

## CHOROLOGY, ECOLOGY AND PHYTOSOCIOLOGY OF THE *Iris variegata* L. IN FOREST HABITATS FROM THE SOUTH OF OLTENIA, ROMANIA

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### Abstract

*Iris variegata* L. (*I. lepida* Heuffel) (Iridaceae), is usually in the area from the oak forest zone to the beech floor, through meadows, thickets and forest clearings, in open forests, at the edges of forests. It can be easily recognized by its flowers with yellow inner perianth segments and yellow-white outer perianth segments mottled with brown to purple. This species is cited from few places in Oltenia. Following field research in the forest habitats of southern Oltenia, important populations of this species were identified. Such populations were identified in the lower Jiului basin, in the forest of the Segarcea and Perișor Forestry Districts. The species is found especially in the forests of the *Quercus cerris* and *Q. frainetto*, in the natural habitat - 91M0 Pannonian-Balkan oak - Oak forest.

**Key words:** *Iris variegata*, populations, corology, ecology, plant communities, habitats.

### INTRODUCTION

*Iris variegata* L. (*I. lepida* Heuffel) (Iridaceae), is usually found in the area from the oak forest zone to the beech floor, through glades, thickets and clearings, in open forests, at the edges of forests. The species is found from the steppe area to the beech floor.

The species is often found on arid, sunny moors, on deep soils of the leached chernozem or typical chernozem.

The popular name of the species is Hungarian Iris the variegated iris.

*Iris variegata* L. which can be found in:

- Central Europe - Hungary, Southeast of the Czech Republic, Slovakia, Austria, South-West of Germany, Croatia and Serbia;
- Eastern Europe - Ukraine and Russia;
- South-East of Europe - Romania, Bulgaria and Albania.

This species is a perennial plant, prefers a sunny site and moderate temperature. Hungarian Iris is an endangered and protected species in Czechia and Slovakia.

*Iris variegata* has a 10-12 cm long rhizome, from which quite vigorous stems branch out in the upper part or in the middle, with about 6 flowers at the top. It can be easily recognized by its flowers with yellow inner perianth segments

and yellow-white outer perianth segments mottled with brown to purple.

It is found in steppe meadows, in forests and forest edges, in sunny areas from the plains to the mountainous floor. It is a summer species, in the southern part of the country blooming in May, and in cooler summers in June.

In Romania, the species is found in the counties: Suceava, Bacău, Vrancea, Iași, Vaslui, Galați, Cluj, Mureș, Brașov, Sibiu, Giurgiu, Constanța, Tulcea, Arad, Caraș-Severin, Vâlcea, Prahova, Argeș, Bucharest, Dolj, Călărași. From the mountain region, the species was cited from: Trașcaului Mountains, Metalici Mountains, Cernei Mountains, Godeanu Mountains, Foarfeca Mountains, Coziei Mountains, Măcin Mountains.

According to the latest studies carried out on the photo-sociology of the species, in the Republic of Moldova the species is frequently found in some areas, having a high abundance-dominant in some forests so that it builds a new plant association *Iridio variegatae-quercetum pubescentis* (Pinzaru et al., 2022) grouped in the alliance *Quercion pubescenti-petraeae* Br.-Bl. 1932, order *Quercetalia pubescenti-petraeae* Klika 1933, class *QUERCO-FAGETEA* Br.-Bl. et Vlieger in Vlieger (1937) (Pinzaru et al., 2022).



Figure 1. The map of the studied territory

## MATERIALS AND METHODS

### Study area

The territory under study is located in the South part of Romania, the South of Oltenia in the lower Jiului basin, in the forest of the Segarcea and Perişor Forestry Districts.

The forest habitats where populations of this species were studied are part of the Silvostepa of Oltenia protected area.

The field research regarding the species *Iris variegata* was carried out in the forest habitats around the towns: Mărcine, Tencănu, Perişor, Ciutura, Tîrnava, Fântânele, Criva, Vărvoru de Jos, Drăgoia, Căruia, Bujor, Cetăţuia, Pleniţa, Verbiţa, Verbicioara, Mârza, Izvoare, Lipovu de Sus, Dâlga, and Radovan (Dolj County) (Figure 1).

### Methods

To identify the species we looked into: *Romanian Flora*, vol. XI (1966) and *Flora Europaea*, (1964-1980), *Flora Alpina* (2004). For the phytosociological studies, the phytosociological research methodology of the Central-European Phyto-Sociological School was used, which is based on the principles and methods developed by Braun-Blanquet & Jenny (1939).

The phytocoenoses in which the species *Iris variaegata* was identified were analyzed taking into account the characteristic, edifying, dominant aspects, the degree of coverage, altitude, slope, appearance and soil properties.

Chorological studies were carried out and the aim was to achieve a distribution as precise as possible in the South-Western part of Oltenia, especially in Dolj County. Population studies were also carried out, especially regarding population density.

## RESULTS AND DISCUSSIONS

This paper presents chorological, ecological and phytosociological studies regarding the populations of the species *Iris variegata*, identified in the Southwest of Oltenia (Figure 2).

This species is cited from few places in Oltenia, from Radovan and Prisaca (Dolj County).



Figure 2. *Iris variegata* in Tencănu Forest (photo: Mariana Niculescu)

Following the research carried out 42 populations were identified in the lower Jiului basin, in the forest of the Segarcea and Perișor Forestry Districts. The most important populations with a large number of individuals, increased vitality and good conservation status are found in the Mărăcine, Tencănuș, Perișor, Ciutura, Tîrnava, Fântânele, Cetățuia, Criva, Vârvoru de Jos, Drăgoia, Căruia, Bujor, Cetățuia, Plenița, Verbița, Verbicioara, Mărza, Izvoare, Lipovu de Sus, Dâlga, and Radovan, (Dolj County) in the forest habitats. The species is found especially in the forests of the *Quercus cerris* and *Q. frainetto*, in the natural habitat - 91M0 Pannonian-Balkan oak - Oak forest.

The number of individuals within these populations varies from 4 to 21 individuals. The conservation status of the populations is good, the individuals are well developed, especially those that develop in the forest clearings where they form populations of 10-21 individuals (Figure 3).

In the less sunny places, through thickets, forest edges, the populations have a reduced number of individuals, reaching a maximum of 2-6 individuals and their behavior being less vigorous, with the stems usually.



Figure 3. *Iris variegata* in Mărăcine Forest (photo: Mariana Niculescu)

### Ecological and cenological characterization of the species *Iris variegata* L. in the investigated territory

Research carried out by us in habitats foresters highlighted the presence of some well-structured forest phytocoenoses floristically and cenotic, which belong to the plant community: *Quercetum frainetto-cerris* (Georgescu, 1945; Rudski, 1949) (Table 1).

*Quercetum frainetto-cerris* plant community develop on compact, forest-brown soils, strongly podzolic, with a high percentage of carbonates. Both the codominant species of the arborescent layer *Quercus cerris* and *Q. frainetto* are acidophilic elements.

They sometimes dominate one another in the tree layer, a fact that led the author of the association to call it "*Quercus farnetti-cerris*" or "*Quercus cerris-frainetti*" (Georgescu, 1945).

In some of the phytocoenoses analyzed, the *Iris variegata* species can achieve a coverage between 5-10%. The greatest coverage is found in phytocoenoses on flat, sunny lands.

The compaction of the canopy of the analyzed phytocoenoses in this forest is between 0.7-0.8.

The shrub layer is quite well developed and is represented by the following species: *Crataegus monogyna*, *C. pentagyna*, *Acer tataricum*, *Cornus mas*, *Evonymus europaea*, *Sorbus domestica*, *Prunus spinosa*, *Ligustrum vulgare*.

The most common species of the grass layer are: *Lychnis coronaria*, *Carex michelii*, *Lithospermum purpureocaeruleum*, *Carex tomentosa*, *Festuca valesiaca*, *Euphorbia cyparissias*, *Vincetoxium hirundinaria*, *Carex caryophylla*, *Stachys officinalis*, *Ajuga reptans*, *Viola odorata*, *Viola alba*, *Helleborus odoratus*, *Asparagus tenuifolius* etc. (Niculescu et al., 2009). Also, the following species participate with high constancy in making up the floristic composition of the grass blanket: *Helleborus odoratus*, *Anemone nemorosa*, *A. ranunculoides*, *Asperula taurina*, *Viola suavis* etc.

In phytocoenoses *Quercetum farnetto-cerris* plant community from Oltenia still sporadically grows some xerothermic species characteristic of the *Quercetalia pubescenti-petraeae* order: *Paeonia peregrina*, *Euphorbia lingulata*, *Vicia sparsiflora*, *Physocaulis nodosus*, *Acanthus balcanicus*, *Ruscus aculeatus*.

A series of species that enter the floristic composition of the grassy layer within the

phytocoenoses in which the *Iris variegata* was identified are rare Natura 2000 species that are included in the national red lists.

From a conservative point of view, it was observed that the highest abundance-dominance of the species is within the Natura 2000 habitat - 91M0 Pannonian-Balkan turkey oak - sessile oak forests; CLASS. PAL.: 41.76. (Gafta & Mountford, 2008) (Figures 4, 5).



Figure 4. 91M0 forest habitat

Ecological, phytosociological and population studies were done during the entire growing season to cover all morphological and phenological aspects.

*Iris variegata* populations show large numbers of individuals. Population density varies depending on the eco-pedo-climatic conditions in each forest where the studies were carried out. Given that it is a xeromesophyte, subthermophile species in the south and Southwest of Oltenia, it finds favorable conditions for development and fruiting, thus the populations have a fairly large number of individuals.

The populations with the largest number of individuals are found in Marăcine Forest,

Tencănu Forest, Radovan Forest, Verbicioara Forest and Plenița Forest.

Although the *Iris variegata* species can also be found in meadow habitats, in the researched territory the species was found in forest habitats, with the maximum development in forest glades, where especially the temperature and light conditions are favorable.

In all the forests where the chorological, phytosociological and population studies were carried out, *Iris variegata* was found, the species was identified in the same type of habitat.

The abundance-dominance (+2) of the *Iris variegata* species in the phytocoenoses also varies with the eco-pedoclimatic conditions and at the same time it is closely related to the climatic changes in Oltenia in recent years, following the studies carried out observing a decrease in the number of individuals compared to 2019, when the studies started.



Figure 5. *Iris variegata* in the 91M0 forest habitat

Table 1. *Quercetum frainetto-cerris* (Georgescu, 1945; Rudski, 1949) plant community

No. of relevée	1	2	3	4	5	6	7	K
<b>Altitude m.o.s. (x 10 m)</b>	120	110	90	120	125	125	120	
<b>Exposure</b>	-	-	-	-	-	S	E	
<b>Inclination (in grades)</b>	-	-	-	-	-	10	7	
<b>Canopy (%)</b>	0.7	0.8	0.8	0.7	0.7	0.7	0.7	
<b>Coverage of herbaceous layer (%)</b>	60	70	70	70	70	60	60	60
<b>Area</b>	400	400	400	400	400	400	400	400
<b>Char. ass.</b>								
<i>Quercus frainetto</i>	3-4	3-4	4-5	4	4	2	2	V
<i>Quercus cerris</i>	2	2	1	+1	+1	4	4	V
<b>Quercetalia pubescentis et Quercion petraeae</b>								
<i>Lathyrus niger</i>	-	-	-	+	-	-	+	II
<i>Cruciata glabra</i>	+	+	+	+	+	+	+	V
<i>Potentilla micrantha</i>	+	+	+	+	+	+	+	V
<i>Acer tataricum</i>	+	+	+	+	+	+	+	V
<i>Campanula persicifolia</i>	+	+	+	+	+	+	+	V
<i>Polygonatum latifolium</i>	+	+	+	+	+	+	+	V
<i>Paeonia peregrina</i>	-	2	-	-	-	-	-	I
<b>Quercion farnetto</b>								
<i>Lychnis coronaria</i>	-	+	-	+	-	-	+	III
<i>Tamus communis</i>	+	+	+	+	+	+	+	V
<i>Aremonia agrimonoides</i>	+	+	+	+	+	+	+	V
<i>Helleborus odoratus</i>	+1	+	+1	+1	+1	+1	1	V
<b>Queretea pubescenti-petraeae</b>								
<i>Crysanthemum corimbosum</i>	-	+	+	+	-	-	+	III
<i>Lithospermum purpureocaeruleum</i>	1	1	1	1	1	1	1	V
<i>Cornus mas</i>	-	-	-	+	-	-	+	III
<i>Viola hirta</i>	+	+	+	+	+	+	+	V
<i>Hieracium bauhini</i>	+	-	+	-	+	+	+	III
<i>Euonymus verrucosus</i>	+	+	+	+	+	+	+	V
<i>Asparagus tenuifolius</i>	+	1	+	1	+	+	+1	V
<i>Doronicum hungaricum</i>	+	-	-	+	+	+	+	IV
<i>Polygonatum odoratum</i>	+1	+	+1	+	+1	+1	+1	V
<i>Carex tomentosa</i>	+	+	+	+	+	+	+	V
<i>Ruscus aculeatus</i>	-	+	-	+	-	-	+	III
<i>Oryzopsis virescens</i>	-	+	-	+	-	-	+	III
<b><i>Iris variegata</i></b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1-2</b>	<b>+1</b>	<b>+</b>	<b>V</b>
<i>Euphorbia lingulata</i>	+	+	+	+	+	+	+	V
<i>Vicia sparsiflora</i>	+	+	+	+	+	+	+	V
<i>Physocaulis nodosus</i>	+	+	+	+	+	+	+	V
<i>Acanthus balcanicus</i>	+	+	+	+	+	+	+	V
<b>Fagetalia et Querco-Fagetea</b>								
<i>Euphorbia amygdaloides</i>	+	+	+	+	+	+	+	V
<i>Veronica officinalis</i>	+	+	+	+	+	+	+	V
<i>Corydalis solida</i>	+	+	+	+	+	+	+	V
<i>Corydalis cava ssp. marshalliana</i>	+	+	+	+	+	+	+	V
<i>Festuca heterophylla</i>	-	+	+	-	-	-	+	III
<i>Acer campestre</i>	+	+	+	+	+	+	-	V
<i>Anemone nemorosa</i>	1	1	1	1	1	1	1	V
<i>Anemone ranunculoides</i>	1-2	1	1	1	1-2	1-2	+1	V
<i>Poa nemoralis</i>	+	+	+	+	+	+	+	V
<i>Brachypodium silvaticum</i>	+	+	+	+	+	+	1	V
<i>Euonymus europaeus</i>	-	+	-	-	-	-	+	IV
<i>Glechoma hirsuta</i>	+	-	+	-	+	+	+	III
<i>Arum maculatum</i>	-	-	-	+	-	-	-	II
<i>Veronica chamaedrys</i>	+	+	+	+	+	+	+	V
<i>Primula vulgaris</i>	2	2	1	1	1-2	1-2	1	V
<i>Asperula taurina</i>	-	+	+	-	-	-	+	III
<i>Melissa officinalis</i>	-	+	-	+	-	-	+	III

<i>Poa sylvatica</i>	-	+	-	+	-	-	-	V
<i>Melica uniflora</i>	+	-	-	+	-	+	-	III
<i>Calamagrostis epigeios</i>	+1	1	+	1	1	+1	+1	V
<i>Urtica dioica</i>	+	+	+	+	+	+	+	V
<i>Silene alba</i>	+	+	+	+	+	+	-	IV
<i>Rumex sanguinea</i>	+	+	+	+	+	+	+	V
<i>Potentilla argentea</i>	+	+	+	+	+	+	-	IV
<i>Geum urbanum</i>	+	+	+	+	+	+	+	V
<i>Agrimonia eupatoria</i>	+	+	+	+	+	+	+	V
<i>Anthriscus sylvestris</i>	+	+	1	+	+	+	+	V
<i>Alliaria petiolata</i>	+	+	+	+	+	+	+	V
<i>Hypericum hirsutum</i>	+	-	-	+	+	+	-	III
<i>Viola odorata</i>	+	+	+	+	+	+	+	V
<i>Viola suavis</i>	1	+	+1	+1	+1	+1	1	V
<i>Cruciata laevipes</i>	+	+	+	+	+	+	+	V
<i>Trifolium pratense</i>	-	+	+	-	-	-	+	III
<i>Trifolium pannonicum</i>	+	+	-	+	+	+	-	IV
<i>Lathyrus nissolia</i>	-	+	+	-	-	-	+	III
<i>Lathyrus sylvestris</i>	+	-	+	-	+	+	+	IV
<i>Lathyrus venetus</i>	-	+	-	+	-	-	-	II
<i>Lathyrus vernus</i>	+	+	+	+	+	+	+	V
<i>Lotus corniculatus</i>	-	-	+	+	-	-	-	II
<i>Astragalus glycyphyllos</i>	+	+	+	+	+	+	+	V
<b>Prunetalia et Prunion spinosae</b>								
<i>Prunus spinosa</i>	+	-	+	+	+	+	-	IV
<i>Cornus sanguinea</i>	+	+	+	+	+	+	+	V
<i>Ligustum vulgare</i>	1	+	+1	+1	+1	+1	1	V
<i>Evonymus europaea</i>	+	+	+	+	+	+	+	V
<i>Crataegus monogyna</i>	+	+	+	+	+	+	+	V
<i>Rosa canina</i>	+	+	+	+	+	+	+	V
<i>Geum urbanum</i>	+	+	+	+	+	+	+	V
<i>Carex silvatica</i>	+	-	-	+	+	+	-	III
<i>Mercurialis perennis</i>	+	-	-	+	+	+	+	IV
<i>Carex pillosa</i>	+	+	-	+	+	+	-	III
<b>Variae Syntaxa</b>								
<i>Stachys silvatica</i>	-	+	-	+	-	-	+	III
<i>Galeopsis speciosa</i>	-	-	+	-	-	-	-	I
<i>Veronica hederifolia</i>	+	+	-	+	+	+	+	IV
<i>Lapsana communis</i>	+	+	+	+	+	+	-	IV
<i>Verbascum phaeniceum</i>	+	-	+	+	+	+	-	III
<i>Myosotis sylvatica</i>	-	+	-	+	-	-	+	III
<i>Campanula bononiensis</i>	+	-	+	+	+	+	+	IV
<i>Leonurus cardiaca</i>	+	+	-	+	+	+	+	IV
<i>Campanula persicifolia</i>	-	+	+	+	-	-	-	III
<i>Ballota nigra</i>	-	-	-	+	-	+	+	III

Place and data of the relevés: 1 - Tencănu Forest, 20.VI.2019, 2- Plenița Forest, 7.VI.2020, 3 - Mărăcine Forest 15.VII. 2022, 4 - Dâlga Forest, 20.VI.2023, 5 - Verbița Forest, 25.VI.2021, 6 - Mărza Forest 5.VI.2023, 7 - Radovan Forest, 10.VI.2023.

## CONCLUSIONS

*Iris variegata* is a xeromesophilic and subthermophilic species that grows spontaneously in the South of Oltenia, especially in thickets and forest glades or in rarer and sunny forests.

From a phytosociological point of view, this species is found in the floristic composition of *Quercetum frainetto-cerris* (Georgescu, 1945; Rudski, 1949) plant community.

The species is found especially in the forests of the *Quercus cerris* and *Q. frainetto*, in the natural habitat - 91M0 Pannonian-Balkan oak - Oak forest. Population density varies depending on the eco-pedo-climatic conditions in each forest where the studies were carried out. Given that it is a xeromesophyte, subthermophile species in the South and South of Oltenia, it finds favorable conditions for development and fruiting, thus the populations have a fairly large number of individuals. The populations with the

largest number of individuals are found in Marăcine Forest, Tencănu Forest, Radovan Forest, Verbicioara Forest and Plenița Forest. The abundance-dominance of the *Iris variegata* species in the phytocoenoses also varies with the eco-pedoclimatic conditions and at the same time it is closely related to the climatic changes in Oltenia in recent years.

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