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MALVA XIZANGENSIS (MALVACEAE), A NEW SPECIES FROM XIZANG (TIBET), CHINA

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Abstract

Malva xizangensis Y. S. Ye, L. Fu & D. X. Duan, a new endemic species of Malvaceae from Xizang (Tibet), China, is described and illustrated. It is closely related to *M. pusilla*, from which it differs in having shorter individuals, stellate velutinous leaf blade, linear epicalyx lobes, blue corolla and 8–11 ridged mericarps which are smooth abaxially and reticulate adaxially. Leaf epidermal characters also support the recognition of *M. xizangensis*.

Key words: *Malva xizangensis,* Malvaceae, New species, Xizang.

Introduction

Malva is a genus with about 25–40 species of herbaceous annual, biennial, and perennial plants in the family Malvaceae (of which it is the type genus). It was founded by Linnaeus based on their characteristic epicalyx (triphyllun or free epicalyx segments) and widespread in tropical and warm-temperate regions of Africa, Asia and Europe (Ray 1995). Several species of *Malva* have been used as food, ornamental and medicinal plants for thousands of years (Shinwari & Qaiser, 2011). There are only 2 species and 1 introduced species in China (Tang *et al*., 1994). During an expedition in Xizang (Tibet) in 2004, we collected a species that was readily distinguished from other taxa, which we described here as a new species.

***Malva xizangensis* Y.S. Ye, L. Fu & D.X. Duan, sp. Nov. (**Fig. 1)

Type: China, Xizang, Linzhi (Nyingchi) Prefecture, the cross-section junction between the Yarlung Zangbo River and the Ni Yang River, 29°25.16' N, 94°27.48' E, alt. 2920m, May 30, 2004. D. X. Duan & X. Wu 170 (holotype: IBSC; isotype: IBSC).

Species affinis M. pusilla, sed foliis pilis stellatis sdspersus, corollis caesiis, 7-9 mm diametro, epicalycibus linearibus, mericarpiis 9-11, abaxialis laevis, adaxialis reticulatis, angulis rotundatis, utrinque porcatis differt.

Herbs perennial, numerous crawling branched, 5–15 cm tall; stem sparsely stellate velutinous. Leaves alternate; stipule ovate-lanceolate, 2–3×0.8–1.2 mm, with long ciliate, apex acuminate; petiole 1–2.8 cm, sparsely stellate velutinous; leaf blade reniform, 0.5–1.2×0.8–2 cm, papery, base subcordate, margin crenate, 3–5- shallow lobed, rarely no lobed, abaxially sparsely stellate puberulent, adaxially densely stellate puberulent, the main vein often sunken in the leaf surface; Flowers 1–3-fascicled, axillary. Pedicel 0.5–1 cm, sparsely stellate puberulent; Epicalyx lobes 3, linear, 2–3×0.3–0.5 mm, ciliate. Calyx cup-shaped, 4–5 mm, 5-lobed, lobes broadly triangular. Corolla blue, 7–9 mm in diam.; petals 5, spoon-shaped, apex retuse, claw barbed in the center. Staminal column 2–4 mm long, puberulent. Filament has 4 small glands. Style branches 9-11. Fruit flat globose, 4–6 mm in diam.; mericarps 8–11, abaxially smooth, adaxially reticulate, angles rounded, both sides ridged, glabrous or sparsely puberulent. Seed black brown, reniform, ca. 1 mm in diam., reticulate, hilum puberulent. Flowering in June; Fruiting in July.

Etymology: The new species is named after Xizang, where the new species is discovered.

Distribution and ecology: *M. xizangensis* is a perennial species from sandy soils, endemic to Xizang, China. It is known only from the type locality in the river valleys, river banks and sandy wastelands at joint of the Yarlung Zangbo River and the Ni Yang River, in the alpine meadow soil at the altitude of 2920 m (Fig. 3). It flowers in June and has mature fruit in July. The associate plants include *Erysinum hieracifulium*, *Caragana franchetiana*, *Artemisia hedinii*.

Epidermis morphology: The morphological comparison of leaf epidermis between *M. xizangensis* and *M. pusilla* in China is given in Fig. 2. For leaf epidermal observation, the samples were collected from the specimen directly, washed by the 95% immediately and observed under an Olympus SZX16 Stereo Microscope. In *M. xizangensis*, both surfaces of the leaf blade are covered with stellate puberulent (Fig. 2A–D). On the Adaxial epidermis, the stellate puberulent is densely (Fig. 2A–B), while the stellate puberulent is sparse on the abaxial epidermis (Fig. 2C–D). In *Flora of China* (Tang *et al*., 1994), the leaf blade of *M. pusilla* is described as "abaxially sparsely stellate puberulent, adaxially sparsely velutinous". But in present observation, the adaxial surface of the leaf blade is densely strigose at margin only (Fig. 2E–F), while the abaxial surface is densely strigose, especially on the veins (Fig. 2G–H). So that, the leaf epidermal morphology of the two species, *M. xizangensis* and *M. pusilla,* is obviously different, supporting the recognition of *M. xizangensis*.

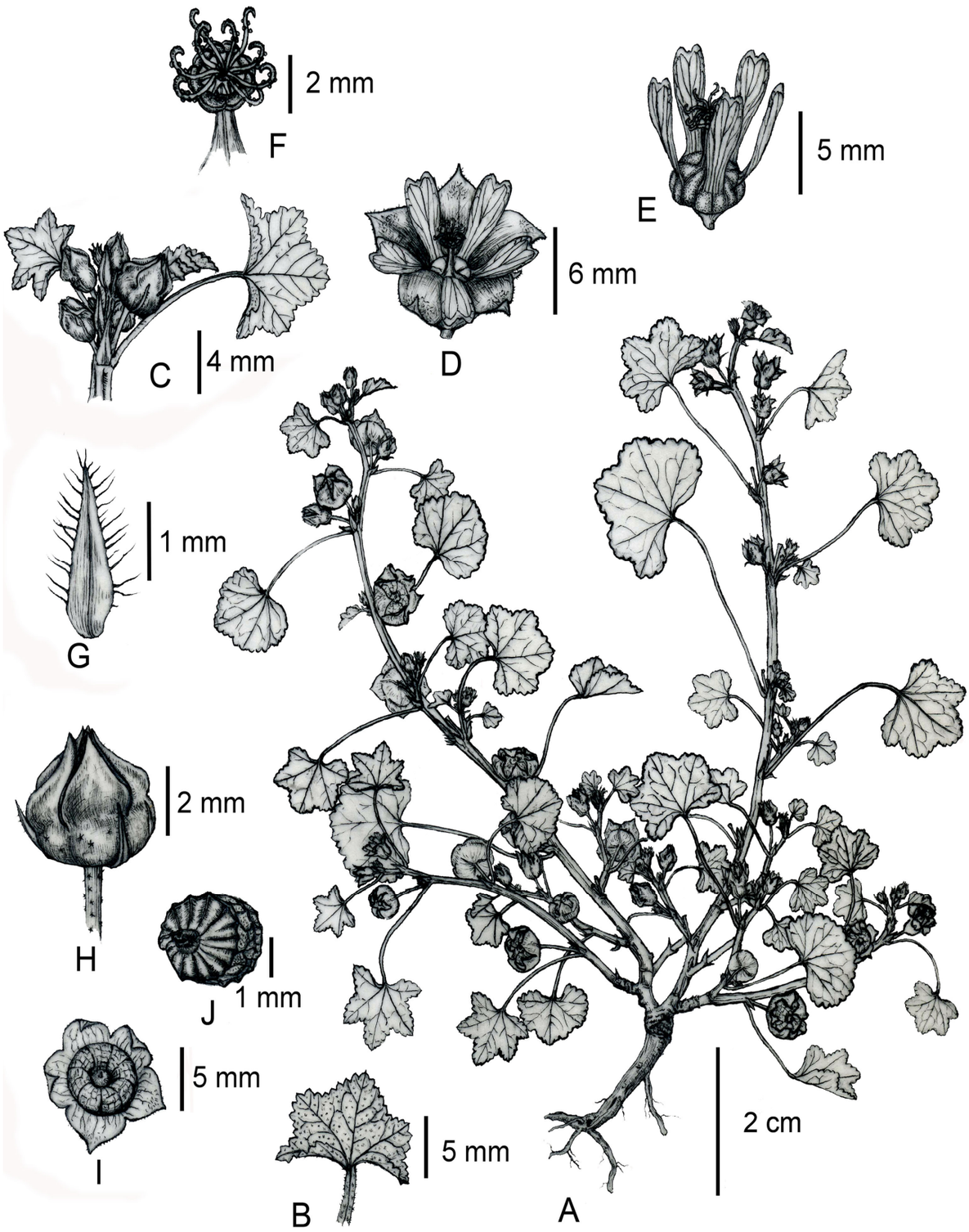

Fig. 1. *Malva xizangensis* Y. S. Ye, L. Fu & D. X. Duan (from holotype).
A: Habit, B: Leaf, C: Flowering branch, D: Flower, E: Flower without the epicalyx, F: Gynoecium, G: Epicalyx lobe, H: Young fruit, showing the epicalyx lobes and calyx, I: Fruit, J: Mericarp.

Conservation status: *M. xizangensis* is known only from the river valleys, river banks and sandy wastelands at joint of the Yarlung Zangbo River and the Ni Yang River, in the alpine meadow soil at the altitude of 2920 m. It should be classified as Endangered (EN) according to the Anon., (2001) categorization, because of its local distribution and rather small population size.

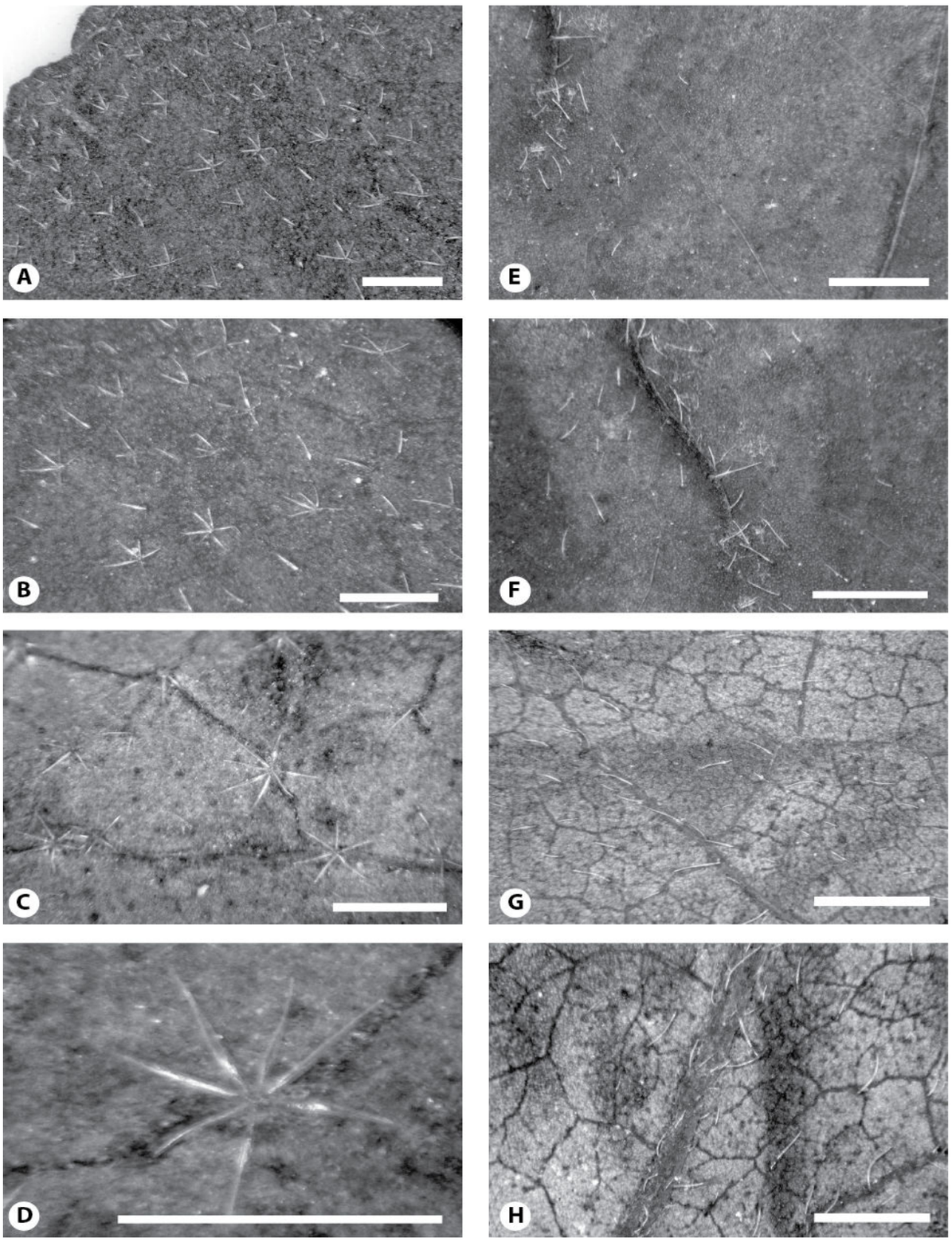

Fig. 2. The morphological comparison of the leaf epidermis between *Malva xizangensis* and *Malva pusilla* under the stereo microscope. A-D: *Malva xizangensis*.
A: Adaxial epidermis, B: Adaxial epidermis, showing the densely stellate puberulent, C: Abaxial epidermis, showing the stellate puberulent, D: Stellate puberulent. E-H: *Malva pusilla*. E: Adaxial epidermis, F: Adaxial epidermis, showing the densely strigose at margin only, G: Abaxial epidermis, showing the strigose, H: Abaxial epidermis, showing the strigose on the vein.
Scale bars = 100 μm. Voucher specimens: *Malva xizangensis*: D. X. Duan & X. Wu 170; *Malva pusilla*: Z.Y. Zhang & H.F. Zhou 23099, all deposited in IBSC.

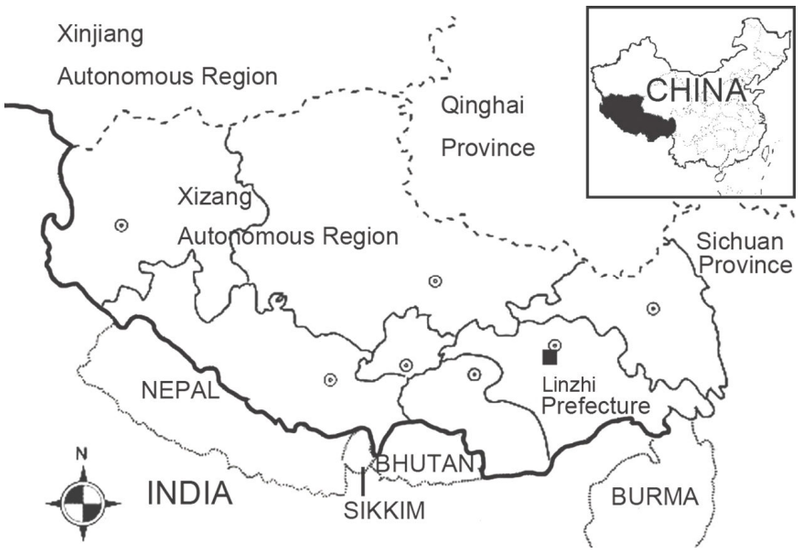

Fig. 3. Distribution of *Malva xizangensis* (■).

Table 1. Morphological differences between *M. xizangensis* and *M. pusilla*.

Characters	*M. xizangensis*	*M. pusilla*
Height (cm)	5–15	20–50
Stipule (mm)	ovate-lanceolate, 2–3×0.8–1.2	ovate-lanceolate, 4–6×2–3
Petiole length (cm)	1–2.8	3–12
Leaf blade	reniform, 0.5–1.2×0.8–2 cm, papery, base subcordate, margin crenate, 3–5- shallow lobed, rarely no lobed, abaxially sparsely stellate puberulent, adaxially densely stellate puberulent	reniform, rarely 5–7-lobed, 1–3×1–4 cm, papery, abaxially densely strigose, especially on the veins, adaxially densely strigose at margin only, base cordate, margin minutely denticulate, apex rounded.
Flowers	1–3-fascicled	3-4-fascicled
Epicalyx lobe (mm)	linear, 2–3×0.3–0.5	lanceolate, 2–5×1–1.5
Corolla	blue, 7–9 mm in diam.	white to pinkish, 10–12 mm in diam.
Style	branching 8–11	branching 13–15
Fruit	flat globose, 4–6 mm in diam.	flat globose, 5–6 mm in diam.
Mericarp	8–11, abaxially smooth, adaxially reticulate, angles rounded, both sides ridged, glabrous or sparsely puberulent	12–15, abaxially smooth, angles rounded, puberulent
Seed	black brown, reniform, ca. 1 mm in diam., reticulate, hilum puberulent	reniform, ca. 1 mm in diam., reticulate or not

Discussion

This previously undescribed species appears to be most closely related to *M. pusilla*, but it differs from the latter in having stellate velutinous leaf blade, linear epicalyx lobes, blue corolla and 8–11 ridged mericarps which are smooth abaxially, reticulate adaxially. But *M. pusilla* have strigose leaf blade, lanceolate epicalyx lobes, white to pinkish corolla, 12–15 mericarps whose both sides is puberulent. More detailed morphological differences between the two species are given in Table 1.

The major township of Linzhi, Bayi town, the economic area and scenic zones just situates at the cross-section junction between the Yarlung Zangbo River and the Ni Yang River, where *M. xizangensis* is discovered. Because of the exploration, such as developing ecotourism industry, the suitable habitat of *M. xizangensis* is very limited now. So that this species is considered to be under threat at this time and will be submitted to relevant conservation bodies as having special conservation needs.

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