class, took into consideration the traditional ecological-floristic systems developed by Tüxen, 1955; Braun-Blanquet J., 1964; Borza Al., Boşcaiu N., 1965; Ellenberg H., 1974 as well as the more recent papers by researchers such as Mucina L. et al., 1993; Pott R., 1995; Weber H. E. et al., 2000; Sanda V. et al., 2008.

RESULTS AND DISSCUSIONS

Following up research conducted by us in the Orăştie river basin, we identified 86 vegetal associations, belonging to 7 suballiances, 53 alliances, 37 orders şi 25 classes. We point out that 81 associations are cited for the very first time in this territory.

The syntaxonomic classification of the associations identified in the Orastie river basin is:

I. *Lemnetea* class O. de Bolós et Masclans 1955
***Lemnetalia minoris* order** O. de Bolós et Masclans 1955
***Lemnion minoris* alliance** O. de Bolós et Masclans 1955
1. *Lemnetum minoris* association Oberdorfer ex. Th. Műller et Görs 1960
II. *Potamogetonetea pectinati* class R. Tüxen et Preising 1942
***Potamogetonetalia pectinati* order** Koch 1926
***Potamion pusilli* alliance** Vollmar em. Hejný 1978
2. *Najadetum marinae* association Fukarek 1961
Callitricho-Batrachietalia **order** Passarge 1964
***Ranunculion aquatilis* alliance** Passarge 1964
3. *Callitrichetum palustris* association (Dihoru 1975 n.n.) Burescu 1999
4. *Ranunculetum aquatilis* association Géhu 1961
III. *Isoëto-Nanojuncetea* class Br.-Bl. et R. Tüxen ex Westhoff et al. 1946
***Nanocyperetalia* order** Klika 1935
***Nanocyperion* alliance** Koch ex Libbert 1932
5. *Cyperetum flavescentis* association Koch ex Aichiger 1933
6. *Juncetum bufonii* Felföldy association 1942
IV. *Phragmitetea australis* class R. Tüxen et Preising 1942
***Phragmitetalia* order** Koch 1926
***Phragmition communis* alliance K**och 1926
7. *Scirpo-Phragmitetum* association Koch 1926
8. *Typhetum angustifoliae* association Pignatti 1953

9. *Typhetum latifoliae* association Lang 1973
10. *Schoenoplectetum lacustris* association Chouchard 1924
11. *Glycerietum maximae* association Hueck 1931
***Nasturtio-Glycerietalia* order** Pignatti 1953
***Sparganio-Glycerion fluitantis* alliance** Br.-Bl. et Sissingh 1942
12. *Sparganietum erecti* association Roll 1938
13. *Mentho-Sietum angustifoliae* Nedelcu 1971 corr. *Mentho aquaticae Beruletum erectae* association Sanda et al. 2001
***Phalaridion arundinaceae* alliance** Kopecký 1961
14. *Calamagrostetum pseudophragmitis* association Kopecký 1961
***Oenanthetalia aquaticae* order** Hejný in Kopercký 1961 ex Hejný 1965
***Oenanthion aquaticae* alliance** Hejný ex Neuhäust 1959
15. *Eleocharitetum palustris* association Schennikov 1919
16. *Oenantho-Rorippetum* association Lohmeyer 1950
***Magnocaricetalia* order**
***Magnocaricion elatae* alliance Koch 1926**
***Caricenion rostratae* suballiance** (Balátová-Tuláčková 1963) Oberdorfer et al. 1067
17. *Caricetum gracilis* association Almquist 1929
V. *Montio-Cardaminetea* class Br.-Bl. et R. Tüxen 1943
***Montio-Cardaminetalia* order** Pawlowski 1928
***Cardaminion amarae* alliance** Mass 1959
18. *Cardamino-Chrysosplenietum alternifolii* association Mass 1959
***Cardamino-Montion* alliance** Br.-Bl. 1926
19. *Carici remotae-Calthetum laetae* association Coldea (1972) 1978
VI. *Oxycocco-Sphagnetea* class Br.-Bl.. et R. Tüxen ex Westoff et al. 1946
***Sphagnetalia magellanici* order** (Pawlowschi 1928) Moore 1968
***Sphagnion magellanici* alliance** (Malcuit 1929) Kästner et Flösner 1933
20. *Eriophoro vaginati-Sphagnetum recurvi* association Huech 1925
VII. *Bidentetea tripartiti* class
***Bidentetalia tripartiti* order** Br.-Bl. et R. Tüxen ex Klika et Hadač 1944
***Bidention tripartiti* alliance** Nordhhagen 1940 em. R. Tüxen in Poli et J. Tüxen 1960
21. *Bidenti-Polygonetum hydropiperis* association Lohmeyer in R. Tüxen 1950
22. *Xantio strumarii-Bidentetum* association Timár 1947
23. *Ranunculetum scelerati* association Sissingh em. R. Tüxen 1950
VIII. *Asplenietea trichomanis* class (Br.-Bl. in Meier et Br.-Bl. 1934) Oberdorfer 1977
***Androsacetalia vandelii* order** Br.-Bl. in Meier et Br.-Bl. 1934
***Hypno-Polypodion* alliance** Mucina 1993
24. *Asplenio trichomani-Pöetum nemoralis* association Boşcaiu 1971

25. *Ctenidio-Polypodietum vulgaris* association Jurko et Peciar 1963
IX. *Nardo-Callunetea* class Preising 1949
***Nardetalia* order** Oberdorfer 1949
***Potentillo-Nardion* alliance** Simon 1959
26. *Nardo-Festucetum rubrae fallax* association Puşcaru et al. 1959
27. *Violo declinatae-Nardetum* association Simon 1966
X. *Betulo-Adenostyletea* class Br.-Bl. et R. Tüxen 1943
***Adenostyletalia alliariae* order** Br.-Bl. 1931
***Adenostylion alliariae* alliance** Br.-Bl. 1925
28. *Cirsio waldsteinii-Heracleetum transsilvanici* association Pawlowschi et Walas 1949
XI. *Molinio-Arrhenatheretea* class R. Tüxen 1937
***Molinietalia caerulae* order** Koch 1926
***Molinion caerulae* alliance** Koch 1926
29. *Junco-Molinietum* association Preising 1951
***Filipendulion* alliance** Lohmeyer in Oberdorfer et al. 1967
30. *Lysimachio vulgaris-Filipenduletum ulmariae* association Balátová-Tuláčková
***Calthion palustris* alliance** R. Tüxen 1937
31. *Scirpetum sylvatici* association Ralscki 1931, Maloch1935 em. Scwick 1944
***Agrostion stoloniferae* alliance** Soó (1933) 1971
32. *Agrostetum stoloniferae* association (Ujvárosi 1941) Burduja et al. 1956
33. *Ranunculo repenti-Alopecuretum pratensis* association Ellmauer et Mucina in Mucina et al. 1993
34. *Poëtum sylvicolae* association Buia et al. 1959
***Arrhenatheretalia* order** R. Tüxen 1931
***Arrhenatherion* alliance** Koch 1926
35. *Arrhenatheretum elatioris* association Br.-Bl. ex Scherrer 1925
***Cynosurion* alliance** R. Tüxen 1947
36. *Festuco rubrae-Agrostetum capillaris* association Horvat 1951
37. *Trifolio repenti-Lolietum* association Krippelová 1967, Resmeriţă et Pop 1967
38. *Antoxantho-Agrostetum capillaris* Sillinger 1933
***Potentillo-Polygonetalia* order** R. Tüxen 1947
***Potentillion anserinae* alliance** R. Tüxen 1937
39. *Potentilletum anserinae* association Felföldy 1942
***Juncenenion effusi* suballiance** Westhoff et van Leeuwen ex Hejný et al. 1979
40. *Juncetum effusi* association Soó (1931) 1949
41. *Junco inflexi-Menthetum longifoliae* association Lohmeyer 1953
42. *Lythro-Calamagrostetum epigei* association I. Pop 1968

***Deschampsietalia caespitosae* order** Horvatič 1956
***Deschampsion caespitosae* alliance** Horvatič 1930
43. *Caricetum brizoidis* association O. Raţiu 1966
XII. *Festuco-Brometea* class Br.-Bl. et R. Tüxen in Br.-Bl. 1949
***Festucetalia valesiacae* order** Br.-Bl. et R. Tüxen ex Br.-Bl. 1949
***Festucion valesiacae* alliance** Klika 1931
44. *Agrostio-Festucetum valesiaceae* association Borisavljevič et. al. 1955
45. *Festucetum rupicolae* association Burduja et al. 1956
46. *Botriochloetum ischaemi* association (Kristiansen 1937) Pop 1977
XIII. *Koelerio-Corynephoretea* class Klika in Klika et Novák 1941
***Corynephoretalia canescentis* order** Klika 1934
***Thero-Airion* alliance** R. Tüxen ex Oberdorfer 1957
47. *Filagini-Vulpietum* association Oberdorfer 1938
XIV. *Stellarietea mediae* class R. Tüxen et al. ex von Rochow 1951
***Sisymbrietalia* order** J. Tüxen in Lohmeyer et al. 1962
***Sisymbrion officinalis* alliance** R. Tüxen, Lohmeyer et Preising in R. Tüxen 1950
48. *Hordeetum murini* association Libbert 1932 em. Passarge 1964
XV. *Plantaginetea majoris* class R. Tüxen et Preising 1950
***Plantaginetalia majoris* order** R. Tüxen et Preising in R. Tüxen 1950
***Lolio-Plantaginion* alliance** R. Tüxen 1947
49. *Lolio-Plantaginetum majoris* association (Linkola 1921) Beger 1930 em. Sissing 1969
XVI. *Artemisietea vulgaris* class Lohmeyer et al. in R. Tüxen 1950
***Onopordetalia acanthii* order** Br.-Bl. et R. Tüxen exKlika et Hadač 1944
***Bracyaction ciliatae* alliance** I. Pop et Viţalariu 1971
50. *Ambrosietum artemisiifoliae* association Viţalariu 1973
***Arction lappae* alliance** R. Tüxen 1937
51. *Arctietum lappae* association R. Tüxen 1937
52. *Tanaceto-Artemisietum vulgaris* association Sissing 1950
53. *Helianthetum tuberosi* association (Moor 1958) Oberdorfer 1967
***Agropyretalia repentis* order** Oberdorfer et al. 1967
***Convolvulo arvensis-Agropyrion repentis* alliance** Görs 1966
54. *Lepidietum drabae* association Timár 1950
XVII. *Galio-Urticetea* class Passarge 1967 em. Kopechý 1969
***Lamio albi-Chenopodietalia boni-Henrici* order** Kopechý 1969
***Galio-Aliarion* alliance** Lohmeyer et Oberdorfer et al. 1967
55. *Sambucetum ebuli* association Felföldy 1942
***Rumicion alpini* alliance** (Rübel 1933) Klika 1944
56. *Urtico dioicae-Rumicetum alpini* association (Şerbănescu1939, Todor et Culică 1967) corr. Oltean et Dihoru 1986
***Convolvuletalia sepium* order** R. Tüxen em Mucina 1933

***Petasition officinalis* alliance** Sillinger 1933 em. Kopecký 1969
57. *Telekio-Petasitetum hybridi* association (Morariu 1967) Resmeriţă et Raţiu 1974
***Senecion fluviatilis* alliance** R. Tüxen 1952
58. *Polygonetum cuspidati* association R. Tüxen et Raabe 1950 apud Oberdorfer 1967
XVIII. *Epilobietea angustifolii* class R. Tüxen et Preising in R. Tüxen 1950
***Atroppetalia* order** Vlieger1937
***Carici piluliferae-Epilobion angustifolii* alliance** R. Tüxen 1950
59. *Senecioni sylvatici-Epilobietum angustifolii* association R. Tüxen 1937
***Atropion belladonnae* alliance** Br.-Bl. et R. Tüxen 1937 em. Oberdorfer 1957
60. *Eupatorietum cannabini* association R. Tüxen 1937
***Sambucetalia racemosae* order** Oberdorfer 1957
***Sambuco racemosae-Salicion capreae* alliance** R. Tüxen et Neumann in R. Tüxen 1950
61. *Fragario-Rubetum idaei* association Gams 1927
***Spireion chamaedryfoliae* alliance** Sanda et Popescu 1999
62. *Spireetum ulmifoliae* association Zólyomi 1939
63. *Coryletum avellanae* association Soó 1927
XIX. *Trifolio-Geranietea sanguinei* class Th. Müller 1961
***Origanetalia vulgaris* order** Th. Müller 1961
***Trifolion medii* alliance** Th. Müller 1961
64. *Clinopodio-Pteridietum aquilini* association Dihoru 1975
XX. *Salicetea purpureae* class Moor 1958
***Salicetalia purpureae* order** Moor 1958
***Salicion triandrae* alliance** Th. Müller et Görs 1958
65. *Salicetum purpureae* association Soó 1930 n.n.) Wendelberger-Zelinka1952
***Salicion albae* alliance** Soó 1930 em. Th. Müller et Görs 1958
66. *Salicetum albae* association Issler 1924 s.l.
***Salicion elaeagno-daphnoides* alliance** (Moor 1958) Gras in Mucina et al. 1993
67. *Salici purpureae-Myricarietum* association Moor 1958
XXI. *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
68. *Alno- Salicetum cinereae* association (Kobendza 1950) Passarge 1956
XXII. *Querco-Fagetea* class Br.-Bl. et Vlieger in Vlieger em. Borhidi 1996
***Fagetalia sylvaticae* order** Pawloski in Pawlowski et al. 1928
***Alno-Ulmion* alliance** Br.-Bl. et R. Tüxen 1943 em. Th. Müller et Görs1958

***Alnenion glutinosae-incanae* suballiance** Oberdorfer 1953
69. *Aegopodio podagrariae-Alnetum glutinosae* association Kárpáti et Jurko1964
70. *Alnetum glutinosae-incanae* association Br.-Bl. 1915
***Symphyto cordati-Fagetum* alliance** Vida 1963
***Symphyto-Fagenion* suballiance** Boşcaiu et al. 1982
71. *Symphyto cordati-Fagetum* association Vida (1959) 1963
72. *Pulmonario rubrae-Fagetum* association (Soó 1964) Täuber 1987
73. *Festuco drymejae-Fagetum* association Morariu et al. 1968
***Calamagrostio-Fagenion* suballiance** Boşcaiu et al. 1982
74. *Luzulo albidae-Fagetum sylvaticae* association Zólyomi 1955
***Lathyro hallersteinii-Carpinenion* suballiance** Boşcaiu et al. 1982
75. *Carpino-Fagetum* association Paucă 1941
76. *Carpino-Quercetum cerris* Klika 1938
XXIII. *Quercetea pubescenti-Petraeae* class (Oberdorfer 1948) Jakucs 1960
***Fraxino orni-Cotinetalia* order** Jakucs 1960
***Quercion petreae* alliance** Zólyomi et Jakucs in Soó 1963
77. *Quercetum petraeae-cerris* association Soó 1963
78. *Cytiso nigricantis-Quercetum petraeae* association Paucă 1941
***Aceri tatarico-Quercion* alliance** Zólyomi 1957
79. *Polygonato latifolio-Quercetum roboris* association (Hargitai 1940) Borhidi 1966 in Borhidi et Kevey 1996
***Robinion pseudacaciae* alliance** M. Csűrös-Káptalan 1968
80. *Bromo sterilis-Robinietum pseudacaciae* association (Pócs 1954) Soó 1964
XXIV. *Rhamno-Prunetea* class Rivas Goday et Borja Carbonell 1961
***Prunetalia spinosae* order** R. Tüxen 1952
***Prunion spinosae* alliance** Soó 1951
81. *Pruno spinosae-Crataegetum* association (Soó 1927) Hueck 1931
XXV. *Vaccinio-Piceetea* class Br.-Bl. in Br.-Bl. et al 1939
***Piceetalia excelsae* order** Pawloski in Pawlowski et al. 1928
***Piceion excelsae* alliance** Pawloski in Pawlowski et al. 1928
***Soldanelo majori-Picenion* suballiance** Coldea 1991
82. *Hieracio transsilvanico-Piceetum* association Pawlowski et Br.-Bl. 1939
***Junipero-Pinetalia mugi* order** Boşcaiu 1971
***Pinion mugi* alliance** Pawlowski 1928
83. *Calamagrostio villosae-Piceetum* association (Coldea et Pânzaru 1986) Sanda et al. 2001
84. *Bruckenthalio-Piceetum* association Borhidi 1964
***Junipero-Bruckenthalion* alliance** (Horvat 1949) Boşcaiu 1971

85. *Campanulo abietinae-Vaccinietum myrtilli* association (Buia et al. 1962) Boşcaiu 1971
***Myrtillo-Piceetalia* order** Hadač 1962
***Myrtillo-Piceion excelsae* alliance** Březina et Hadač 1962
86. *Myrtillo-Piceetum excelsae* association Březina et Hadač 1962

CONCLUSIONS

From the present study one notices the prevalence of the forest associations (16 in all) falling into the *Querco-Fagetea* class Br.-Bl. et Vlieger in Vlieger em. Borhidi 1996, *Quercetea pubescenti-Petraeae* class (Oberdorfer 1948) Jakucs 1960 and *Vaccinio-Piceetea* class Br.-Bl. in Br.-Bl. et al 1939, thereafter the mesophilic meadows of the *Molinio-Arrhenatheretea* class R. Tüxen 1937 (15 associations).

To conclude with, the complexity of landforms, the pedoclimatic agents, and the anthropical-zoogenous influence have definitely determined the existence of a heterogeneous vegetation in the Orastie river basin, with a prevalence of forests followed by secondary mesophilic meadows.

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