

***SEDUM PELTATUM* (CRASSULACEAE): A NEW SPECIES
FROM ANHUI, CHINA**

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Abstract

Sedum peltatum M.L. Chen *et* X.H. Cao, belonging to the family Crassulaceae DC., is described and illustrated from China as a new species. It was collected from Nanwu canyon, Huangnikeng valley, Gaokeng valley and Qingshikeng valley in the Jiulong Mountains, China (P. R.). Morphological diagnostic characters of closely related species are also discussed.

Introduction

Sedum L. is the largest and most widespread genus of the family Crassulaceae DC., comprising ca. 420 species and constituting one third of the family diversity (Thiede and Egli 2007). Consisting of annual and perennial herbs with succulent leaves and stems, this genus is primarily distributed in arid environments in temperate to subtropical regions, with highest diversity in the Himalayas, East Asia, Central America and the Mediterranean (Stephenson 1994, Thiede and Egli 2007, Ito *et al.* 2017). Approximately 121 species (91 endemics) belonging to three sections are found in China; namely, sect. *Filipes* S.H. Fu, sect. *Oreades* K.T. Fu and sect. *Sedum* S.H. Fu (Fu and Ohba 2001). Sect. *Sedum* comprises more than 60 species and is distributed mainly in Asia, with 49 species (34 endemics) in China (Wu *et al.* 2013).

Key to the species:

- | | |
|--|------------------------|
| 1. Leaf axils with viviparous buds or a sterile shoot | 2 |
| - Leaf axils without viviparous buds or a sterile shoot | <i>Sedum alfredii</i> |
| 2. Leaf axils with a long sterile shoot | 3 |
| - Leaf axils with viviparous buds | <i>Sedum viviparum</i> |
| 3. Sterile shoots arising from the base, as long as the flowering shoots; sterile shoots without branches | <i>Sedum subtile</i> |
| - Sterile shoots arising from the base or leaf axils on the stem, white, more than twice as long and half as thick as the flowering shoots; sterile shoots with 1-2 branches | <i>Sedum peltatum</i> |

***Sedum peltatum* M.L. Chen *et* X.H. Cao, sp. nov.**

(Figs 1, 2 & 3)

Diagnosis: Similar to *S. subtile*, but differs in having thinner, much longer, white stolon-like sterile stems with one or two round, verticillate, nearly rotund or oblanceolate - linear leaves usually clustered at the apex.

Sedum peltatum est morphologia similes S. subtili, sed dissimile habendo tenuum, album, quasi-stolon (interpretatio anglice) sterilem stolonem cum verticillatis et paene rotundis frondibus saepe circumglobatis apice, et uno duobusve frondulis.

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Holotypus: China, Anhui, Jiulong Mountains (N30° 07'; E118° 01'), 16th May, 2015; Ming Lin Chen No. 20150516007 (holotype: Herbarium of Anhui Normal University; Isotypes: Herbarium of Anhui Normal University, PE).

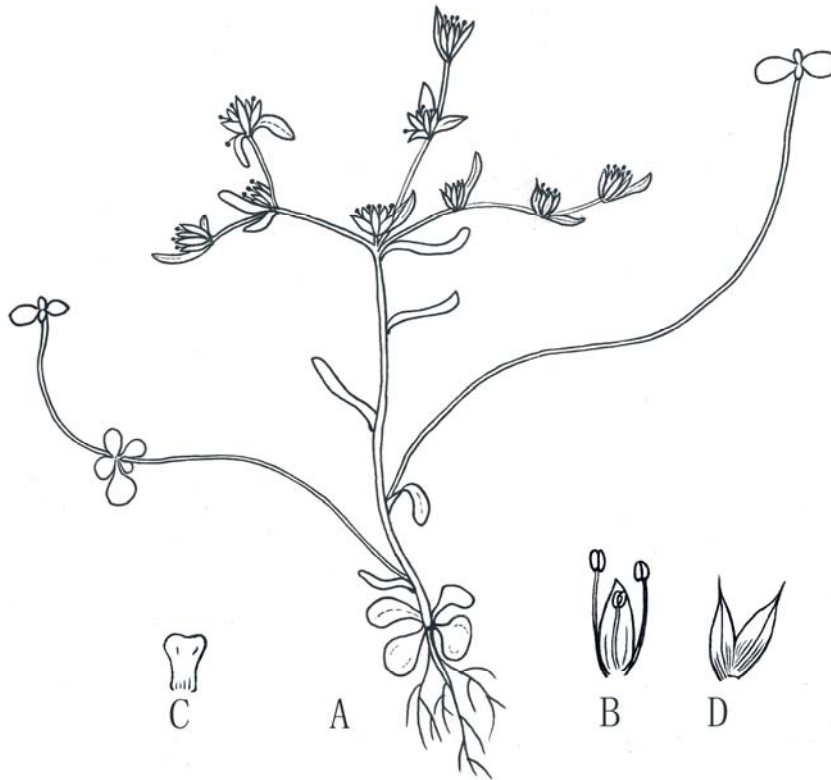


Fig. 1. Schematic diagram of (A) an entire *Sedum peltatum* plant, (B) a petal and anthers, (C) a scale, and (D) parts of the fruit (drawn by Ming-Lin Chen).

Herbs perennial. Sterile stems stolon-like, 8-20 cm, white, sprawled, produced from the base of the flowering stem (Fig. 3A). Fertile stems erect and single, 4 - 12 cm, much shorter than sterile stems (Fig. 3B, C). Fertile stem leaf: proximal stem leaves 3 - 5 verticillate, leaf blade ovate to nearly rotund; distal stem leaves sessile, alternate; leaf blade oblanceolate-linear, 5 - 10 × 1 - 2 mm, base spurred, apex obtuse (Fig. 3D). Sterile stem leaf: one or two round verticillate, nearly rotund or oblanceolate - linear leaves usually clustered at the apex (Fig. 3E). Cyme 3-branched, 1 - 2.5 × 2.5 - 5 cm; branches 3 - 10 flowers; bracts resembling distal stem leaves, linear (Fig. 2). Flowers unequally pantamerous; pedicel 0.5 - 1.5 mm. Sepals oblanceolate to narrowly lanceolate, unequal, 3 - 8 × 0.8 - 1.5 mm, base spurred, apex obtuse. Petals yellow, oblong-ovate to broadly lanceolate, ca. 4.5 × 1.5 mm, apex acute (Fig. 2F). Stamens 10; antesealous, ca. 3 - 3.5 mm; antepetalous, ca. 2-3 mm, inserted slightly above petal base. Tricolporate pollen, striped-reticulate pattern (Fig. 4A, B). Nectar scales oblong-cuneate, ca. 0.2 - 0.4 mm, apex subtruncate to emarginated. Carpels five, oblong, ca. 3-4 mm, base connate for 0.5-1 mm. Styles ca. 1 mm. Follicles stellately divergent at maturity, many seeded. Seeds brown, lanceolate-oblong, ca. 0.5 - 1 mm, reticulate seed coat patterns (Figs 3G and 4C, D).

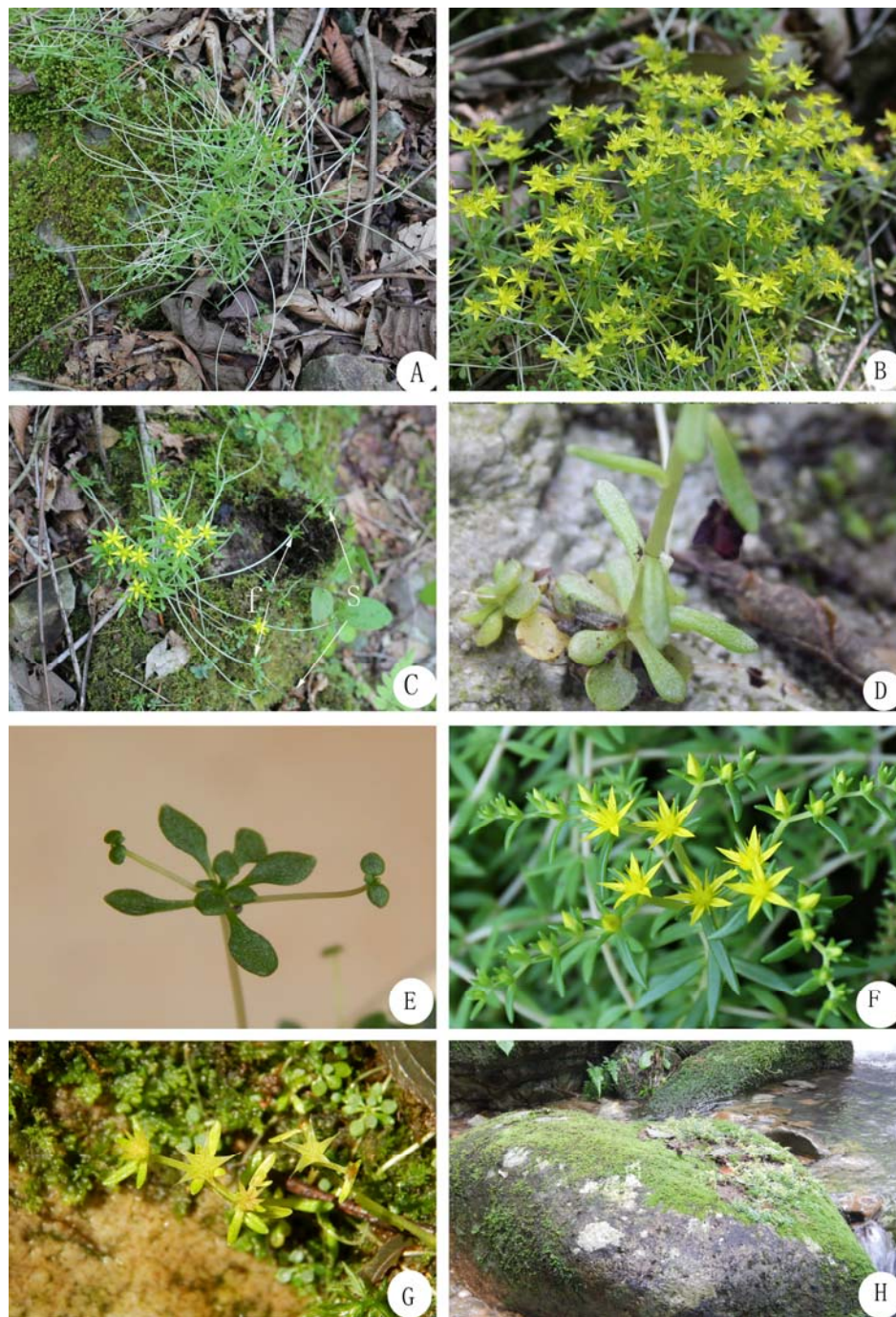


Fig. 2 Growth habits of *Sedum peltatum*. (A) Sterile stems, (B) fertile stems, (C) fertile and sterile stems with clustered leaves (f: first branch; s: second branch), (D) sterile stem leaves, (E) sterile stem showing two round clustered leaves at the apex, (F) flowering stems, (G) fruits and (H) preferred habitat.

This new species was found to be closely related to *Sedum subtile*, with specimens from China having been previously treated as *S. subtile* subsp. *chinense* H. Ohba (Ohba, 1986). *Sedum wannanense* X. H. Guo *et al.* (Zhang *et al.* 1999) and *S. wannanense* var. *incarnatum* X. H. Guo *et al.* both described from Anhui Province (Ningguo Xian), may be synonymous with *S. subtile* (Rao 1996, Fu and Ohba 2001), but *S. peltatum* was easily distinguishable by its thinner and much longer stolon-like sterile stems. Moreover, *S. peltatum* usually presents two round clustered leaves at the apex of the sterile stems. According to Jin (2008), seed micromorphology can be categorized into five types: Orostachys-type, Hylotelephium-type, Phedimus-type, Filipes-type and *Sedum*-type, respectively. The reticulate seed coat patterns of *S. peltatum* are notably different to the mammillate seed coat ornamentation of other *Sedum*-types. *Sedum peltatum* is also closely related to *S. alfredii*, but readily differs in having stolon-like sterile stems.

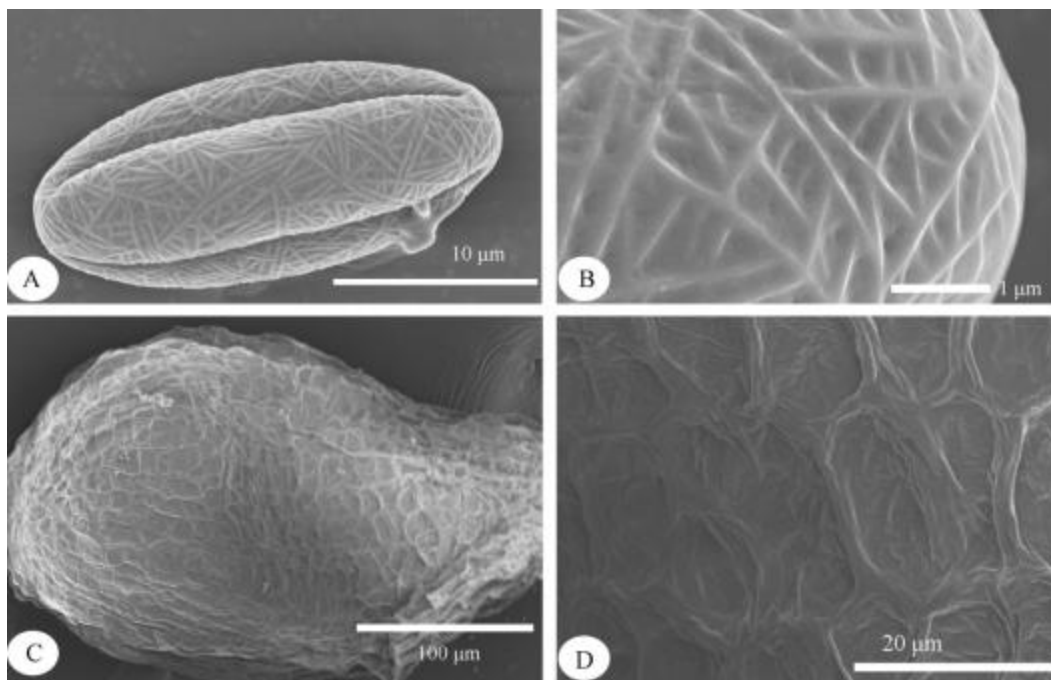


Fig. 3. Micromorphological characteristics of the pollen and seed from *Sedum peltatum*. (A) Pollen and (B) the exine sculpture; (C) seed and (D) seed coat ornamentation.

Phenology: Flowering April-May, fruiting May-June.

Specimens examined: specimen collections from four districts in the Jiulong Mountains (N30° 07'; E118° 01'), Anhui Province, China: Nanwu canyon, Huangnikeng valley, Gaokeng valley and Qingshikeng valley (Fig. 4).

Found in humid valleys under evergreen broad leaf forest (altitudes of ca. 500 - 1500 m) in South Anhui, China (Fig. 3H). Four populations consisting of more than 3800 plants discovered along four valleys (Nanwu canyon, Huangnikeng valley, Gaokeng valley and Qingshikeng valley) in the Jiulong Mountains Nature Reserve (Table 1). Table 1 shows the estimated population size of this new species. Since it is currently represented by only four populations restricted to a small area, it is considered vulnerable based on IUCN 3.01 (IUCN 2001).

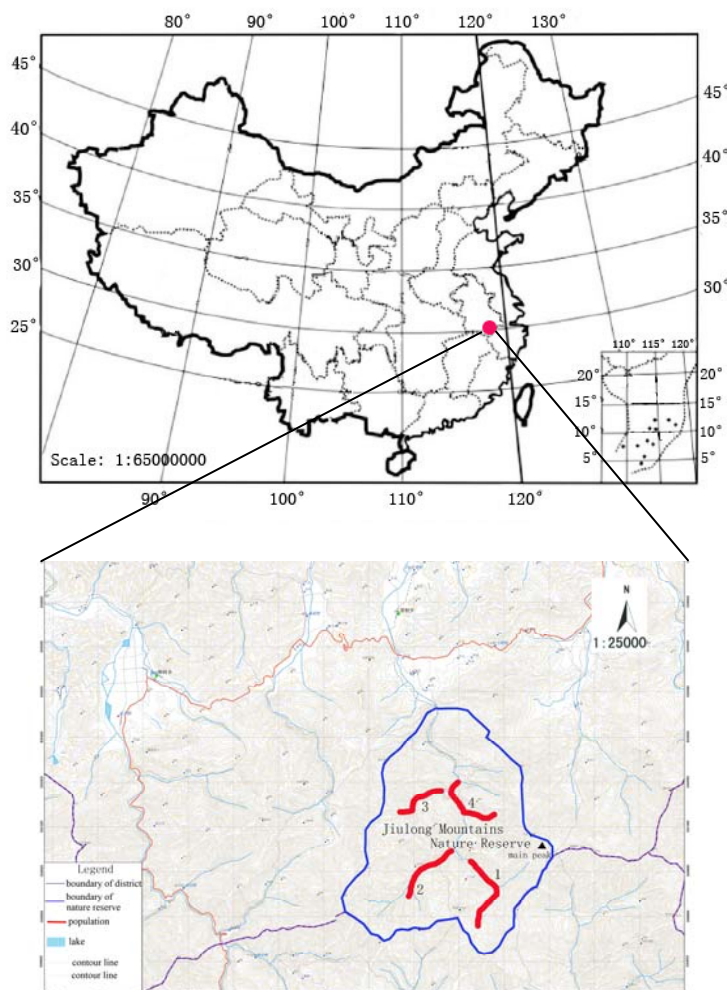


Fig. 4. Distribution of *Sedum peltatum* and the location of the study populations. (Note: 1, Nanwu population; 2, Qingshikeng population; 3, Huangnikeng population, and 4, Gaokeng population).

Table 1. Ecological characteristics of the four populations of *Sedum peltatum*.

Population	Area (m ²)	Altitude (m)	Habitat	Population size
Nanwu	6 × 10 ⁴	700 - 1500	Moist cliffs, shady moist rocks, stream banks	>1800
Qingshikeng	3.3 × 10 ⁴	800 - 1100	Stream banks	>50
Huangnikeng	3 × 10 ⁴	800 - 1200	Moist cliffs, shady moist rocks, alongside a brook	>1100
Gaokeng	4.5 × 10 ⁴	500 - 1000	Moist cliffs, stream banks, underbrush	>750

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