

# Секция 1

## Теоретические основы и практические результаты интродукции растений

### Section 1

#### Theory and practical knowledge of assessment (introduction) of wild flora

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### Distribution and ecology of genus *Iris* L. in Bulgaria

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**Summary.** An overview of the ecological assessment of Bulgarian species of genus *Iris* was done for 2 years period. Evaluation of the distributed in Bulgaria species was done. The ecological preferences were observed, according to the practical use of the perspective species and populations of genus *Iris*. The status and volume of the populations with conservation and economic importance were observed.

The flora of the world consists about 300 natively distributed herbaceous perennial; species of genus *Iris* L. The recent area of the species covers all continents of northern hemisphere – Europe, Middle East and Northern Africa, Asia and Northern America. The members of this genus inhabit extremely variable ecological conditions. This big diversity of the natural habitats and adaptations make a challenge for the investigations in the evolutionary history and the phylogenetic relationships of the genus.

The *Iris* genus is interesting in ecological aspect because of the fact that among the *Iris* species can be found typical mesophytes, mesoxerophytes, hygrophytes, psamophytes, calciphobes and calciphyles. The diversity of forms and colors, the widespread cultivating of some species and their medical use cause the long term interest in the genus. The most accepted classification schemes combine the European species of genus *Iris* in two subgenera. The typical subgenus *Iris*, groups the species with hairs on the external perygon leaflets. The subgenus *Limniris* (Tausch) Spach unites the species with smooth perygon leaflets (Mathew 1981).

The information for the members of genus *Iris* in Bulgaria can be found in the floristic literature, conspects and determination books for Bulgaria. According to different authors the count of the species is between 9 and 10 wild growing and 2 cultivated species (Stojanov & Stefanov 1924, 1933, 1948; Stojanov & al. 1966; Delipavlov 2003; Assyov & Petrova 2006). The last taxonomic work on *Iris* have done in Flora of Republic of Bulgaria vol 2 (Radenkova, 1964). The bigger part of classification schemes and determination keys are based on morphological characters. These characters are too often with undiscrète nature, and by this reason they are not reliable for objective determination. Thus the taxonomical independence of some taxa are put in doubt.

The overview of the existing literature shows that the members of genus *Iris* in Bulgaria have not been object of single-minded evaluations. The investigation and conservation of the natural genetic resources and their practical use is one of the three aims of the Convention of biological diversity. Depending to the level of danger, some *Iris* species are taken to different conservational categories. Practically all botanical gardens possess *Iris* collections. The major focus of the evaluation is to find abilities for introduction of new species which are too limited as natural resources but in the same time are valuable source of decorative and medicinal plants. The investigation and evaluation of the wild growing *Iris* species lets the choice of the most optimal cultivated species for the local region.

The goal of the represented study is the inventarisation of the wild growing representatives of genus *Iris* in the Bulgarian flora, their ecological profile and the abilities to create permanent plantations of ornamental plants, based on the existing information and terrain observations and collections.

**Materials and methods.** The current study was based on literature data, revision of herbar collections, and authors' collections. Its aim is to update and unite the chorological and ecological data for the Bulgarian representatives of genus *Iris*. Terrain investigations in the period of 2010-2011 were carried out using track networks covering a maximal part of the territory of the country. The herbar collections from the major Bulgarian herbaria were examined: SO (University of Sofia), SOA (Agricultural University – Plovdiv) and SOM (Institute of Biodiversity and Ecosystem Research). The authors' collections are 9 species of genus *Iris*. During two vegetation seasons were carried out detailed observation on the ecological profiles of the examined species and their plant communities. The consequent results are obtained from 983 herbar specimens SO, SOA, SOM, as well the author's collections. The maps and graphic contains information for the floristic regions (Kozhuharov et al. 1983) numbered as: *Black Sea Coast* (1), *Notheast Bulgaria* (2), *Danube Plain* (3), *Balkan Foothill* (4), *Stara Planina Mts.* (5), *Sofia region* (6), *Znepole region* (7), *Vitosha region* (8), *West Frontier Mts.* (9), *Valley of Strouma River* (10), *Belasitsa Mts.* (11), *Slavyanka Mts.* (12), *The Valley of Mesta River* (13), *Pirin Mts.* (14), *Rila Mts.* (15), *Mt Sredna Gora* (16), *Rhodopi Mts.* (17), *Thracian Lowland* (18), *Toundzha Hilly Country* (19) and *Strandzha Mt* (20).

**Results and discussion.** In ecological aspect, the *Iris* species are heterogenous, adapted to wide range of habitats. A bigger part of them are distributed in natural or semi-natural habitats. This is a reason for decrease of the populational strength, inversely proportional to the antropogenous influence on the natural vegetation.

As a byotype, the Bulgarian *Iris* species are geophytes. Some of them are strongly adapted to explicit type of habitats, as well other species have wider tolerance according to the conditions. The analysis of the distribution in ecological groups according to water shortage define the bigger part of Bulgarian species as xerophytes, they are followed by mesophytes and hydrophytes, which distribution is related to the high level of subterranean water.

In brief, the xerophytic species predominate in the typical subgenus *Iris* – *I. variegata* L., *I. pumila* L., *I. suaveolens* Boiss. & Reut. and *I. reichenbachii* Heuff. The species of subgenus *Limniris* (Tausch) Spach, *I. sibirica* L. and *I. graminea* L. show higher requirements to the soil humidity have.

A wider distribution in vertical aspect between 0 and 2200 m is determined for *I. reichenbachii*, *I. sibirica* and *I. graminea*. The rest Bulgarian representatives are chiefly in lowlands, some of them up to the submountain belt. Despite of their adaptation to various plant communities, the Bulgarian representatives of *Iris* don't participate as edificators. According to the light as factor, they prefer well lighted, open places. Between the Bulgarian *Iris* species can not be found sciophytes but some of them can be occurred on the periphery of the forest phytocenoses or in sparse shrubs, like as *Iris sintenisii* Janka.

*Iris pseudacorus* L. is the only species with hygrophytic and hydrophytic characters – inhabits wet zones, lowland riverbank places. This species forms thick, tuberous rhizomes and shows tolerance according to low-aerated and temporary dry spell conditions. It grows well in soils with high acidity, with pH between 3,6 and 7,7, and show high requirements to nitrogen nutrition (Ramey, 2001). This species is suitable for planting in high range of ecologically edaphic conditions and has continuous blossoming – between May and the end of June. This species is known with aggressive distribution and weed profile in its secondary distribution area.

The members of *Iris* are successfully breeding by vegetative way and form dense formations. The decorative advantages can be found in the forms of the flowers, with predominating yellow and blue-violet colors, as well as the evergreen leaves except the grass-leaved species *Iris graminea*, *Iris sibirica* and *Iris sintenisii*.

The blossoming period of Bulgarian *Iris* species starts in the beginning of March and continues to the middle of June. This fact determines the group as suitable for ornamental flower compositions. The highest species diversity in the flowering can be displayed in the spring between April and May.

Two of the species in Bulgaria – *Iris florentina* L. and *Iris germanica* L. are cultivated for decorative purposes, but can be found too often in wild. Some taxonomists unite the both taxa in *Iris germanica*. The difficulties in the distinguishing are caused by the fact that the cultivated specimens usually have hybrid origin from some species as *Iris pumila*, *Iris lutescens* Lam., *Iris aphylla* L., *Iris variegata* и *Iris albicans* Lange (Bezzi et al. 1993).

The preliminary of the team studies put in doubt the participation of *Iris aphylla* and *I. mellita*

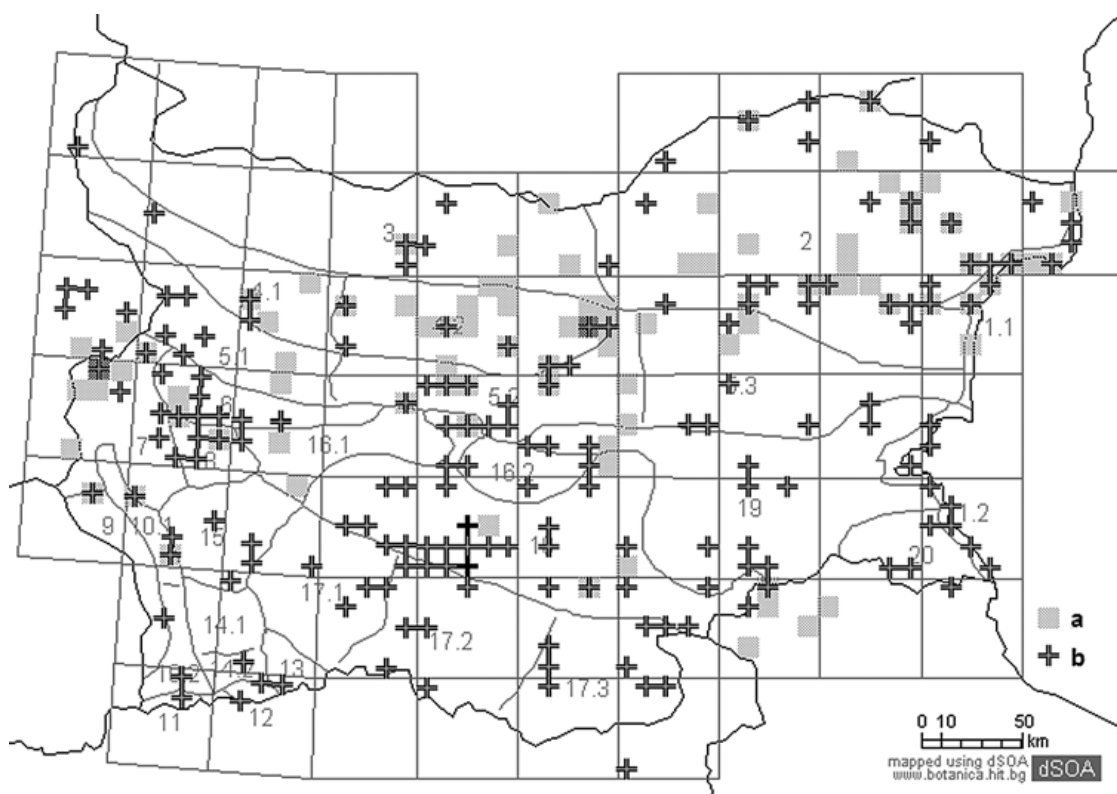


Fig. 1. Distribution of Bulgarian species of genus *Iris*: **a** – data from the literature; **b** – herbar specimens, included authors collections.

Janka. The balcan endemic *I. mellita* Janka is accepted by the most authors as synonym of *I. suaveolens*. The in situ observations of the populational dynamics remain the best basis for real valuation of the populations of the critical species.

Genus *Iris* in Bulgaria consist species with singular preferences to the ecologically edaphic profile of the habitats. A small part of them have a wider tolerance to the environment. The consequent information for the Bulgarian species displays an advantage of species from the plain and submountain belts (Fig. 1). According to the floristic regions in Bulgaria, the highest count of specimens are collected from Rhodopi Mts. (21,2%), followed by the Thracian lowland (14,8%), Stara Planina Mts.Стара планина (9,1%), Black Sea Coast (7,4%), Toundzha Hilly Country (6,9%), North-east Bulgaria (6,8%) etc. (Fig. 2).

On this basis can be delimited the following main groups:

- Lowland species, adapted to hydrophytic habitats as *Iris pseudacorus*. The ecosystems around the streams and wet areas, small lakes and marshlands have azonal profile and can be found in all vegetation belts.
- Plain and submountain species in grassy communities – *I. pumila*, *I. suaveolens*, *I. graminea* and *I. sintensisii*;
- Alpine species – *Iris reichenbachii* (on submountain and alpine limestone rocks), *Iris variegata* and *I. sibirica* (open wet grassland);
- Species with limited distribution – *I. suaveolens*, *I. graminea* and *I. sibirica*.

Most of these species are representative for the grassy communities, natural to slightly influenced by the human activity.

**Conclusion.** The inventarisations and terrain studies on the distribution and ecological features of the members of genus *Iris* were done for a first time in Bulgaria. They initiate the problems, which set accent on the studies about:

- Incomplete chorology of genus *Iris* in Bulgaria and inexact, too often imperfected localities, altitudes, phenology and ecology;
- Taxonomical doubts: uncertain count of species in the country; obscure synonymy and range of some taxa; an antiquated determination key of the taxa. The current level of the study requires a taxonomical revision of some deposited materials. In example the status and distribution of *I. aphylla*, *I. mellita* and *I. florentina* are dubious;

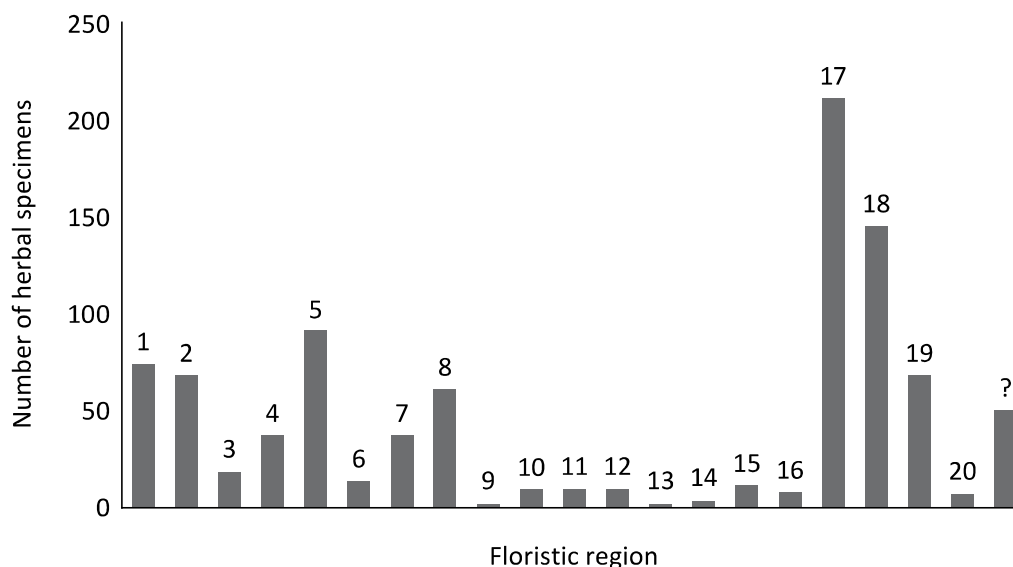


Fig.2. Distribution of the herbar specimens of genus *Iris* according to the floristic regions.

- Three Bulgarian species of genus *Iris* have conservational status and decreasing populations (*I. pseudacorus*, *I. pumila*, *I. graminea*). This fact gives a need of conservation of the populations in their natural habitats and development of ex situ collections for decorative and medicinal purposes;
- The anthropogenic impact is registered in the populations of *Iris pseudacorus* (drainage and cultivation of wet places), *Iris sibirica*, *Iris variegata* (collection, excavation). The best status can be seen in the populations of *I. reichenbachii*.
- The use of wild *Iris* species will allow to get decisions in the projection of terrains with arduous environment (insufficient light, redundant moisture, stony soils etc.), according to the their various ecological niche. Moreover, they help to prolong vastly the flowering period of the compositions and to decrease the labour for the cultivation services.

All explained above sets the initial point for the investigations in genus *Iris* in Bulgaria in future.

**Acknowledgements.** The study has been financially supported by Scientific Research Center of Agricultural University – Plovdiv (grant 20-10).

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