

8. SINOCRASSULA A. Berger in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 18a: 462. 1930.

石莲属 shi lian shu

Plants annual, biennial, or perennial, with reddish brown, thin striations or spots throughout, glabrous or minutely hairy. Roots fibrous. Sterile stems usually present. Leaves mostly in basal rosettes, often with several rosettes per plant, often caducous and lost by anthesis, alternate, apex obtuse or acuminate. Flowering stems erect, ± elongated; stem leaves alternate. Inflorescence terminal or lateral, paniculate-corymbiform with long, basally subopposite branches, rarely simple and racemelike; bracts leaflike, laxly arranged. Flowers erect, pedicellate, bisexual, 5-merous. Calyx subglobose; sepals erect, triangular or triangular-lanceolate, base connate. Petals free or almost so, yellow to red or purplish red, subglobose-urceolate, S-shaped in longitudinal section, apically extrorsely vaulted curved, base concave, apex sometimes thickened. Stamens as many as petals, inserted on sepals, slightly shorter than petals. Nectar scales entire, apex emarginate or dentate. Carpels somewhat wide, base abruptly narrowed. Styles short; stigmas capitate. Follicles many seeded.

Seven species: Bhutan, China, India, Nepal, Pakistan, Sikkim; seven species (six endemic) in China.

1a. Plants usually more than 10 cm.

2a. Lateral branches of inflorescence to 10 cm 5. *S. longistyla*

2b. Lateral branches of inflorescence generally 5–6 cm or shorter.

3a. Stem leaves uniformly broadly oblanceolate, subobovate, or ovate-orbicular, 0.4–1 cm wide .. 6. *S. indica*

3b. Stem leaves dimorphic: proximal ones broadly obovate or elliptic, 2–2.7 cm wide, distal ones narrowly lanceolate to linear-lanceolate, 0.3–0.8 cm wide 7. *S. diversifolia*

1b. Plants 5–10 cm.

4a. Plants densely shortly white pubescent 1. *S. yunnanensis*

4b. Plants glabrous, or sparsely hairy on leaves adaxially or on flowering stems.

5a. Leaves hairy but flowering stems glabrous 6. *S. indica*

5b. Leaves glabrous but flowering stems sometimes sparsely pilose.

6a. Sepals equaling or longer than petals; caudex branched, 3–6 cm 2. *S. ambigua*

6b. Sepals shorter than petals; caudex not elongated.

7a. Basal leaves in a compact rosette; petals triangular-lanceolate 3. *S. densirosulata*

7b. Basal leaves caducous; petals oblong 4. *S. techinensis*

1. *Sinocrassula yunnanensis* (Franchet) A. Berger in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 18a: 463. 1930.

云南石莲 yun nan shi lian

Crassula yunnanensis Franchet, J. Bot. (Morot) 10: 284. 1896; *Sedum indicum* (Decaisne) Raymond-Hamet var. *yunnanense* (Franchet) Raymond-Hamet.

Plants 5–10 cm tall. Rosette lax, 2.5–3.5 cm in diam. Basal leaves oblanceolate to spatulate, 1.2–2.5 × 0.4–0.5 cm, with dense, white, short pubescence, apex acute to acuminate. Flowering stems 5–10 cm, densely leafy, hairy; stem leaves oblanceolate, hairy. Inflorescences corymbiform, ± dense, ca. 2.5 cm in diam.; bracts few, obovate-lanceolate, pubescent. Flowers mostly large. Sepals linear-lanceolate, ca. 1.8 mm, minutely papillate, apex obtuse. Petals yellowish green, oblong-lanceolate, 3.5–4 × ca. 1 mm, minutely papillate abaxially. Stamens shorter than petals. Nectar scales quadrate. Carpels lanceolate. Styles short. Fl. Sep–Oct.

• W Yunnan (Dali Xian).

2. *Sinocrassula ambigua* (Praeger) A. Berger in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 18a: 462. 1930.

长萼石莲 chang e shi lian

Sedum ambiguum Praeger, Notes Roy. Bot. Gard. Edinburgh 13: 69. 1921; *S. indicum* (Decaisne) Raymond-Hamet var. *ambiguum* (Praeger) Raymond-Hamet.

Plants perennial, glabrous. Roots fibrous. Caudex branched, ascending, slender, 3–6 cm, with sterile lateral branches. Basal leaves opposite, oblanceolate to oblong, 7–9 × 1.5–3 mm, apex obtuse. Flowering stems terminal, erect, 7–10 cm; stem leaves few, alternate or opposite, orbicular, orbicular-obovate, or orbicular-rhomboid, 0.9–1.2 × 0.9–1.2 cm, apex acute and mucronate. Inflorescences corymbiform, lax, 1.2–2.5 × 2.5–3.5 cm; bracts few, linear-oblong, apex obtuse; pedicels purple, longer than flowers. Sepals linear-lanceolate, 2.5–4 × 0.8–1 mm, apex obtuse. Petals reddish purple, ovate-triangular, apex acute. Filaments narrowly triangular, 1.1–1.3 mm. Nectar scales nearly quadrate. Carpels erect. Styles short. Seeds oblong-ovoid. Fl. May–Sep.

• Rocks on slopes; 2000–3000 m. SW Sichuan, NW Yunnan.

3. *Sinocrassula densirosulata* (Praeger) A. Berger in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 18a: 468. 1930.

密叶石莲 mi ye shi lian

Sedum indicum (Decaisne) Raymond-Hamet var. *densirosulatum* Praeger, J. Bot. 57: 55. 1919.

Rosette compact, 2–2.5 × 4–4.5 cm. Basal leaves ca. 30, pale green, spatulate, 1–2.5 × 0.6–0.8 cm, apex purple, acuminate. Flowering stem branched near base, 5–7.5 cm; stem leaves alternate, spatulate to elliptic, 1–2 × 0.3–0.5 cm, base rounded to cuneate. Inflorescences

globose, 1.5–3 × 2.5–5 cm, many flowered; pedicels short. Sepals narrowly triangular, ca. 2.5 × 0.8 mm. Petals purplish red, with purple spots toward apex, triangular-lanceolate, to 4 × 1–1.2 mm. Stamens ca. 3 mm. Nectar scales spatulate-quadrate, minute. Carpels erect, almost free, ovate-lanceolate. Styles slender. Fl. Jul, fr. Nov.

• Walls and moist places along rivers. W Sichuan (Huili Xian, Kangding Xian), E Yunnan (Dongchuan Shi).

4. *Sinocrassula techinensis* (S. H. Fu) S. H. Fu in S. H. Fu & K. T. Fu, Fl. Reipubl. Popularis Sin. 34(1): 65. 1980.

德钦石莲 de qin shi lian

Sedum techinense S. H. Fu, Acta Phytotax. Sin. 1: 124. 1951.

Plants glabrous, rarely very shortly hairy. Basal leaves caducous. Flowering stem solitary, erect, 7–10 cm; stem leaves alternate, linear to lanceolate, 1.5–2.5 × 0.2–0.5 mm. Inflorescences corymbiform. Sepals lanceolate, 2–4 mm. Petals red, oblong, 4–5 mm, apex obtuse to acute. Stamens ca. 4 mm. Nectar scales subsquare to broadly quadrate, ca. 0.4 × 0.6 mm. Carpels erect, ovate-lanceolate, ca. 4 mm. Follicles many seeded. Seeds ovoid, ca. 0.5 mm, striate, narrowly winged. Fl. Sep.

• Rocks on slopes; ca. 2700 m. NW Yunnan (Dêqên Xian).

5. *Sinocrassula longistyla* (Praeger) S. H. Fu, Acta Phytotax. Sin., Addit. 1: 112. 1965.

长柱石莲 chang zhu shi lian

Sedum longistylum Praeger, Notes Roy. Bot. Gard. Edinburgh 13: 87. 1921; *S. indicum* (Decaisne) Raymond-Hamet var. *longistylum* (Praeger) Fröderström.

Herbs annual or biennial, 20–25 cm tall, glabrous. Basal stem leaves opposite and others alternate, elliptic, ca. 1.5 × 0.5 cm. Flowering stem many branched, erect; branches divergent, to 20 cm. Inflorescence a ± corymbiform panicle, ca. 10 × 15 cm; branches to 10 cm, each with a dense, small, 10–20-flowered cyme to 10 mm in diam.; bracts sessile, ovate, 2–3 mm, apex acute; pedicels short. Sepals narrowly triangular, 1.5–2.5 × 1–1.2 mm. Petals deep red to purple, oblong-triangular or oblong-ovate, 3.5–4 × ca. 1.2 mm, apex acute or acuminate. Stamens ca. 3 mm; filaments basally gradually broadened; anthers golden yellow. Nectar scales broadly quadrate, apex subemarginate. Carpels erect, lanceolate, ca. 3 mm, base broad. Styles recurved, slender, ca. 1.5 mm. Fl. Jul–Oct.

• Valleys; 1300–1600 m. C and W Sichuan (Danba Xian, Hanyuan Xian).

6. *Sinocrassula indica* (Decaisne) A. Berger in Engler & Prantl, Nat. Pflanzenfam., ed. 2, 18a: 463. 1930.

石莲 shi lian

Herbs biennial, glabrous. Roots fibrous. Basal leaves spatulate-oblong, 3.5–6 × 1–1.5 cm. Flowering stem erect, 5–60 cm; stem leaves alternate, broadly oblanceolate, subobovate, or ovate-orbicular, 2.5–3 ×

0.4–1 cm, margin entire or distally acuminate serrate, apex obtusely rounded or acuminate. Inflorescences paniculate, often corymbiform; lateral branches generally 5–6 cm or shorter; bracts resembling distal stem leaves but smaller. Sepals broadly triangular, ca. 2 × 1 mm, apex subacute. Petals red, reddish, yellow, or greenish yellow, lanceolate to ovate, 2.5–5.5 × ca. 2 mm, apex usually reflexed. Stamens 3–4 mm. Nectar scales quadrate, apex emarginate. Carpels ovoid, 2.5–3 mm, base connate for 0.5–1 mm, apex acute. Styles less than 1 mm. Follicles apically with a recurved beak. Seeds smooth. Fl. Jul–Oct.

Rocks in valleys or on slopes, dry stony and gravelly slopes, river banks. 500–4000 m. S Gansu, Guangxi, Guizhou, Henan, Hubei, Hunan, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, India, Nepal, Pakistan, Sikkim].

1a. Plants 5–10 cm tall; leaves hairy, margin acuminate serrate distally

6b. var. *serrata*
1b. Plants more than 10 cm tall (8–9 cm tall in var. *obtusifolia*); leaves glabrous, margin entire.

2a. Petals red or reddish.

3a. Leaf apex acuminate

6a. var. *indica*

3b. Leaf apex obtuse-rounded

6c. var. *obtusifolia*

2b. Petals yellow or greenish yellow, sometimes with reddish apex.

4a. Plants 30–60 cm tall; leaves ovate-orbicular

6d. var. *forrestii*

4b. Plants 10–20 cm tall; leaves narrow.

5a. Petals yellow with reddish apex, 5–5.5 mm ..

6e. var. *luteorubra*

5b. Petals greenish yellow, ca. 2.5 mm

6f. var. *viridiflora*

6a. *Sinocrassula indica* var. *indica*

石莲(原变种) shi lian (yuan bian zhong)

Crassula indica Decaisne in Jacquemont, Voy. Inde 4 (Bot.): 61. 1844; *Sedum cavaleriei* H. Léveillé; *S. cavaleriense* H. Léveillé; *S. indicum* (Decaisne)

Raymond-Hamet; *S. indicum* var. *silvaticum*

Fröderström; *S. martini* H. Léveillé; *S. scallanii* Diels

var. *majus* Pampanini.

Plants 15–60 cm tall. Leaves glabrous, margin entire, apex acuminate. Petals red.

1200–3300 m. S Gansu, Guangxi, Guizhou, Hubei, Hunan, Shaanxi, Sichuan, Xizang, Yunnan [Bhutan, India, Nepal, Pakistan Sikkim].

The plants are used medicinally.

6b. *Sinocrassula indica* var. *serrata* (Raymond-Hamet) S. H. Fu, Acta Phytotax. Sin., Addit. 1: 113. 1965.

锯叶石莲 ju ye shi lian

Sedum indicum (Decaisne) Raymond-Hamet var.

serratum Raymond-Hamet, Bull. Soc. Bot. France 74: 271. 1927.

Plants 5–10 cm tall. Leaves hairy, margin acuminate serrate distally.

• Rocks in valleys or on slopes; 3700–4000 m. W Sichuan.

6c. *Sinocrassula indica* var. *obtusifolia* (Fröderström) S. H. Fu, Acta Phytotax. Sin., Addit. 1: 113. 1965.

钝叶石莲 *dun ye shi lian*

Sedum indicum (Decaisne) Raymond-Hamet var.

obtusifolium Fröderström, Acta Horti Gothob. 6(Add.): 21. 1931.

Plants 8–9 cm tall. Leaves glabrous, margin entire, apex obtuse-rounded. Petals reddish.

• Rocks in valleys; 2300–2500 m. W Sichuan, NW Yunnan.

6d. *Sinocrassula indica* var. *forrestii* (Raymond-Hamet) S. H. Fu, Acta Phytotax. Sin., Addit. 1: 113. 1965.

圆叶石莲 *yuan ye shi lian*

Sedum indicum (Decaisne) Raymond-Hamet var.

forrestii Raymond-Hamet, Notes Roy. Bot. Gard.

Edinburgh 5: 115. 1912.

Plants 30–60 cm tall. Leaves ovate-orbicular, glabrous, margin entire. Petals yellow.

• Rocks; 1000–3000 m. NW Yunnan.

This variety was treated as *Sinocrassula luteorubra* var. *forrestii* (Raymond-Hamet) H. Chuang (in C. Y. Wu, Fl. Yunnan. 8: 142 1997), but that name is invalid because the basionym was not fully cited and the species name to which it was assigned was itself invalid (see note under var. *luteorubra*).

6e. *Sinocrassula indica* var. *luteorubra* (Praeger) S. H. Fu in S. H. Fu & K. T. Fu, Fl. Reipubl. Popularis Sin. 34(1): 68. 1984.

黄花石莲 *huang hua shi lian*

Sedum indicum (Decaisne) Raymond-Hamet var.

luteorubrum Praeger, Notes Roy. Bot. Gard. Edinburgh

13: 84. 1921; *S. paoshingense* S. H. Fu; *Sinocrassula paoshingensis* (S. H. Fu) H. Ohba et al.

Plants 10–20 cm tall. Leaves narrow, glabrous, margin entire. Petals yellow with reddish apex, 5–5.5 mm.

• Dry stony and gravelly slopes; 700–3700 m. Sichuan, NW Yunnan.

This variety was treated at specific rank, as *Sinocrassula paoshingensis* (S. H. Fu) H. Ohba et al. (J. Jap. Bot. 75: 296. 2000) and as *S. luteorubra* H. Chuang (in C. Y. Wu, Fl. Yunnan. 8: 142. Nov 1997). The basionym of *S. luteorubra* was not fully cited so the name is invalid under Art. 33.3 of the St. Louis Code. Earlier in the same year, Chuang described *S. luteorubra* var. *maculosa* H. Chuang (Acta Bot. Yunnan. 19: 224. Aug 1997), which is invalid under Art. 43.1 of the Code. This name was later validated as *S. indica* var. *maculosa* H. Chuang ex Thiede (Cactus Succ. J. (Los Angeles) 71: 160. 1999). The taxon is known to the present authors only from the protologue. It was distinguished by its smaller flowers, petals 3–3.5 mm, with sepals and petals bearing many “glandular spots.”

6f. *Sinocrassula indica* var. *viridiflora* K. T. Fu, Fl. Tsinling. 1(2): 606. 1974.

绿花石莲 *lu hua shi lian*

Plants 10–20 cm tall. Leaves narrow, glabrous, margin entire. Petals greenish yellow, ca. 2.5 mm.

• River banks, rocks on slopes; 500–1200 m. Henan, S Shaanxi, N Sichuan.

7. *Sinocrassula diversifolia* H. Chuang, Acta Bot. Yunnan. 19: 224. 1997.

异形叶石莲 *yi xing ye shi lian*

Plants 40–50 cm tall, glabrous, many parts purple-spotted. Roots fibrous. Rosette not well defined. Basal leaves densely brown-spotted, broadly obovate, 3–4 ×

2–2.5 cm, base broadly cuneate, apex rounded. Stem leaves alternate, dimorphic: broadly obovate or elliptic and 3–5 × 2–2.7 cm proximally on stem, narrowly lanceolate to linear-lanceolate and 0.3–0.8 cm wide distally on stem, base cuneate to angustate, apex obtuse to acute or acuminate. Inflorescences corymbiform, 6–15 × 8–12 cm; branches winged; bracts resembling distal stem leaves but smaller; pedicels longer than flowers, winged. Sepals triangular-lanceolate, 2–2.5 × 1–1.5 mm, apex acute or acuminate. Petals yellow, spotted with purple, lanceolate, 3.5–4 × 1–1.5 mm, apex acuminate. Stamens 2.5–3 mm; filaments white, spotted with purple; anthers oblong-cordate, ca. 0.8 mm. Nectar scales broadly quadrate, 0.3–0.5 × 0.5–0.7 mm. Carpels erect, narrowly ovoid, 2.5–3 mm. Styles slender, 0.5–1 mm. Follicles many seeded. Seeds brown, ovoid-cylindric, longitudinally 10–12-striate. Fl. Aug, fr. Nov.

• 2500–2700 m. NW Yunnan (Gongshan Drung-Nu Zu Zizhixian).

This species is included here on the basis of the protologue; no material has been seen by the present authors. It is clearly closely related to the widespread and variable *Sinocrassula indica*.

