RESEARCH CONCERNING THE FLORA OF THE EIBENTHAL AREA IN THE IRON GATES NATURE PARK

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Abstract: *Particular attention has been given lately to the study of nature reserves aiming at knowing and maintaining the present status of conservation of these areas. The areas labelled as reserves are known s enclaves of valuable species and are legally protected. There still are, though, areas within different nature parks or even outside them that preserve certain special floristic elements very similar to nature reserves without having been labelled as such. This is why the authors of this paper wish to draw attention on such an area located near Eibenthal (Mehedinţi County), an area included in the Iron Gates Nature Park. The park is located in south-west Romania and it spreads over two administrative units (Caraş-Severin and Mehedinţi counties). The southern limit of the park is marked by the River Danube, which separated Romania from Serbia. The Iron Gates Nature Park is known as the largest nature park in Romania: it includes 18 nature reserves. The reserves are surrounded by lands that are in private ownership and exploited as orchards, haymaking fields, and forests. These neighbouring areas preserve, in their turn, numerous floristic elements and vegetation aspects very similar to those of a nature reserve due to the maintenance, over a number of years, of the traditional exploitation of the ecosystems in the area. The study aims at defining the floristic structure of the area aiming at assessing the value of the gene-fund resources and of landscape from the perspective of biodiversity. The research method pertains to the floristic study. Based on field sampling, the authors define the vascular flora structure. Species identification was done using Flora României; the species are named after Ciocârlan (2009) and Flora Europaea (electronic edition).*

Key words**:** *flora, Eibenthal area, Iron Gates Nature Park*

INTRODUCTION

The Iron Gates Nature Park was established by Law No. 5 from 2000 and it corresponds to the category V IUCN. They have established here two special avifauna protection areas (according to the Government's Decision No. 1284 from 2007) as integral part of the European ecological network NATURA 2000 in Romania: ROSPA0026 Danube Course – Baziaş – Iron Gates (10124.4 ha), ROSPA0080 Almăjului Mountains – Locvei Mountains (118141.6 ha) as well as a community importance site, ROSCI0206 Iron Gates (Minister's Order No. 1964 from 2007 – with an area of 124293 ha).

The narrow strait of the Danube is characterised by a remarkable flower diversity that drew researchers' attention ever since the beginning of the 19th century. In this area, they have identified almost 50% of the total plant species identified in Romania, i.e. 1749 taxa of the total 3500 described in the Romanian Flora. Some of these taxa are unique in the world, as is the case of the species *Stipa danubialis*, described for the first time in 1969, on Cracul Găioara. (Matacă S., 2005)

The studied area borders the locality Eibenthal, i.e. the portion located on both sides of the communal road leading to this Czech locality. This road is links Sviniţa and Dubova parting from the county road DN 57 going along the Danube and linking the towns of Moldova Nouă and Orşova.

From a geographical point of view, the area is located in the Almăjului Mountains that belong to the greater unit of the Banatului Mountains. The Almăjului Mountains reach 1224 m (the Svinicea Mare Peak), dominated by grassland. Cretacic and Jurassic limes predominate in both the Aninei and Almăjului Mountains. (Mihăilescu V., 1978, 1990)

The moderate-continental climate with sub-Mediterranean influences is characterised by a multi-annual mean temperature of 11.2^0C and an amount of precipitations of 560.1 mm, mainly in the first half of the summer (May and June) and in winter (December and January). (Grigore S., Coste I., 1978)

According to the distribution of the soils per region, the studied area belongs to the depression sector, prevosoil and lithosoil subsector with forms of relief well developed on basic and ultra basic rocks. They are black soils formed on serpentines, under oak forests, or on secondary grassland. They are saturated, rich in clay and are associated to brown or eroded soils. (Florea N. and Glăvan V., 1976, in Matacă S., 2005)

MATERIAL AND METHODS

Floristic researches were carried on by field observation in different period of the years between 2009-2010. Species identification was done using the Flora României; the actual names of the species are noticed after Ciocârlan 2009 and Flora Europaea (electronic edition Ecological indices were noted after Sanda V. *et al.*, 2003 and Sanda V. *et al.*, 1983.

RESULTS AND DISCUSSIONS

Based on field studies, we established the cormophyta conspectus. The species are presented per botanical families, each species being accompanied by data concerning its phytogeographical and bio form, as well as ecological indicators of moisture, temperature, and soil reaction. Flora analysis points to the existence of 43 botanical families, the best represented ones being Poaceae (32 species), Fabaceae (23 species), Asteraceae (22 species), and Rosaceae (12 species).

From a phytogeographical point of view, flora is made up mainly from Euro-Asian elements, i.e. 74 species (36%), the general fund of the flora in a European temperate region. There are also numerous European species (40 species, i.e. 19%), Central-European species (21 species, i.e. 10%), and Mediterranean species (16 species, i.e. 9%). (Figure 1.)

Cosmopolitan species (12 species) and adventives species (4 species) share the flora with a total number of species (8%), which points to a relatively low ruderalisation of the vegetal cover in the studied region.

Such species are: *Pteridium aquilinum, Convolvulus arvensis, Viola arvensis, Rumex acetosella, Rumex acetosa, Prunella vulgaris, Erigeron annuus, Sonchus oleraceus, Poa pratensis.*

To note that the invasive species *Ailanthus altissima* cover large areas, expanding rapidly along the entire strait of the Danube detrimental to the species characteristic to the area such as *Syringa vulgaris, Cotinus coggygria, and Fraxinus ornus*.

As far as the adaptations to the unfavourable conditions during winter are concerned, the flora is represented by bio forms within which hemicryptophyte share half of the total number of species (108 species, i.e. 51%). (Figure 2)

These species make up all the grassland associations in the region and most of the rock associations, be they lime rocks or crystal schists. They are followed by annual therophyta (23 species, i.e. 11%), microphanerophyte (17 species, i.e. 9%) and megaphanerophyte (16 species, i.e. 8%).

Flora overview:

Familia Dennstaedtiaceae

1. *Pteridium aquilinum* (L.) Kuhn – G, Cosm; $U_3T_3R_0$

Familia Aspleniaceae

2. *Asplenium adiantum-nigrum* L. - H, Eua(Med); $U_{2,5}T_3R_3$
3. *Asplenium ceterach* L. – H, Atl-Med; $U_{1,5}T_5R_{4,5}$
4. *Asplenium cuneifolium* Viv. – H, Eur; $U_3T_3R_{4,5}$
5. *Asplenium onopteris* L. – H, Med; $U_{1,5}T_{3,5}R_{4,5}$
6. *Asplenium trichomanes* L. – H, Cosm; $U_3T_0R_4$
7. *Cystopteris fragilis* (L.) Bernh. – H, Cosm; $U_{3,5}T_0R_0$
8. *Dryopteris filix-mas* (L.) Schott – H, Cosm; $U_4T_3R_0$

Încrengătura Pinophyta (Gymnospermatophyta)

Familia Pinaceae

9. *Pinus nigra* J.F.Arnold
10. *Pinus sylvestris* L. – MM, Eua; $U_0T_0R_0$

Încrengătura Magnoliophyta (Angiospermatophyta)

Familia Ranunculaceae

11. *Clematis vitalba* L. – N-E, Euc(Med); $U_3T_3R_3$

Familia Papaveraceae

12. *Papaver rhoeas* L. – Th, Cosm; $U_3T_{3,5}R_4$

Familia Moraceae

13. *Morus alba* L. – M(MM), Med; $U_2T_{3,5}R_4$

Familia Juglandaceae

14. *Juglans regia* L. – MM, B-Anat; $U_3T_4R_4$

Familia Fagaceae

15. *Fagus orientalis* Lipsky – MM, Balc-Anat-Cauc; $U_3T_3R_0$
16. *Fagus sylvatica* L. – MM-M, Ec; $U_3T_3R_0$
17. *Quercus cerris* L. – MM-M, Med; $U_2T_{3,5}R_3$
18. *Quercus dalechampii* Ten. – MM, Med-Carp-Balc; $U_{2,5}T_3R_0$
19. *Quercus frainetto* Ten. – MM, Balc;$U_6T_4R_3$
20. *Quercus petraea* (Matt.) Liebl. – MM(M), Eur; $U_{2,5}T_3R_0$
21. *Quercus polycarpa* Schur – MM(M), Carp-Balc-Cauc; $U_{2,5}T_{2,5}R_0$
22. *Quercus pubescens* Willd. – MM, Med; $U_{1,5}T_5R_5$
23. *Quercus virgiliana* (Ten) Ten – MM, Med; $U_2T_4R_4$

Familia Corylaceae

24. *Corylus avellana* L. – M, Ec (Med); $U_3T_3R_3$
25. *Carpinus betulus* L. – MM-M, Ec; $U_3T_3R_3$
26. *Carpinus orientalis* Mill. – M,Balc; $U_3T_4R_{4,5}$

Familia Phytolaccaceae

27. *Phytolacca americana* L. – H (Adv)

Familia Caryophyllaceae

28. *Cerastium banaticum* (Rochel) Heuff. – Ch, Carp-Balc; $U_2T_{4,5}R_4$
29. *Dianthus carthusianorum* L. – H, Eur; $U_2T_5R_5$
30. *Dianthus giganteus* d'Urv. – H, Balc; $U_{2,5}T_3R_4$
31. *Scleranthus perennis* L. – H (Ch), Eur; $U_3T_0R_3$
32. *Silene vulgaris* (Moench) Garcke– H(Ch), Eua; $U_3T_3R_4$
33. *Stellaria graminea* L. – H, Eua; $U_{2,5}T_2R_3$
34. *Stellaria holostea* L. – H-Ch, Eua (Md); $U_3T_3R_0$

Familia Polygonaceae

35. *Rumex acetosa* L. – H, Cosm; $U_3T_0R_0$
36. *Rumex acetosella* L. – H(G), Cosm; $U_2T_3R_2$

Familia Crassulaceae

37. *Sedum acre* L. – Ch, Eua; $U_1T_3R_0$
38. *Sedum telephium* L. – H, Eua(Cont); $U_{2,5}T_0R_4$
39. *Sedum maximum* (L.)Hoffm. – H, Eur; $U_2T_3R_4$

Familia Rosaceae

40. *Crataegus monogyna* Jacq. – M, Eua; $U_{2,5}T_{3,5}R_3$
41. *Crataegus pentagyna* Waldst. & Kit. ex Willd. – M, Pont-Pan-Balc; $U_3T_{3,5}R_3$
42. *Fragaria vesca* L. – H, Eua; $U_3T_{2,5}R_0$
43. *Fragaria viridis* Weston – H, Eur(Cont); $U_2T_4R_3$
44. *Malus sylvestris* Mill. – M, Eur; $U_{3,5}T_3R_4$
45. *Potentilla argentea* L. – H, Eua; $U_2T_4R_2$
46. *Prunus mahaleb* L. – M-MM, Med; $U_2T_3R_{4,5}$
47. *Prunus spinosa* L. – M, Eua(Med); $U_2T_3R_3$
48. *Pyrus pyraster* Burgsd. – M-MM, Eur; $U_2T_3R_4$
49. *Rosa canina* L. – N, Eur; $U_2T_3R_3$
50. *Rubus candicans* Weihe ex Rchb. – N, Eur; $U_2T_{2,5}R_0$
51. *Sanguisorba minor* Scop. – H, Eua; $U_2T_{3,5}R_{4,5}$

Familia Fabaceae (Leguminosae)

52. *Amorpha fruticosa* L. – M, Adv, Am N; $U_3T_4R_0$
53. *Anthyllis vulneraria* L. – H, Eur(Med); $U_2T_0R_4$
54. *Chamaecytisus hirsutus* (L.) Link (*ssp. leucotrichus*) – N, Pan-Balc; $U_2T_{3,5}R_4$
55. *Coronilla elegans* Pancic – H, Carp-Balc; $U_2T_{3,5}R_4$
56. *Coronilla varia* L. – H, Euc(Med); $U_2T_3R_4$
57. *Dorycnium pentaphyllum* Scop. subsp. *herbaceum* (Vill.) Rouy – Ch-H, Euc (Med);$U_2T_5R_4$
58. *Genista tinctoria* L. – Ch, Eur; $U_{2,5}T_3R_2$

59. *Genista ovata* Waldst. & Kit. – Ch, Eur; $U_{2,5}T_3R_3$
60. *Lathyrus latifolius* L. – H, Med; $U_2T_{3,5}R_4$
61. *Lathyrus tuberosus* L. – H (G), Eua (Med); $U_2T_4R_4$
62. *Lathyrus venetus* (Mill.) Wohlf. – H, Pont-Med; $U_3T_4R_3$
63. *Lathyrus vernus* (L.) Bernh. – H, Eua; $U_3T_3R_3$
64. *Lembotropis nigricans* (L.) Griseb.– N, Euc; $U_{2,5}T_{3,5}R_2$
65. *Lotus corniculatus* L. – H, Eua; $U_{2,5}T_0R_0$
66. *Medicago lupulina* L. – Th-H, Eua; $U_{2,5}T_3R_4$
67. *Medicago minima* (L.) Bartal. – Th, Med; $U_{1,5}T_4R_4$
68. *Medicago falcata* L. – H, Eua; $U_2T_3R_5$
69. *Melilotus albus* Medik. – Th(TH), Eua; $U_{2,5}T_3R_0$
70. *Melilotus officinalis* Lam. – Th(TH), Eua; $U_{2,5}T_{3,5}R_0$
71. *Robinia pseudoacacia* L. – MM, Adv; $U_{2,5}T_4R_0$
72. *Trifolium arvense* L. – Th, Eua; $U_{1,5}T_3R_4$
73. *Trifolium medium* L. – H, Eua; $U_3T_3R_0$
74. *Trifolium montanum* L. – H, Eua(Cont); $U_{2,5}T_2R_0$
75. *Trifolium pratense* L. – H-TH, Eua; $U_3T_0R_0$

Familia Cornaceae

76. *Cornus mas* L. – M, Pont-Med; $U_2T_{3,5}R_4$
77. *Cornus sanguinea* L. – M, Euc; $U_3T_3R_4$
78. **Familia Celastraceae**
79. *Euonymus europaeus* L. – M, Eur; $U_3T_3R_3$

Familia Euphorbiaceae

80. *Euphorbia amygdaloides* L. – Ch, Eur(Med), $U_3T_{3,5}R_4$
81. *Euphorbia cyparissias* L. – H-G, Eua; $U_2T_3R_4$
82. *Euphorbia lingulata* Heuff. – H, Balc; $U_{2,5}T_{3,5}R_4$
83. *Mercurialis perennis* L. – G(H), Eur; $U_{3,5}T_3R_5$

Familia Vitaceae

84. *Vitis vinifera* L. subsp. *sylvestris* (C.C.Gmel.) Hegi – M-E, Pont-Med; $U_{3,5}T_{4,5}R_{4,5}$

Familia Anacardiaceae

85. *Cotinus coggygria* Scop. – M, Pont-Med; $U_2T_{4,5}R_4$

Familia Simaroubaceae

86. *Ailanthus altissima* (Mill.) Swingle – MM, Adv; $U_0T_0R_0$

Familia Polygalaceae

87. *Polygala comosa* Schkuhr – H-Ch, Eur; $U_2T_4R_4$
88. *Polygala major* Jacq. – H, Pont-Med; $U_2T_3R_{4,5}$

Familia Araliaceae

89. *Hedera helix* L. – N-E, Atl-Med;

Familia Apiaceae (Umbelliferae)

90. *Cachrys ferulacea* (L.) Calest. – H, Balc; $U_1T_4R_4$

Familia Hypericaceae (Guttiferae)

91. *Hypericum hirsutum* L. – H, Eua; $U_3T_3R_3$
92. *Hypericum perforatum* L. – H, Eua; $U_3T_3R_0$

Familia Violaceae

93. *Viola arvensis* Murray – Th, Cosm; $U_3T_3R_0$
94. *Viola odorata* L. – H, Atl-Med; $U_{2,5}T_{3,5}R_4$
95. *Viola reichenbachiana* Jord. ex Boreau – H, Eua; $U_3T_{2,5}R_3$
96. *Viola tricolor* L. – TH-Th-H, Eua; $U_3T_2R_0$

Familia Brassicaceae (Cruciferae)

97. *Alyssum murale* Waldst. & Kit. – Ch, Pont-Med; $U_2T_4R_3$
98. *Aurinia petraea* (Ard.) Schur – H, Carp-Balc; $U_2T_{2,5}R_{4,5}$
99. *Aurinia saxatilis* (L.) Desv. – Ch, Eur (Cont); $U_1T_4R_{4,5}$
100. *Erysimum cuspidatum* (M.Bieb.) DC. – Th(TH), Eua(Cont); $U_{1,5}T_3R_4$
101. *Erysimum diffusum* Ehrh. – TH(H), Eua (Cont); $U_{1,5}T_3R_4$
102. *Isatis praecox* Kit. ex Tratt. – TH-H, Pont-Pan-Balc; $U_2T_3R_4$
103. *Isatis tinctoria* L. – TH-H, Eua-Cont; $U_{1,5}T_{3,5}R_4$
104. *Sisymbrium loeselii* L. - Th(TH), Eua(Cont); $U_{2,5}T_4R_3$
105. *Thlaspi perfoliatum* L. – Th, Eua; $U_{2,5}T_{3,5}R_{4,5}$

Familia Primulaceae

106. *Lysimachia punctata* L. – H, Eur; $U_{3,5}T_{3,5}R_3$

Familia Oleaceae

107. *Ligustrum vulgare* L. – M, Eua(Med); $U_{2,5}T_3R_3$
108. *Fraxinus ornus* L. – MM, Med; $U_{1,5}T_{3,5}R_5$
109. *Syringa vulgaris* L. – M, Carp-Balc-Anat; $U_{1,5}T_{4,5}R_{4,5}$

Familia Convolvulaceae

110. *Calystegia sepium* (L.) R.Br. – G(H), Eua; $U_5T_3R_4$
111. *Convolvulus arvensis* L. – G(H), Cosm; $U_{2,5}T_{3,5}R_{3,5}$
112. *Convolvulus cantabricus* L. – H, Pont-Med; $U_{1,5}T_{3,5}R_4$

Familia Boraginaceae

113. *Cynoglossum officinale* L. – TH, Eua(Cont); $U_3T_3R_3$
114. *Echium vulgare* L. – TH, Eua; $U_2T_3R_4$
115. *Lithospermum purpureocaeruleum* L. – H-G, Euc-Med; $U_{2,5}T_4R_{4,5}$
116. *Onosma arenaria* Waldst. & Kit. – H, Eur(Cont); $U_{1,5}T_{3,5}R_4$
117. *Onosma heterophylla* Griseb. – H, Balc; $U_2T_{3,5}R_4$

118. *Symphytum ottomanum* Friv. – H, Balc; $U_3T_4R_4$

Familia Lamiaceae (Labiatae)

119. *Clinopodium vulgare* L. – H, Circ; $U_{2,5}T_3R_3$
120. *Melissa officinalis* L. – H, Med; $U_2T_4R_0$
121. *Nepeta nuda* L. subsp. *nuda* – H-Ch, Eua(Cont); $U_2T_3R_0$
122. *Prunella laciniata* (L.) L. – H, Euc-Med;
123. *Prunella vulgaris* L. – H, Cosm; $U_3T_3R_0$
124. *Salvia nemorosa* L. – H, Euc; $U_{2,5}T_4R_3$
125. *Salvia verticillata* L. – H, Euc(Med); $U_2T_4R_0$
126. *Stachys recta* L. – H, Pont-Med; $U_2T_5R_5$
127. *Teucrium chamaedrys* L. – Ch, Med-Euc; $U_2T_4R_4$
128. *Teucrium montanum* L. – Ch, Med-Euc; $U_1T_4R_5$
129. *Thymus pannonicus* All. (*T. marschallianus* Willd.) – Ch, Pont-Pan; $U_{1,5}T_{3,5}R_4$
130. *Thymus pulegioides* L. – Ch, Eur(Mont); $U_2T_3R_3$

Familia Plantaginaceae

131. *Plantago lanceolata* L. – H, Eua; $U_3T_0R_0$

Familia Scrophulariaceae

132. *Digitalis lanata* Ehrh. – TH-H, Balc-Pan; $U_{1,5}T_4R_{4,5}$
133. *Linaria genistifolia* (L.) Mill. – H, Eua(Cont); $U_1T_{3,5}R_5$
134. *Verbascum banaticum* Schrad. – TH, Pont-Balc; $U_2T_4R_4$
135. *Verbascum lychnitis* L. – TH, Eur; $U_1T_3R_4$

Familia Campanulaceae

136. *Campanula glomerata* L. – H, Eua; $U_{2,5}T_3R_4$
137. *Campanula grossekii* Heuff. – H, Balc; $U_2T_4R_3$
138. *Campanula persicifolia* L.– H, Eua; $U_3T_3R_0$
139. *Campanula rapunculoides* L. – H, Eua; $U_3T_2R_0$
140. *Campanula sibirica* L. – H, Eua(Cont); $U_{2,5}T_4R_4$
141. *Campanula sparsa* Friv. subsp. *sphaerothrix* (Griseb.) Hayek – Th, Balc; $U_2T_4R_3$
142. *Edraianthus graminifolius* (L.) A.DC. – H, End; $U_2T_{3,5}R_{3,5}$

Familia Rubiaceae

143. *Galium album* Mill. – H, Eur; $U_{2,5,}T_{2,5}R_3$
144. *Galium aparine* L. – Th, Circ; $U_3T_3R_3$
145. *Galium flavescens* Borbás – H, Cerp-Balc; $U_2T_4R_5$
146. *Galium mollugo* L. – H, Eua; $U_3T_{2,5}R_3$

Familia Caprifoliaceae

147. *Sambucus ebulus* L. – H, Eua; $U_3T_3R_3$
148. *Sambucus nigra* L. – MM-M, Eur(Med); $U_3T_3R_3$

Familia Dipsacaceae

149. *Knautia arvensis* (L.) Coult. – H, Eur; $U_{2,5}T_3R_0$
150. *Scabiosa columbaria* L. – H, Eur(Med); $U_{2,5}T_3R_{4,5}$
151. *Scabiosa banatica* Waldst. & Kit. – H, Dac-Balc; $U_2T_{2,5}R_4$

Familia Asteraceae (Compositae)

152. *Achillea coarctata* Poir. – H, Pont-Balc; $U_{1,5}T_{4,5}R_{4,5}$
153. *Achillea crithmifolia* Waldst. & Kit. – H, Balc-Pan; $U_{2,5}T_4R_0$
154. *Achillea millefolium* L. – H, Eua; $U_3T_0R_0$
155. *Artemisia austriaca* Jacq. – Ch, Eua(Cont); $U_2T_4R_{4,5}$
156. *Centaurea biebersteinii* DC. – TH-H, Pont-Pan-Balc; $U_{1,5}T_4R_4$
157. *Centaurea triniifolia* Heuff. – H, Carp-Balc; $U_{1,5}T_4R_{4,5}$
158. *Chondrilla juncea* L. – TH-H, Eua(Cont); $U_{1,5}T_{3,5}R_4$
159. *Cirsium arvense* (L.) Scop. – G, Eua; $U_{2,5}T_3R_0$
160. *Crepis pulchra* L. – Th, Eur; $U_2T_4R_3$
161. *Doronicum columnae* Ten. – G, Alp-Carp-Balc; $U_{3,5}T_2R_{3,5}$
162. *Erigeron annuus* (L.) Pers. – Th-TH-H, Adv(Am de N); $U_4T_0R_4$
163. *Eupatorium cannabinum* L. – H, Eua; $U_4T_3R_3$
164. *Hieracium pavichii* Heuff. – H, Carp-Balc; $U_2T_{3,5}R_0$
165. *Hieracium pilosella* L. – H, Eua; $U_2T_0R_2$
166. *Lactuca viminea* (L.) J.Presl et C.Presl – TH, Eua(Cont); $U_2T_4R_4$
167. *Lapsana communis* L. subsp. *intermedia* (M.Bieb.) Hayek (*Lapsana grandiflora*)
168. *Leucanthemum vulgare* Lam. – H, Eua; $U_3T_0R_0$
169. *Mycelis muralis* (L.) Dumort. – H, Eur; $U_3T_3R_3$
170. *Sonchus oleraceus* L. – Th, Cosm; $U_3T_0R_0$
171. *Tanacetum corymbosum* (L.) Sch.Bip. – Th, Eua; $U_{2,5}T_{2,5}R_3$
172. *Tragopogon dubius* Scop. – Th-TH, Euc-Med; $U_{2,5}T_{3,5}R_0$
173. *Tragopogon pratensis* L. subsp. *orientalis* (L.) Čelak. - TH-H, Eua; $U_3T_3R_4$
174. *Tussilago farfara* L. – G, Eua; $U_0T_3R_4$

Familia Dioscoreaceae

175. *Tamus communis* L. – G, Med; $U_3T_{3,5}R_4$

Familia Liliaceae

176. *Muscari comosum* (L.) Mill. – G, Eur; $U_{1,5}T_{3,5}R_0$

Familia Alliaceae

177. *Allium carinatum* L. subsp. *pulchellum* Bonnier et Layens – G, Euc-Balc; $U_2T_{3,5}R_3$
178. *Allium oleraceum* L. – G, Eur; $U_3T_3R_0$
179. *Allium rotundum* L. – G, Euc-Med; $U_2T_4R_{4,5}$

180. *Allium scorodoprasum* L. – G, Euc; $U_2T_3R_4$

Familia Poaceae (Gramineae)

181. *Aegilops cylindrica* Host – Th, Eua(Med); $U_{1,5}T_3R_0$
182. *Agrostis stolonifera* L. – H, Circ; $U_4T_0R_0$
183. *Arrhenatherum elatius* (L.) P.Beauv. ex J.Presl et C.Presl – H, Eua; $U_3T_3R_4$
184. *Avenula compressa* (Heuff.) W.Sauer et Cmel. – H, Pont-Pan-Balc; $U_2T_4R_4$
185. *Brachypodium pinnatum* (L.) P.Beauv. – H, Eua(Med); $U_{2,5}T_4R_4$
186. *Briza media* L. – H, Eua; $U_0T_3R_0$
187. *Bromus arvensis* L. – Th-TH, Eua(Med); $U_{2,5}T_3R_0$
188. *Bromus commutatus* Schrad. – Th-TH, Eua(Med); $U_0T_3R_0$
189. *Bromus squarrosus* L. – Th-TH, Eua(Cont); $U_{1,5}T_4R_4$
190. *Bromus sterilis* L. – Th, Eua(Med); $U_2T_4R_4$
191. *Bromus tectorum* L. – Th, Eua(Cont); $U_{1,5}T_{3,5}R_0$
192. *Calamagrostis epigejos* (L.) Roth – G, Eua; $U_2T_3R_0$
193. *Chrysopogon gryllus* (L.) Trin. – H, Med; $U_{1,5}T_4R_4$
194. *Dactylis glomerata* L. – H, Eua; $U_3T_0R_4$
195. *Dactylis glomerata* L. subsp. *aschersoniana* (Graebn.) Thell. – H, Euc; $U_{2,5}T_3R_3$
196. *Elymus hispidus* (Opiz) Melderis – G, Eua(Cont); $U_2T_{4,5}R_4$
197. *Festuca heterophylla* Lam. – H, Euc(Med); $U_{2,5}T_3R_3$
198. *Festuca pallens* Host – H, Euc-Mont; $U_{1,5}T_4R_{4,5}$
199. *Festuca rupicola* Heuff. – H, Eua(Cont); $U_{1,5}T_4R_4$
200. *Festuca valesiaca* Schleich. ex Gaudin – H, Eua(Cont); $U_1T_5R_4$
201. *Melica ciliata* L. – H, Euc-Med; $U_{1,5}T_4R_4$
202. *Melica nutans* L. – H(G), Eua; $U_3T_0R_4$
203. *Melica picta* K.Koch – H(G), Pont-Euc; $U_{2,5}T_3R_4$
204. *Melica transsilvanica* Schur – H, Med; $U_{1,5}T_{4,5}R_{3,5}$
205. *Milium effusum* L. – H, Circ; $U_{3,5}T_3R_3$
206. *Phleum montanum* K.Koch – H, Carp-Balc-Cauc-Anat; $U_{1,5}T_{4,5}R_4$
207. *Phleum phleoides* (L.) H.Karst. – H, Eua(Cont-Med); $U_2T_3R_4$
208. *Poa angustifolia* L. – H, Eua; $U_2T_3R_0$
209. *Poa compressa* L.– H, Eua(Cont); $U_{1,5}T_3R_0$
210. *Poa pratensis* L. – H, Cosm; $U_3T_0R_0$
211. *Poa trivialis* L. – H, Eua; $U_4T_0R_0$
212. *Sesleria rigida* Heuff. ex Rchb. *var haynaldiana* (Schur) Beldie - H, Carp-Balc; $U_{2,5}T_2R_{4,5}$;
213. *Sesleria filifolia* Hoppe – H, Balc; $U_2T_{3,5}R_{4,5}$

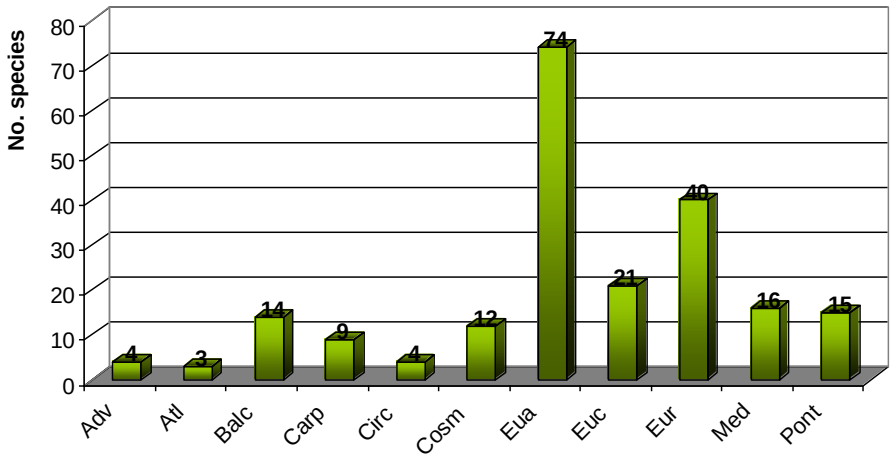

Figure 1. Geo-elements

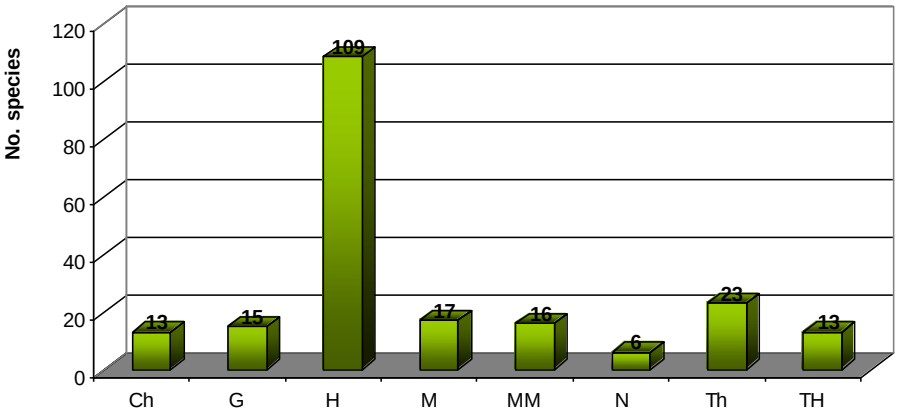

Figure 2. Bio-form

Among moisture loving species, we can notice the predominance of the xeromesophyte elements (102 species, i.e. 49%) that make up the associations specific to the rocky areas in Banat. Such woody species covering these rocks are: *Quercus cerris, Quercus pubescens, Quercus virgiliana, Fagus orientalis, Carpinus betulus, Fraxinus ornus, Syringa vulgaris, Cotinus coggygria, Prunus mahaleb.*

The temperature spectrum points to a dominance of mesothermal species (114 species, i.e. 55%), over half of the total number of species, followed by moderate thermophilous species (54 species, i.e. 26%).

As for soil reaction, species that are low acid neutrophilous predominate with 94 species (45%), followed by amphitolerant species (54 species, i.e. 26%) and acid-neutrophilous (47 species, i.e. 23%). (Figure 3)

The analysis of phytogeographical elements circumscribe the analysed area and the entire south-western region of Romania, the Euro-Siberian region, the Dacian-Illyric province of the Banat circumscription, where sub-Mediterranean and Balkan species with different variants are characteristic. (Coste I., 1974; Matacă S., 2005; Imbrea I., Nicolin A., 2007)

Among rare species mentioned in Romanian literature (V. Ciocarlan, 2009) and identified in the studied area are*: Asplenium onopteris*, *Cachrys ferulacea*, *Symphytum ottomanum*, *Onosma heterophylla*, *Centaurea triniifolia*, *Lactuca viminea*, *Allium carinatum subsp. pulchellum*, *Elymus hispidus*, *Sesleria filifolia*.

Among the endemic species mentioned in the electronic version of Flora Europaea (http://rbg-web2.rbge.org.uk/FE/fe.html) are*: Dianthus carthusianorum*, *Euphorbia lingulata*, *Aurinia petraea*, *Syringa vulgaris*, *Symphytum ottomanum*, *Digitalis lanata*, *Verbascum banaticum*, *Campanula grossekii*, *Campanula sparsa subsp. sphaerothrix*, *Edraianthus graminifolius*, *Galium mollugo*, *Achillea crithmifolia*, *Centaurea biebersteinii*, *Centaurea triniifolia*, *Festuca pallens*, *Sesleria rigida.*

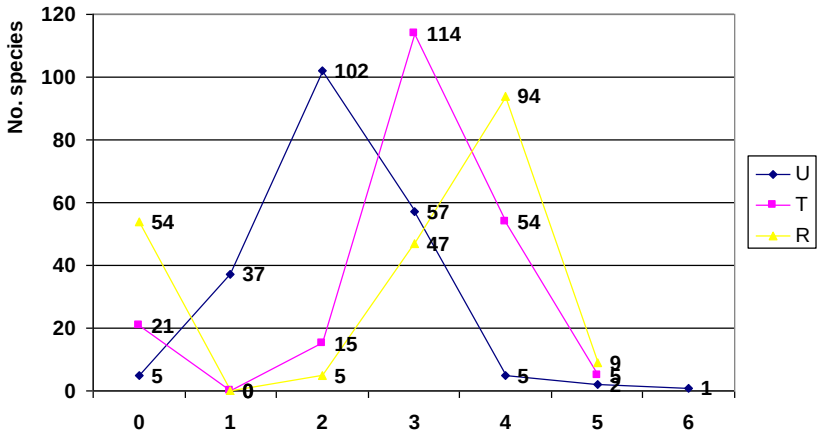

Figure 3. Temperature,
moisture, and soil reaction spectra

CONCLUSIONS

From a phytogeographical point of view, flora is made up of mostly Euro-Asian elements (75 species, i.e. 36%), that make up the general fund of the flora in the temperate European area. The specific feature of the flora is the presence of sub-Mediterranean elements, mainly mesoxerophilous that make up specific associations. The entire area is an area of interference of Balkan-Illyric flora with Central-European flora.

As far as the adaptations to the unfavourable conditions during winter are concerned, the flora is represented by bio forms within which hemicryptophyte share half of the total number of species (108 species, i.e. 51%). These species make up all the grassland associations in the region and most of the rock associations, be they lime rocks or crystal schists.

Among moisture loving species, we can notice the predominance of the xeromesophyte elements (101 species, i.e. 49%) that make up the associations specific to the

rocky areas in Banat. The temperature spectrum points to a dominance of mesothermal species (105 species, i.e. 50%), over half of the total number of species, followed by moderate thermophilous species (52 species, i.e. 25%). As for soil reaction, species that are low acid neutrophilous predominate with 93 species (45%), followed by amphitolerant species (54 species, i.e. 26%) and acid-neutrophilous (47 species, i.e. 23%).

The studied area conserves numerous floral elements and vegetation aspects in a regime close to that of the neighbouring reserves: this is the reason why we have chosen to study this area that is not included in nature reserves proper, yet is unaltered from the point of view of biodiversity.

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