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CHRISTIAN BRÄUCHLER & PAVLE CIKOVAC

Iris orjenii (Iridaceae) – a new species from the littoral Dinaric Alps

Abstract

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Iris orjenii from Mt Orjen in Montenegro is described as a species new to science, it is illustrated and the chromosome number of $2n = 24$ is given. The differences from the closely related *I. pseudopallida* and *I. reichenbachii* are pointed out and details on the synecology of the new species are provided.

Key words: Montenegro, Mt Orjen, taxonomy, synecology, *Iris pseudopallida, Iris reichenbachii.*

A new species of *Iris* was discovered by the second author during phytocoenological investigations of oro-Mediterranean Dinaric calcareous silver fir (*Abies alba* Mill.) forests and Balkan pine (*Pinus heldreichii* subsp. *leucodermis* (Ant.) E. Murray) communities on Mt Orjen, Montenegro (Cikovac unpubl. diploma thesis 2002). Living plants were transferred to the Botanischer Garten München, where they first flowered in May 2004 and at the same time in the following years.

Iris orjenii Bräuchler & Cikovac, **sp. nov.**
Holotype: Cultivated at the Botanischer Garten München from plants collected in the wild in Montenegro on Mt Orjen by P. Cikovac on 6.6.2002, vouchered 1.5.2004, *Bräuchler 3538* (M 0099205, including one flower in the spirit collection; isotypes: B, BEOU, K, ZA) – Fig. 1.

Species inter *Iris pseudopallida* Trinajstić et *I. reichenbachii* var. *bosniaca* G. Beck. Differt a *I. pseudopallida* tepalis eis *I. reichenbachii* similibus; a *I. reichenbachii* var. *bosniaca* spatha ante anthesin tantum viride, demum exsiccata pallide albidi-brunea, interdum violacei-suffusa (nec ad fructus viridis).

Perennial rhizomatous plant with numerous short side branches bearing aerial shoots and leaves. *Rhizome* horizontally creeping, >20 cm long, with few roots. *Stems* upright, (20-)35-46 cm, with leaves clustered at base, with one cauline leaf little further up the stem and another smaller one

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Fig. 1. *Iris orjenii* – holotype at M.

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inserted just below half of the stem length. *Leaves* ensiform to falcate (outer ones), the lower basal ones 2-5 × 0.7-1.2 cm, the upper basal ones 8-24(-45) × 1.5-2.7(-4.5) cm, herbaceous, slightly glaucescent; stem leaves sometimes with membranaceous margins of variable width. *Inflorescences* 2-4(-5)-flowered, shortly pedunculate, not conspicuously branched (when 3- or more-flowered some flowers on a very short lateral branch); spathe not conspicuously keeled, green at bud stage, drying out just before or during flowering, becoming white to slightly brownish, sometimes violet-suffused. *Perigone* white to very pale yellow, with few irregularly scattered pale violet spots (probably a character in common with other *Iris* species in culture caused by virus infections), turning to darker yellow when drying; *perigone segments* fused into a 1.9 cm long tube at the base; *falls* spathulate to obovate, c. 7.5 cm long, 0.6 cm wide at base and 3.5 cm at one third below apex, intensely yellow bearded along proximal half of midvein, veined dark purplish brown on both sides of the bearded ridge up to 2.5 cm from base, with no distinct venation beyond; *standards* oval to obovate, c. 7.5 × 3.7-3.8 cm, margin strongly undulate, claw narrow, 0.7 cm long. *Stamina* with *filaments* white, 17-18 mm long, 1.5 mm wide at base, 1 mm wide just below thecae; *anthers* creamy white, 11-12 mm long and 2 mm wide (0.9 mm for each theca). *Ovary* c. 2.1 cm long, 6 mm in diameter, subcylindrical in shape; *style* c. 1.1-1.2 cm long equalling perigone tube in length; *style branches* almost white, curved outwards, c. 4.7-4.8 × 1.7-1.9 cm, adaxially keeled, distally cleft into two lobes starting 1 cm proximal of apex; lobes curved upwards, median-facing margin entire, outer margin dentate. *Fruit* a ± triangular, dry, dehiscent capsule. *Seeds* oval to drop-shaped (pyriform), not conspicuously flattened, 6-7 mm long, c. 4 mm wide.

Chromosome number. – $2n = 24$ (counted by M. Erben in 2004 from root tips of the plants cultivated at the Botanischer Garten München).

Ic. – Fig. 1-2; for additional colour photographs see the electronic supplement to this paper at www.bgbm.org/willdenowia/willd37/Braeuchler+Cikovac.htm.

Etymology. – The name of the new species is derived from Mt Orjen, in the littoral Dinaric Alps, to which the species is endemic.

Distribution. – *Iris orjenii* is confined to Mt Orjen, 42.54°N, 18.52°E, the largest coastal mountain of the Adriatic Dinaric Alps in Montenegro and Herzegovina (Fig. 3). It is a rugged limestone massif with striking karstic, glacial and glaciokarstic features. Zubački kabao, the main summit (1894 m), is also the highest peak in the littoral Dinaric Alps. The new species is restricted to localities above the tree line in the oro- to alti-Mediterranean life zone between 1550 and 1750 m. The two known localities represent disjunct populations. One is on the Prasa ridge between Zubački kabao and Vučji zub in the central peak zone, the other on a peripherical ridge below Velje leto.

Since the Bay of Kotor winds deep into the high-karst zone, Mediterranean climate penetrates far inland. The driving climatological forces, Sirocco and bora winds, induce vegetation mosaics of Mediterranean and temperate elements at different altitudes (Antonić & Lovrić 1996). This leads to a conspicuous mixtures of species from more than one climatic zone, of endemic and stenoendemic species, and to special vegetation types with marked transitional vegetation units restricted exclusively to ecotons of humid subtropical and hyper humid oceanic climates. Mediterranean cyclones and sirocco storms are accountable for the very high precipitation (up to 5000 mm at Crkvice, 940 m) that feeds the luxuriant and hyper-humid type of E Mediterranean vegetation, comparable to Colchidia-Hyrcanian formations of the Caucasus and Asia Minor, in the exceptionally damp and mild climate of the Montenegrin coast (Grebenščikov 1960).

Additional specimens examined. – MONTENEGRO: Mt Orjen, 6.6.2002, *Cikovac 1* (M); cultivated at the Botanischer Garten München from plant collected at Mt Orjen by Cikovac on 6.6.2002, id., flowering, 3.5.2005, *Bräuchler 3539* (B, BEOU, M, MSB, ZA); id., flowering, 12.5.2006, *Bräuchler 3540* (BEOU, MSB, herb. Bräuchler); id., fruiting, 6.2006, *Bräuchler 3541* (M).

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Fig. 2. *Iris orjenii* – plants from the type collection cultivated at the Botanischer Garten München.

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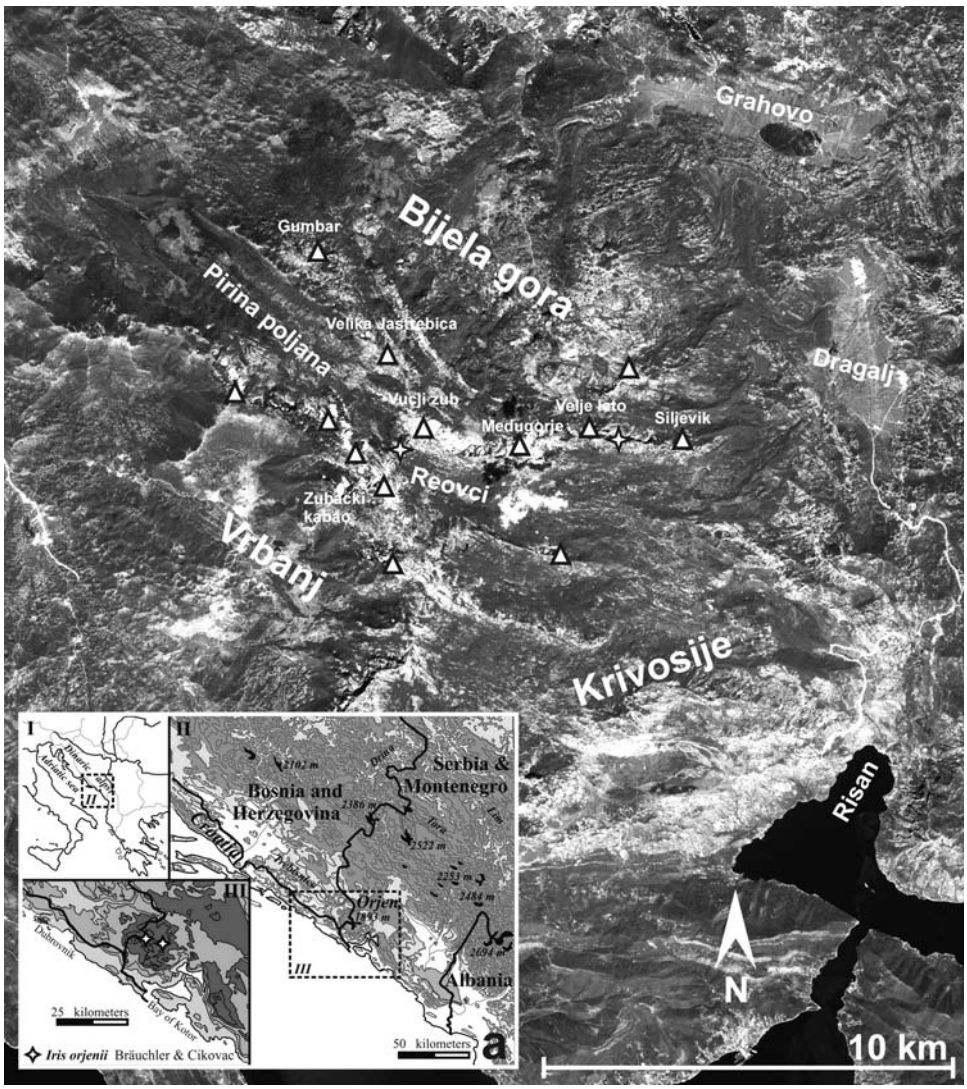


Fig. 3. Distribution of *Iris orjenii* (✧).

Phenology. – Flowering in the wild at beginning of June (observed by the second author on 6.6.2002 at an elevation of 1590 m), probably one of the first bearded irises to flower after the snow has melted away. Due to the milder climate the flowering period in cultivation at the Botanischer Garten München (500 m) starts already at the beginning of May.

Synecology. – The species shows a significant syntaxonomic affinity to open alti-Mediterranean pastures within the Seslerion robustae (Horvat) Lakus. 1966 alliance and open Mediterranean mountainous coniferous pine woodland of the Pinion heldreichii alliances. The examined populations grow under similar conditions on south facing slopes with abundant light. According to observations by the second author there are two different subunits. Both should be regarded as sub-associations within a united community. The first is found on moderately shallow rendzic

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leptosols, at the bases of higher cliffs within Peucedano-Pinetum heldreichii M. Jank (Janković 1967). Here notable alti-Mediterranean Dinaric dry montane grassland species and xerophytic tall herb taxa are present (*Peucedanum longifolium* Waldst. & Kit., *Senecio thapsoides* subsp. *visianianus* (Vis.) Vandas, *Juniperus nana* Willd.). The second subunit is found in depressions with deep chromic luvic cambisols. It represents a mesophytic tall herb community with numerous humidity indicators within the Seslerion robustae. *Iris orjenii* there forms a community of its own with respect to its spectrum of diagnostic species and its physiognomic structure. Associated species are *Heracleum sphondyllum* L., *Lilium martagon* var. *cattaniae* Vis. and *Asphodelus albus* Mill. The appearance of *Paeonia daurica* Andrews (= *P. mascula* subsp. *triternata* (Boiss.) Stearn & P. H. Davis) and nearby scattered individuals of *Betula pendula* Roth and *Acer heldreichii* subsp. *visianii* K. Maly underline that especially this part of Mt Orjen belongs to the transitional oro-Mediterranean type where the orophytic vegetation contains mixtures of Mediterranean, sub-Mediterranean and temperate chorological elements (Stevanović 1996).

Relationship. – The new species without doubt is to be placed in *Iris* subg. *Iris* (bearded irises) sect. *Iris (Pogoniris)* with regard to its bearded falls and relatively long rhizome (Mathew 1989). Within this group affinities are ambiguous. Two other species occur on Mt Orjen, *I. pseudopallida* and *I. reichenbachii* var. *bosniaca,* both with the same chromosome numbers ($2n = 24$) as the new species. *I. orjenii* appears somewhat intermediate, in height of stem, colour of flowers and consistency of spathes. The shape of the tepals is different from *I. pseudopallida* but similar to those of *I. reichenbachii* var. *bosniaca*. The spathe dries out before or during flowering, becoming white to slightly brownish, sometimes with a violet tint, a diagnostic feature for the whole *Pallida* series, whereas in *I. reichenbachii* the spathe is sharply keeled and stays completely green until the flowering period is over. The seed shape, a character regarded to be of high diagnostic value (Mitić & al. 2000) reveals similarity to those of *I. cengialti* A. Kern. and *I. illyrica* Vis., both closely related to *I. pseudopallida,* but striking dissimilarities to the latter, which has compressed seeds. Seeds of *I. reichenbachii* are described as similar to those of *I. orjenii*. Shape and undulation of falls and standards are much more similar to *I. reichenbachii* but no white flowered individuals from wild populations of this species have been reported. However, Dykes (1913) cites white flowered plants of *I. pallida* Lam. from the region of Dubrovnik and white flowered individuals have been spotted very occasionally in southern Dalmatia and Herzegovina, namely at Kotor and Mostar (Blažek, pers. comm.).

A hybrid origin of *Iris orjenii* might be suspected, the more so as it is found exactly at the altitude where the areas of *I. pseudopallida* and *I. reichenbachii* potentially overlap. Cross-breeding of closely related species belonging to different chorions, as may be suspected with the putative parent species of *I. orjenii,* has been made possible by the climatically induced (see Distribution, above) vegetation mosaics of Mediterranean and temperate elements at different altitudes of Mt Orjen. Today the closest neighbouring population of *Iris pseudopallida* is conspicuously remote from all localities of *I. orjenii* as the former species is absent from high mountain areas and restricted to altitudes from coast level to 800 m at south facing slopes. *I. reichenbachii* on the contrary is found in the immediate vicinity of *I. orjenii,* but never has the abundance, dominance and competitiveness at the observed, very distinctive *I. orjenii* localities.

No hybrids of the two putative parent species were investigated or reported in the literature from the natural habitat in the western Balkans. Also, no hybrid cultivars from *Iris pallida* s.l. and *I. reichenbachii* have been recorded yet (Blažek, pers. comm.).

Iris orjenii is not very variable in its natural habitat. The populations are homogenous and cultivars from different localities planted in the Botanischer Garten München also showed no apparent differences.

The new species is restricted to humid chromic luvic cambisols in the high alti-Mediterranean level. The eu- to supra-Mediterranean *Iris pseudopallida* in contrast is widespread on bare limestones or initial rendzic leptosols (Rendzina) in a variety of Mediterranean and sub-Mediterranean alliances of coastal karst plains, on mega cliffs in the Ephedro-Cyathoselinetum pal-

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moidis alliance and on montane limestone escarpments in the Campanula-Moltkeetum petraeae alliance (Lovrić 1993).

Iris reichenbachii var. *bosniaca* and *I. orjenii* have strong affinities in their phytosociological character as the constituents of the Festuco-Seslerietea Barbéro & Bonin 1969, with *I. reichenbachii* var. *bosniaca* common in Seslerietalia juncifoliae and Crepedetalia dinaricae associations on shallow rendzic leptosols of Dinaric high altitudinal limestone pastures and Pinion heldreichii alliances (Horvat & al. 1974). But ecological differences exist as *I. orjenii* is never found on extremely shallow soils.

Both the morphological homogeneity and the ecological specialisation of *Iris orjenii* support the exclusion of a spontaneous hybrid population hypothesis. *I. orjenii* is also a fully fertile species in its natural environment. Setting of seeds was observed in the field and after artificial cross pollination in cultivation. In addition, young individuals that could not be derived from clonal growth have been observed at the known localities. Within populations individual plants are grouped in notable patches dispersed on distant spots and the geographical separation (more than 6 km of deeply cleft alpine area) obviously excludes the possibility of vegetative propagation between the known sites.

Concluding from morphology, reproduction, habitat and ecology, a hybrid origin followed by speciation seems the best explanation for the restricted occurrence of *Iris orjenii*.

Conservation status. – The species is classified as "Vulnerable (VU)" according to criteria D1+2 (IUCN 2001) because it is so far known only from two secluded localities with one larger (c. 150 flowering stems) and one smaller population (c. 100 flowering stems). Nothing can be said about the population structure as it is hard to distinguish single individuals when the rhizome is developed. However, it is very likely that more populations exist in inaccessible parts of the mountain range, where the typical habitat of the species is expected to occur. An increase of tourism in the region over the last three years (Cikovac, pers. obs.) and a persisting interest of professional gardeners in rare *Iris* species may pose a threat to *I. orjenii*.

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