

## The vegetation of the pastures from the Aninei mountains

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### SUMMARY

*The situation of the Aninei Mountains in the South-Western part of Romania, at the interference of air masses with maritime (of Western origin), continental (of Eastern origin) and Southern character (coming across the Mediterranean Sea), as well as the carstic relief conferred by the calcareous geologic substrate, account for the floristic peculiarities of this region, containing numerous rare and characteristic Banatian elements. The European, Southern and Eastern influences are expressed in the diversified floristic composition of the pastures, where xerophile and xeromezophile species prevail. A peculiarity of the researched area is represented by the calciphilic vegetation of the xerophilic pastures. In the floristic composition, we were able to identify several sporadic species in Romania.*

### ÖSSZEFOGLALÁS

*Az Aninei hegységek Romániának dél-nyugati részén találhatóak, a tengeri (nyugati eredetű), kontinentális (keleti eredetű) és déli (a Földközi tengert átszelő) légtömegek interferenciájánál. Ezek a feltételek, összevetve a karsztikus vidék geológiai mészkö alapjával, okozza, hogy a tanulmányozott terület számos ritka és a Bánátnak jellemző florisztikus elemeket tartalmazzon. Az európai déli és keleti klímahatások megnyilvánulnak a vegyes növényi összetételekben, amelyekben főként találhatóak a xerofil és xero-mezofil fajok. A xerofil gyepek mészkönövényzete a tanulmányozott területnek sajátosságát alkotja. A florisztikus kompozícióban sok, Romániában szórványos fajokat azonosítottunk.*

### INTRODUCTION

The Aninei Mountains, part of the Banatian Mountains, occupy a surface of 770 km<sup>2</sup>. Their medium height is 500-800 m, the highest point being the Leordiș peak (1160 m). Approximately two thirds of their surface is covered by forests, the rest being occupied by pastures, primary or as a result of the disafforestation; the pastures are mostly localized in the Northern half of the Mountains. The relief is varied, with the configuration of the terrain being generally undulated. The prevailing orientation of the slopes is NNE-SSW. The most frequent geologic formations are the Jurassic and Cretacic limestones, the Aninei Mountains being situated on the greatest calcareous formation of Romania.

The studied territory is situated in an area with humid, temperate climate, soft winters, exposed to obvious Mediterranean influences (Sencu, 1987). The

soils of the Aninei Mountains are represented mostly by cambisols (especially eumesobasic), followed by molisols (rendzines) and argiluvic soils (brown luvic). The soils of the pastures are generally less profound, with the lythic subtypes prevailing. The erosion, principal cause for the lowering of soil productivity, is wide spread in the pastures of low hills. The main factors that lead to the starting of this process are the surcharge with animals of the pastures in vicinity of villages, leading to the settling of the soil and the intense rarefying of the herbaceous cover, as well as the excessive disafforestation.

### MATERIAL AND METHODS

The study was carried out between 2001-2004. The identification of the vegetal species was made using mainly The Flora of Romania (Săvulescu, 1952-1976) and The Illustrated Flora of Romania (Ciocârlan, 2000), but other sources were also employed : Stichmann, 1999 ; Schönfelder 2001.

### RESULTS AND DISCUSSIONS

#### 1. Botanical setting

From the botanical point of view, the Aninei Mountains contain numerous perimeters with specific vegetation structures, according to the peculiarity of the carstic relief, which shelter rare and typically Banatian floristic elements. The Southern influence in the general character of the flora is evidenced by the elevated number of Southern floristic elements, among which the submediterranean element prevails, followed by balcanic and moesic elements.

The greatest number of submediterranean species can be encountered in the subxerophilic forests of *Quercus cerris* and *Q. frainetto*, in the xerothermophile shrubs (*Carpinus orientalis*, *Fraxinus ornus*, *Lychnis coronaria*, *Ruscus aculeatus*, *Muscari comosum*, *Ornithogallum pyramidale*), xerophilic pastures (*Tunica saxifraga*, *Sedum cepae*, *Trifolium striatum*, *Lathyrus sphaericus*) and on sunny calcareous rocks (*Aethionema saxatile*, *Draba muralis*, *Sedum hispanicum*, *Silene armeria*). Among the balcanic elements there can be found on the rocks: *Dianthus kitaibelii*, *Silene flavescens*, *Lapsana grandiflora* and others. The moesic species from the flora of the investigated area are best represented on calcareous rocks: *Asperula tenella*, *Cerastium*

*banaticum*, *Peucedanum longifolium*, *Sesleria filiformis*. They witness the relation between the flora of these mountains and the flora of the Transdanubian Carpathians. The dacic element is best represented in the subxerophilic forests and xerothermophilic shrubs, by *Quercus polycarpa*, *Dianthus giganteus*, *Campanula divergens* a.o., the mezophilic forests (*Melampyrum bihariense*, *Pulmonaria rubra*), than in xerophilic pastures (*Centaurea banatica*, *Scabiosa banatica*). The pontic-mediterranean species are also better represented in the xerothermophilic shrubs and forests: *Padus mahaleb*, *Cotinus coggygria*, *Muscari racemosum*, *Oryzopsis virescens*. The characteristic species for the pontic elements are few; they are mainly living in the xerophilic pastures resulting from the disafforestation of Quercetae: *Linum flavum*, *Veronica jacquinii*. The continental element is represented especially in the flora of xerophilic pastures, by: *Achillea setacea*, *Alyssum alyssoides*, *Potentilla arenaria*, *Seseli annuum*, *Verbascum phoeniceum*, *Stipa capillata* și altele. The flora of calcareous rocks and forests does not contain continental or pontic elements. Although few, the atlantic-mediterranean species (*Heliathemum canum*, *Trifolium incarnatum*, *Ceterach officinarum*) contribute to the particularization of the flora from the investigated region.

## 2. The vegetation of the pastures

The knowledge of the floristic composition of pastures is of interest not only from a botanical point of view, but also utilitarian: agronomic and pharmaceutical. The exploitation of pastures as source for animal nourishment is largely done in the researched area, but more intense in the Northern half. The pastures are generally well kept, but there also exist places where the surcharge with animals is frequent (the Brădet pasture). Around Anina-Steierdorf, the sterile rocks resulted after the extraction of coal occupy a significant surface; on these rocks proliferates *Tussilago farfara*. A great pasture surface (about 20%) is covered today by harmful and toxic plants like *Pteridium aquilinum* and *Euphorbia cyparissias*, diminishing significantly the productive surface.

Regarding the pasture types of the investigated territory, these can be classified into xerophilic and xeromezophilic, on one hand, and mezophilic and mezohygrophilic, on the other. Their study revealed the composition presented as follows:

In the composition of the xerophilic and xeromezophilic pastures, the prevailing Poaceae are *Festuca valesiaca*; *Festuca rupicola* ssp. *rupicola*; *Dichanthium ischaemum*, însoțite de *Bromus erectus*, *Cynodon dactylon*, *Stipa capillata*, *Poa compressa*; *Brachypodium pinnatum*; *Agropyron intermedium*; *Melica ciliata* ssp. *ciliata*; *Chrysopogon gryllus*. Among the most frequent species that develop against this background have been identified: *Filipendula vulgaris*; *Sanguisorba minor*; *Agrimonia eupatoria*; *Potentilla recta* (Rosaceae); *Anthyllis vulneraria*; *Medicago falcata*; *Vicia angustifolia*;

*Coronilla varia* (Fabaceae); *Alyssum alyssoides*; *Arabis hirsuta*; *Draba nemorosa*; *Thlaspi perfoliatum*; *Cardaminopsis arenosa* (Brassicaceae); *Seseli annuum*, *Pimpinella saxifraga* (Apiaceae); *Cerastium arvense*; *C. brachypetalum*; *Dianthus carthusianorum*; *Holostemum umbellatum*; *Silene italica* ssp. *nemoralis*; *Minuartia verna* (Caryophyllaceae); *Viola arvensis*, *V. hirta*, *V. tricolor* (Violaceae); *Vincetoxicum hirundinaria* (Asclepiadaceae); *Geranium sanguineum* (Geraniaceae); *Hypericum perforatum* (Hypericaceae); *Iris pumila* (Iridaceae); *Linum flavum*; *L. tenuifolium* (Linaceae); *Heliathemum nummularium* (Cistaceae); *Asperula cynanchica* (Rubiaceae); *Campanula glomerata*; *C. sibirica* (Campanulaceae); *Sedum acre* (Crassulaceae); *Linaria genistifolia*; *L. angustissima*; *Melampyrum arvense*; *Veronica spicata*; *V. austriaca*; *V. teucrium*; *V. prostrata*; *Verbascum phoeniceum* (Scrophulariaceae); *Calamintha acinos*; *Prunella grandiflora*; *Teucrium chamaedrys*; *Thymus austriacus*; *Th. glabrescens*; *Th. pannonicus* (Lamiaceae); *Aster linosyris*; *Carlina vulgaris*; *Erigeron acris*; *Hieracium cymosum*; *Tragopogon dubius*; *Anthemis tinctoria*; *Centaurea biebersteinii*; *Chondrilla juncea*; *Achillea collina*, *A. setacea* (Asteraceae), *Euphorbia cyparissias* (Euphorbiaceae); *Carex humilis* (Cyperaceae).

A peculiarity of the researched area is represented by the calcophile vegetation of the xerophilic pastures. In the floristic composition, we could identify several rare or sporadic species in Romania: *Aethionema saxatile*, *Alyssum saxatile*, *Alyssum wierzbickii*, *Draba lasiocarpa*, *Erysimum crepidifolium* (Brassicaceae); *Seseli rigidum* (Apiaceae); *Silene flavescens* (Caryophyllaceae), *Leontodon asper*, *Jurinea mollis* ssp. *macrocalathia* (Asteraceae); *Stipa eriocaulis* ssp. *eriocaulis* (Poaceae); *Ceterach officinarum* (Aspleniaceae); *Galium album* (Rubiaceae); *Heliathemum canum* (Cistaceae); *Sedum album*, *Sempervivum marmoratum* (Crassulaceae).

Other species encountered on the xerophilic pastures, which took the place of *Quercus cerris* and *Q. frainetto*, and which develop on rocky sites are: *Potentilla inclinata* (Rosaceae); *Astragalus cicer*, *Lathyrus nissolia*, *Trifolium striatum* (Fabaceae); *Stachys germanica* (Lamiaceae); *Kohlruschia saxifraga* (Caryophyllaceae); *Artemisia austriaca*, *Aster amellus*, *Crepis setosa*, *Hieracium hoppeanum*, *Inula germanica*, *Xerathemum annuum* (Asteraceae); *Allium oleraceum* (Alliaceae).

To the particularization of these pastures from the Aninei Mountains contribute rare species like: *Cytisus procumbens*, *Lathyrus sphaericus* (Fabaceae); *Dianthus giganteiformis* (Caryophyllaceae); *Sisymbrium polymorphum* (Brassicaceae); *Sedum cepae* (Crassulaceae); *Echium maculatum* (Boraginaceae); *Linum hirsutum* (Linaceae); *Seseli pallasi*, *Seseli peucedanoides* (Apiaceae); *Cruciata pedemontana* (Rubiaceae); *Valerianella coronata* (Valerianaceae); *Carex hallerana* (Cyperaceae).

In the mezophilic and mezohygrophilic pastures are prevailing *Agrostis capillaris* și *Poa pratensis*, *Festuca rubra*, însoțite de *Bromus mollis*, *Festuca pratensis*, *Arrhenatherum elatius*, *Cynosurus cristatus*, *Lolium perenne*, *Deschampsia caespitosa*, *Molinia caerulea*, *Trisetum flavescens*, *Alopecurus pratensis*, *Phleum pretense*, etc.

The most frequent species of these pastures that we have identified are: *Ranunculus repens*, *Thalictrum lucidum* (Ranunculaceae); *Potentilla erecta*, *P. reptans*, *Alchemilla vulgaris* (Rosaceae); *Trifolium dubium*, *T. hybridum*, *T. repens*; *Vicia cracca*, *V. sepium*, *Lathyrus hallersteinii* (Fabaceae); *Angelica sylvestris*, *Anthriscus sylvestris*, *Daucus carota ssp. carota* (Apiaceae); *Euphorbia villosa* (Euphorbiaceae); *Campanula patula* (Campanulaceae); *Cerastium glomeratum*, *Stellaria graminea* (Caryophyllaceae); *Rumex acetosa*, *Rumex crispus* (Polygonaceae); *Symphytum officinale* (Boraginaceae); *Geranium pratense* (Geraniaceae); *Knautia arvensis* (Dipsacaceae); *Primula veris* (Primulaceae); *Gentiana cruciata*, *Gentianopsis ciliata* (Gentianaceae); *Cruciata glabra*, *Galium*

*aparine*, *G. molugo* (Rubiaceae); *Rhinanthus minor*, *R. angustifolius*, *Euphrasia stricta* (Scrophulariaceae); *Plantago lanceolata* (Plantaginaceae); *Ajuga reptans*, *Mentha arvensis*, *Scutellaria hastifolia* (Lamiaceae); *Bellis perennis*, *Carlina acaulis*, *Cirsium canum*, *Senecio jacobaea*, *Pulicaria dysenterica* (Asteraceae); *Veratrum album* (Liliaceae); *Orchis coriophora* (Orchidaceae).

### CONCLUSIONS

From the botanical point of view, the Aninei Mountains contain numerous perimeters with specific vegetation structures, according to the peculiarity of the carstic relief, which shelter rare and typically Banatian floristic elements. The Southern influence in the general character of the flora is evidenced by the elevated number of Southern floristic elements, among which the submediterranean element prevails, followed by balcanic and moesic elements. A peculiarity of the researched area is represented by the calcophile vegetation of the xerophilic pastures, containing several in Romania sporadic species.

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