



A new species and a new combination of *Iris* subgenus *Scorpiris* (Iridaceae) from Central Asia (Hissar Range, Pamir-Alai)

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During floristic surveys in the southwestern borders of the Hissar Mountains (Pamir-Alai system, Central Asia), 2011–2013, we collected one unidentified species from genus *Iris* Linnaeus (1753: 38) subgenus *Scorpiris*, section *Juno* (Trattinnick 1817: 135) Benth. ex Benth. & Hooker (1883: 687). These plants were introduced into the Tashkent Botanical Garden, where we carefully studied them in the *Iris* living collection. We conclude that the new species is related to an alliance that contains *Iris parvula* (Vvedensky 1963: 425) Hall & Seisums (2011: 300). This group consists primarily of high-mountain species, the distribution of which is limited to the ridges of the Pamir-Alai and western Tien-Shan (Central Asia)—*Iris parvula*, *I. linifolia* (Regel 1935: 152) Fedtschenko (1905: 159), *I. tadshikorum* (Vvedensky 1935: 152) Vvedensky (1935: 563) and *I. narynensis* Fedtschenko (1905: 159; İkinci *et al.*, 2011). According to our studies, this group could be extended by the inclusion of *Iris vvedenskyi* Nevski (1932: 323) and *Juno linifoliiformis* Khalkuziev (1985: 1663), here transferred to *Iris*. *Iris vvedenskyi* is primarily documented for the Kugi-Tang Range (western Pamir-Alai), and its main distribution is in Turkmenistan. The lesser-known *I. linifoliiformis* grows on northern slopes of the Turkestan and Alai Ridges (Khalkuziev, 1985). *The world checklist of selected plant families* (2013) placed *J. linifoliiformis* in synonymy with *I. linifolia*. Vvedensky (1971), in the note to *Iris linifolia*, wrote that plants from the Alai Ridge differ from *I. linifolia* and should be recognized as a new species, between typical *I. linifolia* and northern forms of *I. tadshikorum* Vved. Later, a researcher of the flora of Alai Ridge, Khalkuziev (1985), described these plants as *Juno linifoliiformis* Khalkuziev (1985: 1663) and distinguished them from *I. linifolia* by their deeply dissected (1.5–2.0 mm long) crests and narrower leaves not exceeding flowers.

The study of İkinci *et al.* (2011) included a new species referred to as *Iris* aff. *parvula* (Tadjikistan: Hissar Range, near the village of Takob), which is close to where our material was collected in the Uzbekistan part of the Hissar Range, and its diagnostic characters also are similar to those of our new species.

Iris khassanovii Tojibaev & Turginov, *sp. nov.* (Fig. 2)

Diagnosis: The new species differs from *I. parvula* in falcate leaf blade gradually narrowing apically (not straight with parallel margins and suddenly narrowing apically), white, not green, flowers, entire (not dissected) crest. From *I. tadshikorum*, it differs in white, not violet, flowers and entire (not dissected) crest; from *I. linifolia*, in white, not yellow, flowers.

Type:—UZBEKISTAN. Pamir-Alai: border of the Hissar Range, Baisuntau, near the village of Gumatag, Parakhnaursaj, stony slopes, 2123 m, N 38.35696 E 067.33598, 4 May 2013. *Turginov 1421* (TASH!).

Perennial bulbous herb. Bulb ovoid, 1.0–1.5 cm in diameter, tunics papery, brownish. Stem 5–10 cm high. Leaves with internodes inconspicuous at anthesis but elongating later, falcate, linear-lanceolate, acuminate, with white margins; lowest leaf 4–10 mm wide. Flowers 1 (2), whitish with violet veins (in herbarium specimens, flowers are whitish-yellowish-green and the violet veining is no longer visible); perianth tube 4 cm long, yellowish-green; claw (haft) of outer tepals (falls) 4–5 mm wide, with parallel margins and parallel violet veining; blade of outer tepals 6–7 × 10–12 mm, wider than the claw, with violet veining and a violet patch. Raised crest white, denticulate, with a yellowish zone either side. Inner tepals (standards) 6–7 mm long, acute, trilobed, with central lobe 2–3 times or more longer than lateral ones, with violet veining. Petaloid style branches each with two symmetrical broad violet stripes.

Distribution and habitat:—This new species is known only from the type locality in Uzbekistan, where it grows on stony slopes of *Juniperus* forests at 2100–2200 m. According to the field surveys of 2012–2013, the species is rare in the Uzbekistan part of the Hissar Range (Fig. 1).



FIGURE 1. Study area and location of the new species.



FIGURE 2. *Iris khassanovii* Tojibaev & Turginov. A. Plant habit. B. Outer tepal (fall). C. Detail of raised crest on blade of fall. D. Petaloid style branch. E. Inner tepal (standard)



FIGURE 3. Details of flowers of *Iris khassanovii* and other Pamir-Alai species. A. Inner tepals (standards) of *I. khassanovii*, *I. warleyensis*, and *I. narbutii* (left to right, respectively). B. Raised crests of *I. khassanovii*, *I. parvula* and *I. warleyensis* (left to right, respectively). C. Petaloid style branches of *I. khassanovii*, *I. parvula* and *I. warleyensis* (left to right, respectively).

Etymology:—The species is named in honour of the well-known researcher of monocots of Central Asia, Professor Furkat O. Khassanov.

Notes:—Taxonomic studies in juno irises (Wendelbo & Mathew 1975, Mathew 1997, İkinci *et al.* 2011, Khassanov & Rakhimova 2012) have changed the nomenclature of the genus as well as enlarging the list of species. For 70 years, Soviet botanists accepted *Juno* at the generic level (Vvedensky, 1935, 1971), but a molecular (DNA) study of genus *Iris* (Tillie *et al.* 2000) has shown that the junos are deeply embedded within *Iris* and should not be considered a separate genus. Molecular analyses have indicated that there are several distinct groups within section *Juno* of subgenus *Scorpiris* (İkinci *et al.* 2011). However, the systematic organization of section *Juno* at any subsectional level has not yet been developed. According to İkinci *et al.* (2011), species allied to *Iris parvula* (subclade D2) have several common morphological characters: roots swollen above and tapering abruptly below, sheathing leaves (except in *I. narynensis*), seeds usually with a small, fragile aril-like appendage and flowers in

which the falls have a more or less parallel-sided haft and a toothed to markedly fimbriate crest. As well as having leaves that are usually sheathing and a claw (haft) to the outer tepals (falls) with parallel margins, the inner tepals (standards) of these species are often trilobed, with an elongate central lobe.

TABLE 1. Herbarium material of *Iris parvula* alliance studied.

Species	Locality	Herbarium	Collection date	Collector/number
<i>Iris khassanovii</i>	Uzbekistan, Pamir-Alai, Hissar ridge, Baisuntau, Gumatak village, 2123 m	TASH	4 May 2013	<i>Turginov 700</i>
<i>Iris linifolia</i>	Uzbekistan, pass Kendir-auz, Angren	LE	20 May 1900	<i>Mussa sn</i>
	Uzbekistan, Tien-Shan, basin of Angren river, Abjas-say pass	TASH	29 May 1954	<i>Butkov 62</i>
	Uzbekistan, Kurama, Pap-Chust range, 2000 m	TASH	29 April 1969	<i>Filimonova sn</i>
	Tadjikistan, Alai ridge, Kshtut river, Temlyape-say	TASH	14 April 1946	<i>Prosvirina sn</i>
	Tadjikistan, Alai ridge, Shavil-say	TASH	20 April 1957	<i>Ustinova sn</i>
	Kirgizstan, Alai ridge, Shakhimardan	TASH	08 June 1948	<i>Shafeev sn</i>
	Uzbekistan, basin of Kashkadarya, Beshnay	TASH	25 June 1937. 784	<i>Kudryashev 784</i>
<i>Iris linifoliiformis</i>	Uzbekistan, Turkestan ridge, Guralash, 2250–2300 m	TASH	02 June 1937	<i>Vasil'chenko 194</i>
	Uzbekistan, Turkestan ridge, Kulsay	TASH	11 May 1938	<i>Korotkova 5</i>
	Kirgizstan, Shakhimardan, Aksu	TASH	24 June 1954	<i>Aleksandrova sn</i>
	Kirgizstan, Alai ridge, Shakhimardan	TASH	10 April 1960	<i>Shonazarov sn</i>
	Kirgizstan, Alai ridge, Shakhimardan	TASH	10 April 1960	<i>Shonazarov 2390</i>
	Tadjikistan, Alai ridge, Sufikurgan	TASH	09 August 1963	<i>Puchkova 475</i>
	Uzbekistan, Sokh river, Rautsay	TASH	08 July 1962	<i>Puchkova sn</i>
	Kirgizstan, Tien-Shan, Fergana valley, Padsha-ata	TASH	30 March 1926	<i>Gomolitskyi 48</i>
<i>Iris narynensis</i>	Kirgizstan, Tien-Shan, Padsha-ata	TASH	1926	<i>Bochkala sn</i>
<i>Iris parvula</i>	Uzbekistan, Shakhrisabz, Kul-Gilyan	TASH	19 May 1916	<i>Popov 786</i>
	Uzbekistan, Shakhrisabz, Kul-Gilyan	TASH	19 May 1916	<i>Popov 787</i>
	Uzbekistan, Chulbair ridge, Sina village, 2600 m	LE	23 May 1929	<i>Vvedenski sn</i>
	Uzbekistan, western Pamir-Alai, Zeravschan ridge, Aman-Kutan	TASH	24 May 1933	<i>Drobov 41</i>
	Uzbekistan, western Pamir-Alai, Zeravschan ridge, Rabat	TASH	19 May 1936	<i>Gnezdillo 109</i>
	Uzbekistan, western Pamir-Alai, Yakkabag-darya, Tashkurgan	TASH	09 July 1936	<i>Botschansev 810</i>
	Uzbekistan, western Pamir-Alai, Zeravschan ridge, Kashkadarya, Kungus khan pass	TASH	20 May 1936	<i>Gnezdillo 129</i>
	Uzbekistan, Turkestan ridge, Kulsay	TASH	11 May 1938	<i>Korotkova 5</i>
<i>Iris tadshikorum</i>	Uzbekistan, Yakkabag, Chekman-Kuydi pass, between Kalta-Kul and Tashkurgan	TASH	28 May 1916	<i>Popov 1020</i>
	Tadjikistan, Darvaz ridge, Sari-Taval-daray pass	LE	17 June 1927	<i>Korshinsky 5106</i>
	Uzbekistan, Guralash, Kaltasay	TASH	31 May 1935	<i>Zakrjevski 235</i>
	Uzbekistan, Guralash, Tiyanshansay	TASH	22 May 1944	<i>Nazarenko sn</i>
<i>Iris vvedenskyi</i>	Turkmenistan, Kugi-Tang, Hodzha Phil-ata	TASH	14 May 1915	<i>Popov 731</i>
	Turkmenistan, Kugi-Tang, Hodzha Phil-ata	LE	27 June 1934	<i>Nevski 475</i>
	Turkmenistan, Kugi-Tang, Maydan	TASH	20 June 1935	<i>Gnezdillo sn</i>
	Uzbekistan, Kugi-Tang, Zakharlisay and Zakharli tepa, 124 m	TASH	27 April 1965	<i>Kayumov sn</i>
	Uzbekistan, Pamir-Alai, Hissar ridge. Baisuntau, basin of Machay, Sharshara, 3000 m	TASH	07 April 2012	<i>Turginov sn</i>

Geographically, these species are primarily from the Pamir-Alai, although some do extend into the Tien-Shan. The study of living plants in nature and herbarium specimens in TASH, LE and MW shows that this group consists of about seven species: *I. parvula* s.s., *I. tadshikorum*, *I. khassanovii*, *I. vvedenskyi*, *I. linifolia*, *I. linifoliiformis* and *I. narynensis*. Some other species in the D2 clade (Ikinci *et al.* 2011), such as divergent *Iris magnifica* (Vvedensky 1941: 518) Khassanov & Rakhimova (2012: 178), are more distantly related to this group and can be differentiated by their expanded (winged) claws of the outer tepals and stems with more obvious internodes at or after anthesis, characters that can also be observed in three closely related species: *I. hippolyti* (Vvedensky 1941: 519) Kamelin (1981: 102), *I. svetlanae* (Vvedensky 1971: 322) Hall & Seisums (2011: 300) and *I. maracandica* (Vvedensky 1963: 426) Wendelbo (1975: 216), which may have winged claws to their outer tepals up to 2.5 cm wide. However, in the *locus classicus* of *Iris hippolyti* in the southeastern part of the Kyzyl-Kum Desert, Mt. Koktscha, we collected some plants without winged claws, which were close to *I. narbutii* Fedtschenko (1941: 515). *Iris narbutii* and its relative *I. warleyensis* Foster (1902: 386) also occupy a more distant position in clade D2, despite both species having outer tepals without expanded claws; they do not belong to the *Iris parvula* group (Ikinci *et al.*, 2011).

A combination in *Iris* is made here for *Juno linifoliiformis* Khalkuziev

Iris linifoliiformis (Khalk.) Tojibaev & Turginov, *comb. nov.*; basionym: *Juno linifoliiformis* Khalkuziev, *Bot. Journ. Acad. Sci. URSS*, 70, 12: 1693–1695 (1985).

Distribution:—Turkistan, Alai ranges. Tadjikistan, Uzbekistan.

Acknowledgements

We would like to thank Tony Hall for his critical reading of the manuscript and helpful comments. We also thank the curators of LE and MW.

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