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THE COPĂCEL HILL FOREST, BETWEEN BĂLA AND ERCEA, A FUTURE RESERVE OF MUREŞ COUNTY

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Abstract: The forest lies in the region known as the "Transylvanian Plain", on the Copăcel hill, between Băla and Ercea. The specific landscape of this region is characterized by medium altitude hills, with wide and soft slopes. In this forest, the presence of the *Delphinium simonkaianum* Pawł. var. *psilocarpum* (Simk.) Pawł species, a threatened endemic taxon, was reported in 1953. In 2011, this globally threatened taxon was identified, after 58 years, on the upper side of the Copăcel slope, in a mixed oak and hornbeam forest. These oak and hornbeam mixtures are the result of impacts exerted on oak forests. The identified association, *Melampyro bihariensis-Carpinetum* (Borza 1941) Soó 1964 em. Coldea 1975, has three distinct layers: the arborescent layer dominated by *Carpinus betulus* and *Quercus petraea,* along with *Quercus robur*, *Prunus avium*, *Acer campestre*, *Ulmus glabra*, etc., with good canopy cover (0.8-0.9); the shrub layer, represented by species such as: *Crataegus monogyna*, *Corylus avellana*, *Cornus mas*, *Ligustrum vulgare*, *Rosa canina*, *Sambucus nigra*, *Staphylea pinnata*, etc., is relatively poor in individuals, which are present particularly in forest clearings or at the edge of the forest. Grass synusia is well developed, sometimes forming an almost continuous cover (*Asarum europaeum*, *Convallaria majalis*, *Dactylis glomerata* ssp. *aschersoniana*, *Galium odoratum*, *Melampyrum bihariense*, *Stellaria holostea*, *Aconitum anthora*, *Aconitum moldavicum*, *Lilium martagon*, *Arum orientale*).

Key words: *Delphinium simonkaianum* Pawł. var. *psilocarpum* (Simk.) Pawł, rare plant, oak and hornbeam forest, Mureş County

Introduction

The Copăcel Forest is situated between the localities Băla and Ercea, in the Transylvanian Plain, a region characterized by medium altitude hills, with wide soft slopes, called "copârşaie" by the natives. It is from here that the species *Delphinium simonkaianum* Pawł. var. *psilocarpum* (Simk.) Pawł. was cited in Flora of Romania [SĂVULESCU (ed.), 1953].

Materials and methods

The list of the forest species was made based on trips in the field. For the nomenclature of the taxa, *Flora of Romania* [SĂVULESCU (ed.), 1952-1976] and *Flora Europaea* [TUTIN & al. 1964-1980, 1993] were used, and for the assignment of the oak and hornbeam forest to the type of habitat we used *Manual de interpretare a habitatelor Natura 2000 din România* [GAFTA & MOUNTFORD (coord.), 2008] as well as *Habitatele din România* [DONIȚĂ & al. 2005].

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Results and discussions

The forest is a mixture of oak and hornbeam, being situated on the Copăcel hill between Băla and Ercea (Fig. 1). The oak mixed with hornbeam occupies a surface area of 24.1 ha, on a slope with north-western exposure and low grade inclination (15°). The substrate is formed by surface deposits derived from basic rocks, marl clays and limestone marl conglomerates. The dominant soils in the area are: brown eumesobasic, weakly acid, moderately humiferous soils, mesobasic soils with carbonates at the base of the profile, moderately to well supplied with organic nutrient substances [MAC, 1972]. The forest, private property, is of secondary origin, being anthropically conditioned. According to National Forest Administration **Romsilva** reports, the age of the trees is approximately 110 years. The forest flora is consisting of 124 cormophyte species.

The phytocoenoses were assigned to habitat **91Y0** ***Păduri dacice de stejar şi carpen*** [Dacian oak-hornbeam forests] CLAS. PAL.: 41.2C, [GAFTA & MOUNTFORD (coord.), 2008] **HdR 4124** [DONIȚĂ & al. 2005].

The identified association, *Melampyro bihariensis-Carpinetum* (Borza 1941) Soó 1964 em. Coldea 1975, has three distinct layers: the arborescent layer dominated by *Carpinus betulus*, and *Quercus petraea* along with *Quercus robur*, *Prunus avium*, *Acer campestre*, *Ulmus glabra*, *Populus tremula*, *Tilia cordata* etc., with good canopy cover (0.8-0.9); the shrub layer, represented by species such as: *Crataegus monogyna*, *Corylus avellana*, *Cornus mas*, *Ligustrum vulgare*, *Rosa canina*, *Sambucus nigra*, *Staphylea pinnata*, *Viburnum lantana* etc., is relatively poor in individuals, which are present particularly in forest clearings or at the edge of the forest. Grass synusia is well developed, sometimes forming an almost continuous cover (*Asarum europaeum*, *Convallaria majalis*, *Dactylis glomerata* ssp. *aschersoniana*, *Galium odoratum*, *Melampyrum bihariense*, *Stellaria holostea*, *Aconitum anthora*, *Aconitum moldavicum* (Fig. 7), *Lilium martagon*, *Arum orientale*) etc.

Fig. 1. Map of the location of Copăcel Forest

The majority of the plants (73%) are characteristic of the coenotaxa to which the phytocoenoses of the forest association are assigned [POP & COLDEA, 1987; SĂMĂRGHIȚAN, 2005]. Thus:

- **Lathyro hallersteinii – Carpinenion** (Boşcaiu 1979) Boşcaiu et al. 1982: *Carpinus betulus*, *Prunus avium*, *Pyrus pyraster*, *Tilia cordata*, *Carex pilosa*, *Dactylis glomerata* subsp. *aschersoniana*, *Festuca heterophylla*, *Galium schultesii*, *Helleborus purpurascens*, *Ranunculus auricomus*, *Stellaria holostea*, *Erythronium dens-canis*, *Vinca minor* etc.
- **Fagetalia** Pawł. in Pawł. et al. 1928: *Acer pseudoplatanus*, *Tilia platyphyllos*, *Rubus hirtus*, *Daphne mezereum*, *Aegopodium podagraria*, *Asarum europaeum*, *Ajuga reptans*, *Anemone nemorosa*, *Circaea lutetiana*, *Euphorbia amygdaloides*, *Galanthus nivalis*, *Galium odoratum*, *Galeobdolon luteum*, *Geranium robertianum*, *Isopyrum thalictroides*, *Lilium martagon*, *Luzula luzuloides*, *Maianthemum bifolium*, *Mercurialis perennis*, *Lathyrus vernus*, *Sanicula europaea*, *Salvia glutinosa* etc.
- **Querco – Fagetea** Br.-Bl. et Vlieger in Vlieger 1937: *Quercus petraea*, *Quercus robur*, *Acer campestre*, *Populus tremula*, *Pyrus pyraster*, *Cornus mas*, *Corylus avellana*, *Crataegus monogyna*, *Euonymus europaea*, *Ligustrum vulgare*, *Clematis vitalba*, *Ajuga reptans*, *Athyrium filix-femina*, *Brachypodium sylvaticum*, *Campanula trachelium*, *Cruciata glabra*, *Lathraea squamaria*, *Mycelis muralis*, *Poa nemoralis*, *Pulmonaria officinalis*, *Ranunculus ficaria*, *Scilla bifolia*, *Symphytum tuberosum*, *Tanacetum corymbosum*, *Viola reichenbachiana* etc.
- **Quercetalia pubescentis** Br.-Bl. (1931) 1932: *Cornus mas*, *Staphylea pinnata*, *Campanula persicifolia*, *Clinopodium vulgare*, *Convallaria majalis*, *Melittis melissophyllum*, *Polygonatum odoratum*, *Rosa canina*, *Sedum maximum*, *Stachys officinalis*, *Trifolium medium*, *Vincetoxicum hirundinaria* etc.

The analysis of the phytocoenoses according to the main ecological indices (Fig. 3) shows that the association has a mesophilic (63.70%), micro-mesothermal character (74.19%) and a predominantly acid-neutrophilic (37.09%) and weakly acid-neutrophilic (35.48) soil reaction. The predominant bioforms (Fig. 4) are hemicryptophytes (54.83%), phanerophytes (18.54%), followed by geophytes (16.93%). From a chorological point of view, the predominance of European species (17.74%) is found, along with a great number of Eurasian (16.93%), European-Caucasian (21.77%), Eurosiberian (12.99%) and Circumboreal (8.87%) elements. In addition to these, oak-hornbeam forests are contaminated by a significant number of Paleotemperate elements (7.25%) (Fig. 5). Regarding the distribution of polyploidy levels (Fig. 6), diploid species are predominant (64.51%), followed by polyploid species (32.25%).

In this forest, the presence of the species *Delphinium simonkaianum* Pawl. var. *psilocarpum* (Simk.) Pawł. (Fig. 2) [SĂVULESCU TR. (ed) 1953, Flora RPR, vol. II], an endemic and threatened taxon (globally threatened – 1997 IUCN Red List of Threatened Plants), was reported in 1953. The scientific name of the species was given in the honor of the great botanist *Lajos Simonkai* (1851-1910), the author of the work *Enumeratio Florae Transsilvanicae* (1886).

In 2011, this taxon was reported again, after 58 years, on the top of the Copăcel slope (on 28.06.2011, at 509 m altitude, lat. 46°43', long. 24°30', access to the area from DN 15 Târgu-Mureş-Reghin, DJ 153 B Târgu-Mureş-Dumbrăvioara-Glodeni-Fărăgău).

The species was assigned to:

Tracheophyta superdivision,
Spermatophyta division,
Angyospermophytina subdivision,
Dicotyledoneae class,
Ranunculales order,
Ranunculaceae family.

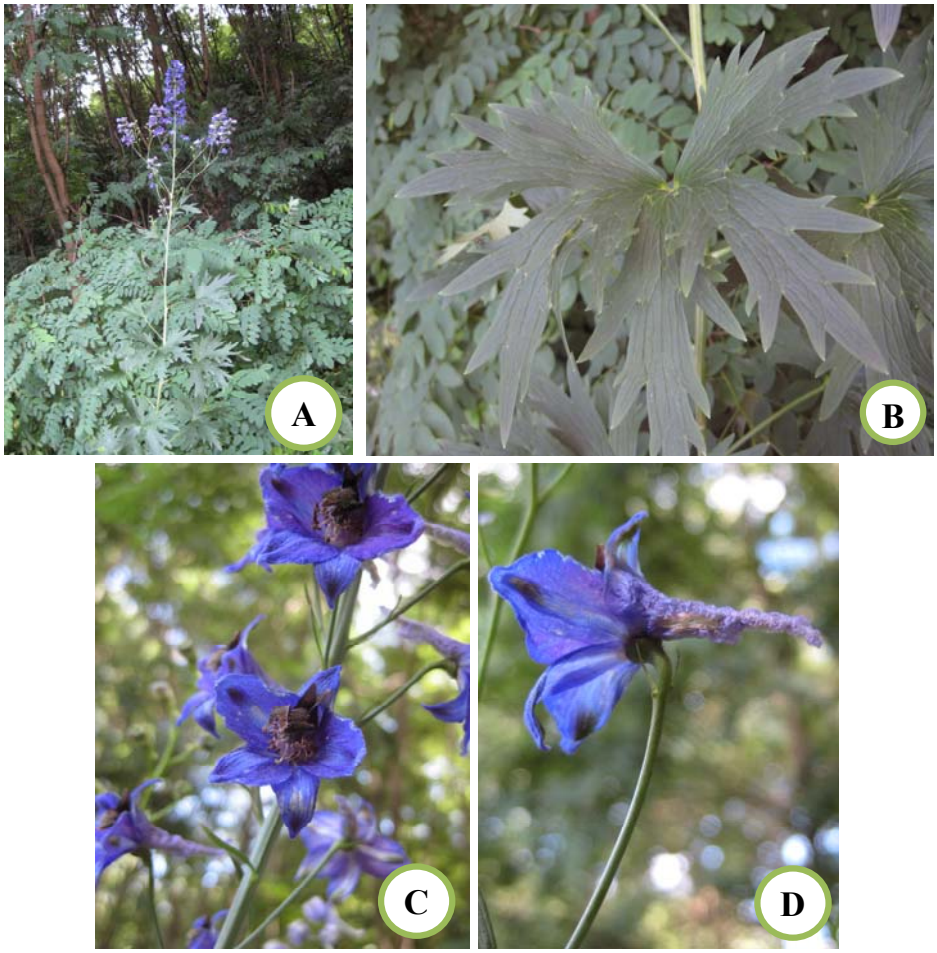

Fig. 2. A – *Delphinium simonkaianum*; B – leaf; C – inflorescence; D – flower.

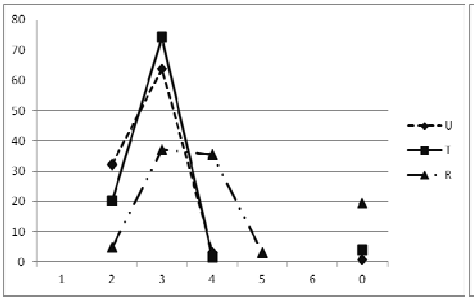

Fig. 3. Ecological indices of *Melampyro bihariensis – Carpinetum*

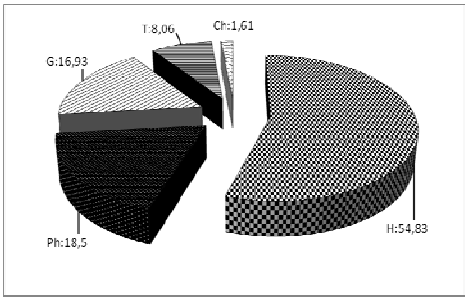

Fig. 4. Bioform spectrum of *Melampyro bihariensis – Carpinetum*

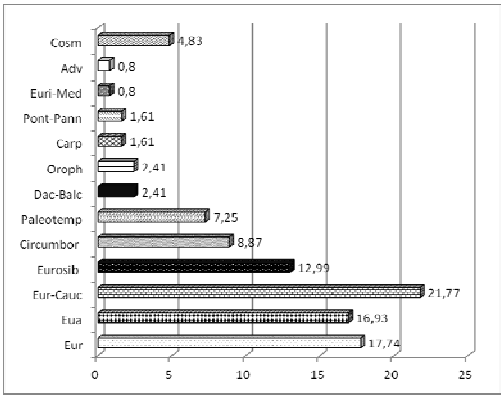

Fig. 5. Floristical elements *Melampyro bihariensis – Carpinetum*

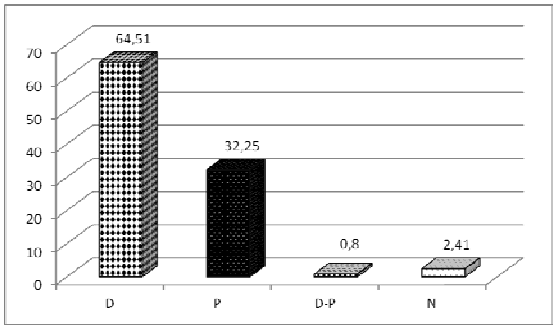

Fig. 6. Caryological spectrum of *Melampyro bihariensis – Carpinetum*

Regarding the **chorology of the species**, we mention some data provided by some specialized Romanian institutions:

IBB – mentions 24 herbarium sheets with the *Delphinium simonkaianum* Pawł. taxon, of which:

- 17 herbarium sheets from AB county (Piatra Cetii, Rachiş, Colţeşti-Piatra Urdaşului) collected by Ghişa E., Nyárády E.I. and Gergely I., in, 1938, 1960 (source IAŞI, BCHM, GLHM, PTHM, SMHM, TMMJ, PLHM, BV, ICAS, CJ);
- 1 sheet from BN county – Corongiş, collected by Baumgarten (1826, source SB);
- 1 sheet from BH county – Stâna de Vale, collected by Borza A. and Morariu I. (1936, source PLHM);
- 1 sheet from VL county – Albu Mountains – Piatra, collected by Ciurchea M. (1960, source CL);
- 1 sheet from IS county – Iaşi – Copou, collected by Marin E., Ursu E. (1968, source BCHM);
- 1 sheet from AG county – Dîmbovicioara Gorge, collected by Vlaicu N. (1978, source TMHM);
- 1 sheet from HD county – Hunedoara, collected by Bichigeanu (1961, source SIB);
- 1 sheet from DB county – Ialomiţa Valley, collected by Moşneaga M. (1970, PLHM).

The **HERBARIUM OF "BABEŞ-BOLYAI" UNIVERSITY CLUJ-NAPOCA**:

- 3 sheets with the site of collection in Alba county, Piatra Cetii and Colţeşti-Piatra Urdaşului, collected by Nyárády E.I. and Gergely I.
- 1 sheet with the site of collection in Cluj county, Turda district.

We mention that the plants of two herbarium sheets have their nomeclature changed from *D. elatum* and *D. intermedium* to *D. simonkaianum* (rev. Nyárády E.I.).

The **HERBARIUM OF THE FACULTY OF PHARMACY, TÂRGU-MUREŞ** also has a herbarium sheet with *Delphinium simonkaianum*, collected by E. Ghişa and E. I. Nyárády in 1938, from Piatra Cetii (AB).

The **"E. NYÁRÁDY" HERBARIUM OF THE NATIONAL BRUKENTHAL MUSEUM SIBIU** has several herbarium sheets collected by Nyárády E.I. with two *Delphinium* spp.: *Delphinium simonkaianum*, collected in AB county – Piatra Cetii, 1936 and *Delphinium elatum,* collected in 1917 on the Copăcel hill between Băla and Ercea. The nomenclature was changed by **W. Mucher** (Graz, 1992) to *Delphinium simonkaianum* var. *simonkaianum* (the species with the site of collection of interest for us).

The literature also reports other places where the species is present: **HR** – Tulgheş, Pietrele Roşii, **AB** – Feneş Valley, **CS** – Domogled Mt., **MH** – "Cazane", etc. [OPREA, 2005].

Other rare, endangered plants were also identified in the forest: *Fritillaria orientalis* (Fig. 8), *Galanthus nivalis*, *Adonis vernalis*.

Fig. 7. *Aconitum moldavicum*

Fig. 8. *Fritillaria orientalis*

The surroundings of the localities Băla and Ercea are also of particular scientific interest because on the sunny slopes in the proximity of the forest, a number of threatened European plant species: *Crambe tataria* (HD An IIb)*, Echium maculatum* (HD An IIb), as well as endemic [BELDIE, 1967] or threatened species, found in national Red Lists [OLTEAN & al. 1994; BOŞCAIU & al. 1994]: *Aconitum moldavicum*, *Salvia transsylvanica*, *Dictamnus albus*, *Orchis morio* etc., were identified.

This is not surprising because in the proximity of the two localities lies the Fărăgău Lake, the last natural lake in the Transylvanian Plain, which is declared a nature reserve.

Given that the Copăcel Forest is an area of botanical interest and has not yet been declared a botanical reserve, we propose to local authorities to take into consideration our suggestion that the identified area become a botanical reserve of scientific interest, where a number of rare plants in Romania or Europe can be protected in order for these beauties of the flora of Mureş county to be saved and preserved.

Abreviations:

– Counties:

AB	Alba
AG	Argeş
BH	Bihor
BN	Bistriţa Năsăud
BV	Braşov
CJ	Cluj
CS	Caraş-Severin
DB	Dâmboviţa
HD	Hunedoara
HR	Harghita

IS	Iaşi
MH	Mehedinţi
SB	Sibiu
VL	Vâlcea

– Herbariums:

BCHM	Herbarium of Bacău Museum
GLHM	Herbarium of Galaţi Museum
ICAS	Forest Research and Management Institute
PLHM	Herbarium of Ploieşti Museum
PTHM	Herbarium of Piatra Neamţ Museum
SMHM	Herbarium of Satu Mare Museum
TMMJ	Herbarium of Timişoara County Museum
IBB	Institute o Biology Bucharest

– HD An IIb - Habitats Directive, Annex IIb
– IUCN – *International Union for Conservation of Nature*

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