

OCHOTONOPHILA FLAVA
(CARYOPHYLLACEAE), A NEW SPECIES
FROM CENTRAL AFGHANISTAN

W. B. DICKORÉ¹, C. SCHLOEDER², M. JACOBS², T. SPRIBILLE³ &
H. FREITAG⁴

Ochotonophila flava Dickoré & Freitag *sp. nov.* (Caryophyllaceae – Silenoideae) is described from the mountains of Bamiyan Province, central Afghanistan. It differs from the two previously known species endemic to Afghanistan, *Ochotonophila allochrusoides* Gilli and *O. eglandulosa* Hedge & Wendelbo, by its cream to yellow petals and elliptic leaves. A key to the identification of *Ochotonophila* species is provided; distribution and ecology are outlined.

Keywords. Afghanistan, Caryophyllaceae, montane semi-desert, *Ochotonophila*, Silenoideae.

INTRODUCTION

An unknown species of the Caryophyllaceae family turned up among plant material collected south-southeast of the city of Bamiyan in the mountains of central Afghanistan by C. Schloeder and M. Jacobs in the course of rangeland studies while implementing an international aid project (the Afghanistan PEACE Project) in May 2007. Morphological analysis and comparison with specimens in the herbaria of Kassel University (KAS), Munich (M, MSB) and the Natural History Museum, Vienna (W) confirmed the plants belong to the small Afghanistan endemic genus *Ochotonophila* Gilli, while they differ conspicuously from the two known species, *O. allochrusoides* Gilli and *O. eglandulosa* Hedge & Wendelbo. The new species had already been included in the *Field Guide Afghanistan* (Breckle & Rafiqpoor, 2010: p. 366, figs Cf-19A, B) as *Ochotonophila flava* Dickoré & Freitag inedit. with a provisional description. This paper provides the validation of that name with a detailed description and discussion of the new species.

¹ Botanische Staatssammlung München, Menzinger Str. 67, 80638 München, Germany. E-mail for correspondence: dickore@bio.lmu.de

² PO Box 445, Fortine, MT 59917, USA. E-mail: caschloeder@gmail.com, mjjacobs@tamu.edu

³ University of Montana, 32 Campus Drive, Missoula, MT 59812, USA and University of Graz, Institute of Plant Sciences, Holteigasse 6, 8010 Graz, Austria. E-mail: toby.spribille@mso.umt.edu

⁴ University of Kassel, Institute of Biology, Plant Taxonomy section, Heinrich-Plett-Str. 40, 34132 Kassel, Germany. E-mail: hfreitag@uni-kassel.de

SPECIES DESCRIPTION

***Ochotonophila flava* Dickoré & Freitag, sp. nov. Figs 1, 2.**

Ochotonophila eglandulosae affinis sed glandulosis; differt a *O. allochrusoides* glandulis gracilioribus. Species petalis ochroleucis (in sicco luteis) et foliis ellipticis a congeneribus valde diversa. – Type: Afghanistan, Bamiyan Prov., 6.4 km SSE of Bamiyan [city], 2729 m, 34.7697°N 67.8505°E, 3 vi 2008, M. Jacobs & C. Schloeder 1664 (holo M [M-0164353]; iso E).

Perennial herb, growing in small tufts, 3–10 cm tall. *Taproot* to > 25 cm long, 5 mm wide, branching at or subsurface into a pleiocorm. *Annual stems* few (1–5), procumbent or ascending, unbranched and each terminating in an inflorescence, easily disarticulating at nodes (especially in dried condition), with 4–6 leaf pairs. *Indumentum* of all green parts dense, consisting of two hair types: *eglandular hairs* 0.1–0.25 mm long, ± patent, curved, and *glandular hairs*, more numerous in the inflorescence, 0.2–0.5 mm long, with a slender multicellular stalk and a terminal globose secretory cell to 50 µm in diameter. *Leaves* spreading or ± reflexed, elliptic, 7–11 × 3.5–6 mm, acute, basally cuneate and shortly connate by a hyaline membrane, carnosae, pale bluish- or greyish-green, with prominent midvein and two laterals. *Inflorescence* densely cymose, ± semiglobose, to 5 cm in diameter, with up to c.40–50 shortly pedicellate, bracteate flowers. *Bracts* dissimilar to stem leaves, 10–15 × 0.5–2 mm, the lower oblanceolate, the upper linear. *Calyx* tubular, 7–12 × 2–3.5 mm, membranous except for 5 prominent green



FIG. 1. *Ochotonophila flava* growing in the type locality. Photo by M. Jacobs, 3 vi 2008.

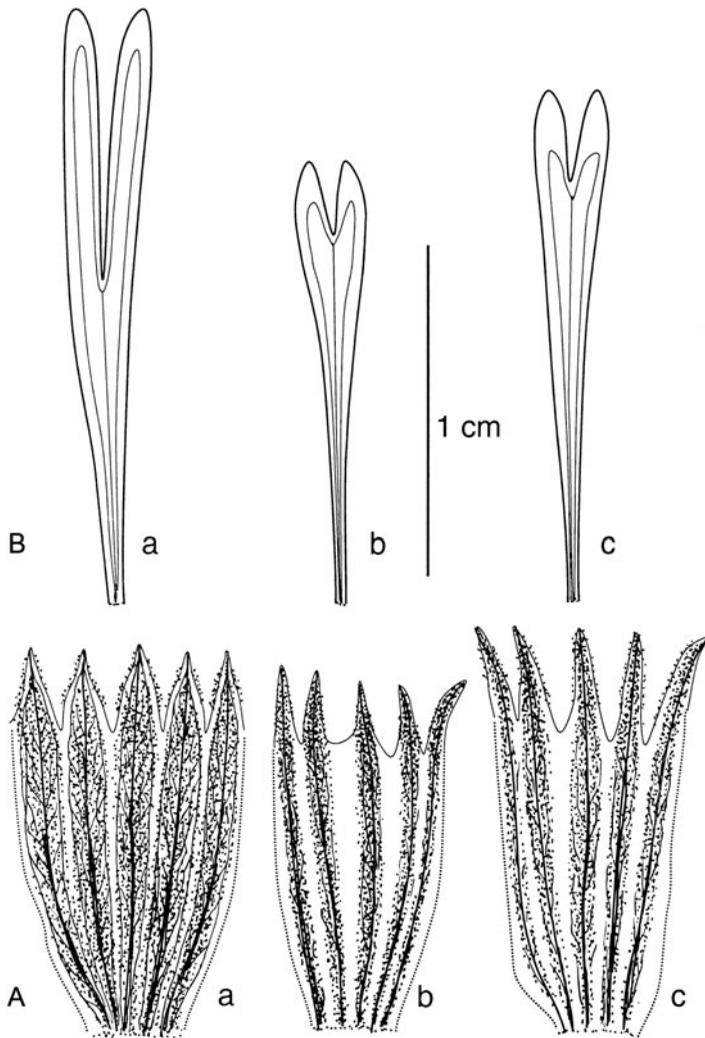


FIG. 2. Calyces and petals of *Ochotonophila* species. A, calyx (opened): a, *O. allochrusoides*; b, *O. eglandulosa*; c, *O. flava*. B, petals: a, *O. allochrusoides*; b, *O. eglandulosa*; c, *O. flava*. Drawn from: a, D. Podlech 18344 (MSB); b, D. Podlech 22192 (MSB); c, M. Jacobs & C. Schloeder 1141 (MSB).

nerves, calyx teeth slightly unequal, 2–3 mm long, acute. *Petals* persistent, 14–22 mm long, bifid to c.1/5–1/6 of their length, adaxially (in living state) cream-coloured to pale yellow with pink veins, abaxially yellow, with red to purple veins, colours on both sides deepening in dried state; petal lobes ligulate, 2.5–3.2 × 0.75–0.9 mm long, subacute, finely papillose; the upper part of petals (c.1/3) spread in full flower to form a patent flower limb. *Stamens* 5; *filaments* thread-like, somewhat unequal in length, 0.7–0.8 mm long, c.0.25 mm wide, exerted; *anthers* dorsifixed, suborbicular in

outline, 0.5–0.6 × 0.7–0.8 mm, lilac or blue (by exposed pollen grains). *Pollen* grains almost orbicular, c.40 µm in diameter. *Ovary* oblong-cylindrical, hyaline, containing c.15 ovules; *styles* 2, threadlike, 7 mm long. *Capsule* in immature stage apically thickened, opening by 4 valves; *seeds* unknown.

Additional specimen examined (paratype). The new species was first collected in the same locality the previous year: Afghanistan, Bamiyan Prov., 6.4 km SSE of Bamiyan [city], 2729 m, 34.7697°N 67.8505°E, 5 vi 2007, M. Jacobs & C. Schloeder 1141 (KUFS [KUFS-022968], MO, MSB). This specimen lacks underground parts.

Distribution. *Ochotonophila flava* is presently known only from a single small population north of the Koh-e-Baba mountain range in Bamiyan Province, central Afghanistan; it is likely a local endemic.

Habitat and ecology. *Ochotonophila flava* was found on the lower slopes of a gently sloping (to 7%) east-facing ridgeline, south-southeast of the city of Bamiyan. Single individuals and small colonies of *Ochotonophila flava* occurred here as subordinate constituents in a relatively barren, dry and stony site averaging up to 15% vegetation cover, with *Phlomidoschema parviflorum* (Benth.) Vved. and *Rheum ribes* L. as the most conspicuous species (Fig. 3). The site further supported an unusually high number of accompanying species including *Acantholimon griffithianum* Boiss., *Allium circumflexum* Wendelbo, *Arnebia inconspicua* Hemsl. & Lace, *Artemisia persica* Boiss., *Astragalus anacamptoides* Širj. & Rech.f., *A. gracilipes* Benth. ex Bunge, *A. lasiosemius* Boiss., *A. persepolitanius* Boiss., *A. tribuloides* Delile, *Boissiera squarrosa* (Banks & Sol.) Nevski, *Camphorosma monspeliaca* L., *Ceratocarpus arenarius* L., *Cicer chorassanicum* (Bunge) Popov, *Cousinia buphthalmoides* Regel & Schmalh., *Cousinia* cf. *chionophila* Rech.f. & Køie, *Fumaria vaillantii* Loisel., *Galium ceratopodium* Boiss., *Haloxylon griffithii* (Moq.) Bunge ex Boiss., *Heteroderis pusilla* (Boiss.) Boiss., *Kaviria tomentosa* (Moq.) Akhani (= *Salsola tomentosa* (Moq.) Spach), *Lactuca orientalis* (Boiss.) Boiss., *Linaria bamianica* Patzak, *Matthiola chorassanica* Bunge ex Boiss., *Nonea caspica* (Willd.) G.Don, *Onobrychis laxiflora* Baker, *Peganum harmala* L., *Piptatherum barbellatum* Mez, *Plantago* cf. *ovata* Forssk., *Polygonum* sp., *Pyankovia brachiata* (Pall.) Akhani & E.H.Roalson (= *Salsola brachiata* Pall.), *Schischkinia albispina* (Bunge) Iljin, *Scorzonera pusilla* Pall., *Scutellaria glutinosa* Benth., *Tetracme quadricornis* (Stephan) Bunge, *Trichodesma incanum* A.DC. and *Turgenia latifolia* (L.) Hoffm. This species composition corresponds to a moderately dry subtype of the central Afghan montane semi-desert as described by Freitag (1971) and Freitag *et al.* (2010). The area is strongly grazed by sheep and goats, particularly during winter and spring. The substrate of the site contained a high amount of relatively small, mostly rounded rock fragments and pebbles of limestone, flint and serpentine, most probably derived from fluvio-glacial sediments. The presence of a coating of pebbles on the lower perennial branches of the plants is suggestive of laminar erosion and freeze–thaw processes. The soil was determined as a Typic Torriorthent (loamy, mixed, active, calcareous, frigid, shallow [http://jasper.brc.tamus.edu/afghanistan/default.aspx]), averaging pH 8.0.

Proposed IUCN conservation category. This tiny but relatively conspicuous species was not observed during the many previous collecting expeditions to Bamiyan Province during the 1950s to 1970s. Subsequent to its discovery in 2007, two parallel ridges with similar ecological conditions were searched for the species by members of the Afghanistan PEACE Project without success. Consequently, it appears that



FIG. 3. Habitat of *Ochotonophila flava*: dry slopes with *Phlomis parviflorum* and *Rheum ribes* dominating. View south towards the Koh-e-Baba range. Photo by M. Jacobs, 3 vi 2008.

Ochotonophila flava is a localised endemic known from a single locality where only 40–50 individual plants were counted on an area of c.0.5 ha. Although the species is obviously not being grazed by sheep and goats, it must be considered at risk due to its limited geographic range and the small number of individuals. As it might be found in other locations, we propose the IUCN conservation category Vulnerable (VU D1+2) for this species.

Key to the species of *Ochotonophila*

- 1a. Petals 23–25 mm, deeply bifid to 1/3–2/5 of their length, white or pink with darker veins, drying purplish; anthers ovoid, c.1 mm long; capsule elongate-cylindrical, with about 20 seeds; leaves narrowly triangular-lanceolate, widest near base; plants with long patent eglandular hairs throughout, and with stout glandular hairs in the inflorescence, glands to 100 µm in diameter; plants medium-sized, (5–)10–20 cm tall, branching throughout; inflorescence a large, loose cyme _____ *O. allochrusoides*
- 1b. Petals 17–22 mm, shallowly bifid to 1/6–1/4 of their length, white, cream or yellow with violet or purple veins; anthers suborbicular, 0.7–0.8 mm long; capsule ovoid or short cylindrical, with 10–15 seeds; leaves linear-lanceolate or elliptic, widest near middle; plants with short eglandular hairs throughout, or with medium-sized eglandular hairs mixed with glandular hairs at least in the inflorescence; glands to 50 µm in diameter; plants small, 3–10 cm tall, branching in the upper part only, inflorescence a small, dense cyme _____ 2
- 2a. Plants densely and uniformly pilose with short eglandular hairs only; leaves linear-lanceolate; petals 17–19 mm, white or cream with purple veins, drying dull purplish; capsule ovoid, with c.10 seeds _____ *O. eglandulosa*
- 2b. Plants densely pilose, with eglandular and with slender glandular hairs; leaves elliptic; petals 14–22 mm, cream or pale yellow with purple veins, drying yellow; capsule short cylindrical, with c.15 seeds _____ *O. flava*

DISCUSSION

The three species of *Ochotonophila*, while morphologically distinct, appear closely interrelated and coherent in distribution (Fig. 4). The type species, *Ochotonophila allochrusoides*, occurs throughout parts of northern, northeastern and central Afghanistan but is probably nowhere common. In contrast, *Ochotonophila eglandulosa* and *O. flava* are both known from single localities only, situated at the southwestern edge of the distribution of the genus. *Ochotonophila eglandulosa* was repeatedly collected on the eastern side of the Shibar Pass, Parwan Province, located approximately 40 km east of the site of the new species. It occurs at a slightly higher elevation (2750–2900 m), in denser, more mesic vegetation types that include *Artemisia* sp., *Astragalus endytanthus* Podlech & I.Deml, *Ephedra gerardiana* Wall. ex Stapf, *Eremurus*

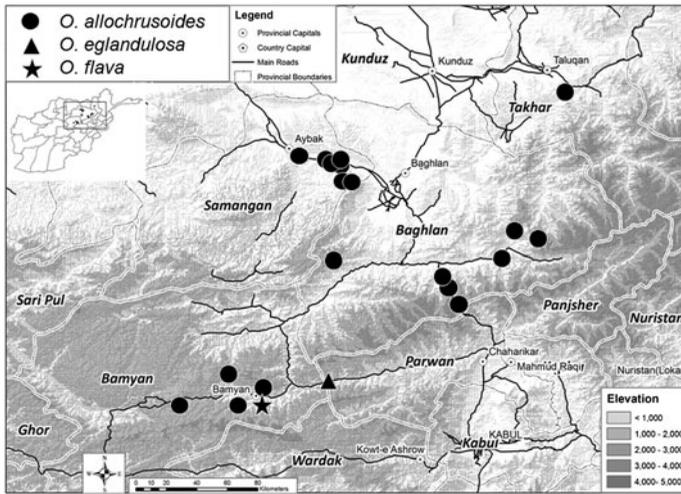


FIG. 4. Distribution of *Ochotonophila* species. ●, *O. allochrusoides*; ▲, *O. eglanulosa*; ★, *O. flava*. Data from Schiman-Czeika (1988) and herbarium specimens seen.

stenophyllus Baker, *Lactuca orientalis* Boiss., *Psathyrostachys caduca* (Boiss.) Melderis, and *Trigonella koeiei* Širj. & Rech.f. (from an unpublished relevé by H. Freitag in June 1963).

Morphological variation within the two species, known only from their type localities, is indiscernible or virtually absent. *Ochotonophila allochrusoides* occupies a wider geographic and altitudinal range, from c.1200 to 3100 m (lower montane to subalpine). Variation in this species is obvious, including habit and leaf size, but so far not been considered relevant taxonomically (Hedge & Wendelbo, 1964; Schiman-Czeika, 1988). The type specimen of *Ochotonophila allochrusoides* from Bamiyan Province, and other specimens from the montane and subalpine semi-deserts in central Afghanistan, are relatively small and have dense inflorescences. In contrast, specimens from lower altitudes (c.1400–2300 m) in Baghlan Province, including montane *Pistacia vera* L. and *Juniperus excelsa* M.Bieb. woodlands with a herb layer covering up to 50% of the surface (unpublished relevés by H. Freitag from June/July 1968/1969), are taller, have effuse inflorescences, and leaves up to 4 cm long.

Phylogenetic relationships in and around the genus *Ochotonophila* are unresolved at present (M. Lidén, pers. comm.; S. Zarre, pers. comm.). Gilli (1956) and Hedge & Wendelbo (1964) considered *Ochotonophila* close to *Acanthophyllum*, *Allochrusa* and *Gypsophila*. *Diaphanoptera* is also morphologically similar, differing only by having entire petals (Schiman-Czeika, 1988). A recent molecular study by Greenberg & Donoghue (2011) included neither *Ochotonophila* nor *Diaphanoptera*, only one species of *Allochrusa*, and two species of *Acanthophyllum*. Further taxon and locus sampling is required to test the monophyly of *Ochotonophila* against a wider taxonomic background.

ACKNOWLEDGEMENTS

Thanks are due to Dieter Podlech (Munich) for providing his Afghanistan collection lists and a number of species' identifications. The curators of the herbaria M, MSB and W kindly facilitated the study of their collections, and Erwin Bergmeier (Göttingen) helped with working space. Magnus Lidén (Uppsala) and Shahin Zarre (Tehran) provided information on phylogenetic studies. The field work of M.J. and C.S. was carried out in the course of implementing the Afghanistan PEACE Project [USAID Cooperative Agreement No. 306-A-00-06-00521-00].

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Received 14 September 2012; accepted for publication 22 December 2012