

Campanula gansuensis (Campanulaceae), a new species from China, and its systematic position

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Abstract. In this paper, a new species of *Campanula*, *C. gansuensis* L.Z. Wang et D.Y. Hong from Gansu is described and illustrated. According to an analysis of the distribution and main characters of 21 taxa of *Campanula* indigenous to China, *C. gansuensis* is a distinct species in sect. *Campanula*. Based on the reflexed appendage in each sinus of the calyx, it is somewhat similar to *C. punctata* Lam. and *C. sibirica* L., but differs in its annual habit and small green corolla. It is very rare and only found in Mayanhe, a village in the mountains of Hui Xian, in the West Qinling mountains of Gansu province, at ca. 1,100 m elevation. A key is provided to aid in the identification of the 22 taxa of *Campanula* in China.

Keywords: *Campanula gansuensis*; Campanulaceae; China; New species; West Qinling mountain.

In June-July 1998, we collected an unusual specimen of *Campanulaceae* during a survey of plants in the forest zone of Mayanhe village, Hui Xian in Gansu province, China, on the south mountain slopes of the west Qinling Mountains. This specimen was determined to be a member of the genus *Campanula* L. This genus comprises over 250 species of perennial (sometimes annual or biennial) herbs, almost all restricted to the northern hemisphere (Bailey, 1925; Mabberley, 1990). Of these, 21 occur in China (Hong, 1980, 1983; How, 1982).

In order to determine the species to which the specimen belonged, the key characters and distributions of all 21 known taxa of *Campanula* in China were analyzed (see Table 1).

From Table 1, we find that this collection is quite different from other Chinese species of *Campanula* and merits recognition as a distinct species:

Campanula gansuensis L.Z. Wang & D.Y. Hong, sp. nov.

— TYPE: CHINA: Gansu province, Hui Xian, Mayanhe, on mosses, in a village between mountains, 104°20'15"E, 33°45'10"N, ca. 1,100 m alt., 6 Jul 1998, Lan-Zhou Wang 98008 (holotype: NWUB; isotype: HAST).甘肅風鈴草

Figure 1

Species a sect. *Campanula* insignis floribus sui viridibus, a speciebus nobis notis bene distincta; appendice inter sepala *C. punctata* Lam. et *C. sibirica* L. similis et nullo dubio his speciebus proxima, praecipue differt a *C. punctata* caule non nisi 5-6 cm alto; a *C. sibirica* parvis maculis.

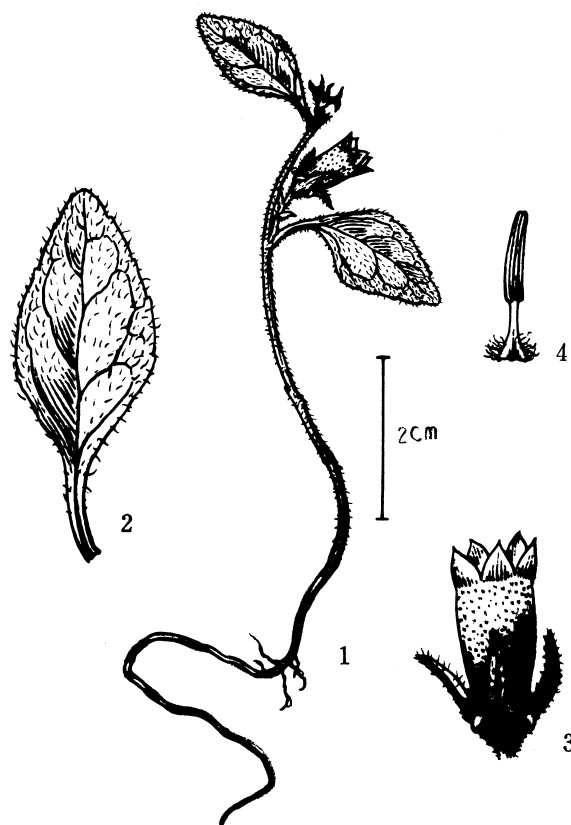


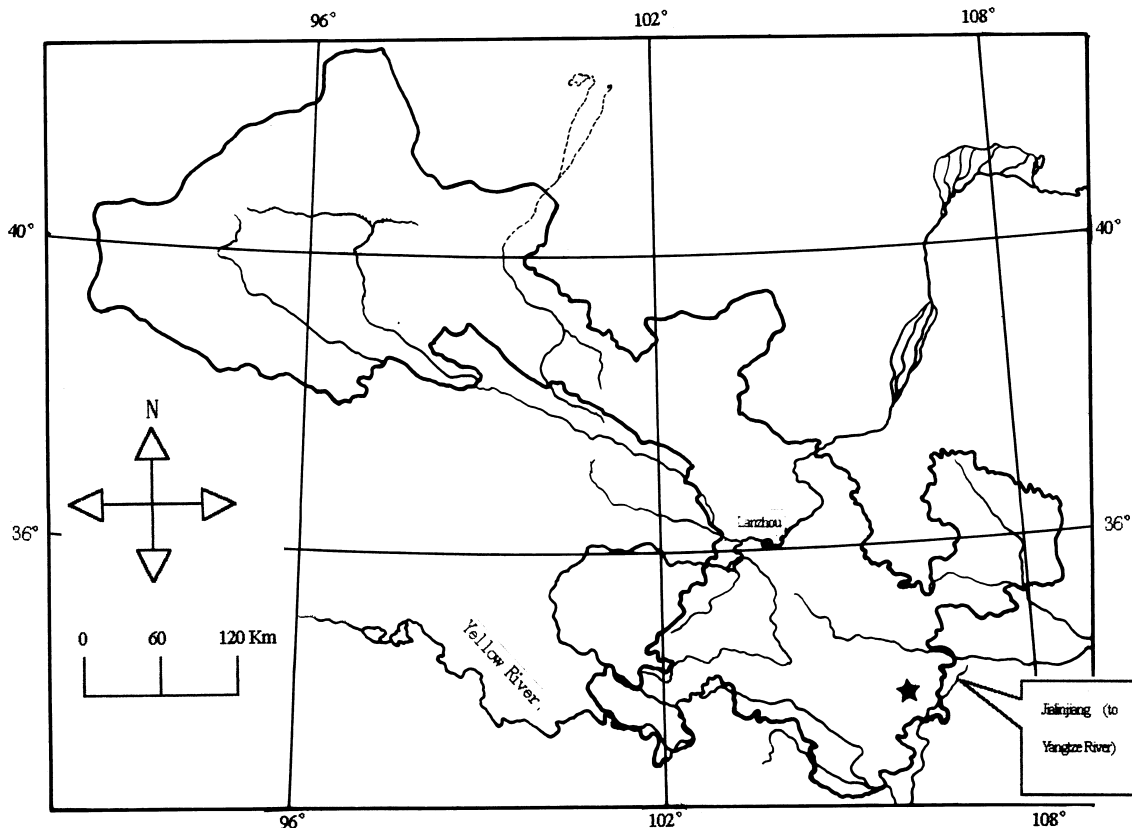
Figure 1. *C. gansuensis*. 1. Habit, showing flowering stem and leaves; 2. Leaf, showing pubescence; 3. Flower, showing an appendage reflexed at base of each sinus; 4. Stamen, showing anther, filaments dilated at base, hairy (from Lan-Zhou Wang 98008 [HAST], illustrated by Jian-Lu Bai).

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Table 1. Distribution and main characters of taxa of *Campanula* in China.

Taxa	Distribution ^a	Habit	Roots	Appendage in sepals	Color of corolla	Spots at corolla	Plant's height
1 <i>C. gansuensis</i>	Gansu	Annual	Slender	Yes	Green	Blotched	Under 10 cm
2 <i>C. punctata</i>	1	Perennial	Slender	Yes	White	Punctum	Over 10 cm
3 <i>C. sibirica</i>	Xinjiang	Perennial	Thick	Yes	Light blue-purple	No	Over 10 cm
4 <i>C. glomerata</i>	Xinjiang	Perennial	Thick	No	Purple-blue	No	Over 10 cm
5 ssp. <i>cephalotes</i>	DB	Perennial	Thick	No	Purple-blue	No	Over 10 cm
6 ssp. <i>daqingshanica</i>	Neimenggu	Perennial	Thick	No	Purple-blue	No	Over 10 cm
7 <i>C. glomeratoides</i>	Xizang	-	-	No	Blue	No	Over 10 cm
8 <i>C. nakaoi</i>	Xizang	Perennial	Slender	No	Blue, blue-purple	No	Over 10 cm
9 <i>C. langsdorffiana</i>	DB	Perennial	Slender	No	Light blue	No	Over 10 cm
10 <i>C. colorata</i>	XN	Perennial	Thick	No	Purple-blue	No	Over 10 cm
11 <i>C. cana</i>	XN	Perennial	Thick	No	Purple-blue	No	Over 10 cm
12 <i>C. chinensis</i>	Yunnan, Xizang	Perennial	Thick	No	Blue, purple-blue	No	Over 10 cm
13 <i>C. yunnanensis</i>	Yunnan	Perennial	Thick	No	Purple, purple-blue	No	Over 10 cm
14 <i>C. mekongensis</i>	Yunnan, Guangxi	Perennial	Thick	No	Blue or white	No	Over 10 cm
15 <i>C. dimorphantha</i>	2	Annual	Thick	No	Purple, blue-purple	No	Over 10 cm
16 <i>C. albertii</i>	Xinjiang	Perennial	Slender	No	Purple	No	Over 10 cm
17 <i>C. delavayi</i>	Yunnan	Perennial	Thick	No	Blue, purple	No	Over 10 cm
18 <i>C. crenulata</i>	Yunnan, Sichuan	Perennial	Thick	No	Blue, purple-red	No	Over 10 cm
19 <i>C. calcicola</i>	Yunnan, Sichuan	Perennial	Thick	No	Purple, blue-purple	No	Over 10 cm
20 <i>C. chrysosplenifolia</i>	Yunnan	Perennial	Thick	No	Blue	No	Over 10 cm
21 <i>C. aristata</i>	3	Perennial	Thick	No	Blue, Blue-purple	No	Over 10 cm
22 <i>C. immodesta</i>	4	Perennial	Thick	No	Blue, purple-blue	No	Over 10 cm

^aDistribution (Provinces): DB=Heilongjiang, Jilin, Liaoning; XN=Xizang, Sichuan, Yunnan, Guizhou; 1=Heilongjiang, Jilin, Liaoning, Neimenggu, Hebei, Shanxi, Henan, Shaanxi, Gansu, Sichuan, Hubei; 2=Taiwan, Guangdong, Yunnan, Sichuan, Shaanxi, Guizhou; 3=Xizang, Yunnan, Sichuan, Qinghai, Gansu, Shaanxi; 4=Xizang, Yunnan, Sichuan.

**Figure 2.** Distribution of *C. gansuensis* in Gansu province, China (illustrated by Jian-Lu Bai).

Very slender annual herbs more or less hairy, root slender. Stem 5-6 cm high, simple, with 2-3 leaves. Leaves alternate, triangular-ovate or rhombic-ovate, ca. 1 cm long and 5-6 mm wide; apex obtuse, margins sparsely and irregularly serrate; base narrowed into a winged petiole, ca. 0.5 cm long. Flower solitary, terminal on branches, pendulous. Calyx-tube adnate to the ovary, lobes 5, long triangular, with an ovate appendage reflexed from each sinus, margins glabrous. Corolla green, tube bell-shaped, to 0.8 cm long, 5-lobed to about one-third the depth, and mostly spotted within. Stamens 5, inserted at corolla base; filaments separate, dilated at base, hairy; anthers yellow, long clavate, ca. 3 mm long. Ovary inferior, half-globose, obovate-awl-shaped, not surrounded by a fleshy disc. Style 1, to 4 mm long, longer than corolla. Capsules and seeds not seen. Flowering in July.

Distribution and Notes. Extremely rare, presently known only from the village of Mayanhe, Huixian county of Gansu (Figure 2). *Campanula gansuensis* occurs in the mosses of a mountain stream, associated with *Oxalis*

corniculata L., often growing under shrubs such as *Hydrangea longipes* Franch., *Cotoneaster acutifolius* Turcz., *Rosa omeiensis* Rolfe, *R. bella* Rehd. & Wils., etc.

All taxa of *Campanula* in China belong to two sections [cf. deCandolle (1830) and Boissier (1875)]: sect. *Campanula*, with the capsule opening at the base, and sect. *Rapunculus* (Fourr.) Boiss., with it opening at the middle or top. Though capsules are lacking in our specimen, in China, only two species of sect. *Campanula* have a reflexed appendage in each sinus of the calyx as seen in *C. gansuensis*; the other species do not. Based on this, *C. gansuensis* should belong to the sect. *Campanula*, making it the third species of that section indigenous to China that has such appendages. *Campanula gansuensis* is a very distinctive member of sect. *Campanula*, somewhat resembling *C. punctata* Lam. and *C. sibirica* L., but distinct in its annual habit, stems only ca. 6 cm high, and corolla green. The following key is provided to aid in the identification of the 22 taxa of *Campanula* indigenous to China.

Key to taxa of *Campanula* in China

1. Capsule opening near the base (sect. *Campanula*).
 2. Calyx with an appendage reflexed in each sinus.
 3. Corolla purple spotted within.
 4. Perennial, 25-100 cm high, corolla long-bell-shaped, 3-6.5 cm long, white *C. punctata* Lam.
 4. Annual, ca. 6 cm high, corolla short-bell-shaped, ca. 0.6 cm long, green *C. gansuensis* L.Z. Wang & Hong
 3. Corolla not spotted, narrowly bell-shaped, to 1.5 cm long, blue purple *C. sibirica* L.
 2. Calyx without appendages.
 5. Flowers 2 or numerous in compact capitate; leaves 4-17 cm long.
 6. Lower cauline leaves very long-petioled; calyx-lobes linear.
 7. Capitate numerous; leaves nearly glabrous.
 8. Stem unbranched; leaves 4-13 × 1.5-3.5 cm *C. glomerata* L. subsp. *glomerata*
 8. Stem sometimes branched; leaves 7-15 × 1.7-7 cm *C. glomerata* subsp. *cephalotes* (Fisch. ex Schrank) Hong
 7. Capitate few; leaves long hispid-hairy *C. glomerata* subsp. *daqingshanica* Hong et Zhao.
 6. Lower cauline leaves with short winged petiole; calyx-lobes broad-lanceolate *C. glomeratoides* Hong
 5. Flowers solitary or spreading racemose, but not clustered; leaves under 6 cm long.
 9. Leaves glabrous or hairy only at margin; corolla glabrous; calyx-lobes linear or small, glabrous or hairy only at margin.
 10. Leaves and calyx-lobes with short hispid-hairs at the margin; cauline leaves obovate elliptic or elliptic *C. nakaoui* Kitam.
 10. Leaves and calyx-lobes glabrous; cauline leaves linear *C. langsdorffiana* Fisch. ex Trautv. & Mey.
 9. Leaves rough-hairy; corolla hairy; calyx-lobes narrowly triangular or triangular and hairy.
 11. Annual; with basal-leaves at flowering; compact cymes at side branches *C. dimorphantha* Schweinf. (= *C. canescens* Wall. ex A. DC.)
 11. Perennial; without basal-leaves at flowering; simple cymes or solitary at side branches.
 12. Calyx-tube usually glabrous; several flowers at side branches; calyx-lobes narrow, prominent *C. mekongensis* Diels ex C.Y. Wu
 12. Calyx-tube densely hairy; solitary or simple inflorescence at side branches; calyx-lobes wide, triangular.

13. Calyx-lobes nearly triangular, margins 2-dentate; stem long and spreading; basal leaves often disappearing by flowering time; leaves rotund *C. yunnanensis* Hong
13. Calyx-lobes subulate-triangular to narrowly triangular, triangular, margins dentate or not; stem erect or ascending, usually with leaves at flowering time; leaves elliptic or elliptic-linear.
14. Style longer than corolla; anthers adnate into a tube *C. chinensis* Hong
14. Style shorter than or as long as corolla; anthers separate.
15. Calyx-lobes subulate-triangular to narrowly triangular; the underside of leaves rarely felt-hairy; stem spreading *C. cana* Wall.
15. Calyx-lobes narrowly triangular to triangular, the underside of leaves more or less hispid-hairy; stem erect or ascending *C. colorata* Wall.
1. Capsule opening about the middle (sect. *Rapunculus*).
16. Calyx-lobes nearly silky-linear, longer than or as long as corolla; capsule opening at top; stem unbranched.
17. Ovary and capsule nearly cylindrical, ovary 5-15 mm long and capsule 2-4 cm long; stem 10-50 cm high; cauline-leaves 1.5-7 cm long *C. aristata* Wall.
17. Ovary and capsule obovate-awl-shaped, ovary 3-6 mm long and capsule 0.7-2 cm long; stem 5-22 cm high; cauline-leaves up to 2 cm long *C. immodesta* Lammers (= *C. modesta* Hook. f. & Thoms., nom. illeg.)
16. Calyx-lobes subulate, subulate-triangular or wide-linear, much shorter than corolla; capsule opening about the middle; stem branched or not.
18. Basal leaves oblong-linear; cauline leaves linear, more than 2 cm long; capsule big, elliptic, 1.2-1.6 cm long; plant with slender rootstocks *C. albertii* Trautv.
18. Basal leaves and the lower cauline ovate, cordate or reniform; cauline-leaves not linear, otherwise short; capsule usually small; plant without slender rootstocks.
19. Plant large, 20-50 cm high, the lower cauline leaves 1-3 cm long, cordate or cordate-rotund *C. delavayi* Franch.
19. Plant small, 6-30 cm high, the leaves at the base of stem much smaller than others, linear to ovate-rotund.
20. Flower pendulous or horizontal; calyx-tube obconical *C. crenulata* Franch.
20. Flower erect or ascending; calyx-tube usually obovate or obovate-conical.
21. Stem slender, basal leaves cordate-reniform; leaves in lower half of stem cordate to ovate-lanceolate *C. calcicola* W.W. Sm.
21. Stem silky, glabrous, basal leaves cordate; leaves in lower half of stem linear *C. chrysosplenifolia* Franch.

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中國產桔梗科風鈴草屬一新種：甘肅風鈴草及其系統位置

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本文描述和圖解桔梗科風鈴草屬一新種，甘肅風鈴草 (*Campanula gansuensis*)，依據對中國產風鈴草屬 21 個分類群的地理分布和主要特徵分析，確定該新種的系統位置。甘肅風鈴草屬於風鈴草組 (sect. *Campanula*)，其萼片間具附屬物的特徵略似紫斑風鈴草 (*C. punctata*) 和刺毛風鈴草 (*C. sibirica*)，但甘肅風鈴草為一年生，植株約 6 公分高，花冠綠色明顯可以區別。現僅知甘肅風鈴草分布於秦嶺西段南坡的甘肅徽縣麻沿河海拔 1,100 公尺山谷中。本文並將風鈴草屬在中國產的 22 個分類群編制成分種檢索表，以助鑑定。

關鍵詞：甘肅風鈴草；桔梗科；中國；新種；西秦嶺。