

Nomenclature of *Soldanella* Linn. (Primulaceae)

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Following a revision of *Soldanella*, we here synonymize 109 non-hybrid names of this genus. We also lectotypify or neotypify 17 names of *Soldanella*. These are *S. alpina* L., *S. alpina* F. W. Schmidt, *S. alpina* L. var. *carestiae* Cristofolini et Pignatti, *S. alpina* L. f. *major* Cristofolini et Pignatti, *S. austriaca* Vierh., *S. carpatica* Vierh., *S. marmarossiensis* Kldst., *S. minima* Hoppe, *S. minima* Hoppe subsp. *samnitica* Cristofolini et Pignatti, *S. minima* Hoppe f. *latifolia* Cristofolini et Pignatti, *S. montana* Mikan, *S. montana* Willd., *S. montana* Willd. subsp. *faceta* Kress, *S. occidentalis* Vierh., *S. pusilla* Baumg., *S. pusilla* Baumg. f. *calcicola* Vierh., and *S. pusilla* Baumg. var. *chrysosplenifolia* J. Murr.

KEYWORDS: nomenclature, *Soldanella*, synonymization, typification.

INTRODUCTION

The genus *Soldanella* L. (Primulaceae), characterized by its five violet funnel-shaped or campanulate corollas with lacinate lobes (Pax, 1905), is endemic to the European alpine system (Ozenda, 1995; Zhang & Kadereit, 2002). A molecular study based on ITS and AFLP variation supported its monophyly (Zhang & al., 2001). After the description of the genus by Linnaeus (1753) nearly 150 names were published for only 16 species and four subspecies recognized in the most recent revision by Zhang & Kadereit (2002). Supplementing this revision, we here will deal with the nomenclatural problems in the genus.

MATERIAL AND METHODS

The classification of *Soldanella* follows the comprehensive revision of the genus (Zhang & Kadereit, 2002) which was based on morphological studies of over 6300 herbarium specimens, field observations, and molecular (ITS, AFLPs) data (Zhang & al., 2001). Herbarium specimens were received on loan from the following institutions: ATH, B, BC, BERN, BM, BP, BRNM, C, FI, G, GB, GJO, GZU, H, JE, K, KL, KRAW, L, LD, LI, LY, M, MA, MJG, PAD, PRC, RO, SIB, SZB, UPS, V, VER, W, WA, WU, Z, ZA and ZT.

The nomenclatural treatment follows the *ICBN* (Greuter & al., 2000). Typifications and synonymizations are based on literature and herbarium studies supplemented by distributional information (Zhang & Kadereit, 2002).

Soldanella Linn., Sp. Pl. 144. 1753. – Type: *Soldanella alpina* Linn.

≡ “*S. (stat. incert.) Crateriflores*” Borbás in Beih. Bot. Centralb. 10: 281. 1901, *nom. inval.* (Art. 22.2) s.ampl. ≡ “*S. sect. Crateriflores*” Knuth in Engler, Pflanzenz. 4 (237): 225. 1905. *nom. invalid.* (Art. 22.2).

= *S. (stat. incert.) Tubiflores* Borbás in Beih. Bot. Centralb. 10: 281. 1901. s. ampl. ≡ *S. sect. Tubiflores* (Borbás) Knuth in Engler, Pflanzenz. 4 (237): 225. 1905 ≡ *S. ser. Tubiflores* (Borbás) Kress, Primulaceen-Studien 7: 24. 1984; Meyer in Haussknechtia 2: 32. 1985 (s.ampl.). – Lectotype [designated by Kress (1984) for ser. *Tubiflores* (Borbás) Kress]: *S. pusilla*.

= *S. (sect.) Campanuliflores* Grinț., Gen. Soldan. Soldan. Haretii 7. 1908. s. ampl. – Type: *S. haretii* Grinț. = “*S. ser. Alpinae*” Pawłowska in Fragm. Florist. Geobot. 9: 26. 1963. *nom. inval.* s. ampl. – “Type”: *S. alpina* L.

= *S. ser. Montanae* Pawłowska in Fragm. Florist. Geobot. 9: 26. 1963. s.ampl. – Type: *S. montana* Willd.

= *S. ser. Pindicae* F. K. Meyer in Haussknechtia 2: 22. 1985. s.ampl. – Type: *S. pindicola* Hausskn.

= *S. ser. Pusillae* F.K. Meyer in Haussknechtia 2: 32. 1985. *nom. illeg.* s. ampl. – Type: *S. pusilla* Baumg.

The type of *Soldanella* is *S. alpina* Linn, the only species placed in the genus when originally described by Linnaeus (Art. 37.3).

Borbás (1901) divided *Soldanella* into two groups without formal rank, “*Crateriflores*” and *Tubiflores*. Knuth (1905) for the first time treated them as sections.

The name “*S. sect. Crateriflores*” is invalid (Greuter & al., 2000: Art. 22.2) but until recently has often been used (e.g., Oberbeck, 1979). Pawłowska (1972) was the

first to use the autonym *S. sect. Soldanella* as the correct name.

Kress (1984) lectotypified *S. ser. Tubiflores* (Borbas) Kress [basonym: *S. (stat. incert.) Tubiflores* Borbas (1901)] with *S. pusilla*. Unaware of Kress' earlier (1984) lectotypification of sect. and ser. *Tubiflores*, Meyer (1985) restricted his “ser. *Tubiflores*” to *S. minima* (and *S. austriaca*). This series was coined as “autonym” of sect. *Tubiflores* (now allowed only in respect to the generic name), left without latin description, and is therefore an invalid name. The name *S. ser. Pusillae* F. K. Meyer (1985) is invalid (Greuter et al., 2000: Art. 52.1.).

1. *Soldanella alpina* L., Sp. Pl. 144. 1753. - Lectotype (designated here): Herb. Clifford 49 *Soldanella* 1 (BM-557943).

Meyer (1985) selected the illustration of “*Soldanella alpina minor*” Clusius, Rar. Pl. Hist. 309. 1601 as the lectotype of *S. alpina* L. because Linnaeus (1753) in his description of *S. alpina* cited his *Hortus Cliffortianus* (1737) which contains older synonyms, including those in Clusius, Rar. Pl. Hist. 309. 1601. Meyer's argumentation, however, is flawed because Clusius' name was not cited in the protologue and cannot therefore be considered an original element. *Hortus Cliffortianus* was published in 1737, and Linnaeus listed many synonyms there, of which not all were retained in his *Species Plantarum* (1753), including “*Soldanella alpina minor*”. There are good arguments for not considering such elements as potential type material, including the possibility that Linnaeus in 1753 no longer considered those synonyms as belonging to the species dealt with.

Following S. Cafferty (BM, pers. comm.), original elements of *S. alpina* include a Burser sheet in Uppsala. This sheet can be traced to Linnaeus through the inclusion of Bauhin pin. 295, using the Burser herbarium, in his synonymy of *S. alpina*. There also exists a LINN sheet annotated with both the name and the relevant *Species Plantarum* entry number “1”. Such an annotation can be taken as proof that the sheet was in the possession of Linnaeus when describing *S. alpina*. In total, the original material for *S. alpina* from which any type must be designated is: (1) Herb. Burser, Hort. Sicc. XVII: 15 (UPS), (2) Herb. Clifford 49 *Soldanella* 1 (BM), (3) Herb. Linn 200.1 (LINN), (4) [icon] Mattioli, Pl. Epit. 254. 1586 and (5) [icon] Morison Pl. Hist. Univ. 2: 285, s. 3, t. 15, f. 8. 1680. We here lectotypify *Soldanella alpina* L. by selecting Herb. Clifford 49 *Soldanella* 1 (BM-557943).

1a. *Soldanella alpina* L. subsp. *alpina*

= *S. clusii* F. W. Schmidt, Fl. Boëm. 2: 50. 1793 ≡ *S. montana* Willd. var. *clusii* (F. W. Schmidt) Thomé, Fl. Deutschl. Österr. Schweiz 4: 21. 1905. – Lectotype [des-

ignated by Meyer (1985)]: “*Soldanella alpina minor*” Clusius, Rar. Pl. Hist. 309. 1601: fig.

= “*S. alpina* L. var. *vulgaris*” Seringe, Mus. Helv. Hist. Nat. (Bot.) 1: 83. 1823. *nom. inval.* p.p.

= *S. alpina* L. var. *pubescens* Seringe, Mus. Helv. Hist. Nat. (Bot.) 1: 84. 1823 (lectotype not designated).

= *S. alpina* L. var. *rufescens* Seringe, Mus. Helv. Hist. Nat. (Bot.) 1: 84. 1823 (lectotype not designated).

= *S. alpina* L. var. *minor* Neileich, Nachtraege. Fl. Wien 219. 1851 (non Seringe 1823) *nom. illeg.* (lectotype not designated).

= *S. pyrolaefolia* Schott, Nym. & Kotschy, Anal. Bot. 16. 1854 ≡ *S. alpina* L. f. *pyrolaefolia* (Schott, Nym. & Kotschy) Hayek, Fl. Steierm. 2: 53. 1911 ≡ *S. alpina* L. var. *pyrolaefolia* (Schott, Nym. & Kotschy) Nikolic in Josifovic, Fl. Srbije 3: 488. 1972 (lectotype not designated).

= *S. alpina* L. f. *crenatifolia* Beck in Ann. K. K. Naturhist. Hofmus. 13 (1): 7. 1898. – Type: Bosnia & Hercegovina, Maglic Planina, 1888, *G. Beck s.n.* (holotype, not seen).

= “*S. alpina* L. var. *typica*” Fiori in Fiori & Paoletti, Fl. Anal. Ital. 2: 220. 1902. *nom. inval.* (Art. 24.3).

= *S. occidentalis* Vierh. in Urban & Graebn., Festschr. Ascherson 503. 1904 ≡ *S. alpina* L. var. *occidentalis* (Vierh.) Grinț., Gen. Soldan. Soldan. Haretii 14. 1908. – Lectotype (designated here): France, Pyrenees, Gavarnie, Jun 1885, *Ed. Timbal-Lagrave & Ed. Marçais s.n.* (lectotype, WU!; isolectotype, ZT!).

= *S. alpina* L. var. *planiflora* Murr in Allg. Bot. Z. Syst. 12: 202. 1906. – Type: Italy, Trient, Monte Vasone, *J. Murr s.n.* (holotype, not found).

= *S. alpina* L. f. *elata* Zenari in Atti Reale Ist. Sci. Lett. Arti 101: 565. 1942. – Syntypes: Italy, Cadini di Misurina, alt. 2100–2200 m.

= *S. alpina* L. f. *major* Cristofolini & Pignatti (in Bull. Soc. Bot. Ital. 1961: 158, 161. 1961. *nom. inval.*) in Webbia 16: 471. 1962. – Lectotype (designated here): Herbarium R. Musei Fiorentini / *Soldanella alpina* L. / 7 Aug 1869 / Piemonte, Valdieri, Bagni di Valdieri, 1200–1300 m / Da Parlatore in Aug 1869, Revis. Cristofolini & Pignatti 1960/61 Nr. 361 [specimen 1 fructu, FI-4072-2(!)]. Paratype: Erbario del collegio Rosinini / Flora Ossolana / *Soldanella alpina* L. / Alpi di Gondo, Giugno 1888 / S. Rossi / Da Rossi. Dec 1888, Revis. Cristofolini & Pignatti 1960/61 Nr. 359 [specimina 3 floribus, FI-4072-1(!)].

= *S. alpina* L. var. *squamulosa* C. Simon in Bauhinia 6: 364. 1979. *syn. nov.* – Syntypes: Switzerland, Tessin, Locarno, Monte Cardada, “La Cimetta”, bei der oberen Seilbahnstation, 1670 m, am Rand des Schnees unter einer dichten Baumkrone ausgegraben und in Basel kultiviert. Blütenstiele infolge Schneedrucks alle gebrochen; vorliegende Pflanzen blühten reichlich am 7

April 1973 in der Basler Kultur, 22 Apr 1972, *C. Simon* 73-539 (BABG!); Tessin, Locarno, Monte Cardada, auf der Crete der “Mottoni”, 1670 m, 1 May 1961, *C. Simon* 73-539 (BABG!).

Soldanella clusii F. W. Schmidt (1793) is the second binary name of the genus published after Linnaeus (1753). It is a synonym of *S. alpina*. Thomé (1905) regarded it as an alpine form of *S. montana*. The lectotypification by Meyer (1985: 10) has priority over that by Kress (1993: 11).

Seringe’s (1823) *S. alpina* var. *minor* to our knowledge is the oldest use of this name which was also associated with Neilreich (1851) and Schur (1866). Gaudin (1828) cited *S. alpina* ? *minor* Poiret (1806). According to our investigations, however, Poiret (1806) did not publish this name but only mentioned “*S. alpina minor*” Clusius (1601).

Soldanella pyrolaefolia also is one of the oldest names in the genus. Schott & al. (1854) did not cite any specimen when they described this species. Although Beck (1898) stated that Schott’s drawing of this taxon is deposited at W, it could now not be found there [H. Riedl (W), pers. comm.]. It is unknown whether such drawing ever existed or was destroyed. According to Neilreich (1868), the species is based on material collected by F. Maly in Slovenia and Croatia. The only way to typify this name may be by selecting material in Schott’s herbarium (W) although this contains only fragments of cultivated plants (Neilreich, 1868).

Soon after *S. pyrolaefolia* was described, it was treated as a synonym of *S. alpina* (Beck, 1898). Almost nobody recognized it.

Soldanella alpina is the oldest valid name of the genus and has rarely been misused. Exceptions to this are *S. alpina* var. *montana* sensu Fiori & Béguinot (1902) and Fiori (1926), *S. hungarica* sensu Knuth (1905) p.p. and *S. montana* sensu Lecoq & Lamotte (1847) and Zangheri (1976).

1b. *Soldanella alpina* L. subsp. *cantabrica* A. Kress, Primulaceen-Studien 12: 8. 1997. - Type: Spain, Burgos, Gebiet von Espinosa de los Monteros / Castro de Valnera / Bei der Schistation südlich des Portillo de Lunada / zwischen 1275 und 1400 m / 18. V. 1988. / ibnr 1632a (holotype: specimina 5 floribus, herb. A. Kress!; isotype, JACA).

2. *Soldanella villosa* Darracq in Labarrère in Actes Soc. L. Bordeaux 16, Melanges: 2. 1849 ≡ *S. montana* Willd. var. *villosa* (Darracq) Grinț., Gen. Soldan. Soldan. Haretii 11. 1908 ≡ *S. montana* Willd. subsp. *villosa* (Darracq) Lüdi in Hegi, Illustr. Fl. Mitteleurop. 5 (3): 1831. 1927. - Type: France, se trouve sur une montagne peu élevée, dite Pas de Rolland, près Cambo, dans les

Pyrénées basques, *U. Darracq s.n.* (P).

In the past, this species was either neglected or regarded as part of *S. montana* without rank (Grenier & Godron, 1850; Knuth, 1905; Lefranc & al., 1973), as a variety (Grințescu, 1908), or as a subspecies (Lüdi, 1927). Its general acceptance as a species goes back to Pawłowska (1966).

3. *Soldanella pindicola* Hausskn. in Mitt. Thür. Bot. Ver. 5 (3): 61. 1886 ≡ *S. montana* Willd. var. *pindicola* (Hausskn.) Grinț., Gen. Soldan. Soldan. Haretii 11. 1908. - Type: C. Haussknecht. Iter Graecum 1885 / *Soldanella pindicola* Hausskn. / Pindus Tymphaeus: in summo montis Zygos (Lakmon veter.) supra Metzovo, alt. 4500–5000’, substratu silicico-serpentino / dieb. Juli [holotype-I: specimina 13 (3 fructibus), JE!; holotype-II: specimina 3 non scapis et 1 scapo, JE!; isotypes: B! (film Nr. 753), WU!].

= *S. dimonieii* Vierh. in Österr. Bot. Z. 59: 148. 1909 ≡ *S. pindicola* Hausskn. var. *dimonieii* (Vierh.) Markgraf in Notizbl. Königl. Bot. Gart. Berlin 11: 221, 223. 1931. - Type: PLANTAE MACEDONICAE / *Soldanella Dimonieii* Vierhapper / Ad nives liquescentes mt. Jablanitza / solo calc. alt. 2000–2200 m / VII. 1908. / leg. Dimonie [holotype, WU!; isotypes, WU!, W! (MJG, photocopy)].

= *S. macedonica* F. K. Meyer in Haussknechtia 2: 23. 1985. syn. nov. - Type: Herbarium Haussknecht / Flora der albanisch-mazedonischen Grenzgebirge / *Soldanella pindicola* Hausskn. ? *Dimonieii* (Vierh.) Markgr. = *S. dimonieii* Vierh. / Mavrovi Hanovi: Korab / 13.–14. 7. 1936, O. & E. Behr 115 [holotype: specimina 6 (5 floribus et 1 non scapo), JE!; isotype, B!].

The taxonomy of *S. pindicola* and the following two species has always been under dispute. Initially even *S. pindicola* was not generally recognized and occasionally identified as *S. alpina* (Degen, 1902), *S. major* (Hermann, 1956), *S. pyrolaefolia* (Borbás, 1901) or *S. scardica* (*nom. nud.*; Degen, 1902). Other authors accepted both *S. pindicola* and *S. dimonieii* (Markgraf, 1927; Lüdi, 1927; Hayek, 1928; Pawłowska, 1972; Meusel & al., 1978; Polunin, 1980; Kress, 1984), and some considered *S. dimonieii* as a variety of *S. pindicola* (Markgraf, 1931; Honcik, 1963, 1967). Meyer (1985) was the first to treat *S. dimonieii* as a synonym of *S. pindicola*. At the same time, Meyer (1985) described a new species, *S. macedonica*. Based on our morphological and molecular analyses, we recognize neither *S. dimonieii* nor *S. macedonica*.

“*Soldanella scardica*” Degen [1902: 92 (Footnote). *nom. nud.* = “*S. hungarica* Simk. var. *scardica*” Bornmüller 1927: 11. *nom. nud.*] should be included in *S. pindicola*.

4. *Soldanella rhodopaea* F.K. Meyer in Haussknechtia 2: 25. 1985. – Type: Herbarium Haussknecht, Jena / Flora von Bulgarien / *Soldanella rhodopaea* F. K. Meyer / Holotypus / Rhodopen: Prespa-Gebiet, Nordhang des Prespa oberhalb Manastir / 1973, 23. 7. / H. & R. Manitz & R. Marstaller (holotype: specimina 3 fructibus, JE!).

This is a little known species which occurs only in the Rhodopi Mountains (Greece & Bulgaria). The following taxa should be included in *S. rhodopaea*: *S. alpina* sensu Hermann (1957) p.p.; *S. alpina* var. *hungarica* sensu Stojanoff & Stefanoff (1925) p.p.; *S. carpatica* sensu Peev (1976, 1982) p.p. (see also Meyer 1985), Raus (1986), *S. hungarica* sensu Vierhapper (1904) p.p. and Meusel & al. (1978) p.p., *S. hungarica* subsp. *major* sensu Pawłowska (1963) p.p., and *S. major* sensu Vierhapper (1904) p.p.

5. *Soldanella chrysosticta* A. Kress, Primulaceen-Studien 7: 20. 1984. p.p. – Type: Plantae rumeliae orientalis exsiccatae / curante Dre de Degen / a. 1892 a J. Wagner lectae. / Nr. 127 *Soldanella montana* W. var. *hungarica* Simk. / In pratis alpinis montis “Musalla” Rhodopes centralis / d. 31 Jul (holotype, W!; isotypes, P, WU!).

= *S. cyanaster* O. Schwarz [1975: 45, *nom. nud.*] in Meyer in Haussknechtia 2: 8. 1985. – Type: Herbarium Haussknecht, Jena / Flora Bulgarica / 9047 *Soldanella cyanaster* O. Schwarz, n. sp. / Pirin, Bansko, Aufstieg zur Hütte Vichren (El Tepe), ca. 1600 m / 1967 / 13. V. leg. F. K. + J. Meyer (holotype: specimina 4 floribus, JE!; isotype: specimina 3 floribus, JE!).

= *S. pelia* T. Raus in Strid, Mountain Fl. Greece 1: 337. 1986. – Type: Greece, Thessalien, Nomos Magnisia, Eparchia Volos, Mt. Pilion, Agriolefkes, 30. V. 1982, T. Raus 6700 (holotype, B).

Based on morphological and molecular evidence (Zhang & al. 2001; Zhang & Kadereit, 2002), we here synonymize *S. pelia* with *S. chrysosticta*. A morphometrical analysis by Kress (1988) supports this decision.

The following material should be included in this species: *S. alpina* var. *hungarica* sensu Stojanoff & Stefanoff (1925) p.p.; *S. alpina* var. *montana* sensu Stojanoff & Stefanoff (1925) p.p.; *S. carpatica* sensu Peev (1982) p.p.; *S. hungarica* sensu ??? author missing (1928) p.p., Meusel & al. (1978) p.p., Nikolic (1972) p.p., Oberbeck (1979) p.p., Peev (1977) p.p., Peev (1982) p.p., Vierhapper (1904) p.p.; *S. hungarica* subsp. *hungarica* sensu Pawłowska (1963) p.p.; *S. hungarica* subsp. *major* sensu Pawłowska (1963) p.p.; *S. major* sensu Hermann (1956) p.p., Janchen (1958) p.p., Jávorka (1925) p.p., Vierhapper (1904) p.p.; *S. montana* sensu Hayek (1928) p.p., Lowe (1988) p.p., Meusel & al. (1978) p.p., Oberbeck (1979) p.p., Pawłowska (1963)

p.p., Polunin (1980) and *S. montana* subsp. *hungarica* var. *minor* sensu Lüdi (1927) p.p. Additionally, *S. hungarica* sensu Nikolic (1972) may belong to *S. chrysosticta* because *S. hungarica* does not occur in Serbia.

6. *Soldanella calabrella* A. Kress, Primulaceen-Studien 8: 24. 1988. – Type: Italy, Calabria, Prov. Cosenza / Gebiet im SW von Camigliatello Silano: auf der O-Seite des Baches Curcio, am “dritten” Zulauf / ca. 1425 m, 13. V. 1986, A. Kress s.n. (holotype: specimina 3 floribus, herb. A. Kress!; isotypes, herb. A. Kress!, M!).

This is a very distinct but not well-known species and remained undescribed until 1988 (Kress, 1988). Before this, it was regarded as *S. alpina* (Vierhapper, 1926; Hermann, 1957; Cristofolini & Pignatti, 1961, 1962; Meusel & al., 1978; Oberbeck, 1979; Pignatti, 1982), “*S. alpina* var. *typica*” (Fiori & Béguinot, 1902; Fiori, 1926), *S. chrysosticta* (Kress, 1984), *S. hungarica* subsp. *major* (Zangheri, 1976; Meusel & al., 1978; Oberbeck, 1979; Pignatti, 1982) or *S. montana* subsp. *hungarica* (Cristofolini & Pignatti, 1961, 1962).

7. *Soldanella carpatica* Vierh. in Urban & Graebn., Festschr. Ascherson 504. 1904 ≡ *S. montana* Willd. var. *carpatica* (Vierh.) Grint., Gen. Soldan. Soldan. Haretii 10. 1908. – Lectotype (here designated): Ungarn: Auf feuchtem Kalkboden (am Rande eines Giessbaches) im Demenova-Thale, südlich von Lipto-Szt.-Niklos (ca. 800 m) (Com. Liptau) / 18. 5. 1902 / leg. F. Vierhapper [lectotype: specimina 7 floribus, WU!; isolectotypes: WU!, herb. J. Nevole, GZU!; LI!].

= *S. montana* Willd. var. *parvifolia* Borbás in Österr. Bot. Z. 40: 462. 1890 ≡ *S. carpatica* Vierh. f. *parvifolia* (Borbás) Vierh. in Urban & Graebn., Festschr. Ascherson 504. 1904. – Type: Polnischer Kamm der Tatra (holotype, not found).

This locally endemic and distinct species has hardly ever been controversial among botanists. Only rarely it was treated as *S. alpina* (Beck, 1898), *S. hungarica* (Knuth, 1905), *S. montana* var. *minor* (Schur) Borbás (1901) or *S. montana* subsp. *carpatica* (Vierh.) Grint. (Grintescu, 1908).

8. *Soldanella montana* Willd., Enum. Pl. Hort. Berol. 192. 1809. – Lectotype (designated here): *Soldanella alpina* F. W. Schmidt, Fl. Boëm. 2: 49. 1793. Tab. 175 [National Library of the Czech Republic (!); MJG, photo!] ≡ [by lectotypification] *S. alpina* F. W. Schmidt, Fl. Boëm. 2: 49. 1793 (non L. 1753). *nom. illeg.* – Lectotype (designated here): *Soldanella alpina* F. W. Schmidt, Fl. Boehm. 49. 1793. Tab. 175 [National Library of the Czech Republic (!); MJG, photo!]. ≡ [by lectotypification] *S. montana* Mikan in Pohl, Tent. Fl.

Bohem. 1: 191. 1809. - Lectotype (designated here): *Soldanella alpina* F. W. Schmidt, Fl. Boehm. 49. 1793. Tab. 175 [National Library of the Czech Republic (!); MJG, photo!].

= *S. affinis* J. Cree ex Loudon, Hort. Brit. Suppl. 2: 673. 1839 (lectotype not designated).

= "*S. montana* subsp. *eumontana*" Lüdi in Hegi, Illustr. Fl. Mittel-Europa 5 (3): 1830. 1927. *nom. inval.* (Art. 26.2).

The name *Soldanella montana* was independently published by Mikan and Willdenow referring to the same species from the same area. Although *S. montana* Mikan instead of *S. montana* Willd. is used by some authors (e.g., Beck, 1893; Borbás, 1901; Dalla Torre & Sarnthein, 1913; Vollmann, 1914; Hermann, 1956; Janchen, 1958; Pawłowska, 1963), and the authority of the name has been much debated (Janchen, 1958, 1963a, 1963b, 1977; Skalický, 1967), we here follow Stafleu & Cowan (1983, 1988) who state that *S. montana* Willd. was published earlier (ca. April 1809) than *S. montana* Mikan (ca. Sept. 1809). In consequence, *S. montana* Willd. has priority.

Although *S. montana* Willd. is the third oldest valid name in the genus, it has not yet been typified. After encountering endless problems with specimens from Willdenow's herbarium (B) (see also Meyer, 1985; Kress, 1993), we here decide to select the lectotype of *S. alpina* F. W. Schmidt as the nomenclatural type of *S. montana* Willd. because this was cited as a synonym of *S. montana* Willd. by Willdenow (1809). Schmidt (1793) failed to indicate a specimen when he published his *S. alpina* (non L. 1753) but referred to a drawing. Because Schmidt's herbarium is lost (Stafleu & Cowan, 1985), we here designate Tab. 175 of *Soldanella alpina* F. W. Schmidt (1793) as its lectotype. This drawing is deposited in the National Library of the Czech Republic.

Soldanella montana Mikan (1809) has not been typified either. According to Stafleu & Cowan (1981), Mikan's European material is in PR, PRC and W. His material of *Soldanella montana*, however, could not be found in W [B. Wallnöfer (W), pers. comm.] or PR/PRC [J. Chrtek (PR), pers. comm.]. Mikan (1809) cited one of an unpublished collection of drawings of the flora of Böhmen. Although this collection was lost during World War II but refound later, it does not contain the drawing of *Soldanella montana* Mikan (Skalický, 1967). Mikan (1809) cited Clusius' (1601) illustration of "*S. alpina minor*" and *S. alpina* Schmidt (1793) as synonyms. Because Clusius' (1601) illustration was already selected as lectotype of *S. alpina* L. (1753) and *S. clusii* Schmidt (1793) and referred to another species (Meyer, 1985), we here choose the type of *S. alpina* Schmidt (1793) as lectotype of *S. montana* Mikan (1809). This also makes *S. montana* Willd. and *S. montana* Mikan homotypic.

Another name related to *S. montana* is *S. clusii* Sims (1828 1820?) (non Schmidt, 1793). In the absence of original plant material of this taxon [Kress, pers. comm.], the original description and illustration and the geographical origin of *S. clusii* Sims imply that this could be either *S. major* or *S. montana*. Knuth (1905), Lüdi (1927) and Honcik (1963) regarded this name as a synonym of *S. montana*.

The report of *S. montana* from the Balkan Peninsula by Hayek (1928) is likely to be a misidentification of *S. chrysosticta* or *S. rhodopaea*. Part of Bertoloni's (1835) *S. alpina* refers to *S. montana* which was not recognized by this author.

9. *Soldanella angusta* L. B. Zhang in Zhang & Kadereit in Nordic J. Bot. 22 (2): 146. fig. 5: C–D. 2002. – Type: Romania, E Carpathians, Mtii. Harghita, Harghita-Bai, 1310 m, 2 Jul 1999, *H. P. Comes & M. Kropf s.n.* (holotype, MJG!; isotype, herb. L. B. Zhang!).

= *S. montana* subsp. *faceta* A. Kress, Primulaceae-Studien 11: 22. 1993. p.p. excl. lectotype (vide infra).

The following material should be included within this species: *S. hungarica* subsp. *hungarica* sensu Pawłowska (1963) p.p., *S. major* sensu Domin (1929) p.p., *S. montana* sensu Hermann (1956) p.p., Lowe (1988) p.p., Pawłowska (1963) p.p., and Smol'yaninova (1952) p.p. "*Soldanella montana* var. *calimanica*" R. Rös. (1968) *nom. inval.* possibly also is identical with *S. angusta*. Additionally, at least part of *S. montana* reported by Morariu & al. (1960) is part of *S. angusta*. The glandular hairs of their "*S. montana*" as illustrated by them are identical with those of *S. angusta*. Many plants from the Carpathians which were identified as *S. montana* in the past belong to *S. angusta*.

10. *Soldanella marmarossiensis* Kldst. in Preslia 9: 19. 1930 emend. Zhang & Kadereit in Nordic J. Bot. 22 (2): 148. 2002. – Lectotype (designated here): Herbarium Ivan Klášterský / Flora: Carpato-Rossica No. 2101 / *Soldanella marmarossiensis* Kl. / (Syn.:) / Habitat: Cerna Hora, patoka mezi Gutinem a Tomnatek, 1750 m / Die: 6 VII. 1929 / Leg. Dr. Ivan Klášterský (specimina 7 floribus, PR!).

= *S. montana* Willd. var. *repanda* Grinț., Gen. Soldan. Soldan. Haretii 12. 1908. – Type: Recoltata pe muntele Ceahlau la 21 Mai 1907 la Botu piciorului Schiop, deasupra Duruietorei 1700 met. prin Abies, locuri umede si umbrite, ? *G. Grințescu* (holotype, not seen).

= *S. haretii* Grinț., Gen. Soldan. Soldan. Haretii 7. 1908 ≡ *S. major* (Neilr.) Vierh. f. *haretii* (Grinț.) Gusul. in Morariu, Nyárady & Gusuleac, Fl. Rep. Pop. Rom. 7: 67. 1960. – Type: Romania, varful Panaghia prin "jghi-abul cu boambe" pe frumosul masiv al Ceahlaului din

judetul Neamtu, pe care am recoltato în primavara anului 1907 în ziua de 21 Mai (holotype, not seen).

= *S. montana* Willd. subsp. *faceta* A. Kress, Primulaceen-Studien 11: 22, 1993. p.p. – Lectotype (designated here): Carpathians, Na Pasmie Zelemina “Na Benki” kolo, Skolego, Wochod. Karpaty, alt. 1230 m, 4. czerw. 1896, Dr. Wołoszczak (W!).

The name *S. marmarossiensis* has never been used after Pawłowska (1963) who synonymized it with *S. hungarica*. Morphologically, *S. hungarica* s.l. in the N and E Carpathians has longer glandular hairs on petiole and scape than *S. hungarica* s.l. in the S Carpathians (Zhang & Kadereit, 2002). Our morphological and molecular analyses show that *S. hungarica* s.l. comprises several species (see discussion of *S. hungarica*). *Soldanella marmarossiensis* Kldst. (1930) is the oldest name representing *S. hungarica* s.l. in the N & E Carpathians.

Kress (1993) typified *S. montana* ssp. *faceta* Kress by citing two specimens collected by the same collector on the same day and on the same mountain. According to our studies, however, these two specimens belong to two different taxa. The first of these belongs to *S. marmarossiensis*, and the second to *S. angusta* which has narrower and brownish (not brown) glandular hairs on petiole and scape and is more closely related to *S. rugosa* and *S. marmarossiensis* than to *S. montana* following our molecular data (Zhang & al., 2001). We choose the first of these two syntypes as lectotype of *S. montana* subsp. *faceta* Kress.

The following taxa should be included in *S. marmarossiensis*: *S. hungarica* sensu Zhilyaev (1985); *S. hungarica* subsp. *major* sensu Pawłowska (1963) p.p.; *S. major* sensu Vierhapper (1904, 1926) p.p., Domin (1929) p.p., Hermann (1956) p.p., and Janchen (1958) p.p.; *S. montana* sensu Borbás (1901), Hermann (1956) p.p., Pawłowska (1963) p.p., and Smol’yaninova (1952).

We suspect that “*S. major orientalis*” Domin 1935 (see Honcik, 1967) is a *nom. nud.* We did not find this name in any of the publications of Domin listed by Novák (1931).

11. *Soldanella rugosa* L. B. Zhang in Zhang & Kadereit in Nordic J. Bot. 22 (2): 149. fig. 5: A–B. 2002. – Type: Botanisches Institut der k. k. Universität Wien / *Soldanella hungarica* Simk. / Ungarn. Rodnaer Alpen, Vrf. Pietrosu bei Borsa, Nordseite, unter dem Gipfel, ca. 2270 m, feuchte Stellen, im Moos. / 2. VIII. 1909 / leg. F. Vierhapper [holotype, WU!; isotypes, WU!, ZT!].

= “*S. montana* Willd. var. *calimanica*” R. Rös. f. *romanica* R. Rös. in Comun. Bot. 7: 58. 1963, *nom. inval.* (Art. 37.1).

Borbás (1901) treated this species as *S. montana* var. *parvifolia* Borbás (= *S. carpatica*). Although both these species are small, there exist many differences between

them. Lüdi (1927) misunderstood Schur’s (1866) *S. alpina minor* and combined *S. rugosa* as *S. montana* subsp. *hungarica* var. *minor* (Schur) Lüdi. Vierhapper (1926) differentiated our *S. rugosa* from *S. hungarica* s.l. but regarded it as *S. hungarica* s.str. Rösler (1968) separated this taxon from others as *S. montana* var. *calimanica* R. Rös. f. *romanica* R. Rös. This, however, is an invalid name. We could not find the material handled by Rösler to validate this name.

Soldanella hungarica sensu Vierhapper (1904) p.p. (excl. plants from the Balkans), *S. hungarica* subsp. *hungarica* sensu Pawłowska (1963) p.p. and *S. major* f. *hungarica* sensu Morariu & al. (1960) p.p. all are synonyms of *S. rugosa*, and *S. minima* sensu Richter (1890) very probably is also.

12. *Soldanella oreodoxa* L. B. Zhang in Zhang & Kadereit in Nordic J. Bot. 22 (2): 150. fig. 6: A–B. 2002. – Type: Herbarium des Landesmuseums in Linz/D. / *Soldanella major* (Neilr.) Vierh. / Fundort: Transsilvania, Distr. Cluj, Muntele Băisorii / Land: Romania Seehöhe: ca. 1000 m. / Assoz.: / Unterlage: Kristallin / leg.: Gh. Groza / Datum: 28. V. 1994 det.: Gh. Groza / Anmerkung: Fichtenwald (holotype, LI!).

The species has been included in *S. hungarica* (e.g., Vierhapper, 1926; Meyer, 1985), *S. hungarica* subsp. *hungarica* (Meusel & al., 1978), *S. hungarica* subsp. *major* (e.g., Pawłowska, 1963), *S. major* (e.g., Vierhapper, 1904) or *S. montana* subsp. *hungarica* (Lüdi, 1927).

13. *Soldanella hungarica* Simonk., Enum. Fl. Transsilv. 461. 1887. p.p. ≡ *S. montana* Willd. var. *hungarica* (Simonk.) Grinț., Gen. Soldan. Soldan. Haretii 10. 1908 ≡ *S. alpina* L. var. *hungarica* (Simonk.) Stojanoff & Stefanoff in Ann. Arch. Min. Agri. Dom. Roy. Bulg. 5: 865. 1925. p.p. ≡ *S. major* (Neilr.) Vierh. f. *hungarica* (Simonk.) Jávorka, Fl. Hung. 811. 1925. p.p. – Lectotype [designated by Kress (1993)]: Flora regni hungarici ex herbario / *Soldanella hungarica* Simonk. erd. flor. 461. / (*S. alpina* auct. trans. - *S. clusii* Baumg. en. 1.137.) / habitat in subalpinis alpinisque alpium Arpásiensium, 1300–1400 met. s. m., secus rivulum Arpás / Leg. 1883 Aug. 6–7. / Dr. Simonkai Lajos [BP; photocopy, MJG!].

= *S. alpina* L. [var] a. *minor* Schur, Enum. Pl. Transsilv. 556. 1866 (non Seringe 1823) ≡ *S. montana* Willd. var. *minor* (Schur) Borbás in Beih. Bot. Centralb. 10: 282. 1901. p.p. ≡ *S. hungarica* Simonk. var. *minor* (Schur) Vierh. in Hannig & Winkler, Pflanzenareale 1 (1): Karte 7–8. 1926. p.p. – Type: Romania, Transsilvania, auf dem Vurtop (Mții Făgărașului) (holotype, not seen).

= “*S. major* (Neilr.) Vierh. f. *parviflora*” Morariu in

Morariu, Nyárády & Guşuleac, Fl. Rep. Pop. Rom. 7: 642. 1960, *nom. inval.*

= "*S. major* (Neilr.) Vierh. f. *macrocarpa*" Morariu in Morariu, Nyárády & Guşuleac, Fl. Rep. Pop. Rom. 7: 642. 1960, *nom. inval.* p.p.

= "*S. major* (Neilr.) Vierh. f. *purpureifolia*" R. Rös. in Comun. Bot. 7: 58. 1963, *nom. inval.*

= *S. pseudomontana* F. K. Meyer in Haussknechtia 2: 15. 1985, *syn. nov.* – Type: Herbarium Haussknecht, Jena / Flora von Rumänien / *Soldanella pseudomontana* F. K. Meyer / Brasov, Piatra Mare (Hohenstein), 800–1400 m / 6. VI. 1976, F. K. + J. Meyer 12183 (holotype: specimina 5 floribus et 1 fructu, JE!).

After Simonkai (1887), Wołoszczak (1889) recognized this species for the first time. Since then it has been widely accepted, but its circumscription always remained unclear and inconstant. For example, *S. hungarica* sensu Pawłowska (1963) includes *S. chrysosticta*, *S. hungarica*, *S. major*, *S. marmarossiensis*, *S. oreodoxa*, *S. rhodopaea* and *S. rugosa* in our circumscription.

Vierhapper (1904, 1926) did not know *S. hungarica* as originally defined. His *S. hungarica* contains mainly our *S. rugosa* plus material from the Balkans. It is understandable that *S. rugosa* was identified with *S. hungarica* because most authors did not exactly know *S. hungarica* particularly before the species was typified by Kress (1993).

The sampling locality (Făgărăş Mts.) of *S. alpina* [*stat. incert.*] *minor* Schur (1866) suggests that this taxon belongs to *S. hungarica*. Because Schur failed to designate the status of this taxon, it should be taken as a variety of *S. alpina* (Art. 35.4); at any rate it is a later homonym of *S. alpina* var. *minor* Seringe (1823) (Art. 53.1). Several authors included Schur's name under *S. montana* (Borbás, 1901), *S. hungarica* (Vierhapper, 1926) or *S. montana* subsp. *hungarica* (Lüdi, 1927).

The report of *S. hungarica* (*S. montana* subsp. *hungarica*) from the S Alps by Lüdi (1927) is erroneous. This species does not occur there. Additionally, *S. hungarica* sensu Hayek (1928) includes *S. chrysosticta* (Bulgaria), *S. alpina* and even *S. pindicola* (Albania, Macedonia, Montenegro, Serbia). Further misidentifications include: *S. alpina* sensu Schur (1866) p.p., *S. hungarica* subsp. *major* sensu Pawłowska (1963) p.p., *S. major* sensu Vierhapper (1904, 1926) p.p., Hermann (1956) p.p., and Janchen (1958) p.p., and *S. montana* sensu Borbás (1901) p.p.

14. *Soldanella major* (Neilr.) Vierh. in Urban & Graebn., Festschr. Ascherson 502. 1904. p.p., emend. Zhang & Kadereit in Nordic J. Bot. 22 (2): 153. 2002 ≡ *S. alpina* L. var. *major* Neilr., Nachtraege Fl. Wien 219. 1851 ≡ *S. montana* Willd. subsp. *hungarica* (Simonk.) Lüdi var. *major* (Neilr.) Lüdi in Hegi, Illustr. Fl. Mittel-

Europa 5 (3): 1827. 1930. 1927 ≡ *S. hungarica* Simonk. subsp. *major* (Neilr.) Pawłowska in Fragm. Florist. Geobot. 9: 11. 1963, p.p. – Lectotype [designated by Kress (1993)]: (Austria, Niederösterreich) Auf der Steiersberger Schwaig am Wechsel / 27. Mai 1849 / Herbar Neilreich: Nr. 8185 (W!).

= "*S. alpina* L. var. *vulgaris*" Seringe, Mus. Helv. Hist. Nat. (Bot.) 1: 83. 1823. *nom. inval.* p.p.

= *S. stiriaca* F. K. Meyer in Haussknechtia 2: 20. 1985. *nom. superfl.* [incl. *S. major* (Neilr.) Vierh.]. – Type: Herbarium normale./ editum ab. I. Dörfler / 4936. *Soldanella major* (Neilr.) Vierh. / Austria inferior et finitima Styria. In sylvis Piceae et locis apertis ad latus australe, rarissime etiam boreale, montis "Sonnwendstein" prope jugum "Semmering"; solo "Grauwacke". 1300–1500 m. s. m. / Junio 1906 leg. H. Freiherr v. Handel-Mazzetti. (holotype: specimina 4 floribus, JE!; isotypes, B!, BC!, C!, G!, GJO!, GZU!, LI!, LY!, M!, WU!, Z!).

Meyer (1985) proposed *S. stiriaca* Meyer to replace *S. major* (Neilr.) Vierh., but because the latter turned out to be a valid name (see also Kress, 1993), *S. stiriaca* Meyer is an illegitimate superfluous name (Art. 52.1).

In our circumscription *S. major* includes *S. hungarica* s.l. from the Alps and the SW Carpathians.

Degen (1937) identified one of Schlosser's plants [Croatia, Velebit, Visocjica, et Debelo Brdo, J. C. Schlosser s.n., herb. Rossi (ZA)] as *S. major*. This is a misidentification of *S. alpina*. Additionally, the following taxa should be included in *S. major*: *S. hungarica* sensu Freyn (1900), Vierhapper (1926) p.p., Janchen (1963a), Meyer (1985) p.p.; *S. hungarica* var. *major* sensu Janchen, 1958, 1963b, 1977; *S. hungarica* subsp. *major* sensu Meusel & al. (1978) p.p.; *S. major* sensu Hermann (1956) p.p. and *S. montana* sensu Beck (1893) p.p., Borbás (1901) and Knuth (1905) p.p.

15. *Soldanella pusilla* Baumg., Enum. Stirp. Transsilv. 1: 138. 1816 ("*pussilla*") ≡ *S. alpina* L. var. *pusilla* (Willd.) Fiori in Fiori & Béguinot, Fl. Anal. Ital. 2: 220. 1902. – Neotype (designated here): [Romania, S Carpathians] 3781 / *Soldanella pusilla* Baumgarten / Făgăraşului / am Zerna in herbarium Baumgarten (specimen unum flore, SIB; photo, MJG!).

= *S. armena* Lipsky in Tr. Tifl. Bot. Sada 4: 387. 1899. – Type: "Azerbaijan, Nakhichevan, Mt. Kapydzhik, VII. 1896, B. Lewandowsky s.n." (holotype, TB; illustr. of holotype, LE; photocopy of illustr., WU!).

Soldanella pusilla is one of the oldest names of the genus, but it also remained untypified. According to Stafleu & Cowan (1976), most of Baumgarten's herbarium and types are kept in CL. However, material of *S. pusilla* handled by Baumgarten before 1816 (the year when *S. pusilla* was published) could not be found in CL

[M. Höhn (Univ. Szent Istvan, Budapest); pers. comm.]. In SIB, where part of Baumgarten's original material is deposited (Stafleu & Cowan, 1976), there exists only one sheet of *Soldanella pusilla* in Baumgarten's herbarium collected possibly before 1816. This sheet certainly belongs to Baumgarten because it has his handwriting although not his signature. We here select this sheet at SIB as neotype of *Soldanella pusilla* Baumg.

In the original description, *Soldanella armena* was erroneously reported as occurring from Azerbaijan. However, *Soldanella* is not known to occur in the Caucasus region (Fedorov, 1940; Smol'yaninova, 1952) However, it remains unclear where the type of *S. armena* was collected.

Soldanella minima sensu Hoppe (1818) is identical with *S. pusilla*.

Based on molecular, morphological and geographical data, we consider *S. pusilla* to comprise two subspecies instead of three species (Meyer, 1985; Greuter & al., 1989), three subspecies (Chrtek, 1985) or one undivided species (Borbás, 1901; Vierhapper, 1904, 1926; Grintescu, 1908; Lüdi, 1927; Pawłowska, 1963, 1972; Meusel & al., 1978; Kress, 1984; Lowe, 1988 etc.). These two subspecies are *S. pusilla* subsp. *pusilla* (S Carpathians and Pirin/Rila Mts.) and *S. pusilla* subsp. *alpicola* (Alps).

15a. *Soldanella pusilla* Baumg. subsp. *pusilla*

= *S. pusilla* Baumg. var. *biflora* Borbás in Braun in Österr. Bot. Z. 40: 244. 1890. – Type: Romania, S Carpathians, Negoai-Alpe, mit *S. pusilla* im fructificierenden Stadium, Barth (holotype, not found).

= *S. pusilla* Baumg. f. *obliqua* Györfy in Magyar Bot. Lapok 7: 219. 1906. – Syntypes: Romania, Carpathians, in der Nähe der Parengul-Spitze des Pareng-Gebirges am Rande eines Schneefeldes am 24. VI. 1900 (I. Györfy); Romania: Carpathians, auf der Drecksano-Alpe des Retizat, 25. VI. 1901 (lectotype not designated).

= "*S. pusilla* Baumg. f. *typica*" Morariu in Morariu, Nyárády & Guşuleac, Fl. Rep. Pop. Rom. 7: 642. 1960, *nom. inval.* (Art. 24.3).

= *S. pirinica* F. K. Meyer in Haussknechtia 2: 36. 1985, *syn. nov.* ≡ *S. pusilla* Baumg. subsp. *pirinica* (F. K. Meyer) J. Chrtek in Cas. Nár. Muz., Rar. Prír. 154 (3–4): 170. 1985. – Type: Herbarium Haussknecht, Jena / Flora von Bulgarien / *Soldanella pirinica* F. K. Meyer / Holotypus/ Pirin, Razlog, Rasloshki Suchodol, zwischen Karssee und Kamenitizia, 2300–2600 m, 1977 / 22. VI. / F. K. + J. Meyer 12489 [holotype: specimina 13 (10 floribus et 2 fructibus, JE!).]

Soldanella pusilla f. *alba* R. Rös. is the only valid name by Rösler (1968). He cited only one specimen which should be regarded as the type of this form (Art.

9.1), which has white flowers.

15b. *Soldanella pusilla* Baumg. subsp. *alpicola* (F. K. Meyer) J. Chrtek in Cas. Nár. Muz., Rar. Prír. 154 (3–4): 170. 1985 ≡ *S. alpicola* F. K. Meyer in Haussknechtia 2: 32. 1985. – Type: *Soldanella pusilla* Baumg. / A. Salisb. Naßfeld / Herbarium Haussknecht / Juni 1871 / (W) *Vatke* [holotype-I: specimina 31 (29 floribus), JE!; holotype-II: specimina 34 (31 floribus), JE!].

= *S. alpina* L. var. *minor* Seringe, Mus. Helv. Hist. Nat. (Bot.) 1: 84. 1823 (lectotype not designated).

= *S. alpina* L. var. *cylindrica* Seringe, Mus. Helv. Hist. Nat. (Bot.) 1: 84. 1823 ≡ *S. chusii* F. W. Schmidt var. *cylindrica* (Seringe) Gaudin, Fl. Helv. 2: 77. 1828 (lectotype not designated).

= *S. alpina* L. var. *uniflora* Steinberger in Beil. k. k. privil. Both. Tirol Vorarlb. 5: 2. (Oktober 2) 1826. – Type: Austria, Tirol, Brixental, Hohe Salve, *Steinberger s.n.* (holotype, not found).

= *S. pusilla* Baumg. var. *parviflora* Freyn in Österr. Bot. Z. 50: 443. 1900. – Type: Herbarium J. Freyn / *S. pusilla* Baumg. f. *parviflora* !! 20/4 06 J. Freyn / [*Soldanella minima* Hoppe, Beck NÖST, p. 922–923!] / Steiermark, Nied. Tauern, Bösenstein, Steilhalden, n.östl. vom gefror. See, mit *Ranunculus crenatus*, Gneis, 1800 m, gleich nach dem Schnee, 24 Juli 1898, leg. & com. J. Freyn, Ende 15/9 98 [holotype, Mor. Zem. Museum-11555/37 (BRNM!).]

= *S. pusilla* Baumg. var. *chryso-splenifolia* J. Murr in Allg. Bot. Z. Syst. 1913: 15. 1913. – Type: Austria, Vorarlberg, Rauz, unter Grün-Erlen, ca. 1600 m, Aug. 1911, J. Murr *s.n.* (holotype, not found). Neotype (designated here): Illustration of *S. pusilla* Baumg. var. *chryso-splenifolia* J. Murr in Deutsche Bot. Monatsschr. 23: 77. 1912.

= *S. pusilla* Baumg. f. *calcicola* Vierh. in Hannig & Winkler, Pflanzenareale 1 (1): Karte 7–8. 1926. – Type: Botanisches Institut der k. k. Universität Wien / *Soldanella pusilla* Baumg. forma *calcarea* Vierh. / Steiermark, Totes Gebirge, Feuertal, ca. 2100 m. / Ende VI. 1910. / leg. F. Vierhapper (lectotype: specimina 9 floribus, WU!; isolectotype, specimina 10 floribus, WU!; here designated!).

= *S. pusilla* Baumg. f. *diversifolia* Zenari in Atti Reale Ist. Sci. Lett. Arti 101: 1951. – Type: Italy, Alpi Breonie, V. Ridanna, Malga Mola, alt. 2050 m; V. Staudenberg, 1850–2150 m; V. di Casalupa, 2100–2250 m; *ibid.*, 2325 m; *ibid.*, 2250–2350 m (syntypes; lectotype not designated).

= *S. pusilla* Baumg. var. *carestiae* Cristofolini & Pignatti (in Bull. Soc. Bot. Ital. 1961: 159, 160. 1961, *nom. inval.*) in Webbia 16: 457. 1962. – Lectotype (designated here): Italy, Macugnaga, Monte Turlo, 30 Jul

1873, *A. Carestia s.n.* (lectotype, FI!; isolectotype, RO!).

The type material of *S. pusilla* Baumg. var. *chryso-plenifolia* J. Murr can not be found in BREG or IBF [W. Neuner (IBF), H. Waldegger (BREG); pers. comm.], which include important Murr collections [W. Gutermann (WU), pers. comm.]. We therefore neotypify this name.

Many authors including Jackson (1895), Knuth (1905), Honcik (1963) and Heß & al. (1970) mentioned the name *S. clusii* Gaud. Such a name does not exist but Gaudin (1828) used the name *S. clusii* F. W. Schmidt.

Soldanella minima sensu Hoppe (1818), *S. clusii* sensu Gaudin (1828) and *S. alpina* sensu Zenari (1942) p.p. refer to our *S. pusilla* subsp. *alpicola*.

16. *Soldanella minima* Hoppe in Sturm, Deutschl. Fl. Abt. I, 50, Heft 20: no. 2. 1806 ≡ *S. alpina* L. var. *minima* (Hoppe) Fiori in Fiori & Béguinot, Fl. Anal. Ital. 2: 221. 1902. – Lectotype (designated here): Illustration of *Soldanella minima* Hoppe in Sturm, Deutschl. Fl. Abt. 50, Heft 20, fig. ad no. 2. 1806.

= *S. alpina* L. var. *rotundifolia* Seringe, Mus. Helv. Hist. Nat. (Bot.) 1: 84. 1823 (lectotype not designated).

Although Hoppe (1818) stated that he had described *S. minima* in 1805, we could not find any description of *S. minima* in the publication indicated by him (Neues Bot. Taschenb. 1805). He provided descriptions for this name twice at later dates (Hoppe, 1806, 1818), but the latter publication refers to *S. pusilla* which he did not recognize at that time.

When Hoppe (1806) validly described *S. minima* he did not cite any specimens. From his later publication (Hoppe, 1818) we know that the original material should be specimens he collected in Bodenthal (Carinthia, Austria) in 1800. We did not find such material in any of the herbaria (BP, GZU, M, PR) where Hoppe's material is possibly preserved (Stafleu & Cowan, 1979) nor in PRC, REG or W which were indicated to us as possible herbaria by D. Kovátz (BP) and F. Schuhwerk (M) (pers. comm.). The original specimens of *S. minima* possibly are lost. Meyer (1985) stated that the isotype of the species is deposited at JE. It is very doubtful, however, whether the specimen Meyer referred to belongs to Hoppe because there is no collection date, name of collector or signature on this sheet. We here lectotypify this name by selecting Sturm's (1806) drawing of this species.

16a. *Soldanella minima* Hoppe subsp. *minima*

= *S. alpina* L. f. *cyclophylla* Beck, Fl. Niederöst. 922. 1893 ≡ *S. minima* Hoppe f. *cyclophylla* (Beck) Vierh. in Hannig & Winkler, Pflanzenareale 1 (1): Karte 7–8. 1926 (lectotype not designated).

= *S. minima* Hoppe f. *biflora* R. Schulz 1903: 2. –

Type: Flora von Tirol / *Soldanella minima* Hoppe f. *biflora* / Lienz: Oberhalb der Kerschbaumer Alpe, nahe der Zoche / 31. 7. 1899 / Roman Schulz [holotype, B (!)].

= *S. minima* Hoppe f. *coerulea* R. Schulz in Verh. Vereins Prov. Brandenburg 44 (1902): 2. 1903. – Type: Austria, Kerschbaumer Alpe, Schlern, *Otto Schulz s.n.* (type, not found).

= *S. minima* Hoppe f. *longistyla* R. Schulz in Verh. Vereins Prov. Brandenburg 44 (1902): 2. 1903 (type, not found).

= “*S. minima* Hoppe subsp. *euminima*” Lüdi in Hegi, Illustr. Fl. Mittel-Europa 5 (3): 1826. 1927, *nom. inval.*

= *S. minima* Hoppe f. *latifolia* Cristofolini & Pignatti (in Bull. Soc. Bot. Ital. 1961: 159, 160. 1961, *nom. inval.*) in Webbia 16: 462. 1962. – Lectotype (designated here): Fusci Maraini herbarium / *Soldanella alpina* L. / Vicenza (Dolomiti di Sassolungo - 2100 m. - *calcareo*) / 16-Ag-1936 [Revis. Cristofolini & Pignatti 1960/61 Nr. 415] [specimen unum flore, FI-4024-9 (!)].

We did not find the types of *S. minima* f. *coerulea* R. Schulz and f. *longistyla* R. Schulz although Roman Schulz's material has been reported to still exist (Pilger, 1957). Possibly, the two types were destroyed during World War II [R. Vogt (B), pers. comm.].

16b. *Soldanella minima* Hoppe subsp. *austriaca* (Vierh.) Lüdi in Hegi, Illustr. Fl. Mittel-Europa 5 (3): 1827. 1927 ≡ *S. austriaca* Vierh. in Urban & Graebn., Festschr. Ascherson 502. 1904. – Lectotype (designated here by W. Gutermann): Botanisches Institut der k. k. Universität Wien / *Soldanella austriaca* Vierh. / Niederösterreich, Raxalpe, Plateau. / VI. 1902. / leg. F. Vierhapper [lectotype: specimina 17 floribus, WU!; isolectotype-1: specimina 14 floribus, WU; isolectotype-2: specimina 10 floribus, W (!) (photocopy, MJG!); isolectotype-3: specimina 14 floribus, LI!].

The collection by F. Vierhapper was divided into four sheets, two of which each are at WU and W. We here select one of the two sheets at WU as lectotype.

Part of *S. minima* sensu Knuth (1905) corresponds to *S. minima* subsp. *austriaca*.

16c. *Soldanella minima* Hoppe subsp. *samnitica* Cristofolini & Pignatti (1961: 159, 160, *nom. inval.*) in Webbia 16: 464. 1962. – Lectotype (designated here): Erbario Vaccari - Flora Abruzzese / *Soldanella minima* Hoppe / Luogo: M. Rapina, skalica verso Penocastanzo (Majella), 2000–2300 m / 2. 7. 1906 / racc *Lino Vaccari s.n.*, Revis. Cristofolini & Pignatti 1960/61 Nr. 437 [specimina 4 floribus, FI-4072-3(!)]. Paratypes: Herbarium H. Groves (Florentia) / *Soldanella minima* Hoppe / Habitat: in saxosis humidis, Grotta Cavona Montagna del. Mailetta Majella, 8/75 (Aug. 1875) / legit HG (H. Groves), Revis. Cristofolini & Pignatti 1960/61

Nr. 438 [specimina 10 (9 fructibus), FI-4072-4(!), WU!].

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