Calligonum taklimakanense sp. nov. (Polygonaceae) from Xinjiang, China

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Calligonum taklimakanense B. R. Pan & G. M. Shen, a new species of Polygonaceae from Taklimakan Desert, Xinjiang, China, is described and illustrated. It is closely related to C. ebinuricum Ivanova ex Sokov in having similar fruit shape and achenes with two rows of bristles, but differs in straight old branches and slightly coiled achenes without a long beak. Calligonum ebinuricum has tortuous old branches, very coiled achenes, and a 2–4 mm long beak.

The genus Calligonum L. (Polygonaceae) comprises 35–80 species, mainly distributed in the arid desert areas of North Africa, southern Europe and Asia (Mabberley 1990, Brandbyge 1993). In China, there are 23 species of Calligonum mainly in Nei Mongol, Gansu, Qinghai and Xinjiang Provinces (Bao and Grabovskaya-Borodina 2003), of which 22 occur in Xinjiang (Mao 1992). In these areas, Calligonum species play an important role in the stability of natural and artificial desert vegetation (Mao and Pan 1986, Ren and Tao 2004). According to the morphology of fruit, the genus has been divided into four sections, viz. Calligonum, Pterococcus, Calliphysa and Medusa (Rechinger and Schiman-Czeika 1968, Musaev and Sokov 1977). However, identification of Calligonum species is often difficult because fruit morphology of many species is highly similar. Recent molecular phylogenetic studies have revealed that the genus is monophyletic and closely allied to Pterophyrum (Sanchez et al. 2009, Tavakkoli et al. 2010).

During field work in the Taklimakan Desert in Xinjiang, northwestern China, we found a unique form of Calligonum. After careful examination and comparison with other Calligonum species, we concluded that it should be treated as a new species, belonging to C. sect. Medusa.

Material and methods

All morphological characters and the diagnostic features in the following description are based on plants in the field and herbarium specimens collected from several populations by the authors. Voucher specimens were deposited at the herbarium of Xinjiang Inst. of Ecology and Geography, Chinese Academy of Sciences (XJBI). The morphological characters of branches and fruits as well as the habitat are illustrated in Fig. 1–3.

Calligonum taklimakanense B. R. Pan & G. M. Shen sp. nov. (Fig. 1–3)

Species nova Calligonum ebinuricum Ivanova ex Sokov affinis, a quo statura altiora, ramis veteribus rectis, achaeniis minoribus, leviter contortis, achenis differt.

Type: Northwestern China, Xinjiang, Taklimakan Desert, 84°18′09.3″E, 40°03′02.6″N, 951 m a.s.l., on the sand dunes, 15 Oct 2007, Gulnur Sabirhazi Ca-0709-1 (holotype: XJBI) (Fig. 1).

Shrub or tree-like shrub, 60–350 cm tall, woody older branches grayish white or grayish brown, straight, rarely tortuous; herbaceous branchlets of current year green, jointed; joints 15–30 mm; apical branches straight. Leaves linear, 2–4 mm long, slightly curved; ochrea membranous and united with the leaf. Flowers bisexual, single in leaf axils. Pedicel slender, jointed below middle, 3–6 mm long. Perianth 5-parted, red with broad white margin. Fruit bright red when young, becoming yellow brown or red brown when mature, broadly ovoid, 10.6–14.3 × 8.6–10.5 mm. Achenes ovoid or oblong, slightly coiled, 7.2–8.9 × 2.8–3.6 mm; ribs not prominent, with bristles in two rows per rib; bristles sparse, free, slender, soft, 4.3–6.1 mm, secondarily 2- or 3-forked from the middle or below.

Distribution, habitat and etymology

Calligonum taklimakanense appears to be endemic to the Taklimakan Desert in Xinjiang, with an area of 3.5 × 10⁸ km². Nordic Journal of Botany 28: 680–682, 2010
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Taklimakan Desert is the largest in China, located in the Tarim Basin of Xinjiang Province and surrounded by plateaus and mountains. The climate is typically warm, dry and windy desert. The new species grows on sand dunes, at ca 920–1100 m a.s.l. Other species within this community are *Tamarix taklamakanensis* M. T. Liu, *Hexinia polydichotoma* (Ostenf.) H. L. Yang, *Cynanchum kaschgaricum* Y. X. Liou, *Phragmites australis* (Cav.) Trin. ex Steud., *Salsola collina* Pall. *Calligonum taklimakanense* is a prominent species within the community, comprising up to 35% of the vegetation. The vertical structure of the community is very simple, with only two layers, shrubs and grasses. *Calligonum taklimakanense* flowers in May–Jun (secondary flowers: Sep–Oct), and fruits in Jun–Jul (secondary fruits: Oct–Nov).

The epithet refers to the type locality, Taklimakan Desert.

**Similar species**

According to the *Calligonum* classification system of Musaev and Soskov (1977), *C. taklimakanense* should be included in sect. *Medusa* Sosk. & Alexandr. Among the

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**Figure 1.** *Calligonum taklimakanense* B. R. Pan & G. M. Shen sp. nov. (1) branch, (2) fruit. From the holotype, drawn by Li-Xia Tan.

**Figure 2.** The fruit of *Calligonum taklimakanense* B. R. Pan & G. M. Shen sp. nov.

**Figure 3.** The habitat of *Calligonum taklimakanense* B. R. Pan & G. M. Shen sp. nov.
species in the section, *C. taklimakanense* is most similar to *C. ebinuricum* Ivanova ex Soskov in having a similar fruit shape and achenes with two rows of bristles per rib. However, the new species differs easily from *C. ebinuricum* by its straight old branches and slightly coiled achenes without a long beak (Table 1). Both species are colonizing plants, occurring in moving sand, and not in gobi areas.

Tianshan Mountain is a natural barrier for distribution of the two species. *Calligonum ebinuricum* occurs on the northern slope of Tianshan Mountain, Jinghe, Shawan, Moshuowan and Kuitun Counties, whereas *C. taklimakanense* occurs in the Taklimakan Desert on southern Tianshan Mountain. The habitat of *C. ebinuricum* is the fixed or semi-fixed sandy areas, whereas *C. taklimakanense* is found on moving dunes. In addition, the structure of the communities to which the two species belong is clearly different; *C. taklimakanense* grows in a simple community structure, whereas *C. ebinuricum* is a member of a species-rich community.

**Additional specimen examined (paratype)**
Northwestern China, Xinjiang, Taklimakan Desert, 84°18′06.8″E, 40°02′59.5″N, 949.5 m a.s.l., on sand dunes, 15 Oct 2007, Gulnur Sabirhazi Ca-0707 (XJBI).

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**References**

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**Table 1. Comparison of diagnostic characteristics of *Calligonum taklimakanense* sp. nov. and *C. ebinuricum***

<table>
<thead>
<tr>
<th>Character</th>
<th><em>C. taklimakanense</em></th>
<th><em>C. ebinuricum</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Habit</td>
<td>shrub or tree-like shrub, up to 3.5 m</td>
<td>shrub, up to 1.5 m</td>
</tr>
<tr>
<td>Shape of old branches</td>
<td>straight, rarely tortuous</td>
<td>tortuous</td>
</tr>
<tr>
<td>Length of fruit (mm)</td>
<td>10.6–14.3</td>
<td>11.9–14.3</td>
</tr>
<tr>
<td>Width of fruit (mm)</td>
<td>8.6–10.5</td>
<td>11.0–20.2</td>
</tr>
<tr>
<td>Shape of achenes</td>
<td>slightly coiled, without a long beak</td>
<td>very coiled, with a 2–4 mm long beak</td>
</tr>
<tr>
<td>Length of achenes (mm)</td>
<td>7.2–8.9</td>
<td>9.7–11.8</td>
</tr>
<tr>
<td>Width of achenes (mm)</td>
<td>2.8–3.6</td>
<td>3.1–4.9</td>
</tr>
<tr>
<td>Bristle rows</td>
<td>two rows of bristles per rib</td>
<td>two rows of bristles per rib</td>
</tr>
</tbody>
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