
New Combinations in *Phedimus* (Crassulaceae)

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ABSTRACT. During the preparation of the account of the Crassulaceae for the *Flora of China*, Volume 8, it was decided that *Phedimus* Rafinesque should be separated from *Sedum* L. It is therefore necessary to publish new combinations in *Phedimus* for three varieties and one species previously recognized in *Sedum*: *P. aizoon* (L.) 't Hart var. *latifolius* (Maximowicz) H. Ohba, K. T. Fu & B. M. Bartholomew, comb. nov., *P. aizoon* var. *scabrus* (Maximowicz) H. Ohba, K. T. Fu & B. M. Bartholomew, comb. nov., *P. aizoon* var. *yamatutae* (Kitagawa) H. Ohba, K. T. Fu & B. M. Bartholomew, comb. nov., and *P. hsinganicus* (Y. C. Chu ex T. N. Liou) H. Ohba, K. T. Fu & B. M. Bartholomew, comb. nov. One subgeneric name, *Phedimus* subg. *Aizoon* (L. K. A. Koch ex Schönland) H. Ohba & Turland, is validated; it was first proposed by 't Hart but with an erroneous (and uncorrectable) basionym citation. The name *Sedum aizoon* L. var. *scabrum* Maximowicz is lectotypified.

The most widely accepted infrageneric classification of *Sedum* L. was first outlined by Ohba (1978). Until then, most species of the Sedoideae were classified in *Sedum*. Ohba (1978) classified *S. aizoon* L. and allied species in *S.* subg. *Aizoon* (L. K. A. Koch ex Schönland) H. Ohba. In the most recent commentaries on the Asian Sedoideae, Ohba (1995) separated *S.* subg. *Aizoon* from *S.* subg. *Spathulata* (Borissova) H. Ohba, treating the former as a distinct genus under the name *Aizopsis* Grulich, while 't Hart (1995) included *S.* subg. *Aizoon* and *S.* subg. *Spathulata* in *Phedimus* Rafinesque. Ham

(1995) as well as Ham and 't Hart (1998) demonstrated that *S.* subg. *Aizoon* and *S.* subg. *Spathulata* are paraphyletic with respect to *S.* subg. *Sedum*. Though the species of *S.* subg. *Spathulata* differ from those of *S.* subg. *Aizoon* by their creeping sterile stems, purple or white petals, and nearly smooth testae (Ohba, 1978), these differences are insufficient to justify separation at generic rank, and so 't Hart's treatment is followed here. Except for Gontcharova (1999), *Aizopsis* has never been used in Asian regional floras. Ohba has adopted *Phedimus* in the new English-language *Flora of Japan* (Ohba, in press) and will do likewise in the forthcoming account of the Crassulaceae for the *Flora of China*, Volume 8 (Fu & Ohba, in press). Most combinations in *Phedimus* were published by 't Hart (1995), but the following additional new combinations are needed for the *Flora of China*.

Sedum, *Phedimus*, *P.* subg. *Phedimus*, and *P.* subg. *Aizoon* are distinguished as follows:

- 1a. Leaves terete or semiterete, margin always entire; testa reticulate or papillate-reticulate . . . *Sedum*
- 1b. Leaves flattened, margin serrate or crenate; testa longitudinally costate or subsmooth *Phedimus*
 - 2a. Petals purple or white; creeping sterile stem present; testa subsmooth
. *Phedimus* subg. *Phedimus*
 - 2b. Petals yellow; creeping sterile stem absent; testa longitudinally costate
. *Phedimus* subg. *Aizoon*

Phedimus Rafinesque, Amer. Monthly Mag. & Crit. Rev. 1: 438. 1817.

Phedimus subg. **Phedimus**. *Asterosedum* Grulich, Preslia 56: 38. 1984. TYPE (designated by 't Hart, 1991: 52): *Phedimus stellatus* (L.) Rafinesque (*Sedum stellatum* L.; *Asterosedum stellatum* (L.) Grulich).

Spathulata (Borissova) Á. Löve & D. Löve, Taxon 34: 163. 1985. *Sedum* sect. *Sedum* subsect. *Spathulata* Borissova, Novosti Sist. Vyssh. Rast. 6: 117. 1970. *Sedum* subg. *Spathulata* (Borissova) H. Ohba, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 12: 178. 1978. *Phedimus* sect. *Spathulata* (Borissova) H. Ohba, in 't Hart & Eggli, Evol. & Syst. Crassulac. 156. 1995. TYPE: *Spathulata spuria* (Marschall von Bieberstein) Á. Löve & D. Löve (*Sedum spurium* Marschall von Bieberstein; *Phedimus spurius* (Marschall von Bieberstein) 't Hart).

When 't Hart (1991: 52) lectotypified *Phedimus*, that genus became homotypic with the later name *Asterosedum*, which was typified by *A. stellatum* in its protologue. Therefore, *Asterosedum* is now nomenclaturally superfluous, but it remains legitimate because the two names were not homotypic when *Asterosedum* was first published (*St. Louis Code*, Art. 52 Note 2, Greuter et al., 2000).

Phedimus subg. **Aizoon** (L. K. A. Koch ex Schönland) H. Ohba & Turland, comb. nov. Basionym: *Sedum* sect. *Aizoon* L. K. A. Koch ex Schönland, in Engler & Prantl, Nat. Pflanzenfam. 3(2a): 30. 1890. *Sedum* subg. *Aizoon* (L. K. A. Koch ex Schönland) H. Ohba, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 12: 179. 1978. *Aizopsis* Grulich, Preslia 56: 35. 1984. TYPE: *Phedimus aizoon* (L.) 't Hart (*Sedum aizoon* L.; *Aizopsis aizoon* (L.) Grulich).

The combination *Phedimus* subg. *Aizoon* was first proposed by 't Hart (1995: 168). However, the basionym 't Hart cited ("*Sedum* sect. *Aizoon* [W. D. J.] Koch, Syn. Fl. Germ. [Helv.], 259. 1835") does not exist. No *S.* sect. *Aizoon* was published by Koch in his account of *Sedum* in *Synopsis florum germanicae et helveticae* (Koch, 1835: 257–261). Therefore, 't Hart's combination is invalid under Article 33.3 of the *St. Louis Code* (Greuter et al., 2000). Unfortunately, this incorrect basionym citation cannot be treated as an error to be corrected under Article 33.4 (since it is an omission) or Article 33.6, thus necessitating the current nomenclatural action.

Phedimus aizoon (L.) 't Hart, in 't Hart & Eggli, Evol. & Syst. Crassulac. 168. 1995. Basionym: *Sedum aizoon* L., Sp. Pl. 1: 430. 1753. *Aizopsis aizoon* (L.) Grulich, Preslia 56: 37. 1984. TYPE: not designated; original material: Herb. Linn. 595.1 (LINN); [icon] "Anacampseros flore flavo" Amman, Stirp. Rar. Ruth. 96, t. 11. 1739.

Phedimus aizoon var. **latifolius** (Maximowicz) H. Ohba, K. T. Fu & B. M. Bartholomew, comb. nov. Basionym: *Sedum aizoon* L. var. *latifolium* Maximowicz, Mém. Acad. Imp. Sci. St.-Petersbourg Divers Savans 9 [Prim. Fl. Amur.]: 115. 1859. TYPE: Russia. Amur River region: "in der Nähe der Bureja-Mündung," 23 Aug 1856, Maximowicz s.n. (holotype, LE).

Sedum austromanshuricum Nakai & Kitagawa, Rep. Exped. Manchoukuo Sect. 4, 1: 26. 1934 [as "*austromanshuricum*"]. *Sedum aizoon* L. var. *austromanshuricum* (Nakai & Kitagawa) Kitagawa, Lin. Fl. Manshur. 247. 1939 [as "*austromanshuricum*"]. TYPE: China. Hebei: "in monte Wu-ling-shan [Wuling Shan]," 2 Sep 1933, T. Nakai, M. Honda & M. Kitagawa 1925 (holotype, TI).

Phedimus aizoon var. **scabrus** (Maximowicz) H. Ohba, K. T. Fu & B. M. Bartholomew, comb. nov. Basionym: *Sedum aizoon* L. var. *scabrum* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 29: 144. 1883. TYPE: Mongolia/China. "Mongolia australis: Siwan-tze" [= Xiwanzi, now Chongli, NW of Beijing in Hebei Province], 1877, Artselaer s.n. (lectotype here designated, LE).

Ten syntypes were cited by Maximowicz in the protologue: the first three from "Mongolia australis" and the others from China, although all were probably collected in what is now Chinese territory. The first cited syntype, at LE, collected from "Siwan-tze," agrees with the taxon as currently understood with its narrowly lanceolate or elliptic-lanceolate leaves and is here designated as the lectotype. The second cited syntype, also at LE, collected from "Alaschan" by Przewalski in July 1873, better resembles *Phedimus hybridus* (L.) 't Hart in its broadly oblanceolate to narrowly obovate leaves. The authors have not traced the other syntypes.

Phedimus aizoon var. **yamatutae** (Kitagawa) H. Ohba, K. T. Fu & B. M. Bartholomew, comb. nov. Basionym: *Sedum aizoon* L. var. *yamatutae* Kitagawa, Lin. Fl. Manshur. 247. 1939 [as "*Yamatutai*"]. TYPE: China. Liaoning: "Prov. Feng-t'ien: In montibus Chien-shan [Qian Shan]," s.d., K. Yamatuta s.n. (holotype, TI).

Sedum aizoon L. f. *angustifolium* Franchet, Nouv. Arch. Mus. Hist. Nat., sér. 2, 6: 9. 1883 [as "*angustifolia*"]. TYPE: China. Hebei: "environs de Pékin [Beijing]," s.d., David 566 (holotype, P).

Phedimus hsinganicus (Y. C. Chu ex S. H. Fu & Y. H. Huang) H. Ohba, K. T. Fu & B. M. Bartholomew, comb. nov. Basionym: *Sedum hsinganicum* Y. C. Chu ex S. H. Fu & Y. H. Huang, in T. N. Liou, Fl. Pl. Herb. Chin. Bor.-Orient. 4: 230, t. 108. 1980. TYPE: China. Nei Mongol: Hulun Buir Meng, Ergun Youqi, 750 m, 8 Aug. 1951, Z. Wang 1834 (holotype, IFP not seen).

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