CHOROLOGY, ECOLOGY AND PHYTOSOCIOLOGY OF THE *ERYTHRONIUM DENS-CANIS* L. IN THE FOREST HABITATS FROM OLTENIA, ROMANIA

Mariana NICULESCU[*1], Florina GRECU[1], Marilena Alina PRIOTEASA
[1]*University of Craiova, Faculty of Agronomy, Department of Botany, 19 Libertatii street, Craiova, author e-mail: mniculescum@yahoo.com*

***Corresponding author e-mail:** *mniculescum@yahoo.com*

Abstract

Erythronium dens-canis L. is a monocotyledonous, perennial geophyte species, belonging to the lily family (Liliaceae). It flowers before trees leafing out, starting in February – March. This Eurasian floristic element is distributed in southern Europe and the Balkans. It extends eastwards to the Caucasus, Siberia and Japan. It is found in Portugal, Spain, France, Romania, Italy (southwards to Tuscany and the Marche), in the southern foothills of the Alpine arc to Burgenland), in south-eastern Hungary and northern Greece. It is found north of the Alps and is found in the Czech Republic and Slovakia. It occurs in dry to mesophilous soils, in deciduous forests, but mainly in older and more open forest stands. In southern Oltenia, isolated populations with a small number of individuals can also be found through the plant community built by Robinia pseudoacacia. In southern Oltenia, an infrataxon with white flowers is found, identified for the first time by Alexandru Buia and Marin Păun - Erythronium dens-canis L. subsp. niveum, characteristic of forest habitats of Carpinion betuli.

In Europe, E. dens-canis is a native species, in Romania it is considered a vulnerable species. Following phytosociological and ecological studies carried out in Oltenia, especially in the forests of the Jiu basin, a very high variability and a decrease in the number of populations but also in the number of individuals within populations correlated with global climate changes but also with the impact of the anthropogenic result of inadequate forest management were found.

Key words: *Erythronium dens-canis L., Oltenia, chorology, forest habitats, ecology, phytosociology*

INTRODUCTION

The dog's-tooth-violet is known as a geophyte and monocotyledonous species from the lily family (*Liliaceae*) and the genus *Erytrhonium*.

This genus appeared approx. 12 million years ago in the eastern part of Asia, from where it spread in Europe, the easter and western parts of North America (Patterson and Givnish, 2002; Kunigunda, M., 2025). It has a disjunct distribution: from the 28 species, 17 appear in the western and 6 in the eastern part of North America, and 5 species in Europe (Allen et al., 2003; Bartha et al., 2015; Kunigunda, M., 2025). The genus is morphologic homogenous, easy to recognise. Out of the 5 Eurasian species just one is present in Europe, *Erythronium dens-canis* (Săvulescu, 1966), *E. sajanense, E. sibiricum, E. japonicum* and *E. caucasicum* are Asian species

The phylogeny of the genus *Erythronium* has been extensively studied.

All phylogeographic groups of the genus *Erythronium* (Eurasian, East American, and West American) form well-supported subclades (Allen et al., 2003; Clennett et al., 2012; Kunigunda, M., 2025).

Erythronium dens-canis L. is a perennial plant that opens its flowers in early spring,

in February or March, preceding the foliage of the forests.

This species belongs to the Eurasian flora, its range extending from southern Europe and the Balkan region to the Far East, passing through the Caucasus and Siberia to Japan.

In Europe, the species can be found from Portugal and Spain to Romania, the Czech Republic and Slovakia, but also in northern Greece, southeastern Hungary, the Alpine massif (up to Burgenland) or the central regions of Italy.

As an introduced and non-native species it can be found in Germany, Great Britain, Ireland, Virginia.

The biology of *Erythronium dens-canis* is poorly understood, in contrast to that of the non-European species of the genus, for which considerable information is available (Guitián et al., 1999; Guitián et al., 2000).

This species has unique morpho-anatomical characteristics and is characterized by a solitary flower at the top of the stem, resembling a small lily, pink in color, with a reddish stem and a basal pair of elongated leaves with brown spots.

However, many mature plants in natural populations do not flower and are characterized by a single, large leaf. These non-flowering individuals most probably have not yet attained the sexually competent stage (La Rocca et al. 2014).

As a myrmecochorous plant, *Erythronium dens-canis* depends on ants for secondary seed dispersal. This biological peculiarity significantly limits its potential for range expansion.

In Romania, *Erythronium dens-canis* has been traditionally known as beeing present with two subspecies: E. dens-canis ssp. dens-canis and E. dens-canis ssp. niveum (Baumg) Buia et Păun (Ciocârlan, 2009). The taxonomic status of the subspecies has not been studied by molecular methods (. According to the Flora Europaea (Richardson, 1980) these taxa appear as varieties.

In southern Oltenia, isolated populations with a small number of individuals can also be found through the plant community built by *Robinia pseudoacacia*.

In southern Oltenia, an infrataxon with white flowers is found, identified for the first time by Alexandru Buia and Marin Păun - *Erythronium dens-canis* L. subsp. *niveum*, characteristic of forest habitats of Carpinion betuli.

Popularly dog's-tooth-violet, this plant often grows in scrub, thickets, and on the edges of deciduous forests. Although its main habitat is in the forests of the hilly region, the species can sometimes be found at lower altitudes, in the plains.

This european species of the genus *Erythronium* forms populations with variable numbers of individuals depending on the eco-pedo-climatic conditions of each distribution area.

This species of cormophytes begins its vegetation in late winter, carrying out its photosynthetic and reproductive cycle over a short period. The plant capitalizes on the direct solar radiation available at ground level before the tree foliage fully develops, entering rapid senescence as soon as the forest canopy closes.

Changes in climatic conditions influence the development and distribution of *Erythronium* populations.

In recent decades, other anthropogenic factors have also contributed to the decrease in the number of individuals within the populations of this species, with a direct impact including on seed production, germination and their growth rate.

Including the impact of invasive species on the native vegetation in which this species grows, the increase in drought and aridification of lands in southern Oltenia, which may lead to the loss or irreversible degradation of the species' natural populations and habitats.

In recent years, in Oltenia, especially in the southern part, in the large hydrographic basins of the Danube, Jiu

and Olt, not only this species, but also others of conservation interest have suffered considerably from a phytosociological, morpho-physiological point of view and also in terms of their capacity for spread and development in close correlation with the structure and functionality of specific shrub and forest phytocoenoses.

MATERIALS AND METHODS

Situated within the Oltenia area, the investigated region spans the interfluve of the Danube, Jiu, and Olt rivers, integrating various habitats such as forests, grasslands, wetlands, agricultural lands, and urban, ruderal, or segetal sites. Taxonomical identification relied on key botanical literature, notably Romanian Flora (1952–1976) and Flora Europaea (1964–1980), as well as specialized catalogues on alien and adventive flora (Sîrbu, 2004; Sîrbu & Oprea, 2011) and official invasive species lists. A comprehensive analysis of the chorological and ecological traits was performed for every recorded species.

RESULTS AND DISCUSSIONS

This paper presents a study with chorology, ecology and phytosociology on dog's-tooth-violet plant species found in the forest habitats from Oltenia, Romania

Chorology. In recent years, in this part of Romania, the studied species is spread over small areas and can be found in smaller or larger populations in scrub, sparse forests and especially deciduous forests of oak, hornbeam, hornbeam and beech, in early spring, settling in March and sometimes on average, settling in March and on average.

Due to climate changes in recent years, the range of this species in Oltenia has been quite restricted, the species being increasingly rare. Regarding the vegetation period, 25-30 years ago, the species could be found in March-April, now in April it is found very rarely, only in late springs, with humidity and temperature conditions specific to the winter-spring transition period, found in this area.

Regarding the western limit of the researched area, the species was identified in the Domogled-Valea Cernei National Park, in the localities of Băile Herculane and Străjuț, in the beech and hornbeam groves. The species also grows in the beech or hornbeam groves of the Portile de Fier Natural Park, being identified in the localities of Eselnița, Orsova, Ilovița.

The infra-taxon established by Buia et Păun, namely *E. dens-canis* ssp. *niveum* (fig. 1), characterized by a leaf blade with yellow spots, white perigon, much larger than 4-5 cm in length, is considered an endemic to the West and South-West of Romania and is found much less frequently, the populations having a much smaller number of individuals.

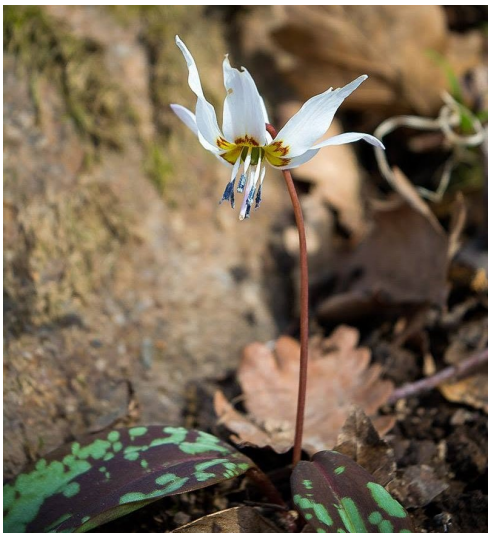


Fig.1. *Erythronium dens-canis* L. subsp. *niveum* in Oltenia

From Oltenia, an infrataxon with pale yellowish flowers was described over 70 years ago, in the 1950s, named by Buia and Păun Erythronium dens-canis L. subsp. niveus (Maly) Buia et Păun var. Prodani. This was identified in the south of Dolj County in the localities of Podari and

Palilula. Following our research, this infrataxon was not found.

The infrataxon *Erythronium dens-canis* L. subsp. *niveum* was cited from the Parâng Massif.

The same infrataxon was cited by Păun from the southern part of Oltenia, from the lower Olteț basin, from the southern part of Oltenia. Thus *Erythronium dens-canis* L. subsp. *niveum*, (Maly) Buia et Păun was found in the deciduous forests around the localities: Curtișoara, Vulpeni, Gropșani, Iancu Jianu, Călui, Oboga, Morunglav, Bobicești, Dobrum, Blaj, Buzduc.

Following field research, we encountered the species in deciduous forests in northern Oltenia, in the Amaradia, Gilort and Olteț basins, near the localities: Bulzești, Velești, Murgași, Bălcești, Goești, Negoiu, Mierea, Lădesti, Stoina, Târgu Cărbunești, Novaci, Cernădia, Oteteliș, Frâncești, Mătăsari, Mateești, Buleta, Bustuchin, Vulpeni, Balota, Drăgășani, Arcani, Mihăești, Pește̦ana.

Since the 1950s, Buia and Pun have encountered the infrataxon with white flowers in almost the entire plain and hilly area of Oltenia, specimens with characteristic pink or violet flowers, the basic species being rarely encountered.

Following our research, we found that at higher altitudes, fervent populations are found whose individuals have pink or violet flowers

At lower altitudes, the infrataxon with white flowers is predominant, so as the altitude increases, the basic species appears dominant

Both the species *E. dens canis* and the infrataxon *E. dens-canis* ssp. *niveum* are frequently encountered in the following woody plant communities: *Quercetum petraeae-cerris* Soó (1957) 1969, 1980; *Quercetum cerris* Georgescu 1941; *Quercetum frainetto-cerris* (Georgescu 1945) Rudski 1949; *Carpino-Quercetum cerris* Klika 1938 (Boşcaiu *et al.* 1969); *Quercetum frainetto* Păun 1964; *Carpino-Fagetum* Paucă 1941, *Convallario-Quercetum roboris* Soó (1939) 1957, *Dentario bulbiferae-Quercetum petraeae* Resmeriţă (1974) 1975, *Carici pilosae-Quercetum petraeae typicum* Sanda *et* Popescu 1999, *Carici brizoidis-Quercetum roboris* Raţiu *et al*. 1977.

The common species found in the forests where populations of the studied plant were found are: *Quercus petraea, Q. dalechampii, Q. polycarpa, Q. cerris, Q. frainetto, Acer tataricum, A. campestre, Ulmus minor, Apoeseris foetida, Clematis vitalba, Fraxinus excelsior, Helleborus odorus, Carpinus orientalis, Fraxinus ornus, Tilia tomentosa, Ligustrum vulgare, Euonymus europaeus, Festuca heterophylla, Carex montana, Poa nemoralis, Potentilla micrantha, Tanacetum corymbosum, Campanula persicifolia, Digitalis grandiflora, Vicia cassubica, Viscaria vulgaris, Lychnis coronaria, Achillea distans, A. nobilis, Silene nutans, S. viridiflora, Hieracium racemosum, H. sabaudum, Galium schultesii, Lathyrus niger, Tamus communis, Hedera helix,Phalaris arundinacea, Corydalis solida, Gagea lutea, Pirus pyraster, Polygonatum latifolium, P. officinalis, Sciila bifolia, Galanthus nivalis, Asparagus tenuifolius, Anemone nemorosa, A. ranunculoides, Viola odorata, Ranunculus constantinopolitanus, Corulus avellana, Ranunculus ficaria, Crataegus monogyna, Prunus spinosa,*

From a conservation point of view, the species, especially the infrataxon, is found within the Natura 2000 habitat - 91M0 Pannonian-Balkanic turkey oak - sessile oak forests - CLAS. PAL.: 41.76

CONCLUSIONS.

This study is a preliminary study, the research on the *Erythronium dens-canis* species and its infrataxa described in the 1950s in Oltenia. The studies were carried out at the level of forest and shrub habitats in Oltenia, taking into account the geographical position of each identified

population and all the constantly changing eco-pedo-climatic conditions.

Following phytosociological and ecological studies carried out in Oltenia, especially in the forests of the Jiu basin, a very high variability and a decrease in the number of populations but also in the number of individuals within populations correlated with global climate changes but also with the impact of the anthropogenic result of inadequate forest management were found. In recent decades, other anthropogenic factors have also contributed to the decrease in the number of individuals within the populations of this species, with a direct impact including on seed production, germination and their growth rate.Including the impact of invasive species on the native vegetation in which this species grows, the increase in drought and aridification of lands in southern Oltenia, which may lead to the loss or irreversible degradation of the species' natural populations and habitats.

The infrataxon *E. dens-canis* ssp. *niveum* was frequently encountered in Oltenia 30 years ago, its populations have decreased in recent years in close agreement with climate changes.

In conclusion, the white-flowered infrataxon is predominant in the forest vegetation of Oltenia, with populations having great variability depending on altitude, anthropogenic impact and current climatic conditions. Most populations were found in the hilly floor of the *Quercus cerris, Q. frainetto* and *Q. petraea*.

ACKNOWLEDGEMENTS

The present study was carried out within the project POIM:150549, "Revision of the Management Plan of the Protected Natural Areas ROSCI0045 Jiului Corridor, ROSPA0023 Jiu-Danube Confluence, ROSPA0010 Bistreț and the Drănic Fossil Site-2391 and Zăval Forest-IV.33 nature reserves".

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