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A new, highly endangered and restricted-range species of *Parrya* sect. *Pseudoclausia*, *comb. nov.* (Brassicaceae) from Western Tian Shan, Uzbekistan

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Abstract

Parrya tojibaevii, a morphologically distinct species related to the taxa previously assigned to the genus *Pseudoclausia*, recognized herein as a section, is described and illustrated. The novelty, known from a few collections, is confined to a small and highly disturbed area around the confluence of Chatkal River with Charvak Reservoir (Western Tian Shan, Uzbekistan) and is morphologically closest to *P. gracillima* and *P. mollissima*. The new species can be assessed as critically endangered due to its very narrow and obviously shrinking range and habitat, an easy accessibility of known localities, and a growing threat from the construction of hydroelectric power station, roads and resorts, and also from recreation and grazing.

Key words: Chatkal, Charvak Reservoir, Chorisporeae, conservation, Cruciferae, endemic, Middle Asia, morphology, taxonomy

Introduction

The Tian Shan (otherwise spelled as Tien Shan) extends on more than 2,500 km across Tajikistan, Uzbekistan, Kazakhstan, Kyrgyzstan, and Xinjiang Province of China, covering an area of about one million km^2, is one of the greatest mountain systems in the world. Along with the adjacent mountain system of Pamir-Alay, the Tian Shan constitutes one of 36 global biodiversity hotspots, namely Mountains of Central Asia (Mittermeyer *et al.* 2011), often referred to as Middle Asia in Soviet and post-Soviet literature. The Tian Shan can be divided into four physiographical regions, the Eastern (Chinese or Xinjiang), Northern, Central (or Inner) and Western Tian Shan (Adylov & Zuckerwanik 1993). Of these, the Western Tian Shan is a region where the greatest floristic diversity and largest number of endemic species are registered (Tojibaev *et al.* 2020, Sennikov & Tojibaev 2021). New species endemic to this area from various families are still being regularly described (e.g., Krasovskaya 2018, Shchegoleva *et al.* 2019, Wilson *et al.* 2022, Pimenov *et al.* 2023, to name a few recent examples). Importance of further taxonomic and floristic studies in this densely inhabited region as the basis of biodiversity assessment and proper planning/improving of nature protection measures is therefore beyond question. A recently (since 2016) launched international project 'Flora of Uzbekistan' (Sennikov *et al.* 2016) has prompted conducting relevant investigations and become a good option for revision of understudied taxa. The first five volumes of the new edition of *Flora of Uzbekistan* containing treatments of 19 families with 164 genera and 718 species (about 16.5% of flora) have been published to date (Sennikov 2016, 2017, 2019, 2022a, 2022b).

Parrya Brown (1823: 10) is a medium-size genus of Asian-North American distribution, which includes 43 species (Al-Shehbaz & German 2013, Al-Shehbaz 2015); 35 species occur in the Tian Shan and Pamir-Alay, most of them being endemic to these mountain systems. For example, *Parrya* represented by 17 endemics is among 15 leading endemic-rich genera in the Tian Shan (Tojibaev *et al.* 2020). The taxonomy of this genus is relatively complicated (German *et al.* 2011, Al-Shehbaz & German 2013), first of all due to the presence of closely related species with somewhat blurred species limits and often a high degree of intraspecific variability. In particular, this is true (Pachomova 1974) for the group of ten predominantly biennial species, centered in the Western Tian Shan and long recognized as a separate

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genus *Pseudoclausia* Popov (1955: 18), which was merged with *Parrya* (Al-Shehbaz & German 2013) based on the phylogenetic treatment of the tribe Chorisporeae Meyer (1831: 104) (German *et al.* 2011).

Recent field surveys and our revision of *Parrya* collections towards the treatment of Brassicaceae for 'Flora of Uzbekistan' provided unequivocal evidence for another, yet undescribed biennial species with very peculiar morphology, especially with regards to flower characters. Specimens of this novelty were found mostly in TASH, with the single exception in LE represented by plants that were fully dry and lacking leaves by the collection time and therefore difficult for identification. Specimens of the new species described herein were found under the names *Pseudoclausia mollissima* (Lipsky 1904: 44) Vassiljeva (1961: 243) and *Ps. gracillima* (Popov ex Botschantzev & Vvedensky 1941: 13) Vassiljeva (1961: 244) or among undetermined material. As revealed by these gatherings and subsequent observations in nature, the novelty is a stenoendemic species growing in highly impacted and partly destroyed habitats pleading for taking immediate measures to prevent its extinction.

Regarding the placement of the new species within *Parrya*, in their synopsis, Al-Shehbaz & German (2013) did not aim to provide infrageneric classification of the genus and did not recognize *Pseudoclausia* at any infrageneric rank. This is done here to make the name available for the treatments accepting a sectional division of the genus.

Material & Methods

The present study is primarily based on revision of herbarium collections of TASH (herbaria acronyms according to Thiers (2023 [continuously updated])). The material of AA, LE, MHA and MW was also considered. Observations and additional collections were made in nature, mainly in *locus classicus*, both in the flowering and fruiting periods. Measurements and the description were prepared mostly from dry and partly from live material. Apart, photographs of both the described species [all annotated as *P. gracillima* (Popov ex Botsch. & Vved.) D.A. German & Al-Shehbaz (Al-Shehbaz & German 2013: 463)] and its closest congeners available at Plantarium (2007–2023) were consulted. The holotype is deposited in TASH, isotypes in AA and ALTB, and further isotypes are to be sent to LE, MW and several other herbaria.

A distribution map was created in QGIS 3.8.1 free software using GPS coordinates. Historical specimens were geo-referenced using Google Earth software. A conservation status was assessed in accordance with the IUCN Categories and Criteria (2022). The extent of occupancy (EOO) and area of occupancy (AOO) were calculated according the IUCN Mapping Standards (2021).

Taxonomic treatment

Parrya Brown (1823: 10).

Lectotype (Pfeiffer 1873: 596): *Parrya arctica* Brown (1823: 11).

Parrya sect. ***Pseudoclausia*** (Popov) Madaminov, ***comb. et stat. nov.*** ≡ *Pseudoclausia* Popov (1955: 18).

Type: *Parrya hispida* (Regel 1870: 266) D.A. German & Al-Shehbaz (Al-Shehbaz & German 2013: 463) [*Chorispora hispida* Regel; *Pseudoclausia hispida* (Regel) Popov (1955: 18)]

Parrya tojibaevii D.A. German & Madaminov, ***sp. nov.***

Type:—UZBEKISTAN. Tashkent Province, western branches of Chatkal Range, left bank of Chatkal opposite to the natural monument Obirakhmat, ca. 950 m a.s.l., open clayey-gravelly slopes, 41°33'44.334" N, 70°06'21.319" E, 6 May 2023, *D. A. German, F. M. Madaminov, G. T. Kurbaniyazova & G. Kh. Bukharov s. n.* (holotype: TASH054556; isotypes: AA, ALTB, TASH054549, TASH054555, also to be distributed elsewhere).

Biennial herb, rather densely covered throughout (except for petals, stamens, and stigmas) with a mixture of stipitate glands 0.2–0.4(–0.5) mm long and patent simple trichomes (0.5–)1–4(–7) mm long (the latter sometimes rare or absent on upper part of rachis, pedicels and rarely sepals) and therefore hispid; longest (3–7 mm) trichomes restricted to rosette leaves, shortest (mainly to 1 mm) to styles; most of other trichomes range within 1.5–2.5(–3) mm, on average longest in lower half of stems and shortest on sepals, though variation in trichome length on the same organs is observed among and even within individual plants. Leaves of first-year rosettes to 3.5 × 1.7 cm, elliptic to narrowly elliptic in outline, with 4(–5) subacute to obtusate, triangular to lanceolate-triangular, usually entire, sometimes

indistinctly and minutely toothed teeth or lobes, less often subentire, predominantly obtusate, gradually narrowed into petiole to 2 cm with somewhat expanded base. Stems (15–)25–40(70) cm tall, stout, single, branched in lower third; branches ascending, often simple, rarely few-branched. Basal leaves narrowly elliptic to broadly lanceolate or lanceolate in outline, cuneate, sessile or shortly (to 1.5 cm) petiolate, to 5 × 1.5 cm, pinnatifid or pinnatipartite, rarely pinnatisect, with 4–6(–7) usually remote, triangular to oblong-lanceolate, entire or rarely weakly denticulate teeth or lobes on each side, with acute or obtusate apex, along with stem ones withering by fruit (sub)maturity. Stem leaves: lowermost similar to basal, others predominantly narrowly ovate to broadly lanceolate, partly lanceolate and (usually on secondary branches) linear-lanceolate, to 4.2 × 1.9 cm, progressively smaller upward, sessile or nearly so, cuneate or narrowed to a petiole-like base, acute, serrate to (uppermost sometimes) remotely denticulate, with (2–)4–6(–7) pairs of teeth. Racemes ebracteate, (6–)8–30(–36)-flowered, terminating stem and all branches, rather lax and considerably elongating in fruit; rachis straight. Pedicels ascending, flowering slender, 2–4.5 mm; fruiting thickened, 0.8–1.2 mm wide proximally and expanded to ca. 1.5 mm distally, straight or slightly curved upward in lower part, 4–7 mm long. Sepals oblong-linear, gradually narrowing towards apex, erect, deep purple coloured, narrowly (widest at the apex) hyaline-margined, fading turning blackish, (6.5–)7–9(–10.5) × 1.8–3 mm, lateral slightly saccate at base. Petals 10–16 × 1.5–2 mm, indistinctly differentiated into claw and blade; claw 7–11 mm, slightly exceeding sepals, narrowly cuneiform, in proximal and middle part whitish, with indistinct and rather blurred pale green midvein, distally starting turning wine from central part in the lowest point through the transitional zone between the claw and blade and reaching (almost) the whole width by the beginning of blade, with pale yellow margins, sometimes protruding to proximal part of the blade; blade 3–5 mm, narrowly oblong, rounded to subtruncate, not emarginate, in fully open flowers recurved, grooved, usually undulate, wine-coloured (darkest in central part), fading turning black. Stamens slightly tetradynamous, 8–11.5 mm, with narrow filaments slightly gradually expanded towards the base in inner ones; anthers oblong-linear to linear, sagittate, acute, 2.2–3.5 mm in lateral and 3–4 mm in median stamens, respectively. Siliques (3.2–)4–6(–7) cm × 1.8–2.1(–2.3) mm, immature compressed-tetragonal, mature terete or weakly tetragonal-terete, straight to very slightly curved upward, ascending, tardily dehiscent; valves with distinct midvein and obscure lateral ones; septum opaque, with slightly translucent, wide midvein throughout the whole length. Ovules/seeds (30–)40–58 per ovary/fruit; seeds compressed, oblong to broadly oblong-elliptic, brown, 1.8–2.1 × 1.2–1.6 mm, very narrowly margined all round. Styles cylindric, stout, without stigma (1–)2–3(–4) mm long; stigmas narrowly conical, (1.5–)2–2.8(–4) mm, with strongly connivent lobes shortly diverged only in distalmost part. Fig. 1.

Affinity:—Based on morphological characters, *Parrya tojibaevii* appears to be most closely related to *P. gracillima* and *P. mollissima* (Lipsky) D.A. German & Al-Shehbaz (Al-Shehbaz & German 2013: 464), both endemics of the Western Tian Shan and belonging to *P.* sect. *Pseudoclausia*, with long trichomes (up to 4.5 mm in the prior and up to 6 mm in the latter) on primary rosette leaves. Among the two, *P. mollissima* is the nearest relative of the new species resembling *P. tojibaevii* in habit of fruiting plants, character of indumentum, fruit, style and stigma dimensions, ovules/seeds number and ecology, but considerably differing in bigger (up to 9.5 cm, including petiole up to 2.8 cm), usually lyrate-pinnatisect rosette leaves, white or very pale pink (with deep pink zone of transition to a claw and venation), spreading petals 1.7–2.5 cm × 3–6 mm with obtriangular, apically emarginate blade, pedicels 6–15 mm long, light green (vs. intensive green) colour of leaves and further, less distinct features. With *P. gracillima*, the new species shares flower size and intensive green colour or stems, leaves and young fruits. Most obvious differences of *P. gracillima* from *P. tojibaevii* include light to deep pink, sometimes lighter proximally, turning violet when fading, spreading petals with narrowly obtriangular, truncate or weakly emarginate, sometimes subrounded blade, narrower (1–1.5 mm wide), tetragonal siliques, higher number (60–90) of smaller (1.3–2 × 1–1.3 mm) seeds, shorter (1–1.5 mm long) stigmas and less robust habit. Ecologically, *P. gracillima* differs in preferring mesic habitats with developed vegetation (vs. xeric and open), although sometimes it occurs under conditions typical of *P. tojibaevii*. Both *P. gracillima* and *P. mollissima* can be distinguished from *P. tojibaevii* in generally narrower (predominantly narrowly lanceolate to linear-lanceolate) cauline leaves.

Etymology:—Named in honour of Komiljon Sharobitdinovich Tojibaev, Head of the Institute of Botany, Academy of Sciences of Uzbekistan, and Leader of the ongoing project ‘Flora of Uzbekistan’ (since 2016), in recognition of his scientific and organizational contribution to the contemporary inventory, analysis and conservation of the flora of the Western Tian Shan, Uzbekistan and Middle Asia in general.

Distribution and habitat:—The novelty is known thus far from a small area around the place of the confluence of the Chatkal River with the Charvak Reservoir (Fig. 2). It was predominantly collected and observed along ca. 6 km of the left bank of Chatkal/Charvak, i. e. on branches of Chatkal Range. Besides, a single collection was made at the right bank of Chatkal, belonging to Koksu (wrongly indicated as Pskem on the label) Range, just opposite to the southern (upper) end of the above 6-km bank line. Therefore, it should be assigned to the same population which is thus

currently the single known one. All collections and observations fall within the narrow altitudinal range of 900–1300 m a.s.l.

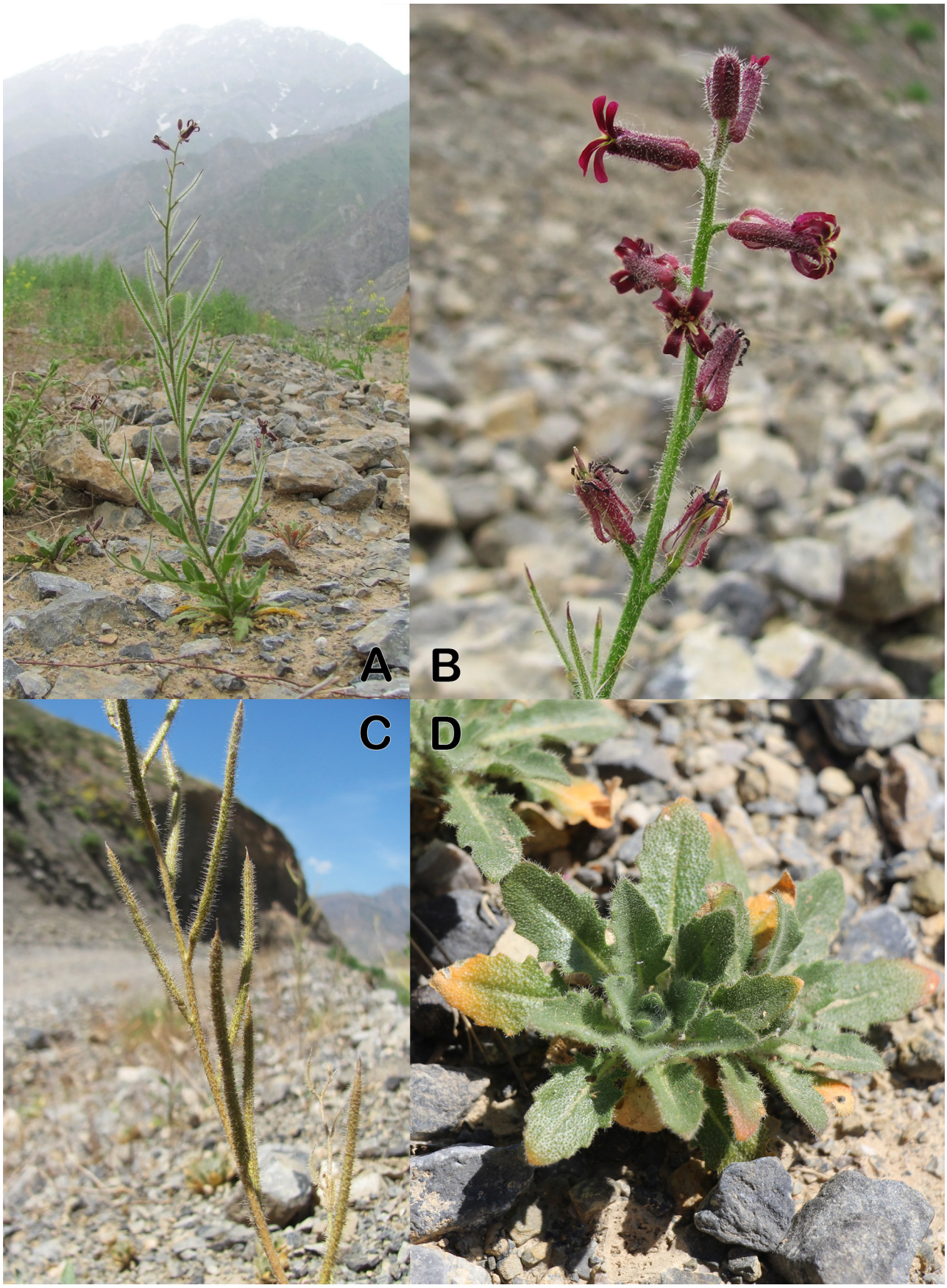


FIGURE 1. Living plant of *Parrya tojibaevii*: (A) plant in natural habit; (B) and (C) part of inflorescence and infructescence; (D) first-year rosettes.

It is important to note that the species occurs in the area of intensive human activity which negatively affects its population and may even threaten its existence. First, at least one locality (vicinities of Shungak) is apparently gone since Shungak Village was flooded in 1970 by the construction of the Charvak Reservoir. Second, banks of the reservoir are heavily exploited as tourist/recreation zone with a growing number of hotels, guesthouses, resorts, restaurants, summer camps, beaches, etc. Third, a large new threat is the ongoing construction of the Lower Chatkal hydroelectric power station situated just 2.5 kilometers upstream the habitat of the species. The launch of this power station (planned in 2025) and the development of its infrastructure (roads, power lines, etc.) will inevitably lead to further habitat losses of *P. tojibaevii*. And finally, intensive livestock grazing also has a negative impact on the species and local vegetation in general.

Although the territory around the Charvak Reservoir belongs to the Ugam-Chatkal National Park (506,941 hectares), a protected area of IUCN category II, in reality an economic growth, energy production and tourism take priority over the biodiversity conservation in this area (Volis 2022).

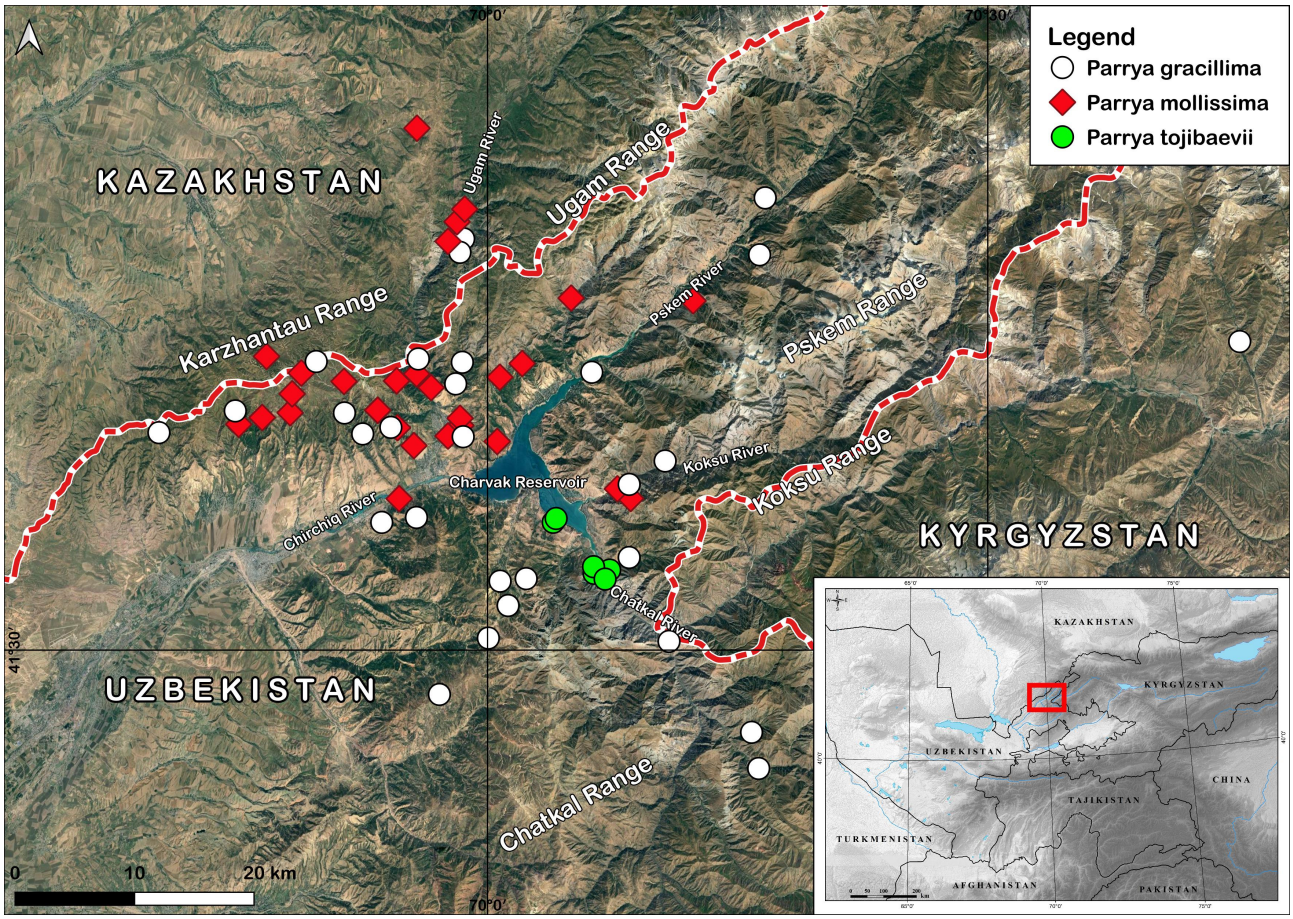


FIGURE 2. Distribution of *Parrya tojibaevii* and related species within the study area.

Phenology:—Flowering in mid-April to mid-(late) May, fruiting in May to early June.

Ecology:—Occurs on steep, rarely gentle, clayey-gravelly and stony slopes of predominantly east- and northeast-facing exposition (Fig. 3). Also found at the roadside on the same type of substrate. Apparently reveals low competitive ability growing on bare soil with no or very scarce vegetation, but sometimes occurs in xeric open shrublands and grass-forb communities. *Alyssum simplex* Rudolphi, *Crambe orientalis* L., *Glaucium fimbrilligerum* Boiss., *Guenthera persica* (Boiss. & Hohen.) D.A. German, *Hordeum bulbosum* L., *Poa bulbosa* L., *Prunus erythrocarpa* (Nevski) Gilli and *Scandix stellata* Banks & Sol. were found to be the most common accompanying species. The following endemic and threatened plants (Khassanov 2019) were recorded in the study area around the confluence of the Chatkal River with the Charvak Reservoir: *Eremurus lactiflorus* O. Fedtsch. (Asphodelaceae, endemic to Western Tian Shan listed in the Red Data Book of Uzbekistan), *Hedysarum drobovii* Korotk. (Fabaceae, extremely rare endemic of the Western Tian Shan and Uzbekistan, listed in the Red Data Book of Uzbekistan), *Iris orchioides* Carriere (Iridaceae, endemic to the Western Tian Shan listed in the Red Data Books of Kazakhstan, Kyrgyzstan and Uzbekistan), *Parrya tschimganica* (Popov ex Botsch. & Vved.) D.A. German & Al-Shehbaz (Brassicaceae, extremely rare endemic of the Western Tian

Shan listed in the Red Data Book of Uzbekistan), *Rubia laevissima* Tscherneva (Rubiaceae, endemic to the Western Tian Shan listed in the Red Data Book of Uzbekistan), *Salvia korolkowii* Regel & Schmalh. (Lamiaceae, endemic to the Western Tian Shan listed in the IUCN Red List and Red Data Books of Kyrgyzstan and Uzbekistan), *Tulipa greigii* Regel (Liliaceae, endemic to the Western Tian Shan listed in the Red Data Books of Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan).



FIGURE 3. Habitat of *Parrya tojibaevii* near the confluence of the Chatkal River with the Charvak Reservoir.

Biology:—Appears to be cross-pollinated. Bee flies (Bombyliidae) are noticed visiting flowers of *Parrya tojibaevii*.

Conservation status:—*Parrya tojibaevii* appears to be a stenoendemic species facing real threat of extinction because of human impact and natural factors. Its extent of occupancy (EOO) and area of occupancy (AOO) are 8 km^2 only. Since the only subpopulation of the species may suffer or go extinct from a single threatening event, the number of localities should be estimated as one. Then, criteria B1 and B2ab(iii,iv) of IUCN (2022) are met for estimating the conservation status of the species as critically endangered (CR). As noted above, the major direct and indirect threats are connected with the residential and commercial development, energy production and natural system modifications. The main natural threats are geological events (mudflows and landslides), as well as climate change.

Additional specimens examined:—UZBEKISTAN: Northern clayey-stony slope (conglomerate talus slopes) in vicinities of Kupryuk-bashi (near Brichmulla), 900–1000 m, 30 July 1950 [fr. mat., sicc.], *I. T. Vassilczenko & V. F. Golubkova 229* (LE, 3×); Syr-Darya Prov., Tashkent Distr., near Brich-Mulla, slope at the left bank of Chatkal [fr. mat., sicc.], 18 June 1921, *V. P. Drobov 30* (TASH054075, TASH054094); Western Tian Shan. Valley of Chatkal. Vicinities of Shungak [fl., fr. immat.], 8 May 1962, *T. [A.] Adylov & [T. I.] Zuckerwanik 67* (TASH054461); Western Tian Shan. Pskem Range, lower reaches of Fartob (Pal'tau) [fl.], 25 April 1966, *T. Adylov 1805* (TASH054083, TASH054090, TASH054091); Tashkent Province, Bostanlyk District, slope at the left bank of Chatkal on the opposite of natural boundary Obirakhmat near the confluence with Charvak Reservior [fl.], 16 April 2016, *A. D. Gaziev s. n.* (TASH053958); the same locality [defl., fr.], 26 May 2015, *A. D. Gaziev s. n.* (TASH053957); the same locality [fl., fr. immat.], 27 April 2021, *F. M. Madaminov 49–62* (TASH 053991–054004); the same locality [fl., fr. immat.], 26 April 2022, *F. M. Madaminov 105–118* (TASH 054354–054367); the same locality [fr.], 8 June 2023, *N. Yu. Beshko & al. s. n.* (TASH, ALTB).

Concluding remarks

With the discovery of *Parrya tojibaevii*, the number of members of *P.* sect. *Pseudoclausia* reaches 11 species, of which ten are confined to the Central Asian biodiversity hotspot or Middle Asia, and seven are endemic to the Western Tian Shan. A number of recognized *Parrya* species then equals 44 with 36 (81.8% out of the total) occurring in Middle Asia and 30 (68.2%) being confined to this area. This finding stresses the need of, first, further studies of the genus in the Middle Asian region and, second, increasing efforts to prevent biodiversity losses in this unique area.

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APPENDIX. List of selected examined specimens of *Parrya gracillima* and *P. mollissima*.

Parrya gracillima:
KAZAKHSTAN: South Kazakhstan [Turkestan] Prov., Qyzyl-Qum, near the well Iyaly, 2 Jun 1960, *V. Terekhov s.n.* (AA); Talas Range, N slopes of Suyuk-Bastau, 3 May 1935, *A. Dmitrieva s.n.* (AA); Bostandyk [Bostanlyk], Ugam Range, Boguchal-sai, 10 May 1954, *N. V. Pavlov 23* (AA, MW0837552); Tashkent Prov., Bostandyk Distr. [actually Kazakhstan, Turkestan Prov.], Ugam Range, gorge of Boguchal-sai, 1200 m, 1 May 1958, *N. V. Pavlov 24* (MW0837547); Syrdarya Karatau, valley of Kochkarata, natural boundary Aulie (Aktas), 25 May 1972, *N. Karmysheva s.n.* (AA); Plateau of Syrdarya Karatau, vicinities of Aral-Tyube, 26 May 1963, *V. P. Goloskokov s.n.* (AA, LE); Aksu-Zhabagly Nature Reserve, pass Baranchi-Asu, 22 Apr 1951, *N. Karmysheva s.n.* (AA); Talas Alatau, canyon of Aksu, 13 May 1961, *N. Karmysheva s.n.* (AA); Karzhantau, Azatbashsai, 25 May 1961, *Zaitseva s.n.* (AA); Boroldaitau, gorge of Bostorgai, 20 March 1981, *R. G. Zaripov s.n.* (AA); Karatau, 25 km NE of Sholakkorgan, 900 m, 27 May 2001, *P. V. Vesselova s.n.* (AA); Karatau Mts., foothills of Kaz-gurt near Chimkent, 19 May 1939, *N. V. Pavlov 397* (AA, MW0837558, MW0837559); Karatau Mts., below the peak Bukui-tau, 3 Jul 1931, *N. V. Pavlov 462* (LE, MW0837545); Zhambyl Prov., Boroldaitau, near Alekseyevka, 12 Jun 1987, *Tokmacheva & Balanenko 1175* (LE); South Kazakhstan Prov., Tyulkubas Distr., W Tian Shan, Talas Alatau, Taldy-bulak, 1250 m, 7 Jul 1958, *V. N. Golubev s.n.* (MHA); Turkestan Distr., Karatau Mts., upper reaches of Ak-Tuma, 21 May 1930, *S. Lipschitz 170a* (MW0837546, TASH054262); W Tian Shan, Talas Alatau, Mts. Dzhebogly, gorge Taldy-bulak, 28 May 1927, *E. Mokeyeva & I. Linczevsky 108a* (TASH053978); Aulie-Ata Distr., near Burnoye, 1922, *V. G. Chernov s.n.* (TASH053983); W Tian Shan, Karatau Mts., natural boundary Chanrak-saldy, 1200 m, 28 May 1936, *A. Pyatayeva 239* (TASH054257, TASH054261); Turkestan Distr., Karatau Mts., Kzyl-Ata, 14 May 1930, *S. Lipschitz 170* (TASH054263);
KYRGYZSTAN: Talas Alatau, northern slope, valley of Koksai, 21 May 1985, *M. G. Pimenov & S. Melibaev 114* (MW0837544); Pskem Range, basin of Chatkal, natural boundary Karakorum, 21 Jun 1987, *I. I. Mokhova & N. D. Tokmacheva 1607* (LE); Osh Prov., Dzhangi-Dzhol [Aksy] Distr., right bank of Arkit, 3 May 1962, *Aidarova s.n.* (LE); Dzhalal-Abad [Jalal-Abad] Prov., sovkhoz Kugart, natural boundary Toguz-Bulak, 2 Jun 1945, *P. Winter 84* (LE); Dzhalal-Abad Prov., Karavan Distr. Uspenka, 20 May 1957, *Galkina 495* (TASH053960);
TAJIKISTAN: Kurama Range, southern slope, upper reaches of Dolona-sai, 2400 m, 6 June 1948, *G. T. Sidorenko 361* (LE); Kurama Range, valley of Pangaz, mt. Sie-Kukh, 24 Jun 1970, *R. V. Kamelin 371* (LE);
UZBEKISTAN: Between Bagistan and Nanai, 1850 m, 13 Jun 1948, *N. V. Pavlov s.n.* (AA, MW0837506); Tian-Schan occidentalis. Mons Tschimgan Minor, 11 Jul 1924, *P. Baranov s.n.* (MW0837560); Kurama Range, southern slope of Kamchik pass, Rezaksai, 29 Apr 1986, *M. G. Pimenov et al. 183* (MW0837547); Chimgan, 8 May 1916, *V. I. Lipsky 218* (LE); Bostandyk Distr., SE slope of Karzhantau, Kara-tepe (above Kyzyl-su), 31 May 1987, *I. V. Balanenko & V. K. Gannibal 451* (LE); Tashkent Prov., lower reaches of Chatkal, vicinities of Brichmulla [Burchmulla], Pal'tau-sai, 26 May 1987, *Malakhovsky & Tokmacheva 191* (LE); Chatkal-Akbulak basin, 7 km upstream the mouth of Koshman-sai, 14 Jul 1973, *R. V. Kamelin s.n.* (LE); Chatkal-Akbulak basin, Koshman-sai, 24 Jul 1974, *R. V. Kamelin 319, 319a* (LE); Near the border with Kirghisia [Kyrgyzstan], valley of Chatkal upstream the mouth of Akbulak, 28 Jun 1974, *R. V. Kamelin 1382* (LE); Tashkent Prov., W Tian Shan, river Nurekata, Uinatai Mts., 27 May 1975, *V. P. Botschantzev 285* (LE); Tashkent Prov., Parkent Distr., near Nevich, 10 Sep 1957, *T. Pashina 727* (MHA); W Tian Shan, basin of Angren, Kurama Range, on the road to Karamazar pass, 2700 m, 29 May 1954, *R. Vernik & M. Nabiev 203* (TASH053959); W Tian Shan, Kurama Range, northern slope, Kuntuymas-sai. 13 May 1940, *A. Usmanov 9* (TASH053961); W Tian Shan, valley of Angren, vicinities of Telyau. 9 May 1940, *A. Usmanov 387* (TASH053962); W Tian Shan, vicinities of Chimgan botanical station, Khodzhikent, 24 Apr 1929, *P. Gomolitzky 4* (TASH053963); W Tian Shan [Karzhantau], Aktash, 28 Apr 1926, *I. Raikova 24* (TASH053964, TASH053965); Pskem Range, valley of Koksu near the mouth Airik, 23 May 1970, *T. Adylov & Kh. Akhunov s.n.* (TASH053972, TASH053973); W Tian Shan, vicinities of Chimgan botanical station, valley of Chimganka, foot of Greater Chimgan, 1 May 1929, *P. Gomolitzky 101* (TASH053979); W Tian Shan, vicinities of Chimgan botanical station, valley of Chimganka, foot of Greater Chimgan, 27 Apr 1929, *P. Gomolitzky 68* (TASH053982); Syr-Darya Prov., Tashkent Distr., vicinities of Khumsan, valley of Ugam, 15 Jun 1921, *A. Bulgakov 22* (TASH053984); Angren, Itel'ge, near meteorological station, 3 May 1931, *A. Matzkevich 10* (TASH053985); W Tian Shan, Kurama Range, Abzhazsai, 24 May 2007, *K. Sh. Tojibaev* (TASH054086); Tian-schan occidentalis, inter Niazbek et Majskoë, 3 May 1926, *Granitov & Vvedensky 5* (TASH054209); Tashkent Prov., foothills along the river Angren, 16 May 1965, *M. Pryakhin s.n.* (TASH054227, TASH054228); Chatkal Range, upper reaches of Galavasai, 19 May 1967, *M. M. Nabiev & R. Kazakbayev 67* (TASH054239); W Tian Shan, vicinities of Brich-Mulla, 1 Jun 1952, *Butkov s.n.* (TASH054260); Syr-Darya Prov., Tashkent Distr., valley of Ugam, Jun 1921, *students 49* (TASH054270); W Tian Shan, Chatkal Range, right bank of Alatangasai, 1644 m, 31 May 2020, *K. Sh. Tojibaev et al. 31052039* (TASH054302).

Parrya mollissima:
KAZAKHSTAN: Syr-Darya Prov., Tashkent Distr., right bank of Ugam, Boguchelpak-sai, 12 Jul 1922, *O. A. Simonova s.n.* (TASH054073); Syr-Darya Prov., Tashkent Distr., left bank of Ugam, Boguchelpak-sai, 13 Jul 1922, *E. A. Mokeyeva s.n.* (TASH054092); South Kazakhstan Prov., W Tian Shan. Ugam Range, Kara-Archa-sai, 2 Jun 1940, *V. U. Makarchuk s.n.* (AA); Boguchal near Sidzhak, 17 Jun 1948, *N. V. Pavlov s.n.* (AA, MW0837505); South Kazakhstan Prov., northern slope of Karzhantau, near Karzhan-sai, 23 May 1959, *A. F. Ashkerov 61* (LE); Karzhantau Mts., upper reaches of Dzhalpak-sai, 25 May 1959, *O. N. Bondarenko & A. Ya. Butkov 147* (TASH054082);
UZBEKISTAN: South Kazakhstan [actually Tashkent] Prov., W Tian Shan. Karzhantau Range, upper reaches of Kary-Kiya-sai, 7 Jun 1940, *V. U. Makarchuk s.n.* (AA); Tashkent Prov., Upper Chirchik Distr., Chatkal Range, Sukok basin, mt. Bumardak, 1900 m, 29 IV 1963, *N. V. Pavlov 2* (MW0837555); Bostandyk, eastern slope of Ugam Range, above Sidzhak, 1800 m, 14 Jun 1953, *N. V. Pavlov 236* (AA); Tian-schan occidentalis. In montis Karshan-tau, in valle Ak-tasch, 20 Jun 1926, *I. Rajkova s.n.* (LE); valley of Ugam near Khumsan, 23 Jun 1974, *R. V. Kamelin 1342* (LE); Vicinities of Tashkent, Aktash forestry, 29 Apr 1926, *B. A. Fedtschenko 145* (LE); Tschirtschikthal, Saylik, 4–6000 ft., 1876, *A. Regel s.n.* (LE); W Tian Shan, valley of Pskem, right bank of Ispai-sai, 16 Jul 1946, *A. Pyatayeva 134* (TASH053968); Ugam Range near the road Charvak-Sidzhak, ca. 950 m, 13 Apr 2013, *A. D. Gaziev s.n.* (TASH054070); [Tashkent], cultivated in botanical garden in spring 1922, seeds collected in 1920 in Ugam [Range] by *M. G. Popov* (TASH054071); Tashkent Distr., vicinities of Khumsan, 15 May 1922, *E. P. Korovin 727* (TASH054072); W Tian Shan [Karzhantau], Aktash, 20 Jun 1926, *I. Raikova s.n.* (TASH054074); W Tian Shan, Karzhantau, gorge of Karakiya-sai, 4 Jun 2014, *A. D. Gaziev s.n.* (TASH054076); Tashkent Prov., Bostanlyk Distr., Karzhantau, Kamav-sai, 6 Jul 1962, *Karimov s.n.* (TASH054077); Ugam Range, Novalisai, 18 May 2008, *K. Sh. Tojibaev s.n.* (TASH054079, TASH054080); Ugam Range, upper reaches of Kainar-sai, 1800 m, 27 May 1960, *A. D. Li 10* (TASH054081, TASH054085); Tashkent Distr., Khumsan, upper reaches of Khordzhuman-sai (Karzhantau), 9 Aug 1920, *M. G. Popov 1171* (TASH054084), *1084* (TASH054093); Tashkent Distr., Aktash Mts., 10 Apr 1922, *E. P. Korovin A214* (TASH054095), *A213* (TASH054096); W Tian Shan, vicinities of Khodzhikent, right bank of Chatkal, 3 May 1959, *A. Pyatayeva s.n.* (TASH054106).

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