

# A key to the genus *Chelonopsis* (Lamiaceae) and two new combinations: *C. rosea* var. *siccanea* and *C. souliei* var. *cashmerica* comb. nov.

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Two new combinations in the genus *Chelonopsis* (Lamiaceae) are proposed based on a wide range of herbarium and field investigations. *Chelonopsis rosea* W. W. Smith and *Chelonopsis siccanea* W. W. Smith are treated as conspecific and the latter taxon, is here recombined as *C. rosea* var. *siccanea* (W. W. Smith) C. L. Xiang & H. Peng, comb. et stat. nov. Another species, *C. albiflora* Pax & K. Hoffmann ex Limpricht var. *cashmerica* Mukerjee is recombined as *C. souliei* (Bonati) Merr. var. *cashmerica* (Mukerjee) C. L. Xiang & H. Peng. In addition, *C. pseudobracteata* C. Y. Wu et H. W. Li is newly synonymized with *C. lichiangensis* W. W. Smith and *C. odontochila* Diels var. *smithii* (Kudo) C. Y. Wu with *C. odontochila* Diels var. *odontochila*. An updated key to the genus is also provided.

The name *Chelonopsis* Miq. (Lamiaceae) was established by Miquel based on collections from Japan (Miquel 1865). The genus is endemic to east Asia (Mabberley 1997), mainly occurring in southwest China and Japan. Based on the habit and calyx morphology, Wu and Li (1965) divided the genus into two subgenera, namely, *C.* subg. *Aequidens* and *C.* subg. *Chelonopsis*, of which 12 species were included in *C.* subg. *Aequidens*.

*Chelonopsis* subg. *Aequidens* is characterized by being shrubs with equal calyx while species of *C.* subg. *Chelonopsis* are herbs with unequal calyx. This classification is also consistent with Wu's division of areal-types (Wu 1979, Wu and Wu 1998); *Chelonopsis* subg. *Aequidens* belongs to the Sino-Himalayan forest subkingdom, mainly distributed in xerothermic valleys, whereas *C.* subg. *Chelonopsis* belongs to the Sino-Japan forest subkingdom, distributed in forests in China (Anhui, Guangdong, Hunan and Zhejiang) and Japan.

Thirteen species have been described from China by different authors (Diels 1905, 1912, Smith 1916, Anthony 1927, Pax and Hoffmann 1927, Kudo 1929, Merrill 1947, Wu 1959, Wu and Li 1965). However, during systematic studies in *Chelonopsis*, we found that some species in the genus are conspecific and we recognize 10 species and 2 varieties in China, 1 variety in Kashmir, India and 3 species in Japan (Murata and Yamazaki 1993). Two new combinations and two new synonyms are proposed in the present paper.

## Identification key to the species of *Chelonopsis*:

1. Herbs, calyx conspicuously 2-lipped, with 5 short unequal teeth..... 2
- Shrub or subshrubs, calyx with 5 equal teeth..... 5
2. Peduncle 2–6 mm long, pedicels 0.5–5.0 mm long. 3
- Peduncle 10–30 mm long, pedicels 1–3 mm long... 4
3. Plants 5–10 dm tall, cymes 1–3-flowered, calyx puberulent..... *C. moschata*
- Plants 2–3 dm tall, cymes 1-flowered, calyx sparsely hirsute..... *C. yagiharana*
4. Cymes 1–3-flowered, calyx densely puberulent ..... *C. longipes*
- Cymes 3–5-flowered, calyx sparsely strigose ..... *C. chekiangensis*
5. Leaves lanceolate ..... 6
- Leaves ovate to ovate-triangular ..... 7
6. Leaves opposite, flowers yellow, solitary cymes 1-flowered ..... *C. forrestii*
- Leaves in whorls of 3, flowers white, cymes usually 1–3-flowered ..... *C. souliei*
7. Leaves less than 30 mm, petiole less than 20 mm, cymes 1–3-flowered, but usually 1-flowered ..... *C. giraldii*
- Leaves more than 30 mm, longly petiolate, cymes rarely 1-flowered ..... 8
8. Petiole with 1–4 pairs of pinnae, bracts leaflike, large, conspicuous..... 9

- Petiole without pinna, bracts linear, minute ..... 10
9. Bracts close to calyx, pedicel only 2–4 mm, flowers rose.....*C. bracteata*  
Bracts widely separated, pedicel to 50 mm; flowers yellow.....*C. lichiangensis*
10. Peduncle abbreviated, only 2–5 mm ..... *C. abbreviata*  
Peduncle at least 150 mm ..... 11
11. Corolla yellow..... *C. odontochila*  
Corolla reddish to scarlet..... 12
12. Leaves not corrugated, double crenate–serrate ..... *C. rosea*  
Leaves corrugated, coarsely crenate–serrate ..... *C. mollissima*

***Chelonopsis rosea* W. W. Smith, Notes R. Bot. Gard. Edinburgh 9 (1916, p. 93) var. *rosea***

Based on the same type: *Chelonopsis odontochila* Diels subsp. *rosea* (W. W. Smith) Kudo, Mem. Fac. Sci. Agr. Taihoku Imp. Univ. 2 (1929, p. 155).

**Type:** China. ‘Shrub of 4–6 ft. Flowers deep dull rose. Open situations amongst boulders in side valleys on the Tali Range, Yunnan’, 25°40’N, altitude 10 000 ft. Aug 1913. G. Forrest 11 682 (holotype: E; isotype: K).

**Distribution**

The species is endemic to Yunnan. It occurs under shrubs on limestone mountains or xerothermic slopes by the River from 1600–3100 m a.s.l.

**Additional specimens examined**

Yunnan: Fengqing, T. T. Yü 17 603(E); Fengqing, T. T. Yü 17 663(KUN); Gengma, T. P. Zhu 0 451(KUN); Jingdong, C. L. Xiang 036(KUN); Jingdong, M. K. Li 2 371(KUN); Jingdong, M. K. Li 2 392(IBSC); Lincang, T. T. Yü 18 204(E, KUN); Weishan, Y. Tsiang 12 073(IBSC, KUN).

***Chelonopsis rosea* W. W. Smith var. *siccanea* (W. W. Smith) C. L. Xiang & H. Peng comb. et stat. nov.**

**Basionym:** *Chelonopsis siccanea* W. W. Smith, Notes R. Bot. Gard. Edinburgh 9 (1916, p. 94).

**Type:** China. ‘Shrub of 4–6 ft. Flowers deep purple–rose. Dry situations amongst shrubs on the Yungning–Yangtze divide, Yunnan, 27°40’N, alt. 9000 ft. July 1914.’ G. Forrest 13 082 (holotype: E; isotype: K, IBSC).

Smith (1916) considered *C. siccanea* to be very closely related to *C. rosea* when he first described it, but the former taxon is densely tomentose on branchlets and without glandular trichomes. After an examination of a number of specimens, we found that there is a continuous variation in

this character. The percentage of the hairs covering the branchlets varies considerably at different stages of flowering and fruiting and at different localities. In addition, our study on the anatomy of the leaves and branchlets, shows that glandular trichomes occasionally exist in *C. rosea*. We think *C. siccanea* is sufficiently morphologically similar to *C. rosea* to be considered as conspecific, and thus we here sink *C. siccanea* to varietal rank under *C. rosea*.

**Distribution**

This variety is endemic to a limited area in the southwest of China, known from the border area between Yunnan and Sichuan. It occurs under shrubs on xerothermic slopes by the Jinsha River (upper reach of the Yangtze River) and Lancang Jiang from 1900–2200 m a.s.l.

**Additional specimens examined**

Yunnan: Lijiang, G. Forrest 20 662(E); Mekong valley, G. Forrest 13 414(IBSC); Sine loc., G. Forrest 28 554(E, PE). Sichuan: Muli, G. Forrest 22 958(E).

***Chelonopsis souliei* (Bonati) Merr. J. Arnold Arbor. 28 (1947, p. 252) var. *souliei***

**Basionym:** *Brandisia souliei* Bonati. Bull. Soc. Bot. France. 56 (1909, pp. 467–468).

**Type:** China. ‘Folia membranacea, lanceolato-acuto, serrato; Corolla calyce duplo longior, tubo glabro, cylindrico, 5 mm.’ R. P. Soulié 5 199 (holotype: P).

**Distribution**

This species is endemic to Sichuan and Tibet. It occurs on hillsides, at an altitude of about 3200 to 3600 m a.s.l.

**Additional specimens examined**

China. Sichuan: Dajianlu, W. J. Zheng 1 862(NAS); Muli, Qinghai-Tibet Expedition 14 553(KUN). Tibet: Milin, Tibet herb Expedition 3 842(HNWP).

***Chelonopsis souliei* (Bonati) Merr. var. *cashmerica* (Mukerjee) C. L. Xiang & H. Peng comb. nov.**

**Basionym:** *Chelonopsis albiflora* Pax et Hoffm ex Limpricht var. *cashmerica* Mukerjee, J. Ind. Bot. Soc. 21 (1942, pp. 315–316).

Based on the same type: *Chelonopsis cashmerica* (Mukerjee) Hedge, Flora of Pakistan. 192 (1990, p. 136).

**Type:** India. ‘Small shrub, leaves shortly petioled, lanceolate. Calyx campanulate, 15 mm. corolla pale yellow,

nutlets obovate, compressed, winged on top. Uri Hills Kashmir, 2000 m.' P. N. Kohli 189 (holotype: CAL; isotype: RAW).

*Chelonopsis albiflora* Pax et Hoffm. ex Limpricht was first published by Pax and Hoffmann (1927) based on two specimens collected by Limpricht from Sichuan. It was treated as a synonym of *C. souliei* by Merrill (1947) because both share the same characters, e.g. most of the leaves are in whorls of three. In addition, the distribution area of these two species overlaps entirely. After examination of the type specimens, we also agree with Merrill's opinion and think they are conspecific.

*Chelonopsis albiflora* Pax et Hoffm. ex Limpricht var. *cashmerica* Mukerjee was first described by Mukerjee (1942). It differs from *C. albiflora* var. *albiflora* by having longer calyx teeth, shortly petiolate leaves that are densely hairy on the nerves with white and somewhat floccose hairs. Here, this variety is transferred to *C. souliei* (Bonati) Merr as *C. souliei* (Bonati) Merr. var. *cashmerica* (Mukerjee) C. L. Xiang & H. Peng.

### Distribution

This variety is only found in Kashmir, India. It occurs on hillsides at an altitude of about 2000 m a.s.l.

### Additional specimens examined

China. Sichuan: Batang–Litang, Limpricht 2 230(holotype A); Batang, Qinghai–Tibet Expedition 1 515(CDBI, KUN); Qianning, J. Chen 5 810 (KUN); Xiangcheng, J. Chen 3 009(KUN); Xiangchen, Qinghai–Tibet Expedition 4 668(KUN); Xiangchen, Qinghai–Tibet Expedition 1 102(CDBI, KUN); Xiangchen, Qinghai–Tibet Expedition 3 007(CDBI, KUN); Yidun, Sichuan Expedition 3 958(CDBI, KUN). Tibet: Jiacha, J. S. Yang 90 532(KUN); Jiacha, Qinghai–Tibet Expedition 7 657(KUN); Jiacha, Qinghai–Tibet Expedition 75 680(KUN); Lilungchu, Ludlow 7 174(E); Longzi, Qinghai–Tibet Expedition 750 401(KUN); Milin, Tibet herb Expedition 7 224(HNWP); Shoga Dzong, Ludlow et al. 14 167(E).

*Chelonopsis souliei* var. *cashmerica* – India. Kashmir, Kohli 38(K).

### *Chelonopsis lichiangensis* W. W. Smith, Notes R. Bot. Gard. Edinburgh 9 (1916, p. 92).

**Basionym:** *Chelonopsis odontochila* Diels subsp. *lichiangensis* (W. W. Smith) Kudo, Mem. Fac. Sci. Agr. Taihoku Imp. Univ. 2 (1929, p. 153).

**Synonyms:** - *Chelonopsis pseudobracteata* C. Y. Wu et H. W. Li, Acta Phytotax. Sin. 10 (1965, pp. 152–153), syn. nov.

– *Chelonopsis pseudobracteata* var. *rubra* C. Y. Wu & H. W. Li, Acta Phytotax. Sin. 10 (1965, p. 152); Li and Hedge, Flora of China, 17 (1994, p. 138).

**Type** for *Chelonopsis lichiangensis*: China. 'Shrub of 4–8 ft. Flowers yellow. In open situations in the valley of the Yangtze, east of the Lichiang Valley, Yunnan, 27°45'N, altitude 6000 ft July 1913.' G. Forrest 10 512 (holotype: E; isotype: K).

**Type** for *Chelonopsis pseudobracteata* var. *rubra*: China. 'Chung-tien, inter Tung-pa-tze et Bödö, Yunnan. 10 Sep 1939.' K. M. Feng 2342 (holotype: KUN; isotype: A, PE).

*Chelonopsis lichiangensis* is a rare species endemic to Yunnan. It was described by Smith (1916) based on a few specimens collected by G. Forrest in 1913 from Lijiang, northwest Yunnan, China. The species is also rarely represented in four major Chinese herbaria PE, KUN, IBSC and CDBI and other major foreign herbaria (A, E, K, MO). Its identity has long been considered dubious.

*Chelonopsis pseudobracteata* was described by Wu and Li (1965). The taxon differs from all other members in the *C.* subg. *Aequidens* by 'petioles superne pinnis 1–3 jugis insertis, bracteis minoribus cymam primo non velantibus, pedicellis longioribus' (Wu and Li 1965, 1977). Wu think that *C. pseudobracteata* is very close to *C. bracteata* because their similar conspicuous leaf-like bracts and 1–3 pairs of pinnae on the pedicel. However, our observations of wild populations and type specimens show that *C. lichiangensis* also shares the characters of *C. pseudobracteata*, i.e. 1–3 pairs of pinnae on the pedicel. However, in the protologue of *C. lichiangensis*, Smith (1916) failed to mention this character. In addition, bracts of *C. lichiangensis* are also widely spaced, not covering the calyx. After an examination of the type specimens and other specimens, no natural difference can be found between *C. pseudobracteata* and *C. lichiangensis*. It is thus inappropriate to treat them as different species.

### Distribution

*Chelonopsis lichiangensis* is endemic to a limited area in Yunnan and Sichuan. It occurs under shrubs on xerothermic slopes by rivers with altitudes ranging from 1900 to 2300 m a.s.l.

### Additional specimens examined

As *Chelonopsis lichiangensis*: China. Yunnan: Da-gu shan, G. Forrest 17 152(E); Dali, G. Forrest 13 587(PE, SCBI); Lijiang, K. M. Feng 2 595(KUN, PE); Mekong valley, G. Forrest 15 429(E, K).

As *Chelonopsis pseudobracteata*: China. Yunnan: Zhongdian, C. L. Xiang 020(KUN); Zhongdian, K. M. Feng 14 923(KUN); Zhongdian, T. T. Yü 14 928(PE). Sichuan: Muli, K. M. Feng 2 898(KUN, PE).

### *Chelonopsis odontochila* Diels, Notes R. Bot. Gard. Edinburgh 5 (1912, p. 240).

**Type:** China. 'Shrubby plant of 6–10 ft. Flowers yellow. Valley of the Yangtze between Tzuko and Chinho. Alt.

6000–7500 ft. October 1904.' G. Forrest 22 600 (holotype: K).

– *Chelonopsis odontochila* subsp. *smithii* Kudo, Mem. Fac. Sci. Agr. Taihoku Imp. Univ. 2 (1929, p. 154), syn. nov.

**Based on the same type:** *C. odontochila* var. *smithii* (Kudo) C. Y. Wu, Acta Phytotax. Sin. 8 (1959, p. 29).

**Type:** China. Yunnan. T. T. Yü 14 176 (holotype: KUN; isotype: PE).

*Chelonopsis odontochila* var. *smithii* (Kudo) C. Y. Wu was first described by Kudo (1929) as a subspecies of *C. odontochila* and then it was treated as a variety by Wu (1959). In some authors' opinion (Wu 1959, Wu and Li 1977, Li and Hedge 1994), the variety *smithii* mainly differs from variety *odontochila* by having broadly triangular calyx teeth (vs triangular calyx, mucronate–acuminate), leaves about 8 × 5 cm (vs leaves 3–5 × 1.5–3.0 cm) and bracteoles leaf-like to linear (vs bracteoles linear–lanceolate). However, these characters are not sufficient to separate variety *smithii* from the typical variety. Based on our examinations of specimens and field investigations, there are two kinds of calyx teeth on the same plant. Generally, calyx teeth in fruiting stage are mucronate–acuminate, while calyx teeth at flowering are broadly triangular and acuminate. The leaf size and bracteoles are variable in both varieties, with no clear distinction between them. We here synonymize *C. odontochila* Diels var. *smithii* (Kudo) C. Y. Wu with *C. odontochila* Diels.

### Distribution

This species is also endemic to Yunnan and Sichuan. It occurs under shrubs on xerothermic slopes by rivers at altitudes ranging from 1400 to 2500 m a.s.l.

### Additional specimens examined

As *Chelonopsis odontochila* var. *odontochila*: China. Yunnan: Dali, K. M. Feng 3 200(KUN); Jingdong, M. K. Li 2 367(IBSC); Lijiang, C. L. Xiang 022(KUN); Lijiang, R. L. Xiong 612 667(KUN); Lushuei, H. T. Tsai 54 543(IBSC, KUN, LBG, PE). Sichuan: Ebian, M. Y. He et Q. S. Zhao 116 786(CDBI, SZ); Muli, Q. S. Zhao et al 7 564(CDBI, SZ); Muli, Q. S. Zhao 8 733(CDBI, SZ); Muli, S. G. Wu 3 674(KUN, PE); Wulong, W. H. Wang 3568(CDBI, SZ); Wulong, W. H. Wang 3 576(CDBI, SZ).

As *Chelonopsis odontochila* var. *smithii*: China. Yunnan: Fumin, T. N. Liou 14 722(IBSC, KUN, PE). Sichuan: Muli, S.G. Wu 2 497(KUN).

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### References

- Anthony, J. 1927. A description of some Asiatic phanerogams. – Notes R. Bot. Gard. Edinburgh 15: 239–246.
- Diels, L. 1905. Beiblatt zu den Botanischen Jahrbüchern, no. 82. – Bot. Jahrb. Syst. 36: 1–142.
- Diels, L. 1912. Plantae Chinesens Forrestianae. – Notes R. Bot. Gard. Edinburgh 5: 161–304.
- Kudo, Y. 1929. Labiatarum sino-Japonicarum prodromus. – Mem. Fac. Taihoku Imp. Univ. 2: 1–332.
- Li, X. W. and Hedge, I. C. 1994. *Chelonopsis*. – In: Wu, Z.-Y. and Raven, P. H. (eds), Flora of China. Vol. 17. Science Press, Beijing, Miss. Bot. Gard. Press, pp. 135–139.
- Mabberley, D. J. 1997. A portable dictionary of vascular plants. – Cambridge Univ. Press.
- Merrill, E. D. 1947. On the identity of *Brandisia souliei* Bonati. – J. Arnold Arbor. 28: 251–253.
- Miquel, F. A. G. 1865. Prolusio Florae Iaponicae. – Ann. Mus. Bot. Lugd. Bat. 2: 69–212.
- Mukerjee, S. K. 1942. The genus *Chelonopsis* Miq. recorded for the first time from India. – J. Ind. Bot. Soc. 21: 313–317.
- Murata, G. and Yamazaki, T. 1993. *Chelonopsis*. – In: Iwatsuki, K. et al. (eds), Flora of Japan IIIa. Kodansha Ltd. Tokyo, pp. 292–293.
- Pax, F. and Hoffmann, K. 1927. Aufzählung der von Dr Limpricht in Ostasien gesammelten Pflanze. – Fedde Rep. Spec. Nov. 12: 477.
- Smith, W. W. 1916. Diagnoses specierum novarum. – Notes R. Bot. Gard. Edinburgh 9: 92–94.
- Wu, C. Y. 1959. Revisio labiatarum sinensium. – Acta Phytotax. Sin. 8: 26–31, in Chinese.
- Wu, C. Y. 1979. The regionalization of Chinese flora. – Acta Bot. Yunnan. 1: 1–23, in Chinese.
- Wu, C. Y. and Li, H. W. 1965. Materiae ad floram labiatarum sinensium 1. – Acta Phytotax. Sin. 10: 142–166, Plates 29–38, in Chinese.
- Wu, C. Y. and Li, H. W. 1977. *Chelonopsis* (Lamiaceae). – In: Flora Reipubl. Pop. Sin. Vol. 65. Science Press, Beijing, pp. 394–408, in Chinese.
- Wu, C. Y. and Wu, S. G. 1998. A proposal for a new floristic kingdom (realm): the east Asiatic kingdom, its delimitation and characteristic. – In: Zhang, A. L. and Wu, S. G. (eds), Proc. of the 1st Int. Symp. on floristic characteristics and diversity of east Asian plants. China Higher Education Press, Beijing, pp. 3–42.