

A MONOGRAPH OF THE GENUS SYMPHORICARPOS

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THE FIRST synoptical revision of *Symphoricarpos* was written by Asa Gray more than sixty years ago. At that time only eight species were known; since then nine additional species have been discovered. Inevitably, there has been the usual accretion in the bibliography and synonymy in this genus, and the confusion that consequently exists concerning the identity, specific limits, nomenclature, and geographical distribution of the species seems to warrant the presentation of the following monographic study. The objectives in this paper are, therefore, to present a taxonomic treatment including keys and descriptions of the species, with attention to their probable phylogeny and biogeographical affinities, and to give fairly complete accounts of the bibliography and synonymy.

Symphoricarpos is a genus of ligneous plants belonging to the Caprifoliaceae, containing sixteen known species in North America, and one in central China. The generic name is of Greek origin, *symphorein*, to bear together, and *karpōs*, fruit, referring to the clustered drupes. Several species are grown for their attractive fruits and are cultivated under the names snowberry, waxberry, wolfberry, or coralberry. Many of the species are very closely related and therefore difficult to distinguish. Several are important browse plants in western United States.

The generic concept of *Symphoricarpos* was established in 1732 by Dillenius upon the plant we now call *S. orbiculatus* Moench, and was validated nomenclaturally by Duhamel du Monceau in 1755. The genus is evidently closely related to *Lonicera*, in which it was included by Linnaeus. However, *Lonicera* is entirely distinct in its mostly irregular and bilabiate gibbous corolla, and by the locules of the ovary being all fertile and 2-many-ovuled; its fruit is a few-several-seeded berry.

The important structural characters used in the classification of the species of *Symphoricarpos* are to be found in the flowers and fruits, particularly the shape and size of the corolla, the relative length of the lobes and the tube, as well as the size of the anthers and their length in relation to the free portion of the filament and the lobes of the corolla. The character of the style, whether glabrous or pubescent, or long or short, is a valuable and significant taxonomic criterion for most of the

species. Luckily, *Symphoricarpos* shows no evidence of dimorphism or heterostyly. This fact has been already attested by Asa Gray. The color, shape, and size of the drupe and nutlets are characters of the greatest utility and phylogenetic value. The one species known from eastern Asia, *S. sinensis*, has black fruit. One of the North American species, *S. orbiculatus*, has red fruit; the others are white-fruited. The two nutlets are plano-convex, varying from oval to lanceolate and obtuse, or occasionally acute, according to the species. Vegetative structures, as a general rule, are of secondary value as phylogenetic characters. However, the habit of the plant, whether erect, or decumbent and trailing, affords a constant character. The foliage is notoriously variable in size, texture, indument, and margins. In nearly all the species the leaves of the young branches of the season are larger and frequently toothed or lobed. Occasional specimens with verticillate phyllotaxy may be found. In the key and descriptions on the following pages, the statements concerning the leaves refer to those of the flowering branches unless there is a statement to the contrary.

Since this is the first monographic survey of the subject, the bibliography has been made as nearly complete as possible. The intention throughout has been to achieve maximal uniformity of arrangement and facility of reference. To that end, only publications containing references to original or significant taxonomic data, or to illustrations, are cited. In the key to the species external and easily observed characters such as pubescence of twigs, shape of leaves, or habit of plant, have been used as much as possible. In most instances wherever these convenient characters are used, other characters, usually of flowers or fruits, have been inserted as additional guides to identity, as well as for the purpose of strengthening the key and indicating that the scheme of classification herein adopted rests chiefly upon characters of fundamental morphological importance.

During this investigation the study of herbarium specimens has been supplemented by living plants of several of the species in the field, as well as those available in the Arnold Arboretum. The herbarium specimens from most of the larger collections in the United States and Canada have been examined, making a total of approximately 6000 sheets. In citing specimens the abbreviations included in the following parentheses are used: (A) Arnold Arboretum, (P) Academy of Natural Sciences, Philadelphia, (Cal) California Academy of Sciences, (Can) National Museum of Canada, (F) Field Museum of Natural History, (UI) University of Illinois, (Mo) Missouri Botanical Garden, (NY) New York Botanical Garden, (UC) University of California, and (US) United

States National Herbarium. Due to the necessity for economizing space, only representative specimens are cited.

To the curators of the above-mentioned institutions who have kindly permitted the loan and use of the botanical specimens cited in the following pages, my thanks and gratitude are hereby expressed. Special thanks are due Professor Alfred Rehder for innumerable useful suggestions and criticisms; to Dr. E. D. Merrill for his co-operation in making the completion of this study possible; and to Miss Nell Horner of the Missouri Botanical Garden for bibliographical assistance.

GENERIC SYNONYMY AND DESCRIPTION

Symphoricarpos [Dillenius, Hortus Eltham. 371. *pl.* 278, *f.* 360. 1732]; Duhamel, Traité des Arbres 2:295, *pl.* 82. 1755; Boehmer in Ludwig, Defin. Gen. Pl. (ed. 3) 35. 1760; Jussieu, Gen. Pl. 211. 1789; Moench, Meth. Pl. 502. 1794; Michx. Fl. Bor. Am. 1:103. 1803; Poiret in Lam. Encycl. Méth. Bot. 7:523. 1806; Willd. Enum. Pl. 1:221. 1809; HBK. Nov. Gen. Sp. 3:331. 1818 (as *Symphoricarpus*); Roemer & Schultes, Syst. Veg. 5:xiv, 222. 1819; Torrey, Fl. N. & Middle Sect. U. S. 1:246. 1824; Eaton, Man. Bot. (ed. 5) 414. 1829; DeCandolle, Prodr. 4:338. 1830; Hook. Fl. Bor. Am. 1:284. 1833 (as *Symphoricarpus*); Loudon, Arb. Frut. Brit. 2:1059. 1838; Endlicher, Gen. Pl. 568. 1838 (as *Symphoricarpus*); Eaton & Wright, N. Am. Bot. 447. 1840; Torr. & Gray, Fl. N. Am. 2:4. 1841; Loudon, Encycl. Trees Shrubs 542. 1842; Gray, Man. Bot. N. U. S. 170. 1848, (ed. 2) 164. 1856; Koch, Dendrol. 2:47. 1872 (as *Symphoricarpus*); Bentham & Hooker, Gen. Pl. 2:4. 1873; Gray, Jour. Linn. Soc. 14:9. 1873 (as *Symphoricarpus*), Man. Bot. N. U. S. (ed. 5) 203. 1875, in Brewer & Watson, Bot. Calif. 1:279. 1880; Gray, Syn. Fl. 1²:13. 1886; Dippel, Handb. Laubholzk. 1:277. 1889; Watson & Coulter in Gray, Man. (ed. 6) 220. 1889; Fritsch in Engler & Prantl, Nat. Pflanzenf. IV. 4:165. 1891; Greene, Fl. Franciscana 344. 1892, Man. Bot. San Francisco Bay Reg. 163. 1894; Britton in Britton & Brown, Ill. Fl. N. States 3:235. 1898; Howell, Fl. NW. Am. 281. 1900; Cowell in Bailey, Cyclop. Am. Hort. 1757. 1902; Small, Fl. SE. U. S. 1124. 1903; Post & Kuntze, Lexic. Gen. Phaner. 545. 1903 (as *Symphorocarpus*); Dalle Torre & Harms, Index Siphon. 509. 1905; Robinson & Fernald in Gray, Man. (ed. 7) 757. 1908; Coulter & Nelson, New Man. Rocky Mts. Bot. 470. 1909; Schneider, Ill. Handb. Laubholzk. 2:670.

1911 (as *Symphoricarpus*); Britton in Britton & Brown, Ill. Fl. N. States (ed. 2) 3: 276. 1913; Rehder in Bailey, Stand. Cyclop. Hort. 3292. 1917; Rydberg, Fl. Rocky Mts. 813. 1917; Bailey, Man. Cult. Pl. 722. 1924; Standley, Contr. U. S. Nat. Herb. 23: 1398. 1924; Jepson, Man. Fl. Pl. Calif. 966. 1925; Keck, Bull. So. Calif. Acad. Sci. 25: 71. 1926; Rehder, Man. Cult. Trees Shrubs 811. 1927 (as *Symphoricarpus*).

Lonicera Linnaeus, Sp. Pl. 173. 1753, ex p.

Vaccinium Linnaeus, Sp. Pl. 350. 1753, ex p.

Symphoricarpa Necker, Elem. Bot. 1: 129. 1790.

Symphoria Persoon, Syn. 1: 214. 1805, pro syn. *Lonicera* sect. *Symphoricarpus*; Pursh, Fl. Am. Sept. 1: 162. 1814; Nuttall, Gen. Am. Pl. 25. 1814; Sprengel, Syst. Veg. 1: 757. 1825.

Anisanthus Willdenow MS. ex Roemer & Schultes, Syst. Veg. 5: xiv, 223. 1819.

Margaris De Candolle, Prodr. 4: 483. 1830.

Descliaea Sessé & Mociño ex DC. l.c., pro syn. *Margaris*.

Shrubs with opposite, simple, short-petioled, exstipulate, entire or sometimes sinuately toothed or lobed deciduous leaves, and small, perfect, pink or white flowers in axillary or terminal clusters, or solitary in the axils of the upper leaves; winter buds with 2 pairs of outer scales; calyx acetabuliform, the teeth 5 or 4; corolla sympetalous, 5- or 4-lobed, campanulate to tubular-funnelform, or salverform, regular or nearly so, or sometimes slightly gibbous at the base, often villous within; stamens 5 or 4, equal or subequal, inserted on the corolla; ovary inferior, 4-loculed, two of the locules containing several abortive ovules, the other two locules each with a single pendulous ovule; style 1; stigma capitate or slightly 2-lobed; fruit a globose, ovoid, or ellipsoid, white, red, or black, dipyrenous berry-like drupe,¹ the nutlets oval, more or less compressed; seeds with endosperm, the embryo minute.

TYPE SPECIES: *Symphoricarpus orbiculatus* Moench (*Lonicera Symphoricarpus* L.).

The genus falls naturally into two well-defined biological subdivisions. These were loosely treated by Gray in 1873 as sections without names. Zabel, in 1903, named them, but his names are *nomina nuda*. There seems to be good reason for treating these two main groups as subgenera. Such a procedure is in conformity with the prevailing treatment in many other genera, and obviates the undesirable necessity of using adjectival names. It is provided in the International Rules of Botanical

¹As pointed out by Asa Gray in 1873, the fruit is a drupe with usually two nutlets. Recently, Norma Pfeiffer (Contr. Boyce Thompson Inst. 6: 103-122, f. 1-6. 1934) reported results of a histological study of the fruits of *S. racemosus* [*S. rivularis* Suksd.] which confirm Gray's statement.

Nomenclature that subgeneric or sectional names should be substantives resembling the names of genera. Accordingly, for the two subgenera of *Symphoricarpos* I have selected the name *EUSYMPHORICARPOS* for the group with the short corollas, and for the group with long corollas the name *ANISANTHUS* has been used.

KEY TO THE SPECIES OF SYMPHORICARPOS

Fruit bluish black; nutlets pilose; leaves and twigs glabrous; flowers in short terminal peduncled spikes; corolla shortly campanulate, symmetrical, glabrous within, the lobes about as long as the tube; style glabrous, 6–7 mm. long, equalling the corolla; anthers 2 mm. long; Chinese species. 1. *S. sinensis*

Fruit white or red; nutlets glabrous; flowers chiefly axillary; North American species.

The corolla shortly campanulate, pubescent within, often slightly ventricose on the lower side, the lobes about as long as or slightly longer than the tube.

Fruit white; style glabrous; or if pilose, 4–8 mm. long

Style and stamens shorter than or equalling the corolla, not exerted; style 2–3 mm. long, glabrous.

Erect shrubs; corolla 5–6 mm. long; upper surface of leaves glabrous or glabrescent; nutlets 4–6 mm. long, 3–3.5 mm. wide.

Young twigs glabrous; leaves usually glabrous, varying to sparsely pilose on the lower surface; the larger fruits usually 1–1.5 cm. in diameter when fully mature, in terminal and axillary glomerules; shrub 1–3 m. tall, rarely smaller in dry habitats; indigenous west of the Continental Divide; introduced into eastern North America. 2. *S. rivularis*

Young twigs finely crisp-puberulent; leaves usually densely short-pilose, prominently reticulate, and pale green or glaucous beneath; mature fruits 6–10 mm. in diameter, in pairs or solitary in the upper axils; shrub 20–80 cm. tall; east of the Continental Divide. 3. *S. albus*

Low diffuse or trailing shrubs; corolla 3–5 mm. long; leaves pubescent, at least on the lower surface; fruits 4–6 mm. in diameter; nutlets 2.5–3 mm. long, 1.5–2 mm. wide; Pacific Coast species.

Young twigs closely puberulent or sparsely pilose with short, curved trichomes, or sometimes glabrous.

Leaves firm, roundish oval, rounded at each end, copiously pilosulous beneath, slightly less so above; young twigs usually closely tomentulose-puberulent; California. 4. *S. mollis*

Leaves thin, oval, usually acutish at each end, glabrous or nearly so above, sparsely pilosulous beneath; young twigs

- nearly glabrous or only sparingly pilosulous; southern British Columbia to northern Idaho, western Oregon, and northwestern California.5. *S. hesperius*
- Young twigs softly velutinous or short-villous, often densely so, with straight spreading trichomes; leaves oval, often sinuate, the lower surface whitish or pale green, prominently veined and copiously pubescent; upper surface dark green, softly pubescent; mountains of California and adjacent Nevada, and southern Oregon.6. *S. acutus*
- Style and stamens shortly exserted; corolla 6–9 mm. long; style 4–8 mm. long, pilose or glabrous; leaves oval, thick, usually 3–7 cm. long; young twigs puberulent.7. *S. occidentalis*
- Fruit red, ellipsoid, glaucous, 5–7 mm. long; flowers in short dense axillary clusters; style and stamens included, the former pilose, 2 mm. long; erect shrub with the young twigs pubescent.8. *S. orbiculatus*
- The corolla elongate-campanulate to tubular-funnelform or salverform, symmetrical, not at all ventricose, the lobes much shorter than the tube; fruit white, ellipsoid; style shorter than the corolla.
- Corolla elongate-campanulate or tubular-funnelform, 6–13 mm. long, with 5 glandular areas (nectaries) at the base; style 3–5 mm. long, usually glabrous; anthers equalling or somewhat shorter than the free portion of the filaments.
- Anthers as long as or slightly longer than the corolla-lobes; corolla about 1 cm. long; leaves oval, acute, dark green and glabrous above, pale beneath; New Mexico, Mexico, and Guatemala.9. *S. microphyllus*
- Anthers shorter than the corolla-lobes; species of western United States, rarely also northern Mexico.
- Young twigs completely glabrous.
- Corolla elongate-campanulate, 6–9 mm. long; leaf-buds lanceoloid, acuminate.
- Corolla 8–9 mm. long; leaves glabrous; erect shrub.10. *S. tetonensis*
- Corolla 6–7 mm. long; leaves glaucous, pilosulous, rarely glabrous; low spreading shrub.12. *S. Parishii*
- Corolla tubular-funnelform, 11–13 mm. long; leaf-buds ovoid, acute; leaves almost always perfectly glabrous; erect shrub.13. *S. oreophilus*
- Young twigs puberulent or pubescent; corolla pilose within.
- The young twigs tomentulose-puberulent or loosely (sometimes only sparsely) pilosulous.
- Corolla elongate-campanulate, 6–9 mm. long.
- Erect shrub; corolla 7–9 mm. long, oblong-campanulate, the interior of the tube pubescent only on the lower half; leaves only slightly or not at all glaucous, puberulent;

young twigs usually densely (or on occasional specimens only sparsely) softly tomentulose-puberulent; British Columbia to Colorado and eastern California.

.....11. *S. vaccinioides*

Low spreading shrub, the branches declined, often rooting at the tips; corolla 6–7 mm. long, tapering below, the interior of the tube pilose throughout; leaves glaucous, pilosulous; young twigs loosely short-pilosulous, or occasionally the internodes glabrous; southern California and adjacent Arizona.12. *S. Parishii*

Corolla tubular-funnelform, 9–12 mm. long, pubescent within; young twigs tomentulose-puberulent with short, curved trichomes.

Erect shrub; leaves puberulent, scarcely paler beneath, the principal veins on the upper surface prominent (in herbarium specimens); petioles 2–4 mm. long; nutlets lanceoloid or fusiform, acute or apiculate at the base, 5–7 mm. long; Wyoming, Utah, Colorado, and northern Arizona.13. *S. utahensis*

Trailing shrub; leaves short-pilosulous, paler beneath, the veins on the upper surface obscure; petioles 1–2 mm. long; nutlets ellipsoid, flattened, acutish at the base, 4–5 mm. long; southern Colorado, New Mexico and western Texas.14. *S. Palmeri*

The young twigs densely pubescent with straight, spreading trichomes; corolla tubular-funnelform, 8–10 mm. long; anthers reaching only to the base of the corolla-lobes; leaves roundish oval, dark green, obtuse or obtusish, softly pubescent on both surfaces, 1–3 cm. long, 6–18 mm. wide; Arizona and New Mexico.16. *S. rotundifolius*

Corolla salverform, 11–13 mm. long, with only one small basal glandular area (nectary); style 5–7 mm. long, usually pilose above the middle; anthers sessile, one-fourth the length of the corolla-lobes; leaves oblanceolate, glaucous, 6–15 mm. long, 2–5 mm. wide; Utah, Nevada, California, Arizona.17. *S. longiflorus*

SUBGENUS I. *Eusymphoricarpus*, subgen. nov. Corolla shortly campanulate, 3–9 mm. long, pubescent within, the lobes about as long as or slightly longer than the tube; fruit subglobose to ovoid, black, red, or white.

Symphoria Persoon ex Pursh, Fl. Am. Sept. 1: 162. 1814. — *Symphoricarpus* sect. 1. *Boreales* Gray ex Schneider, Ill. Handb. Laubholz. 2: 669. 1911. — *Symphoricarpus* sect. *Breviflorae* Zabel in Beissner, Schelle & Zabel, Handb. Laubholz-Benennung 445. 1903, *nomen nudum*. — Type species: *Symphoria glomerata* Pursh (*Symphoricarpus orbiculatus* Moench.)

1. ***Symphoricarpos sinensis*** Rehder in Sargent, Pl. Wilson. 1:117. 1911, in Bailey, Stand. Cyclop. Hort. 3294. 1917, Man. Cult. Trees Shrubs 812. 1927.

An erect shrub 1–1.5 m. tall; branches slender, glabrous, becoming reddish brown; bark fibrous; buds small, brown, acute, with several scales; leaves glabrous, oval to rhombic-ovate, acute or obtusish at the apex, cuneate at the base and narrowed to the petiole, the blades 1.5–2.5 cm. long, 1.2–1.8 cm. wide, green on the upper surface, the lower surface glaucescent, 4–6-veined; petioles 1–2 mm. long; flowers sessile, solitary in the axils of subulate bracts which are shorter than the ovary, forming a slender, terminal, 6–12-flowered spike; calyx-teeth ovate-lanceolate, acute, glabrous, about 1 mm. long; corolla white, campanulate, nearly symmetrical, 5–7 mm. long, glabrous inside and out, the lobes ovate, the tube slightly ventricose; stamens equalling or slightly longer than the corolla; anthers 2 mm. long, white; style glabrous, 6–7 mm. long; stigma capitate; fruit ovoid, 7 mm. long, bluish black, pruinose, the apex contracted to a short beak; nutlets ovoid, 5 mm. long, white, densely pilose.

TYPE LOCALITY: Fang Hsien, western Hupeh, China. Collected by E. H. Wilson in July, 1907.

RANGE: Central and southwestern China.

SPECIMENS EXAMINED: CHINA: Western Hupeh: Fang Hsien, Ta-pa-shan, thickets, rare, altitude 2300 m., July, 1907, *E. H. Wilson* 718 (TYPE, A). Yunnan: Loufou, near Tungchwan, October 2, 1909, *F. Ducloux* 1640 (UC); Lan-ping Hsien, October 12, 1933, *H. T. Tsai* 56214 (A). NORTH AMERICA: formerly cultivated in the Arnold Arboretum, specimens collected September 10, 1908, *Rehder* (A), October 13, 1912, *Wilson* (A), October 2, 1909, *Rehder* (UI).

The occurrence of an Asiatic *Symphoricarpos* is highly interesting because, as pointed out by Professor Rehder in the original publication of this species, it adds one more genus to the number of those formerly considered peculiar to the flora of North America, but which in recent years have been discovered in western and central China, such as *Nyssa*, *Sassafras*, *Liriodendron*, *Decumaria*, and others. *Symphoricarpos sinensis* constitutes a distinct section of the genus, and is well separated biogeographically from all its congeners by its restricted present-day range. In the shape of the corolla it is plainly a member of the subgenus *EUSYMPHORICARPOS*, and is most similar in this respect to *S. orbiculatus*, but the black fruits with pilose nutlets, both unique characters in this genus, and the terminal peduncled spikes, as well as the elongated

style, separate it completely from any of the other species. We must conclude, then, that *S. sinensis* is an ancient species that has been isolated at least since the Cretaceous, remaining today as the sole known representative of its genus on the continent of Asia, and probably, as indicated by the paucity of herbarium specimens, rather rare and local at the present time.

2. *Symphoricarpos rivularis* Suksdorf, Werdenda 1: 41. 1927.

Symphoria racemosa sensu Loddiges, Bot. Cabinet 3: no. 230. 1818; Sims, Bot. Mag. 48: pl. 2211. 1821; Watson, Dendr. Brit. 1: pl. 7. 1825. Non Pursh 1814.

Symphoria elongata Presl ex De Candolle, Prodr. 4: 339. 1830, pro syn. *Symphoricarpos racemosus*.

Symphoria heterophylla Presl ex De Candolle, ibid.; Rafinesque, New Fl. 3: 21. 1836, *nomen dubium*.

Symphoricarpos racemosus sensu Hooker, Fl. Bor. Am. 1: 285. 1833, ex p., excl. syn.; Loudon, Arb. et Frut. Brit. 2: 1059, f. 826. 1838, Encycl. Trees Shrubs 542, f. 1012. 1842; Torrey in Bot. Wilkes Exped. 17: 327. 1874; Gray, Man. Bot. N. U. S. (ed. 5) 203. 1875, in Brewer & Watson, Bot. Calif. 1: 279. 1876; Coulter, Man. Bot. Rocky Mt. Reg. 125. 1885; Dippel, Handb. Laubholz. 1: 278. 1889; Greene, Fl. Franciscana 344. 1892, Man. Bot. San Francisco Bay Reg. 163. 1894; Britton in Britton & Brown, Ill. Fl. N. States 3: 235, f. 3451. 1898; Rydberg, Mem. N. Y. Bot. Gard. 1: 270. 1900; Howell, Fl. NW. Am. 281. 1900; Piper & Beattie, Fl. Palouse Reg. 170. 1901; Jepson, Fl. W. Middle Calif. 472. 1901, (ed. 2) 395. 1911; Cowell in Bailey, Cyclop. Am. Hort. 1757, f. 2447. 1902; Keeler, Our Northern Shrubs 287, pl. opp. p. 288. 1903; Piper, Contr. U. S. Nat. Herb. 11: 528. 1906; H. M. & C. C. Hall, Yosemite Fl. 235. 1912; Britton in Britton & Brown, Ill. Fl. N. States (ed. 2) 3: 276, f. 3976. 1913; Small & Carter, Fl. Lancaster Co., Pennsylvania 275. 1913; Piper & Beattie, Fl. SE. Wash. Adj. Idaho 236. 1914; Bean, Trees Shrubs Hardy Brit. Isles 2: 564. 1914; Longyear, Trees Shrubs Rocky Mt. Reg. 217, f. 119a. 1927; Kirkwood, N. Rocky Mt. Trees Shrubs 295, pl. 33. 1930. Non Michx. 1803.

Symphoricarpos racemosus var. *macrophylla* Lavallée, Enum. Arbres Arbriss. 142. 1877, *nom. nud.*

Symphoricarpos racemosus var. *foliis variegatis* Lavallée, l.c., *nom. nud.*

Symphoricarpos racemosus var. *macrocarpa* Lavallée, l.c., *nom. nud.*

Symphoricarpos racemosus var. *glaucus* Lavallée, l.c., *nom. nud.*

Symphoricarpos racemosus var. *laevigatus* Fernald, Rhodora 7: 167. 1905; Robinson & Fernald in Gray, Manual (ed. 7) 757. 1908; Schneider, Ill. Handb. Laubholz. 2: 671, f. 429 l-o. 1911; Clements, Rosendahl & Butters, Minnesota Trees & Shrubs 286. 1912; Mathews, Field Book Am. Trees Shrubs 392, f. opp. p. 392. 1915; Beckett in Garden 84: 17. 1920; Anon. in Gard. Chron. (ser. 3) 161, suppl. pl. opp. p. 64. 1924.

Symphoricarpos hyalinus Heller ex Schneider, Handb. Laubholz. 2: 672. 1911, pro syn. *S. racemosus*.

Symphoricarpos ovatus Hort. ex Schneider, op. cit. 673, *nomen dubium*.
Symphoricarpos racemosus laevigatus Piper & Beattie, Fl. SE. Wash. Adj. Idaho 236. 1914.

Symphoricarpos albus var. *laevigatus* Blake, Rhodora **16**: 119. 1914; Rehder in Bailey, Stand. Cyclop. Hort. 3293. 1917; Bailey, Man. Cult. Pl. 722. 1924; House, N. Y. State Mus. Bull. **254**: 650. 1924; Pease, Vasc. Pl. Coos Co., N. H. 342. 1924; Wiegand & Eames, Fl. Cayuga Basin 387. 1926; Rehder, Man. Cult. Trees Shrubs 811. 1927; Rosendahl & Butters, Trees Shrubs Minnesota 352. 1928; St. John, Fl. SE. Wash. Adj. Idaho 395. 1937; Van Dersal, U. S. Dept. Agric. Misc. Publ. **303**: 268, *pl. 41, fig. a*. 1938.

Symphoricarpos albus sensu Piper & Beattie, Fl. NW. Coast 338. 1915; Rydberg, Fl. Rocky Mts. 813. 1917; Standley, Contr. U. S. Nat. Herb. **22**: 413. 1921; Jepson, Man. Fl. Pl. Calif. 966, *f. 900*. 1925; Tidestrom, Contr. U. S. Nat. Herb. **25**: 515. 1925; Longyear, Trees Shrubs Rocky Mt. Reg. 217. 1927; Gilkey, Spring Fl. NW. Oregon 130, *fig.* 1929; Dayton, U. S. Dept. Agric. Misc. Publ. **101**: 151, *f. 39*. 1931; Rydberg, Fl. Prairies Plains 748. 1932; Small, Man. SE. Fl. 1273. 1933; Benson, Contr. Dudley Herb. Stanford Univ. **2**: 153. 1930; St. John, Fl. SE. Wash. Adj. Idaho 395. 1937; G. N. Jones, Univ. Wash. Publ. Biol. **7**: 152. 1938; Applegate, Am. Midl. Nat. **22**: 302. 1939; McMinn, Ill. Man. Calif. Shrubs 531, *f. 634, 636*. 1939. Non *Vaccinium album* L.

Symphoricarpos albus var. *macrocarpus* Hort., Anon. in Gard. Chron. (ser. 3) **60**: 304, *f. 132*. 1916.

Symphoricarpos albus var. *ovatus* Rehder in Bailey, Stand. Cyclop. Hort. 3293. 1917, Man. Cult. Trees Shrubs 811. 1927; Krüssmann, Laubgehölze 314. 1937.

Symphoricarpos albus laevigatus Nash in Addisonia **3**: 27, *pl. 94*. 1918.

Symphoricarpos albus var. *laevigatus variegatus* Nash, Jour. N. Y. Bot. Gard. **21**: 76. 1920.

Symphoricarpos leucocarpus Hort. ex Koch, Dendrol. **2**: 49. 1872 pro syn. *S. racemosus*; McMahon ex True, Proc. Am. Phil. Soc. **67**: 14. 1928 (as "*leucocarpa*").

Symphoricarpos albus f. *laevigatus* G. N. Jones, Univ. Wash. Publ. Biol. **6**: 236. 1936.

An erect, branched shrub 1–3 m. tall, rarely smaller in dry habitats; young twigs slender, almost always completely glabrous; bark of the older branches gray, smooth, not shreddy or only slightly so; bud-scales glabrous; leaves of the flowering branches oval, 2–3 cm. long, 7–15 mm. wide, rarely smaller on stunted plants, acutish at the base, the apex acute or obtusish, the upper surface dark green and glabrous, the lower surface scarcely paler, completely glabrous or with a few scattered trichomes, the margin glabrous or sparsely ciliate, entire, or on young shoots sinuate or lobed; petioles 2–4 mm. long; flowers often numerous in short peduncled racemes 1–2.5 cm. long at the tips of the branches, sometimes some of

them also in the uppermost axils; bracts and bractlets glabrous; calyx glabrous, the teeth triangular, acute, 0.5 mm. long; corolla 5–7 mm. long, rosy pink shading to white, strongly ventricose on the lower side, whitish villous inside, the lobes equalling the tube, 2–2.5 mm. long, minutely granular on the margins, obtuse; anthers 1–2 mm. long, the free part of the filament 1.5 mm. long; style glabrous, 2 mm. long, shorter than the tube of the corolla; stigma capitate, 0.5 mm. in diameter; fruits white, subglobose, or ellipsoid, in terminal glomerules, the larger ones usually 12–15 mm. in diameter or length when fully mature; nutlets 2, oval, plano-convex, obtuse at each end, 4–6 mm. long, 3–3.5 mm. wide.

TYPE LOCALITY: Holmes Creek, near Laurel, Falcon Valley, Klickitat County, Washington. Collected by W. N. Suksdorf in 1912 and 1914.

RANGE: Southeastern Alaska to California, eastward to Montana; frequently cultivated, and often fugitive or naturalized in eastern North America from Quebec to Minnesota and southward to northern Illinois, and eastern Tennessee and Virginia.

REPRESENTATIVE SPECIMENS: ALASKA: Chilkat Valley, *Walker* 1074 (F, Mo, US), 1068 (Mo, US); Haines, *Scheuber* in 1909 (US). BRITISH COLUMBIA: Skidegate Inlet, *Newcombe* in 1897 (Can); Stikine River, *Cooper & Andrews* 412 (F); Campbell River, *Howell* 7733 (Cal); Victoria, *Coville & Kearney* 271 (US); Chilliwack Valley, *Macoun* 64662 (NY, F); Revelstoke, *Shaw* 879 (Mo, NY, P). WASHINGTON: Oyhut, *Lamb* 1267 (F, NY, P, Mo); Clallam Co., *Elmer* 2738 (US, NY, Mo); Columbia River, *Pringle* in 1881 (F); Montesano, *Heller* 3948 (US, F, Mo, UI, NY, UC, P); Peshastin, *Sandberg & Leiberg* 804 (UI, UC, NY); Pullman, *Elmer* 836 (US, Mo, NY); Falcon Valley, *Suksdorf* 7557 (NY, US, A, Mo, F, P, UI, ISOTYPES); Columbia National Forest, *Kienholz* 235, 257, 266 (UI). OREGON: Silver Creek, *Hall* 223 (Mo, F); Portland, *Eastwood* 1129 (Cal), *Sheldon* 12085 (F); Sisters, *Benson* 2258 (NY, Mo); Prineville, *Leiberg* 819 (US, UC, NY); Ashland, *Applegate* 2145 (US). CALIFORNIA: Kings Mt., *Baker* 238 (Cal, NY, Can, US); Quincy, *Heller* 10858 (UC, UI, Mo, NY); Los Gatos, *Heller* 7448 (NY, UC). ALBERTA: Crows Nest Pass, *Macoun* 20607 (NY). IDAHO: Lake Pend d'Oreille, *Sandberg, et al.* 952 (Mo, F, UI, P, NY); Lake Waha, *Heller* 3412 (US, NY, UC, P, Mo, A). MONTANA: Glacier National Park, *Standley* 17867 (NY, US); Gallatin Basin, *Blankinship* 234 (F, US, Mo, Can, P); Forks of the Madison, *Rydberg & Bessey* 5023 (US, NY, F); Jack Creek Canyon, *Rydberg & Bessey* 5022 (US, NY, Can); Emigrant Gulch, *Rydberg & Bessey* 5025 (NY, F). WYOMING: Alpine, *Payson & Armstrong* 3605

(Mo, P); Hot Spring Bar, *Merrill & Wilcox 1041* (US, NY); Madison Canyon, *Nelson & Nelson 6758* (NY, Mo, US). COLORADO: Meeker, *Maguire & Piranian 12879* (Mo.); Denver, *Bisson 14* (Mo); Golden, *Ward* in 1881 (US); Estes Park, *Allen 138* (Mo); Empire, *Vasey* in 1889 (US).

Symphoricarpos rivularis is commonly cultivated, and occurs in eastern North America as a fugitive from cultivation, or as a naturalized plant in those states and provinces indicated by the following selected list of specimens.

QUEBEC: Bic, *Collins & Fernald 135* (Can, US, UI, UC); Montmorency Falls, *Macoun 68139* (Can), *Jack* in 1895 (A). NOVA SCOTIA: Weymouth, *Fernald & Long 24536* (P); Barrington Passage, *Macoun 81574* (Can). NEW BRUNSWICK: Kent Co., *Fowler* (F). MAINE: Portland, *Fernald, Long & Norton 14595* (P, A). NEW HAMPSHIRE: Derry, *Seaman* (US). VERMONT: Middletown Springs, *Carpenter* in 1932 (Cal); Wilmington, *Carpenter, et al.* in 1925 (Mo); Peacham, *Blanchard* in 1884 (Mo). MASSACHUSETTS: Canton, *Blake 1735* (US). CONNECTICUT: Somers, *Weatherby 5258* (US); Ridgefield, *Eames 5517* (NY). RHODE ISLAND: Providence, *Collins* in 1892 (US). NEW YORK: White Creek, *McCall* in 1876 (UC); Clove, *Standley & Bollman 12192* (US); Hempstead, *Bicknell 8074* (NY). NEW JERSEY: Fanwood, *Moldenke 6208* (NY); Charlotteburg, *Mackenzie 3131* (NY, US, Mo). PENNSYLVANIA: Easton, *Porter* in 1887 (F). DISTRICT OF COLUMBIA: Washington, *Hunter* in 1897 (US), *Ward* in 1877 (US, Mo). MARYLAND: Smithsburg, *Norton* in 1902 (Mo); Piney Point, *Vasey* in 1874 (US). VIRGINIA: Mt. Crawford, *Heller 1359* (US, P); Holston Valley, *Small* in 1892 (Mo, NY, F, UC, P, US, A). TENNESSEE: Cocke Co., *Kearney 733* (Mo, NY, US). OHIO: Cincinnati, *Lloyd* in 1879 (F); Fox Lake, *Selby 1414* (P). ONTARIO: Queenston Heights, *Macoun 20604, 62964* (Can). MICHIGAN: Mackinac Island, *Williamson 2411* (P); Haslet, *Yuncker 424* (US); Midland, *Dreisbach* in 1918 (F, P). INDIANA: Porter Co., *Standley 57351* (US, Mo, UC, F, A). ILLINOIS: Highland Park, *Sherff* in 1911 (Mo). MISSOURI: St. Louis, *Sherff 265* (F).

Although it was not proposed until 1927, *S. rivularis* Suksd. appears to be the earliest available binomial for this western American species. Unfortunately, the type specimen is scarcely typical, and apparently Suksdorf distributed only a single set of specimens. They consist of parts of a small shrub from a dry habitat, with unusually small leaves and small fruits. However, a large number of other collections from western Washington and western Oregon have been examined during

the course of the present study, and there is, therefore, no doubt that Suksdorf's plants are conspecific with the common, erect, glabrous, short-flowered shrub distributed throughout the region; and they differ in no other respect than in size from several hundred other specimens examined by the writer. Furthermore, the identity of Suksdorf's material is amply proved by an excellent series of specimens collected near the type locality in 1928 by R. Kienholz and deposited in the herbarium of the University of Illinois.

Symphoricarpos rivularis is the common native snowberry occurring at low altitudes from Alaska to California and eastward to Montana. It occurs in eastern North America only as a cultivated plant, and in certain localities, as a garden escape or as a naturalized species along roads. It is a larger shrub than *S. albus*, with the leaves glabrous or nearly so, often numerous flowers in terminal or axillary spiciform racemes, and much larger fruits. It is very generally cultivated in Europe as well as in America. For this purpose it is regarded as one of the best species of the genus on account of its handsome white fruits which occur in great abundance on the slender, drooping branches and persist well into the winter season.

In 1928 Dr. R. H. True presented some additional data concerning this species, copied from unpublished manuscripts in the Library of Congress. The seeds, cuttings, and other living plant material brought back by the Lewis & Clark Expedition in 1806 were given to Bernard McMahon, a gardener and seedsman of Philadelphia, by President Thomas Jefferson who had received them from Lewis. Among this material of living plants were some specimens of the plant we now call *Symphoricarpos rivularis*. In 1812, McMahon sent some of these to Jefferson at Monticello with the following account in a letter:

"No. 2. *Symphoricarpos leucocarpa* (mihi). This is a beautiful shrub brought by C. Lewis from the River Columbia, the flower is small but neat, the berries hang in large clusters and of a snow white colour and continue on the shrubs, retaining their beauty, all the winter, especially if kept in a greenhouse. The shrub is perfectly hardy: I have given it the trivial english name of Snowberry-bush."²

The plant here mentioned is plainly *S. rivularis*. Until 1905, when Fernald investigated this plant, it was generally assumed to be *S. racemosus* Michx. [*S. albus* (L.) Blake], due, apparently, to an erroneous identification by Loddiges, who in 1818 was the first to describe and illustrate it. Loddiges says: "This plant is quite new to this country [England]; we received it, for the first time, last spring, [i.e., 1817]

²True, R. H., Proc. Am. Phil. Soc. 67: 14. 1928.

from our friend Mr. Robert Carr, who informs us that it is a native of the Western country of North America, and was found by Lewis and Clark beyond the rocky mountains, in August 1805: we consider it, however, to be the *Symphoria racemosa* of Michaux."

The best characters for distinguishing this species from its nearest relative, *S. albus*, are the size and arrangement of the fruits, the size and habit of the plant, the smooth twigs and leaves, as well as the different geographical distribution. Occasional specimens of *S. rivularis* have the lower surface of the leaves sparsely pilose. This fact, which has no apparent taxonomic significance, misled the present writer in 1936 (l.c.), when it was erroneously assumed that such specimens from western Washington belonged to the eastern American *S. albus*. The fact should be noted here, however, that none of the western material shows the kind and quantity of leaf-pubescent that is characteristic of *S. albus*, also that the texture and venation of the leaves of these two species are quite different. In the field, there is of course usually no problem of identification because *S. rivularis* and *S. albus* have wholly different natural geographical ranges.

The leaves of the sterile shoots, or those of the flowering branches of the season, are very variable in size, shape, toothing, and degree of lobation. The fruiting clusters often have one or more terminal flowers, *i.e.*, the flowering may continue while the fruit is maturing, the oldest fruits being at the base. A fact that has increased the difficulty of correctly interpreting herbarium specimens is that frequently both the vigorous, large-leaved branches of the season, and the slender, smaller-leaved branches of previous seasons bear flowers and fruits side by side on the same shrub, and when these are made into the conventional herbarium specimens such collections often simulate two different species. In fact, it seems to have been a rather frequent practice to name specimens consisting of old branches bearing small leaves *S. albus*, while specimens of the vigorous, large-leaved branches of the season have been frequently named var. *laevigatus*.

There is a colored plate of a fruiting branch of *S. rivularis* in Audubon's Birds of America 4: pl. 375, 1835-38, and in the reprinted Macmillan edition in 1937.

A cultivated form with variegated leaves may be called f. **variegatus** (Nash), n. comb. (*S. albus* var. *laevigatus* *variegatus* Nash, Jour. N. Y. Bot. Gard. 21: 76. 1920; nom.)

3. **Symphoricarpos albus** (L.) Blake, Rhodora 16: 118. 1914; Rehder in Bailey, Stand. Cyclop. Hort. 3293. 1917; Bailey, Man. Cult. Pl. 722. 1924; House, N. Y. State Mus. Bull. 254: 650. 1924;

Wiegand & Eames, Fl. Cayuga Basin 387. 1926; Rehder, Man. Cult. Trees Shrubs 811. 1927; Rosendahl & Butters, Trees Shrubs Minn. 351, *f. on p.* 352. 1928.

Vaccinium album L. Sp. Pl. 350. 1753.

Symphoricarpos racemosus Michx. Fl. Bor. Am. **1**: 107. 1803; Roemer & Schultes, Syst. Veg. **5**: 222. 1819; Link, Enum. Pl. Hort. Berol. **1**: 223. 1821; Barton, Fl. N. Am. **1**: 67, *pl.* 19. 1821; De Candolle, Prodr. **4**: 339. 1830; Hooker, Fl. Bor. Am. **1**: 285. 1833, *ex p.*; Torrey & Gray, Fl. N. Am. **2**: 4. 1841; Eaton & Wright, N. Am. Bot. 447. 1840; Torrey, Fl. N. Y. **1**: 295. 1843; Gray, Man. Bot. N. U. S. 170. 1848; Gray, Man. Bot. N. U. S. (ed. 2) 164. 1856; Koch, Dendrol. **2**: 48. 1872; Gray, Jour. Linn. Soc. Bot. **14**: 10. 1873, *ex p.*; Macoun, Cat. Can. Pl. **2**: 196. 1884; Gray, Syn. Fl. **1**²: 13. 1886, *ex p.*; Watson & Coulter in Gray, Man. (ed. 6) 220. 1889; MacMillan, Metasp. Minn. Valley 483. 1892; Newhall, Shrubs NE. N. Am. 145. 1893; Koehne, Dendrol. 557. 1893; Britton in Mem. Torr. Club **5**: 306. 1894; Miller & Whiting, Wild Fl. N. E. States 236. 1895; Small, Fl. SE. U. S. 1124. 1903; Parkhurst, Trees Shrubs 278, 253, *f.* 7. 1903; Robinson & Fernald in Gray, Man. (ed. 7) 757. 1908; Jones & Rand in Bull. Vermont Agr. Sta. **145**: 179. 1909; Schneider, Ill. Handb. Laubholzk. **2**: 670. 1911; Bergman, Fl. N. Dakota 283. 1912; Clements, Rosendahl & Butters, Minn. Trees Shrubs 286, *f.* 1912; Keeler, Our Northern Shrubs (ed. 2) 289. 1912; Britton in Britton & Brown, Ill. Fl. N. States **3**: 276, *f.* 3976. 1913; Hegi, Illustr. Fl. Mitteleur. VI. **1**: 234. 1915; Mathews, Field Book Am. Trees Shrubs 391, *f. opp. p.* 392. 1915; Schaffner, Field Man. Fl. Ohio 494. 1928; Marie-Victorin, Fl. Laurent. 536. 1935.

Lonicera racemosa Persoon, Syn. Pl. **1**: 214. 1805.

Symphoria racemosa Pursh, Fl. Am. Sept. **1**: 162. 1814, *ex p.*; Nuttall, Gen. Am. Pl. 139. 1818; Sprengel, Syst. Veg. **1**: 757. 1825.

Symphoria alba Rafinesque, New Fl. **3**: 21. 1838, *nom. nud.*

Symphoria leucocarpa Hort. *ex* De Candolle, Prodr. **4**: 339. 1830, *pro syn.* *Symphoricarpos racemosus*.

Symphoricarpos leucocarpus Hort. *ex* Bosse, Vollst. Handb. Blumengärt. **3**: 458. 1842, *pro syn.* *Symphoria racemosa*.

Symphoricarpos racemosus var. *pauciflorus* Robbins in Gray, Manual (ed. 5) 203. 1867, *ex p.*, *emend.* Fernald, Rhodora **7**: 167. 1905; Gray, Jour. Linn. Soc. Bot. **14**: 10. 1873; Macoun, Cat. Can. Pl. **2**: 196. 1884; Coulter, Man. Bot. Rocky Mt. Reg. 125. 1885; Gray, Syn. Fl. **1**²: 14. 1886; Dippel, Handb. Laubholzk. **1**: 279. 1889; Watson & Coulter in Gray, Manual (ed. 6) 220. 1889; MacMillan, Metasp. Minn. Valley 484. 1892; Cowley in Bailey, Cyclop. Am. Hort. 1758. 1902; Robinson & Fernald in Gray, Manual (ed. 7) 757. 1908; Coulter & Nelson, New Man. Bot. Rocky Mts. 470. 1909; Schneider, Ill. Handb. Laubholzk. **2**: 672, *f.* 429 *p-r.* 1911; Clements, Rosendahl & Butters, Minnesota Trees Shrubs 286. 1912; Mathews, Field Book Am. Trees Shrubs 391, *f. opp. p.* 392. 1915.

Symphoricarpos alba "Raf." *ex* Koch, Dendrol. **2**: 48. 1872, *pro syn.* *S. racemosus*.

Symphoricarpos pauciflorus Britton, Mem. Torr. Bot. Club 5: 305. 1894, in Britton & Brown, Ill. Fl. N. States 3: 236. f. 3452. 1898; Rydberg, Mem. N. Y. Bot. Gard. 1: 370. 1900; Rydberg, Fl. Colorado 324. 1906; Petersen, Fl. Nebraska (ed. 2) 165. 1912; Rydberg, Fl. Prairies Plains 748. 1932.

Symphoricarpos racemosus pauciflorus Rydberg, Contr. U. S. Nat. Herb. 3: 503. 1896.

Symphoricarpos albus var. *pauciflorus* Blake, Rhodora 16: 119. 1914; Rosendahl & Butters, Trees Shrubs Minnesota 352. 1928; Raup, Contr. Arnold Arb. 6: 199. 1934, Nat. Mus. Can. Bull. 74: 163. 1935, Jour. Arnold Arb. 17: 298. 1936.

Symphoricarpos albus pauciflorus Tidestrom, Contr. U. S. Nat. Herb. 25: 515. 1925.

Xylosteon album Moldenke, Revista Sudam. Bot. 5: 3. 1937.

An erect shrub 20–80 cm. tall, the branches slender, often slightly curved so that the leaves are on an ascending or almost horizontal plane; young twigs slender, crisp-puberulent with short, curved hairs; bark on the older branches thin, gray, shreddy; bud-scales ciliate or puberulent; leaves of the flowering branches thin, oval to ovate or nearly orbicular, 1–3 cm. long, 8–25 mm. wide, rounded or slightly narrowed at the base, the apex acute or obtuse, occasionally apiculate, but not mucronate, the upper surface bright green, very sparsely puberulent at first, soon becoming permanently glabrous, the lower surface paler or glaucous, pilose at least along the veins, or frequently rather densely short-pilose throughout, the margin ciliate, entire, or on young shoots sinuate; petioles sparsely pilose, 2–3 mm. long, longer than the acute leaf-buds; flowers short-pedicelled, 1–5 in the axils of the upper leaves; bracts lanceolate; bractlets deltoid, very slightly or not at all ciliate; calyx irregularly 5-toothed, the sepals glabrous or more or less ciliolate; corolla pink, campanulate, somewhat gibbous at the base, 5–6 mm. long, the lobes obtuse, 2–3 mm. long, shorter than the tube and densely villous within; stamens slightly shorter than the corolla; anthers 1–1.5 mm. long, versatile, slightly shorter than the free portion of the filament; style glabrous, 2–3 mm. long, shorter than or nearly equalling the corolla-tube; stigma capitate; fruits in pairs or solitary in the axils of the upper leaves and pendent from the underside of the branchlets, white, depressed-globose, 6–10 mm. in diameter, not edible; nutlets 2, oval, plano-convex, straw-colored, rounded at the ends, smooth or nearly so, 4–5 mm. long, 2.5–3.5 mm. wide.

TYPE LOCALITY: On hills near St. Lawrence River, in the vicinity of Quebec, Ontario, Canada.³ Collected by Per Kalm in 1749.

RANGE: Quebec to northern Alberta, southward along the eastern

³Svenson, H. K., Rhodora 39: 461. 1937.

foothills of the Continental Divide to Colorado, eastward to Nebraska, Minnesota, Michigan, and the Allegheny Mountains of Virginia.

REPRESENTATIVE SPECIMENS: QUEBEC: "Hauteur des terres, près Mistassin," *Michaux* (A, fragment of TYPE); Aylmer, *Marie-Victorin* 9181 (US, F, P); Rimouski Co., *Bartram & Long* 608 (P). ONTARIO: Queenston Heights, *Macoun* 62963, 62964 (NY); Belleville, *Macoun* 9600 (Can); Fort William, *Williamson* 2010 (P). VERMONT: Burlington, *Grout* in 1894 (F, NY, US); Weybridge, *Eggleston* in 1896 (US, P, NY, F); Charlotte, *Pringle* in 1877 (Cal, F, Mo). NEW YORK: Port Henry, *Britton* in 1878 (NY); Jamesville, *House* in 1901 (NY), *Britton* in 1902 (NY); Goat Island, Niagara Falls, *Engelmann* in 1840 (Mo); Rochester, *Bartram* in 1910 (P). PENNSYLVANIA: Huntington Co., *Lowrie* in 1865 (P, F). VIRGINIA: Allegheny Mts., *Steele* 308 (NY, Mo, US), Monroe Co., *Canby* (F). MICHIGAN: Norway, *Wheeler* in 1892 (US, UI, NY); Port Huron, *Dodge* in 1896 (Mo, P); Keewenaw Point, *Robbins* (NY, Mo). WISCONSIN: Alma, *Palmer* 28512 (US, Mo); Ephraim, *Millsbaugh* 4281 (F). MINNESOTA: Sandy Lake, *Sandberg* 777 (US, Mo, UC); Taylors Falls, *Rydberg* 9631 (NY); Itasca Park, *Moyle* 358 (Cal, F, UC, Mo, P). MANITOBA: Oak River, *Macoun & Herriot* 72609 (NY); Brandon, *Macoun* 12248 (Can). NORTH DAKOTA: Turtle Mts., *Lunell* in 1910 (US, UI); Walhalla, *Stevens* 256 (F). SOUTH DAKOTA: Deadwood, *Carr* 94 (NY, Can, US, Mo, F); Lead City, *Rydberg* 744 (NY, US); Hot Springs, Fall River Co., *Palmer* 37434 (US, P, NY, Mo). NEBRASKA: War Bonnet Canyon, *Williams* in 1890 (US, NY); Hat Creek Basin, *Webber* in 1889 (NY, Mo). COLORADO: Boulder, *Shear* 4743 (NY); Fort Collins, *Baker* in 1896 (NY, Mo). WYOMING: Bighorn, *Tweedy* 2510 (NY); Newcastle, *Hayward* 2005 (F). MONTANA: Belt Creek, *Anderson* in 1884 (US). SASKATCHEWAN: Prince Albert, *Macoun* 12759 (Can); Duck Lake, *Johnson* 1468 (NY); without locality, *Bourgeau* in 1858 (US). ALBERTA: Peace River, *Raup & Abbe* 4387 (NY, Can); Edmonton, *Macoun & Herriot* 72608 (NY, Can); Chipewyan, *Laing* 152 (US); Banff, *McCalla* 2210 (US, NY). BRITISH COLUMBIA: Hudson Hope, *Raup & Abbe* 3654 (NY, Can).

Symphoricarpos albus grows in rocky or dry soil, on river banks, in dry open rocky woods, often at the base of cliffs, or at the edges of thickets. It is not known to occur west of the Continental Divide. The flowers appear in June and July, and the fruit ripens in August and September. It was first described by Linnaeus in 1753 as *Vaccinium album*. Linnaeus' name was generally disregarded until 1914, when S. F. Blake restored it, and the shrub usually had been designated *S. racemosus*

Michx. The snowberry commonly cultivated as *S. racemosus* is *S. rivularis*. *Symphoricarpos albus* is seldom cultivated.

The plant described as *S. pauciflorus* appears to be merely an ecological form. This point has already been suggested by House, and tacitly indicated by Britton, who reduced *S. pauciflorus* to synonymy under *S. racemosus*, and by Fernald who observed that the type of Michaux's *S. racemosus* has the same leaf character as *S. pauciflorus*. I have been able to examine a fragment of Michaux's type of *S. racemosus* from "hauteur des terres près Mistassin" [Quebec] obtained for me through the kindness of Dr. Leon Croizat of the Arnold Arboretum, and thus can verify Professor Fernald's observation. Rosendahl & Butters have pointed out that "forms intermediate between *S. albus* and *S. pauciflorus* are rather common in Minnesota." There are no distinguishing characters of flowers or fruits.

4. ***Symphoricarpos mollis*** Nuttall in Torrey & Gray, Fl. N. Am. **2**: 4. 1841; Walpers, Rep. Bot. **2**: 447. 1843; Bentham, Pl. Hartweg. 313. 1849; Gray, Jour. Linn. Soc. Bot. **14**: 10. 1873, in Brewer & Watson, Bot. Calif. **1**: 279. 1876, Syn. Fl. **1**²: 14. 1886; Dippel, Handb. Laubholzk. **1**: 279, f. 184. 1889; Brandegee in Zoe **1**: 137. 1890; Davidson, List Pl. Los Angeles Co. 7. 1892; McClatchie, Fl. Pasadena 643. 1895; Davidson, List Pl. Los Angeles Co. 12, 1896; Jepson, Fl. W. Mid. Calif. 472. 1901; Abrams, Fl. Los Angeles 381. 1904, Bull. N. Y. Bot. Gard. **6**: 456. 1910; Jepson, Fl. W. Mid. Calif. (ed. 2) 395. 1911; Schneider, Ill. Handb. Laubholzk. **2**: 671. 1911; Bean, Trees Shrubs Hardy Brit. Isles **2**: 563. 1914; Rehder in Bailey, Stand. Cyclop. Hort. 3294. 1917; Abrams, Fl. Los Angeles 349. 1917; Parish, Pl. World **20**: 255. 1917; Davidson & Moxley, Fl. So. Calif. 343. 1923; Millspaugh & Nuttall, Field Mus. Publ. Bot. **5**: 251. 1923; Jepson, Man. Fl. Pl. Calif. 967. 1925, ex p.; Rehder, Man. Cult. Trees Shrubs 811. 1927; Krüssmann, Laubgehölze 314. 1937; McMinn, Ill. Man. Calif. Shrubs 533, f. 635. 1939.

Symphoricarpos ciliatus Nuttall in Torrey & Gray, Fl. N. Am. **2**: 4. 1841; Walpers, Rep. Bot. **2**: 447. 1843; Gray, Jour. Linn. Soc. Bot. **14**: 11. 1873; Greene, Fl. Franciscana 345. 1892, Man. Bot. Bay Reg. 163. 1894.

Symphoricarpos nanus Greene, Fl. Franciscana 345. 1892, a provisional name for *S. ciliatus*.

Symphoricarpos albus var. *mollis* Keck, Bull. So. Calif. Acad. Sci. **25**: 72. 1926; Munz, Man. So. Calif. Bot. 496, f. 265. 1935.

A low, trailing, diffusely branched shrub 30–90 cm. long; young

twigs usually closely tomentulose-puberulent with short, curved trichomes; bark of the older branches grayish, thin, fibrous; leaves of the flowering branches entire, ciliate, roundish oval to orbicular, dark green, 1–4 cm. long, 7–30 mm. wide, rounded or somewhat truncate at the base, the apex obtuse; upper surface pilosulous, dark green, the lower surface pale green, prominently reticulate, densely pilosulous, especially along the veins; petioles 1–3 mm. long, densely pubescent; flowers in pairs or small clusters in the axils of the upper leaves; bracts and bractlets oval or lanceolate, pubescent; calyx-lobes 0.5–0.8 mm. long, deltoid, obtuse, ciliate; corolla pink, 3–5 mm. long, asymmetrical, somewhat gibbous on the lower side, open-campanulate, glabrous outside, the lobes obtuse, 2–3 mm. long, sparsely pilose inside at the base, equalling the tube in length; stamens nearly as long as the corolla-lobes; anthers 0.8–1 mm. long, as long as the free part of the filament; style glabrous, 2 mm. long, as long as the corolla-tube; stigma capitate; fruits white, globose, 4–6 mm. in diameter; nutlets oval, plano-convex, smooth, 2.5–3 mm. long, 1.5–2 mm. wide.

TYPE LOCALITY: "St. Barbara" [Santa Barbara], California. Collected by Thomas Nuttall.

RANGE: California, chiefly near the coast.

REPRESENTATIVE SPECIMENS: CALIFORNIA: Mendocino Co., *Davy & Blasdale 5310* (US); Sonoma Co., *Samuels* (US), *M. S. Baker 3168a* (UC); Mt. Diablo, *Greene* in 1892 (UC); Mt. Tamalpais, *Heller 5713* (P, NY, US, Mo, F); Mill Valley, *Walker 642* (UC); Berkeley, *Greene* in 1887 (F); Alameda Co., *Chandler 309* (UC); Watsonville, *Elmer 4306* (Mo, NY, US, Cal); Santa Cruz Mts., *Pendleton 343* (UC), *Davis* in 1907 (UC), *Norton* in 1878 (F); Stanford University, *Elmer 2128* (Mo); Saratoga, *Davy 271* (UC); Alma Soda Spring, *Pendleton 724* (US, UC); Mt. Hamilton, *Sharsmith 3218, 3345, 3378* (UC); Los Gatos, *Heller 7455* (Mo, US, P, UC), *7455a* (Mo, NY, US, P, UC, F); Pacific Grove, *Heller 6648* (P, NY, UC, F, Mo, US), *Parish 11501* (UC); Monterey, *Brewer 617* (US, UC); Salinas, *Eastwood & Howell 2179* (F, NY, US, Cal), *Vasey 239* (US, P); San Luis Obispo, *Palmer 161* (F, NY); near Santa Barbara, *Eastwood 68* (UC, US, Mo, Cal); "St. Barbara," *Nuttall* (P, TYPE); Santa Cruz Isl., *Clokey 5216* (NY, US), *Hoffmann 196* (F); *Howell 6193* (Cal); Nordhoff, *Eastwood 4951* (Cal); Pt. Mugu, *Howell 3742* (Cal); Ojai, *Peckham* in 1866 (US); Santa Monica Mts., *Abrams 2552* (Mo, NY, P, US, Can), *Clokey & Templeton 4541* (Mo, F, UI, UC, US), *Munz & Harwood 3988, 3965* (US, UC); Mt. Wilson, *Grant 1260* (F, P); San Bernardino, *Parish*

4595 (UC); Santa Catalina Isl., *L. W. Nuttall* 202 (US, F), *Brandegee* in 1890 (UC), Avalon, *Trask* in 1896 (US, NY, Mo), *Millsbaugh* 4704 (F), *H. H. Smith* 5088 (F), *Knopf* 175, 84 (F), *Eastwood* 6541 (US, Cal, Mo); Cuiamaca Mts., *Palmer* 119 (UC, NY, Mo, F).

Symphoricarpos mollis grows in woods and on hillsides in the coastal valleys, foothills, and canyons below 4000 feet elevation, from Los Angeles County, to Mendocino County, California. It flowers during April and May. Its nearest relative is *S. acutus* (Gray) Dieck, from which it may be distinguished by the roundish oval, obtuse, truncate-based leaves, and the fact that the young twigs are crisp-puberulent with short, curved trichomes. The nutlets of *S. mollis* are slightly smaller than those of *S. acutus*. Occasional shade-forms are nearly glabrous, as *Heller* 7455 from Santa Clara County, California.

Within the last few years there has been a tendency for some botanists to regard *S. mollis* as a "variety" of the tall, glabrous western shrub (*S. rivularis*) that has been passing as *S. albus*. There is, however, no cogent reason for doing this, and the results of some recent experimental work reported by H. E. McMinn support this view. McMinn (l.c.) says: "Specimens of *S. albus* [i.e., *S. rivularis*] and *S. mollis* transplanted to the experimental plot at Mills College [California] have retained their respective differences for several years. The prostrate habit, earlier flowering period, fewer flowers, and smaller fruit easily distinguish *S. mollis* from *S. albus*."

5. *Symphoricarpos hesperius*, sp. nov.

Symphoricarpos pauciflorus sensu Howell, Fl. NW. Am. 281. 1900. Non Robbins 1867.

Symphoricarpos mollis sensu Macoun, Cat. Can. Pl. 4²: 331. 1888; Piper, Contr. U. S. Nat. Herb. 11: 528. 1906; Piper & Beattie, Fl. SE. Wash. Adj. Idaho 237. 1914, Fl. NW. Coast 338. 1915; Gilkey, Spring Fl. NW. Oregon 130. 1929; Benson, Contr. Dudley Herb. Stanford Univ. 2: 153. 1930; G. N. Jones, Univ. Wash. Publ. Biol. 6: 236. 1936, ibid. 7: 152. 1938. Non Nuttall ex Torrey & Gray 1841.

Symphoricarpos racemosus var. *pauciflorus* sensu Henry, Fl. S. Brit. Col. 280. 1915. Non Robbins 1867.

Symphoricarpos albus var. *mollis* sensu St. John, Fl. SE. Wash. Adj. Idaho 395. 1937. Non Keck 1926.

Frutex prostratus, ramulis 1–3 m. longis, initio puberulis, erectis vel adscendentibus; folia ovalia, vel ovata, 1–3 cm. longa et 5–20 mm. lata, acuta, basi cuneata et sensim in petiolum attenuata, supra laete viridia, reticulata, subtus pilosa; petioli teretes, 1–2 mm. longi; racemi terminales 2–5-flori; calycis dentes ovati, acuti, ciliolati, circa 1 mm. longi; corolla campanulata, rosea, 3–5 mm. longa, intus pilosa, extus

glabra, lobis ovatis tubum leviter ventricosum subaequantibus; stamina corollam subaequantia, antheris 1 mm. longis; stylus glaber; stigma capitatum, leviter bilobum; drupa alba, subglobosa, 5–6 mm. diametro; nuculae 2, ovaes, albae, 3.5–4 mm. longae, 2.5–3 mm. latae.

A trailing shrub 1–3 m. long, the branches short, erect or ascending; young twigs sparsely pilosulous to glabrous; bark gray and shreddy on the older branches; leaves oval, 1–3 cm. long, 5–20 mm. wide, tapering toward each end, widest near or below the middle, acutish or obtusish at the apex, broad-cuneate to rounded at base; upper surface dark green, glabrous or nearly so, finely reticulate; lower surface very pale, prominently reticulate, sparsely short-pilose on the veins, the margin ciliate, entire, or on young shoots sinuately lobed; petiole 1–2 mm. long, sparsely pilose; flowers short-pedicelled, in small 2–5-flowered terminal racemes 2–5 mm. long; bracts linear-lanceolate; bractlets ovate, ciliate; calyx nearly regularly 5-toothed, the teeth ovate, ciliolate, 1 mm. long; corolla pink, campanulate, nearly symmetrical, not at all, or only very slightly gibbous at the base, 3–5 mm. long, the lobes sparsely pilose at base, about as long as the tube; stamens as long as the corolla, the anthers 1 mm. long, slightly shorter than the filament; style glabrous, about as long as the tube of the corolla; stigma somewhat bilobed; fruit white, subglobose, 5–6 mm. in diameter; nutlets 2, oval, plano-convex, whitish, rounded at each end, smooth or nearly so, 2.5–3 mm. long, 1.5–2 mm. wide.

TYPE LOCALITY: Upper Valley of the Nisqually River, Pierce Co., Washington. Collected by O. D. Allen in 1895.

RANGE: Southwestern British Columbia to Humboldt County, California, chiefly west of the Cascade Mountains, but occurring also in northern Idaho, and in the Blue Mountains of southeastern Washington.

REPRESENTATIVE SPECIMENS: BRITISH COLUMBIA: Mt. Benson, *Macoun* 87969 (NY, Can); Shawnigan Lake, *Canby*, *Sargent & Muir* 106 (US); Oyster River, *J. T. Howell* 7562 (Cal); Nanaimo, *Macoun* 87971 (NY, Can); Langford Lake, *Macoun* 87970 (NY, Can); Comox, *Macoun* 397 (Mo, Can); Victoria, *Eastwood* 9687 (Cal); Chilliwack Valley, *Spreadborough* in 1906 (NY, Can); Yale, *Macoun* 9613 (Can); Mayne Island, *Macoun* in 1914 (Can). WASHINGTON: Seahorn Hill, Whatcom Co., *H. B. Bailey* 48 (NY); Upper Valley of the Nisqually River, *Allen* 105 (A, TYPE, NY, Can, F, Mo, UC); Lake Crescent, *Parks* 0692 (UC); Sequim, *Grant* in 1904 (F); Seattle, *Shumway* in 1892 (Mo); Shelton, *Eyerdam* 1230 (Mo, F); Mt. Angeles, *Thompson* 7355 (P, Mo, US); w. Klickitat Co., *Suksdorf* in 1881 (NY, P, UC, F, US); Columbia River, *Nuttall* (P); eastern Washington,

without definite locality, *Vasey* 293 (NY); Johnson Creek, Kittitas Co., *Thompson* 9535 (NY). IDAHO: forks of St. Mary's River, *Leiberg* 1144 (NY, US, UC); Clarkia, *Quick* 1082 (UC, Cal). OREGON: without locality, *Hall* 223 (NY); Hood River, *Henderson* 655, 326 (Mo); Tillamook Co., *Lloyd* in 1894 (NY); Rogue River, *Austin* 1472 (US), *Gorman* 524 (US); Chemawa, *Nelson* 3701 (P); Portland, *Drake & Dickson* in 1888 (NY, F), *Howell* in 1887 (Can, UC, F, US, Mo); Suttle Lake, *Peck* 14424 (P); High Prairie, Lane Co., *Coville & Applegate* 1008 (US); Nichols Station, Douglas Co., *Ward* 45 (US); Kitson Springs, Lane Co., *Coville & Applegate* 1004 (US); Breitenbush Springs, *Applegate* 2753 (US); Siskiyou Mts., *Engelmann* in 1880 (Mo); Walterville, *Eastwood & Howell* 1585 (Cal); Kean Creek, Jackson Co., *Applegate* 2304 (US); Mt. Hood, *Purpus* 6 (F). CALIFORNIA: Upper Canyon Creek, Trinity Co., *C. Hart Merriam* 512 (US); Trinity Summit, *Tracy* 10415, 15120 (UC).

This newly described species has been passing as *S. pauciflorus* or, more commonly, *S. mollis*. It is not uncommon on gravelly slopes, often in open coniferous woods, at low altitudes, from southwestern British Columbia to northwestern California, and also in northern Idaho and in the Blue Mountains of southeastern Washington. It frequently has been included in *S. acutus*, from which it differs, among other characters, in the type of pubescence and in the shape of the leaves. From the Californian *S. mollis* it may be distinguished by the characters mentioned in the key.

The only other species of *Symphoricarpos* occurring in the region west of the Cascade Mountains is *S. rivularis*. From that species, *S. hesperius* differs in its trailing habit, shorter corollas, smaller fruits, and the pilosulous pubescence of the leaves and young twigs.

6. ***Symphoricarpos acutus*** (Gray) Dieck, Hamb. Gart. Blumenzeit. 44: 562. 1888, Nat. Arb. Zoesch. Neuheit. 21. 1889, ex p.; Dippel, Handb. Laubholzk. 1: 279, f. 185. 1889; Howell, Fl. NW. Am. 281. 1900; Rehder in Bailey, Stand. Cyclop. Hort. 3293. 1917; Bailey, Man. Cult. Plants 722. 1924.

Symphoricarpos racemosus var. *trilobus* Durand, Proc. Acad. Nat. Sci. Phila. 3: 89. 1855.

Symphoricarpos mollis var. *acutus* Gray, Syn. Fl. 1²: 14. 1886, ex p.; Greene, Fl. Franciscana 345. 1892; Schneider, Ill. Handb. Laubholzk. 2: 673. 1911; Rehder, Man. Cult. Trees Shrubs 811. 1927.

Symphoricarpos pilosus Greene, ex Merriam, N. Am. Fauna 16: 164. 1899, *nom. nud.*

Symphoricarpos mollis sensu Jepson, Man. Fl. Pl. Calif. 967. 1925, ex p.; Tidestrom, Contr. U. S. Nat. Herb. 25: 515. 1925; Wynd, Am. Midl. Nat. 17: 940. 1936. Non Nuttall ex Torrey & Gray 1841.

Symphoricarpos albus mollis sensu Applegate, Am. Midl. Nat. 22: 302. 1939. Non Keck 1926.

A low, diffuse, procumbent or trailing shrub, less than 30 cm. tall, the branches 40–80 cm. long; young twigs softly velutinous-pubescent or short-villous, usually densely so, with short, straight, spreading trichomes; bark of the older branches, thin, gray, shreddy; buds ovoid, acute, villous, 0.5–1 mm. long; leaves oval or ovate, 1–3 cm. long, 6–18 mm. wide, the apex acutish, or obtuse, the upper surface dark green, more or less soft-pubescent, the lower surface pale green, prominently reticulate and densely pubescent, the margin entire, or more frequently sinuate or toothed, or lobed, especially on the branches of the season; petioles rather densely pubescent, 2–3 mm. long; flowers short-pedicelled, solitary or in pairs in the axils of the upper leaves; bracts and bractlets oval, densely pubescent; calyx 4–5-toothed, the sepals ciliate, acute, short-pubescent on the back; corolla bright pink, campanulate, 4–5 mm. long, the lobes obtuse, about the length of the tube and villous within; stamens shorter than the corolla; anthers 1 mm. long, versatile; style glabrous, 2–2.5 mm. long; stigma capitate; fruits in pairs or solitary in the axils of the upper leaves, white, subglobose, 4–6 mm. in diameter; nutlets 2, oval, plano-convex, obtuse at each end, 4 mm. long, 2–2.5 mm. wide.

TYPE LOCALITY: Lassen Peak, California. Collected by Mrs. R. M. Austin.

RANGE: Southern Oregon, California, in the Sierra Nevada and the Coast Range, and adjacent Nevada.

REPRESENTATIVE SPECIMENS: OREGON: Klamath Valley, *Cronkhite* 79 (US); Swan Lake Valley, *Applegate* 248 (UC); Keno, *Peck* 9363 (P, Mo); Crater Lake, *Coville* 1370 (US). NEVADA: Ormsby Co., *Baker* 1496 (US, Can, Cal, Mo); Humboldt Co., *Taylor & Richardson* 58 (UC); Incline, Washoe Co., *Kennedy* 1441 (US, NY, UC). CALIFORNIA: McCloud, *Eastwood* 1068 (NY, US, Cal); Shasta Springs, *Heller* 7985 (F, P, UC, US); Forestdale, *Baker* in 1898 (UC); Rush Creek, *Yates* 531 (UC, US); Rattlesnake-Colby Creek Divide, *Eggleston* 7290 (US); Prattville, *Eggleston* 7618 (NY, US); Mendocino Co., *Bolander* 4807 (Mo, F, UC); Glenn Co., *Heller* 12804 (NY, UI, US, P, Mo, Cal, F); Elk Mt., *Tracy* 2334 (UC, US); Mt. Sanhedrin, *Hall* 9510 (UC), *Heller* in 1902 (US, Mo); Mt. Konocti, *Blankinship* in 1928 (Cal); Jonesville, *Copeland* 479 (Mo, F, UC, Cal, US); Stirling, *Heller* 10802 (US, P, Mo, UC, F, NY, UI); Feather River Region, *Head* in 1921 (Cal); Sierra Nevada, *John Muir* 4365 (Mo); Webber Lake, *Lemmon* 277 (F); Donner Lake, *Heller* in 1903 (Mo); Truckee, *Sonne*

178 (NY, UC, Mo); Nevada, *Pratten* in 1851 (P, TYPE of *S. racemosus* var. *trilobus*); Emigrant Gap, *M. E. Jones* 3292 (Cal, NY, UC, P, Mo, US); Tuolumne Grove, *Eastwood* 72 (Cal); Stanislaus Forest, *Eggleston* 9388 (US); Antelope, *Hansen* 1867 (US, Mo); Silver Lake, *Hansen* 221 (Mo, UC); Eldorado Co., *Heller* 11519 (F, NY, UI, Cal, P, US); near Lake Tahoe, *Baker* in 1904 (UC), *Howell* 1259 (Cal), *Grant* 6971 (UC), *Hawver* in 1911 (Cal), *Eastwood* 31 (Cal); Wawona Lake, *Howell* 420 (Cal); Yosemite Park, *Howell* 204 (Cal); Yosemite Valley, *Abrams* 4617 (UC, US); Bass Lake, *Winblad* in 1937 (Cal); Pine Ridge, *Hall & Chandler* 157 (Mo, NY, US, UC, P); Mineral King, *Culbertson* 4557 (Mo, NY), *Fox* in 1923 (Cal); Tejon Pass, *Dudley & Lamb* 4472 (US, F); Tassajara Hot Springs, *Elmer* 3130 (Mo, US); San Raphael Mts., *Dearing* 1859 (Cal).

This trailing snowberry occurs in California in the Sierra Nevada up to an altitude of 8500 feet, and in the Coast Range. It is found also in adjacent Nevada and in southern Oregon. It is a species that has been in cultivation since 1888. One of its closest relatives, with which it is frequently confused, is *S. mollis* Nutt. Both species occur in California, but *S. mollis* occurs chiefly at lower elevations nearer the coast. It is to be distinguished from *S. acutus* by the crisply puberulent twigs, the roundish-oval, usually entire leaves that are rounded or somewhat truncate at the base, and by the smaller nutlets. The flowering period of *S. acutus* is June and July, while that of *S. mollis*, according to dates obtained from labels of herbarium specimens, is usually in April and May.

Gray's *Symphoricarpos mollis* var. *acutus* included two distinct elements, belonging to different subgenera, one from the plains of eastern Washington, consisting of an erect shrub with cylindrical-campanulate corollas 6–9 mm. long; this is *S. vaccinioides* Rydb. The other element is a trailing subalpine shrub from the mountains of California with broadly campanulate corollas only 4–5 mm. long. This was treated as *S. acutus* by Dieck in 1888. Gray's comment about his var. *acutus* was, "Not improbably a distinct species, but materials incomplete."

7. ***Symphoricarpos occidentalis*** Hooker, Fl. Bor. Am. 1: 285. 1833; Loudon, Arb. et Frut. Brit. 2: 1059. 1838; Torrey & Gray, Fl. N. Am. 2: 4. 1841; Loudon, Encycl. Trees Shrubs 542, f. 1013. 1842; Walpers, Rep. Bot. 2: 446. 1843; Gray Man. Bot. N. U. S. 170. 1848, (ed. 2) 164. 1856, (ed. 5) 203. 1875, Jour. Linn. Soc. Bot. 14: 10. 1873; Porter & Coulter, Syn. Fl. Colorado 54. 1874; Macoun, Cat. Can. Pl. 2: 195. 1884; Coulter, Man. Bot. Rocky Mt. Reg. 125. 1885; Gray, Syn. Fl. 1²: 13. 1886; Watson &

Coulter in Gray, Man. (ed. 6) 220. 1889; Dippel, Handb. Laubholz. **1**: 280, *f.* 186. 1889; Sargent, Garden & Forest **3**: 296, *f.* 46. 1890; MacMillan, Metasp. Minn. Valley 484. 1892; Eastwood, Fl. Denver 19. 1893; Rydberg, Contr. U. S. Nat. Herb. **3**: 160. 1895; Holzinger, Contr. U. S. Nat. Herb. **3**: 229. 1895; Rydberg, Contr. U. S. Nat. Herb. **3**: 503. 1896; Hitchcock, Contr. U. S. Nat. Herb. **3**: 545. 1896; Britton in Britton & Brown, Ill. Fl. N. States **3**: 236, *f.* 3453. 1898; Rydb. Mem. N. Y. Bot. Gard. **1**: 371. 1900; Howell, Fl. NW. Am. 281. 1900; Cowell in Bailey, Cyclop. Am. Hort. 1758. 1902; Rydberg, Fl. Colorado 324. 1906; Robinson & Fernald in Gray, Man. (ed. 7) 757. 1908; Coulter & Nelson, New Man. Rocky Mt. Bot. 470. 1909; Schneider, Ill. Handb. Laubholz. **2**: 670. 1911; Clements, Rosendahl & Butters, Trees Shrubs Minnesota 285. 1912; Petersen, Fl. Nebraska (ed. 2) 165. 1912; Bergman, Fl. N. Dak. 283. 1912; Britton in Britton & Brown, Ill. Fl. N. States (ed. 2) **3**: 277, *f.* 3977. 1913; Bean, Trees Shrubs Hardy Brit. Isles **2**: 563. 1914; Mathews, Field-Book Am. Trees Shrubs 391, *f. opp. p.* 392. 1915; Rydberg, Fl. Rocky Mts. 813. 1917; Rehder in Bailey, Stand. Cyclop. Hort. 3293, *f.* 3752. 1917; Standley, Contr. U. S. Nat. Herb. **22**: 413. 1921; Bailey, Man. Cult. Pl. 722. 1924; Rehder, Man. Cult. Trees Shrubs 811. 1927; Longyear, Trees Shrubs Rocky Mt. Reg. 217, *f.* 118. 1927; Rosendahl & Butters, Trees Shrubs Minnesota 350, *f. on p.* 352. 1928; F. D. Smith, Proc. Iowa Acad. Sci. **37**: 127-130, *f.* A, B. 1930; Kirkwood, N. Rocky Mt. Trees Shrubs 294, *f.* 72. 1930; Rydberg, Fl. Prairies Plains 748. 1932; Raup, Contr. Arnold Arb. **6**: 199. 1934, Nat. Mus. Canada Bull. **74**: 163. 1935, Jour. Arnold Arb. **17**: 298. 1936; Palmer & Steyermark, Ann. Mo. Bot. Gard. **22**: 650, 1935; Graham, Ann. Carnegie Mus. **26**: 340. 1937; Krüssmann, Laubgehölze 314. 1937; Van Dersal, U. S. Dept. Agric. Misc. Publ. **303**: 268. 1938.

Symphoria occidentalis R. Brown ex Richardson in Bot. App. Franklin Jour. 734. 1823, *nom. nud.*

Symphoricarpos occidentalis var. *Heyeri* Dieck, Cat. 1888; Rehder, Man. Cult. Trees Shrubs 811. 1927.

Symphoricarpos Heyeri Dippel, Handb. Laubholz. **1**: 281, *f.* 187. 1889; Rehder in Bailey Stand. Cyclop. Hort. 3293. 1917.

Symphoricarpos occidentalis var. *quercifolia* A. Nelson in Coulter & Nelson, New Man. Bot. Rocky Mts. 470. 1909.

Symphoricarpos occidentalis × *racemosus* Schneider, Ill. Handb. Laubholz. **2**: 671. 1911.

An erect shrub 30–100 cm. tall, more or less branching, spreading freely from rhizomes and often forming dense colonies, the branches slender, light colored, rather stiff; young twigs puberulent (rarely completely glabrous), light reddish brown, slender, but usually more than 1 mm. in diameter; bark of the older stems gray and shreddy; leaves 2.5–11 cm. long, 1.5–7 cm. wide, oval, thick and leathery at maturity, entire, or often undulate-crenate, or sinuate or lobed on young shoots, obtuse and apiculate at the apex, or acute, the margin somewhat revolute in dried specimens, the base cuneate to rounded; upper surface dull dark green, sparsely short-pilose with scattered trichomes or more frequently glabrous except along the midvein and close to the margin; lower surface pale green, thinly pubescent at least along the veins, rarely glabrous; petioles 4–10 mm. long, pubescent; flowers sessile, 5- or 4-merous, in short, dense, axillary and terminal several-many-flowered spicate clusters 1–2.5 cm. long; bracts and bractlets broadly ovate, ciliate; calyx usually regularly 5-toothed, the teeth ovate, ciliate, 0.7–0.8 mm. long; corolla campanulate, deeply lobed, pale pink, 6–9 mm. long, 10–12 mm. in diameter when living, densely villous within, the lobes slightly longer than the tube, 3–4 mm. long, obtuse; stamens shortly exserted; anthers 2 mm. long, half the length of the filaments; style pilose near the middle, or varying to completely glabrous, 4–8 mm. long, twice the length of the corolla-tube, longer than the stamens and exserted in the living flowers; stigma yellow, capitate; fruit nearly globose, pale greenish white, 6–8 mm. in diameter, soon becoming discolored and blackish; nutlets 2, smooth, straw-colored, oval, plano-convex, 3.5 mm. long, 2–2.5 mm. wide, obtuse at the ends.

TYPE LOCALITY: "Woody country between lat. 54 and 64 . . . Dr. Richardson."

RANGE: British Columbia to New Mexico, eastward to northern Illinois and Michigan.

REPRESENTATIVE SPECIMENS: BRITISH COLUMBIA: Williams Lake, *Murie* 1202 (Mo); Wilmer, *Mackay* 17 (F); Lake Pakowpi, *Dawson* 9612 (Can). ALBERTA: Fort McMurray, *Preble* 174 (US); Wood Buffalo Park, *Raup* 3061 (UC, NY, Can), 3063 (NY, US, UC, Can), 3067 (NY, US, Can); Athabaska Landing, *Hitchcock* 12133 (US); Rosedale, *Moodie* 1099 (US, NY, F, Mo). WASHINGTON: Okanogan Co., *Fiker* 979 (US); Tonasket, *Eggleston* 13018 (US), *Thompson* 7104 (P, Mo, US), 8695 (Mo, A, US, NY), 10924 (Mo, A, NY). IDAHO: Lemhi Indian Reservation, *Henderson* 3830 (US). UTAH: Granger, *Dodge* 220 (Mo); Jensen, *Graham* 9817 (US); Uinta Basin, *Petersen*

in 1912 (Mo); Wasatch Mts., *Stokes* in 1903 (US, Mo); Dry Fork, *Graham* 7382 (F, US). NEW MEXICO: Johnsons Mesa, *Wooton* in 1910 (US); Bartlett Ranch, *Wooton* in 1913 (US); Yankee Canyon, *Eggleston* 18957 (US, NY). COLORADO: Bear Creek Canyon, *Bethel & Clokey* 4312 (US, Cal); Rye, *Clokey* 4311 (Mo, US, Cal, Can, F, P, NY, UC); Rockport, *Williams* 2461 (US, Mo, UC); Pueblo, *Baker et al.* 3 (US, Mo, NY, UC, A, F). WYOMING: Ranchester, *Rollins* 561 (NY); Gardiner River, *Nelson & Nelson* 5966 (Mo, US, NY); Granger, *Aven Nelson* 8136 (US, NY); Casper, *Aven Nelson* 8965 (US, NY). MONTANA: Greycliff, *Eggleston* 9920 (US, NY); Midvale, *Umbach* 676 (US, F); Wolf Creek Canyon, *Rydberg & Bessey* 5015 (F, NY, US, Can); Bozeman, *Blankinship* 232 (UC, P, Mo, F, Can, US). SASKATCHEWAN: Carmichael, *Jack* (A, Cal); Kootenay Plains, *Brown* 1504 (NY, P); Prince Albert, *Macoun* 12219 (Can); Saskatoon, *Macoun & Herriot* 72607 (F, NY). MANITOBA: Winnipeg, *Preble* 74 (US), *Bourgeau* in 1857 (NY); Flinflon, *Gardner* 55 (Can); Brandon, *Macoun* 14136 (Can). NORTH DAKOTA: Walhalla, *Bergman* 2029 (UC, P); Larimore, *Palmer* 36849 (A, US); Fargo, *Stevens* in 1936 (F). SOUTH DAKOTA: Custer, *Rydberg* 745, 746 (US, NY); Vermillion, *Visher* 4077 (Mo); Hot Springs, *Palmer* 37433 (US, Mo, P, NY, A). NEBRASKA: York, *Palmer* 36052 (Mo, A); Thedford, *Rydberg* 1442 (US); Carns, *Winter* 97 (US). KANSAS: Solomon River, *Palmer* 21338 (US, A); Trego Co., *Hitchcock* 199 (NY, US, Mo); Osborne, *Shear* 232 (US, NY, A); Stockton, *Gates* 18139 (Mo). MISSOURI: Atchison Co., *Bush* 129a (UC, US); Watson, *Palmer* 18909 (Cal, Mo, US, A). IOWA: Estherville, *Cratty* in 1882 (P, US); Fayette Co., *Fink* 298 (US); Hamburg, *Bush* 10307 (NY, A). MINNESOTA: Leaf Lake, *Shunk & Manning* 363 (US); Itasca Park, *Grant* 2824 (Mo, UC, F, US); Fort Snelling, *Mearns* 403 (NY, US); Swan Lake, *Metcalf* 34 (US). WISCONSIN: Alma, *Palmer* 28511, 27832 (US, Mo, A). ILLINOIS: Elgin, *Benke* 1615 (US). MICHIGAN: Grayling, *Piper* in 1922 (US).

By its shortly campanulate corollas *S. occidentalis* belongs quite evidently to the subgenus *EUSYMPHORICARPOS*. It occurs in thickets, often on open hillsides, or rocky wooded banks, or along creeks or rivers throughout much of temperate western North America. In the original description a collection is said to have been made of this species at Fort Vancouver, Washington, by David Douglas. This reference, as well as subsequent ones of the same sort undoubtedly belong to *S. rivularis*, the common species of that region. At least, a collection by Suksdorf from near Bingen, Washington in 1902, distributed as *S. occidentalis*, turns out to be *S. rivularis*. However, the former species has been dis-

covered since then in Washington, but only in the extreme northern part, in Okanogan County, where it was first found in 1916 by W. W. Eggleston.

Symphoricarpos occidentalis appears to be very uniform throughout its range, although certain variations in pubescence have been noted, as, for example, the style is commonly villous near the middle, but it varies to sparsely pilose or, in some specimens, completely glabrous. This variation has no taxonomic significance, and it appears to be correlated with no other character of the plant. A flower from an isotype ("Forest country between Lat. 54–64°, Dr. Richardson") in the herbarium of the National Museum of Canada, examined by the writer has the style pilose near the middle. When sterile, this species sometimes simulates *S. rivularis*. However, its leaves are usually larger and more rigid, and the pubescence of the young twigs is characteristic, although occasionally these are glabrous or nearly so; also the plants spread by suckers growing from rhizomes, while *S. rivularis* is a rather compact shrub. When in flower or fruit, *S. occidentalis* may be distinguished at once by the prominent style and stamens, and the smaller drupes containing smaller nutlets.

In places where the ranges of *S. albus* and *S. occidentalis* overlap, these two species may be found growing together in the same habitat. When in flower or fruit there is no difficulty in distinguishing them, but when sterile, as is frequently the condition in dry shaded habitats, *S. occidentalis* is recognizable by the fact that it is a taller, more robust shrub, with the larger oval, acute, longer petioled leaves dark green above, and somewhat paler beneath but less prominently reticulate than in those of *S. albus*, which is a much smaller shrub, with slender branches. The ovate, obtuse, short-petioled leaves are more strongly reticulate and paler green beneath. The petioles are relatively shorter, and the pubescence of the young twigs is less dense, and consists of lighter-colored, more curved trichomes.

The var. *Heyeri*, based by Dieck upon specimens from Colorado, seems to have no distinguishing characters, and is, accordingly, here reduced to synonymy. Schneider (l.c.) treated it as a hybrid between *S. occidentalis* and *S. racemosus*, but there seems to be no evidence to support such a conclusion.

8. ***Symphoricarpos orbiculatus*** Moench, Methodus Plant. 503. 1794; Torrey & Gray, Fl. N. Am. 2: 4. 1841; Engelm. Boston Soc. Nat. Hist. Jour. 6: 215. 1857; Koch, Dendrol. 2: 48. 1872; Dippel, Handb. Laubholzk. 1: 278, 1889; Koehne, Dendrol. 557. 1893;

Newhall, Shrubs NE. N. Am. 145. 1893; Hitchcock & Norton, Bull. Kans. Agric. Sta. 57. 1896, 66. 1897, 76. 1898; Druery, Gard. Chron. (ser. 3) **28**: 413, *f.* 128. 1900; Lounsberry, Guide to the Trees, (ed. 2), *f.* 142. 1900; Mackenzie & Bush, Man. Fl. Jackson Co. Missouri 180. 1902; Robinson & Fernald in Gray, Man. (ed. 7) 757. 1908; Apgar, Ornamental Shrubs U. S. 228, *f.* 373. 1910; Schneider, Ill. Handb. Laubholzk. **2**: 670, 671. 1911; Bean, Trees Shrubs Hardy Brit. Isles **2**: 563. 1914; Mathews, Field Book Am. Trees Shrubs 391, *f. opp. p.* 392. 1915; Rehder in Bailey, Stand. Cyclop. Hort. 3293. 1917; Hitchcock & Standley, Contr. U. S. Nat. Herb. **21**: 260. 1919; Palmer, Jour. Arnold Arb. **2**: 152. 1921; Cocks, Jour. Arnold Arb. **3**: 181. 1922; Palmer, Jour. Arnold Arb. **4**: 30. 1923, l.c. **5**: 131. 1924, l.c. **7**: 135. 1926; Bailey, Man. Cult. Pl. 722. 1924; Rehder, Man. Cult. Trees Shrubs 812. 1927; Schaffner, Field Man. Fl. Ohio 494. 1928; Kirkwood, N. Rocky Mt. Trees Shrubs 294. 1930; Deam, Shrubs Indiana (ed. 2) 326, *pl.* 136. 1932; Rydberg, Fl. Prairies Plains 748. 1932; Palmer & Steyermark, Ann. Missouri Bot. Gard. **22**: 650. 1935; Krüssman, Laubgehölze 315. 1937; Stemen & Meyers, Oklahoma Fl. 510. 1937; Van Dersal, U. S. Dept. Agric. Misc. Publ. **303**: 268. 1938.

Lonicera Symphoricarpos Linnaeus, Sp. Pl. 175. 1753; Persoon, Synopsis **1**: 214. 1805.

Symphoricarpos vulgaris Michaux, Fl. Bor. Am. **1**: 106. 1803; J. St. Hilaire, Expos. Fam. Nat. **1**: 455. 1805; Willdenow, Enum. Pl. **1**: 221. 1809; Roemer & Schultes, Syst. Veg. **5**: 222. 1819; Link, Enum. Pl. Hort. Berol. **1**: 222. 1821. De Candolle, Prodr. **4**: 339. 1830; Loudon, Arb. et Frut. Brit. **2**: 1058, *f.* 825. 1838, Encycl. Trees Shrubs 541, *f.* 1010. 1842; Darby, Bot. Southern States 133. 1841; Torrey, Fl. N. Y. **1**: 296. 1843; Gray, Man. Bot. N. U. S. (ed. 2) 164. 1856; Chapman, Fl. Southern U. S. 169. 1860; Gray, Jour. Linn. Soc. Bot. **14**: 10. 1873, Man. Bot. N. U. S. (ed. 5) 203. 1875, Syn. Fl. **1**²: 13. 1886; Watson & Coulter in Gray, Man. Bot. N. U. S. (ed. 6) 220. 1889; Chapman, Fl. Southern U. S. (ed. 3) 187. 1897; Cowell in Bailey, Cyclop. Am. Hort. 1758, *f.* 2448. 1902; Keeler, Our Northern Shrubs 290, *pl. opp. p.* 290. 1903; Longyear, Trees Shrubs N. Rocky Mt. Reg. 218. 1927.

Symphoricarpos parviflora Desfontaines, Tabl. Ec. Bot. 114. 1804, *nom. nud.*

Symphoria glomerata Pursh, Fl. Am. Sept. **1**: 162. 1814; Elliott, Bot. S. C. & Ga. 273. 1817; Nuttall, Gen. N. Am. Pl. 139. 1818; Torrey, Fl. N. & Midd. Sect. U. S. **1**: 246. 1824; Sprengel, Syst. Veg. **1**: 757. 1825; Eaton, Man. Bot. (ed. 5) 414. 1829; Darby, Man. Bot. Southern States 133. 1841.

Symphoria rubra Rafinesque, New Fl. **3**: 21. 1838, *nom. nud.*

- Symphoricarpos imberbis* Tausch, Flora **21**: 734. 1838.
Symphoricarpos spicatus Engelmann, Pl. Lindh. **2**: 215. 1847, Boston Jour. Nat. Hist. **6**: 215. 1850.
Symphoricarpos erythrocarpus Koch, Dendrol. **2**: 48. 1872.
Symphoricarpos vulgaris var. *foliis aureis* Lavallée, Enum. Arbres Arbriss. 143. 1877, *nom. nud.*
Symphoricarpos vulgaris var. *glomeratus* Lavallée, op. cit. 143. 1877; Cowell in Bailey, Cyclop. Am. Hort. 1758. 1902.
Symphoricarpos vulgaris var. *spicatus* Gray, Syn. Fl. **1**²: 13. 1886.
Symphoricarpos Symphoricarpos MacMillan, Bull. Torr. Bot. Club **19**: 15. 1892, Metasp. Minn. Valley 485. 1892; Britton, Mem. Torr. Bot. Club **5**: 306. 1894, in Britton & Brown, Ill. Fl. N. States **3**: 236, f. 3454. 1898; Small, Fl. SE. U. S. 1124. 1903; Keeler, Our Northern Shrubs 290. 1903; Rydberg, Fl. Colorado 324. 1906; Petersen, Fl. Nebraska (ed. 2) 165. 1912; Britton in Britton & Brown, Ill. Fl. N. States **3**: 277, f. 3978. 1913; Rydberg, Fl. Rocky Mts. 813. 1917; Pennell in Addisonia **3**: 61, pl. 111. 1918; House, N. Y. State Mus. Bull. **254**: 651. 1924; Small, Man. SE. Fl. 1273. 1933.
Symphoricarpos vulgaris var. *variegatus* Hort. ex Cowell in Bailey, Cyclop. Am. Hort. 1758. 1902.
Symphoricarpos orbiculatus f. *aureo-reticulatus* Zabel in Beissner, Schelle & Zabel, Handb. Laubholz-Benennung 445. 1903.
Symphoricarpos orbiculatus var. *variegatus* Schneider, Ill. Handb. Laubholz. **2**: 669. 1911; Bean, Trees Shrubs Hardy Brit. Isles **2**: 563. 1914; Rehder in Bailey, Stand. Cyclop. Hort. 3293. 1917, Man. Cult. Trees Shrubs 812. 1927; Krüssmann, Laubgehölze 315. 1937.
Symphoricarpos orbiculatus var. *spicatus* Schneider, l.c.
Symphoricarpos Symphoricarpos var. *variegatus* Nash, Jour. N. Y. Bot. Gard. **21**: 76. 1920.
Symphoricarpos Giralddii Hesse, Haupt-Preisliste, 1925-1926, p. 122. 1925.
Symphoricarpos vulgaris leucocarpa Andrews, Spring Cat. Rockmont Nurs. 10. 1927.
Symphoricarpos vulgaris elongata Andrews, op. cit. 23. 1932.

An erect shrub 0.5-2 m. tall; branches leafy, erect or ascending, slender, light brown or purplish; bark on the older branches gray and shreddy; young twigs rather densely villosulous-tomentulose, varying to puberulent; leaves 1-6 cm. long, numerous, oval to ovate or nearly orbicular, entire or undulate, thick, acute or obtuse at the apex, rounded or slightly acutish at the base, dull green and glabrous or sparsely pilosulous on the upper surface, the veins impressed; the lower surface soft-pubescent, paler and glaucescent, with the veins prominent; petioles 2-4 mm. long; flowers in many-flowered, densely crowded, short, axillary spikes on the branches of the season; corolla broadly campanulate, villous within, pinkish, 3-4 mm. long, turned obliquely upward, slightly ventricose on the lower side, the lobes about as long as the tube; anthers

1 mm. long, shorter than the filaments; calyx-teeth 5, triangular, ciliate, persistent on the fruit; style 2 mm. long, pilose; fruit delicate coral-red (varying to pink), or somewhat purplish tinged, glaucous, ellipsoid, 5–7 mm. long, 4–5 mm. thick, the beak about 1 mm. long; nutlets 2, oval, flattened, 2.5–3.5 mm. long, 2 mm. wide, obtuse at each end.

TYPE LOCALITY: "Habitat in Virginia, Carolina."

RANGE: Western and southern New York to Florida, westward to Texas, northern Mexico, Colorado, and eastern South Dakota; introduced, and occurring as a fugitive from cultivation, or occasionally naturalized, in New England.

REPRESENTATIVE SPECIMENS: MASSACHUSETTS: Harwich, *Fernald & Long* 19138 (P); Manchester, *Chamberlain* in 1899 (NY). CONNECTICUT: Seymour, *Eames* 5531 (NY); Newtown, *Harger* 5210 (P). NEW YORK: Long Island, *Ferguson* 8014 (NY). PENNSYLVANIA: Chestnut Hill, *Adams* 2190 (UC); Easton, *Porter* in 1887 (F). NEW JERSEY: Trenton, *Fisher* in 1902 (UC). MARYLAND: Plummers Island, *Standley* 11859 (US). DISTRICT OF COLUMBIA: Washington, *Ward* in 1876 (US). VIRGINIA: Mt. Crawford, *Heller* 1174 (Mo, NY, UC, F, NY, A); Gloucester, *Palmer* 39778 (NY, A); Montpelier, *House* 2878 (NY, US). WEST VIRGINIA: Eagle Mt., *Steele* in 1903 (US, Mo, NY). KENTUCKY: Kuttawa, *Eggleston* 5241 (NY, Mo); Monticello, *Smith & Hodgdon* 3975 (US). NORTH CAROLINA: Richland Valley, *Small & Heller* 337 (Mo, US, F, NY, UC, P); Black Mt., *Standley & Bollman* 10427 (US). TENNESSEE: Paint Rock, *Redfield* 5583 (Mo); Cumberland Mts., *Ruth* 607 (Mo). ARKANSAS: Langley, *Demaree* 9513 (NY, Mo); Beaver, *Palmer* 29344 (Mo). MISSISSIPPI: Oktibeha Co., *Pollard* 1340 (US, Mo, F, NY). ALABAMA: Clay Co., *Earle* 936 (NY); Fort Smith, *Bigelow* in 1853–4 (US). GEORGIA: Rome, *Canby* 59 (US); Blue Ridge Mts., *Smith* 2618 (F); Dacula, *Palmer* 39898 (A). FLORIDA: without loc., *Chapman* in 1892 (Mo). OHIO: Yellow Springs, *Demaree* 11855 (US, Mo, A). INDIANA: Greencastle, *Underwood* in 1891 (NY); Lawrence-Monroe county line, *Friesner* 11568 (Cal, NY, F). ILLINOIS: East Cape Girardeau, *Palmer* 14894 (Mo, Cal); Hamilton, *Davis* 3511 (Mo); Evanston, *Shipman* in 1875 (P). MISSOURI: Webb City, *Palmer* 737 (Mo); Worth, *Palmer* 35777 (Mo); Columbus, *Palmer* 36695 (Mo, A). IOWA: Keosauqua, *Pammel & Reis* 452 (Mo); Des Moines, *Pammel* 561 (F, Mo, US). MINNESOTA: Redwood Falls, *Watson* (US). SOUTH DAKOTA: Brookings, *Williams* (US). NEBRASKA: Franklin, *Laybourne* in 1893 (Mo); Crete, *Dreisbach* 6099 (P); Lincoln, *Webber* in 1886 (Mo, NY).

COLORADO: Manitou, *Mulford* in 1892 (NY). KANSAS: Riley Co., *Norton* 198 (NY, Mo, US); Wyandotte, *Mackenzie* in 1897 (NY); Osborne, *Shear* 167 (US, NY, A). OKLAHOMA: Tonkawa, *Stevens* 1850 (Mo, US); Tishomingo, *Houghton* 3336 (NY, Mo); Norman, *Emig* 343 (US). TEXAS: Decatur, *Ferris & Duncan* 3321 (Cal, NY, Mo); New Braunfels, *Lindheimer* 846 (TYPE collection of *S. spicatus* Engelm.), 847 (US, F, UC, NY, P, A, Mo, Can); Tarrant Co., *Ruth* 187 (P, F, NY, Mo); Ganado, *Palmer* 9077 (Mo, US, Cal, A). MEXICO: Santa Barbara, *Nicolas* in 1911 (US, UC); Villa Santiago, *Muller* 2986 (UI).

Symphoricarpos orbiculatus occurs usually in loose dry sandy soil in woodlands, along river banks, and often in open woodland pastures. Common names in use in various parts of its range are Indian currant, coralberry, or buckberry bush. It has been in cultivation since 1730, and in many of the older settlements occurs as a garden escape. It is apparently not native in New England, or perhaps New York, but occurs there as a fugitive from cultivation. It seems to be native, however, in Pennsylvania. In Colorado it is evidently quite rare; I have seen only one herbarium collection from that state. It flowers in July, and in the autumn the slender branches are loaded with the purplish red fruits which begin to ripen in September and persist until midwinter. The fruits are produced in great abundance; as many as 200 may occur on a single branch. They have an insipid flavor and are apparently not relished by birds. The leaves turn crimson in autumn and persist in that condition for some time.

The plant introduced by Hesse as *S. Giraldui* stated to have been raised from Chinese seed, is identical with *S. orbiculatus* according to specimens received from Spaeth's nursery near Berlin; Hesse already says (l.c.) that it seems close to that species. Apparently there had been a confusion of labels in Hesse's nursery.

Plants that appear to be the result of a cross between *S. orbiculatus* and *S. microphyllus* have been in cultivation since 1912. No feral plants are known. This hybrid is:

× ***Symphoricarpos Chenaultii*** Rehder, Jour. Arnold Arboretum 2: 179. 1921, Man. Cult. Trees Shrubs 812. 1927; Krüssmann, Laubgehölze 315. 1937. *Symphoricarpos parviflorus conglomeratus* Chenault, Cat. 18. 1912 = (*S. microphyllus* × *orbiculatus*).

Professor Rehder's comments are as follows: "This plant is probably a hybrid between *S. orbiculatus* Moench and *S. microphyllus* H.B.K. In its habit and the smallness of the leaves it is very similar to the latter

species, but differs in the more pubescent underside of the leaves, and in the always clustered or spicate flowers, in the shorter and broader corolla-tube only twice as long as the lobes, in the pilose and shorter style and in the red or partly red color of the fruit. From *S. orbiculatus* it is easily distinguished by the generally smaller leaves, the tubular not broadly campanulate corolla with the nectary glands extending all round below the middle, and by the lightly colored partly whitish fruit. The color of the fruit is rather peculiar; it is usually bright purplish red on the upper exposed side with numerous minute light dots and toward the lower side the color passes gradually into pinkish white sprinkled with purplish dots . . ."

This hybrid has been cultivated at the Arnold Arboretum as no. 7255, the plants received from León Chenault & Cie. at Orléans, France, in 1912 as *S. parviflorus conglomeratus*. The following herbarium specimens have been examined: Arnold Arboretum, August 1, 1916, *Rehder* (A), *Palmer* in 1936 (A), November 17, 1917, *C. K. Schneider* (UI); Highland Park, New York, *Edson* in 1917 (A).

SUBGENUS II. **Anisanthus**, subgen. nov. Corolla tubular or elongate-campanulate to salverform, symmetrical, not at all ventricose, the lobes much shorter than the tube; flowers chiefly axillary; style shorter than the corolla; fruit white or pink, ellipsoid; species of western North America.

Anisanthus Willd. ex Roemer & Schultes, Syst. Veg. 5: xiv, 223. 1819. — *Symphoricarpos* sect. 2 *Meridionales* Gray ex Schneider, Ill. Handb. Laubholzk. 2: 673. 1911. — *Symphoricarpos* sect. *Longiflorae* Zabel in Beissner, Schelle & Zabel, Handb. Laubholz-Benennung 445. 1903, *nomen nudum*. — Type species: *Anisanthus microphyllus* Willd. (*Symphoricarpos microphyllus* H.B.K.).

9. ***Symphoricarpos microphyllus*** Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 3: 1818; Kunth, Syn. Pl. 3: 71. 1824; DeCandolle, Prodr. 4: 339. 1830; Loudon, Encycl. Trees Shrubs 542, f. 1011. 1842; Hooker, Bot. Mag. 83: pl. 4975. 1857; Koch, Dendrol. 2: 49. 1872; Gray, Jour. Linn. Soc. Bot. 14: 11. 1873; Hemsley, Biol. Centr.-Am. 2: 4. 1881, 4: 46. 1886; Urbina, Cat. Pl. Mex. 111. 1897; Rehder in Bailey, Stand. Cyclop. Hort. 3293. 1917; Standley, Contr. U. S. Nat. Herb. 23: 1399. 1924; Rehder, Man. Cult. Trees Shrubs 812. 1927.

Symphoricarpos montanus Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 3: pl. 296. 1818; Maund, The Botanist 1: pl. 20. 1837; Dippel, Handb. Laubholzk. 1: 281, f. 188. 1889; Schneider, Ill. Handb. Laubholzk. 2: 673, 1911.

Symphoricarpos glaucescens Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 3: pl. 295. 1818.

Anisanthus microphyllus Willdenow, in Roemer & Schultes, Syst. Veg. 5: 223. 1819.

Symphoria microphylla Sprengel, Syst. Veg. 1: 757. 1825.

Symphoria glaucescens Sprengel, l.c.

Symphoria montana Sprengel, l.c.

Descliaea leucocarpa Sessé & Mociño ex De Candolle, Prodr. 4: 483. 1830, pro syn. *Margaris barbiger*a.

Margaris nudiflora De Candolle, l.c.

*Margaris barbiger*a De Candolle, l.c.

Symphoricarpos mexicanus Hort. ex Koch, Dendrol. 2: 50. 1872.

Chiococca axillaris Sessé & Mociño Pl. Nov. Hisp. 36. 1887.

Lonicera vacciniifolia Hort. ex Dippel, Handb. Laubholz. 1: 282. 1889, pro syn. *Symphoricarpus montanus*.

An erect shrub, much branched, 2–3 m. tall; young twigs crisp-puberulent or sometimes almost tomentulose with curved trichomes; bark of the older branches smooth, scarcely shreddy; leaves oval, acute or apiculate at the apex, tapering at the base, entire, 1–2.5 cm. long, 7–15 mm. wide, dark green and glabrous or finely puberulent above, pale green and short-pilose beneath, at least on the veins, varying to glabrous; petioles 1–2 mm. long; flowers in pairs or solitary, axillary, short-pedicelled, pendent, each subtended by 2 bracts, distributed in the upper axils or also in a short, terminal, few-flowered spike; calyx glabrous or ciliate, irregularly 5-toothed, the teeth acutish; corolla narrowly campanulate or somewhat tubular, 9–10 mm. long, pinkish, the lobes equal, ovate, one-third the length of the corolla, much shorter than the tube, the inside of the throat and tube pubescent; stamens 5, slightly longer than the lobes; anthers 1.5 mm. long, half the length of the filaments; style glabrous, 4–5 mm. long, shorter than the corolla-tube; stigma capitate; fruit globose, smooth, white or tinged with pink, translucent, tipped with the persistent calyx, 7–9 mm. in diameter; nutlets flattened, oval, obtuse at each end, 3 mm. long, 2 mm. wide.

TYPE LOCALITY: "Crescit in temperatis, prope Moran Mexicanorum, alt. 1350 hex."

RANGE: New Mexico, Mexico, and Guatemala.

REPRESENTATIVE SPECIMENS: NEW MEXICO: Craters, Valencia Co., Wootton in 1906 (US). MEXICO: Bartolo, Schiede in 1833 (US, UC); Cerro Potosi, Mueller 1243, 2256 (F, A); Lerios, Palmer 390 (P, F); Miquihuana, Nelson 4474 (US); San Luis Potosi, Parry & Palmer 296 (US, Mo, P); Metepec, Pringle 13010 (US, F); Real del Monte, Rose & Hough 4491 (US); San Vincente, Fisher in 1937 (Mo),

37191 (F); Mt. Orizaba, *Rose & Hay* 5693 (US), *Seaton* 187 (F, US); Colima, *M. E. Jones* 223 (US, Mo); El Oro, *Rangel* 6632 (US); Nevado del Toluca, *Loesner* 4415 (US); mts. between Toluca and Mexico City, *Rusby* 328 (US); Ixtaccihuatl, *Purpus* 9 (UC), *Arsène* in 1910 (US); Tlaxacola, *Arsène* 1727 (US); Morelia, *Arsène* 9849 (US); Patzcuaro, *Pringle* 4261 (F, UC, P, Mo, A, US), 9840 (F, Mo, US); Barranca, near Santa Fe, *Bourgeau* in 1866 (US); Tlaupujahua, *Rose & Hay* 5397 (US); Boca del Monte, Puebla, *Purpus* 2488 (UC); Popocatepetl, *Rose & Hay* 6045 (US); Cerro Verde, *Purpus* 3518 (F, UC, US); Reyes, *Nelson* 1731 (US); Tehuantepec, *Orcutt* 3782 (Mo). GUATEMALA: Chichavac, *Skutch* 133 (US); Ziha, *Seler* 3162 (Cal); Santa Maria, *Skutch* 870 (F, A); Sierra Cuchumatanes, *Skutch* 1253 (F, A); Volcan de Agua, *J. R. Johnston* 910 (F), 202 (F).

Symphoricarpos microphyllus is reported to be one of the tallest species of the genus, and of a neat and compact appearance, with numerous, short, lateral, leafy branches. The stamens are longer than those of any other member of its group. Plainly a member of the subgenus ANISANTHUS, it forms a connecting link with EUSYMPHORICARPOS through the hybrid $\times$ *S. Chenaultii*. Only one United States collection of *S. microphyllus* has been seen, and that came from Valencia Co., New Mexico. The species is apparently not uncommon in various parts of Mexico, where it ascends to an altitude of 10,500 feet on Popocatepetl, and southward into Guatemala. It is the only species of *Symphoricarpos* known from the latter country, and thus it extends farther south than any other member of the genus.

10. ***Symphoricarpos tetonensis*** A. Nelson, Bull. Torr. Bot. Club **31**: 246. 1904.

Symphoricarpus montanus sensu Watson, Bot. King Exped. **5**: 132. 1871, ex p. Non H.B.K. 1818.

Symphoricarpos rotundifolius sensu Graham, Ann. Carnegie Mus. **26**: 341. 1937, ex p. Non Gray 1853.

Symphoricarpos utahensis sensu Tidestrom, Contr. U. S. Nat. Herb. **25**: 515. 1925, ex p. Non Rydb. 1899.

An erect, branched shrub 1–1.5 m. tall; young twigs glaucous, these and the leaf-buds completely glabrous; bark of the older branches smooth; leaves glabrous, oval, widest at the middle, acute or acutish at each end, 1.5–3 cm. long, 5–10 mm. wide, entire, or occasionally with a few irregular, acute teeth, veins conspicuous, and the margins often minutely thickened-revolute; petioles slender, 2–4 mm. long, glabrous, dilated and somewhat connate at the base; flowers mostly in pairs in the upper axils, drooping, short-pedicelled; bracts glabrous, glaucous,

about half the length of the ovary; calyx glabrous, glaucous, less than 2 mm. long, the lobes about as long as the tube; corolla cylindrical-campanulate, ochroleucous, tinged with pink, 7–9 mm. long, typically glabrous within, rarely slightly with 5 basal nectaries, the lobes about one-third the length of the tube; anthers 1.5–2 mm. long, equalling or slightly longer than the free portion of the filament, about half the length of the corolla-lobes; style 4 mm. long, glabrous, about half the length of the corolla; stigma capitate; fruit white, ellipsoid, 8–10 mm. long; nutlets 4–5 mm. long, 2–3 mm. wide, oval, obtusish at each end.

TYPE LOCALITY: Teton Mountains, Wyoming. Collected by Merrill & Wilcox in 1901.

RANGE: Montana, Idaho, Wyoming, Colorado, Utah, Nevada.

REPRESENTATIVE SPECIMENS: MONTANA: Alta, *Goodman* 1299 (Mo); Tobacco Mts., *Butler* 4265 (NY); Helena, *Butler* 4089 (NY). IDAHO: Caribou Mt., *Payson & Armstrong* 3596 (P, Mo); Lava, *Nelson & Macbride* 1595 (Mo); Pocatello, *Palmer* 430 (US), *Heller* 10195 (P, US); Henrys Lake, *Blankinship* in 1899 (UC); Montpelier, *Nelson & Macbride* 1046 (NY, F, US, Can, UC, Mo); Mt. Chauvet, *Rydberg & Bessey* 5021 (NY, P); Salmon, *Payson & Payson* 1900 (NY, Mo, Cal); Rush Creek, *M. E. Jones* 6367 (NY); St. Anthony, *Merrill & Wilcox* 882 (US). WYOMING: Teton Mts., *Merrill & Wilcox* 1025 (US); Jelm, *Nelson* 8058 (US, Mo, NY); Afton, *Payson & Armstrong* 3326 (Mo, UI, P); Jackson Hole, *Williams* 258 (Mo); Arizona Creek, *Murie* 303 (US); Hoback Basin, *Curtis* in 1900 (NY); Battle Creek, *Tweedy* 4631 (NY, US); Sublette Co., *Payson & Payson* 2629 (NY, UC, Mo, P, F, US). YELLOWSTONE NATIONAL PARK: Specimen Ridge, *A. Nelson & E. Nelson* 5882 (NY, US); Yellowstone Falls, *B. H. Smith* in 1911 (P). COLORADO: Little Fountain Creek, *Blumer* in 1903 (F); Ridgway, *Tweedy* 188 (US); Pagosa Springs, *Bethel & Milley* 4310 (NY); Wolcott, *Osterhout* 2105 (NY); Montrose Co., *Payson & Payson* 4226 (Mo, UC), *Payson* 1038 (Mo); Marvin, *Hermann* 5680 (Mo); Durango, *Zobel* in 1935 (Mo). UTAH: La Sal Mts., *Rydberg & Garrett* 8937 (NY), 8868 (US); Big Cottonwood Creek, *Rydberg & Carlton* 6694, 6596 (NY, US, Can); Midway, *Carlton & Garrett* 6719 (NY), *Eastwood & Howell* 520 (Mo, Cal); Wasatch Mts., July 1869, *Watson* 475 (NY), *Tidestrom* 297 (US), 1466 (US); Uinta Basin, *Graham* 9472 (US); Fish Lake Plateau, *Harris* C28712 (Mo); Payson Forest Reserve, *Potter* in 1905 (US); Provo Canyon, *Palmer* 38106 (US), *Eastwood & Howell* 489 (Cal, US); Bryce Canyon, *Eastwood & Howell* 861 (Cal); Mt. Nebo, *Harris* C24571 (P).

NEVADA: Gold Creek, *Nelson & Macbride 2111* (NY, Mo, US); Humboldt Reserve, *Kennedy 4436* (P).

This species was probably first collected by the Second Fremont Expedition in 1844, according to a specimen in the herbarium of the New York Botanical Garden, but it was not recognized and distinguished until Dr. Aven Nelson described it in 1904. It is closely allied to *S. vaccinioides* and *S. oreophilus*, probably closer to the former. Vegetatively, it resembles the latter in its glabrous foliage and branchlets, but it differs fundamentally in its shorter, cylindrical-campanulate corollas. From *S. vaccinioides* it may be distinguished by its glabrous twigs and leaves, and by the fact that the inside of the corolla lacks any trace of pubescence. Also the corolla tends to be slightly longer. *S. tetonensis* occurs within the range of *S. utahensis*, but that species is immediately separated by its longer, tubular-funnelform corollas, which are pilose within, and by its puberulent leaves and twigs.

Specimens collected by S. Watson (no. 475) in Utah and Nevada in 1867, 1868, and 1869, belong to four different species, as follows: the specimens from "Virginia Mts.," Nevada, August 1867 (NY) are *S. oreophilus*; those from "E. Humboldt Mts.," Nevada, July 1868 (US) are *S. Parishii*; those from the "Wahsatch Mts.," Utah, July 1869 (NY) are *S. tetonensis*; and those from "Uintas, Utah," July 1869 (NY) belong to *S. vaccinioides*.

11. ***Symphoricarpos vaccinioides*** Rydberg, Mem. N. Y. Bot. Gard. **1**: 371. 1900, Fl. Colorado 324. 1906, Fl. Rocky Mts. 813. 1917; Rehder in Bailey, Stand. Cyclop. Hort. 3294. 1917; Tidestrom, Contr. U. S. Nat. Herb. **25**: 515. 1925; Rehder, Man. Cult. Trees Shrubs 812. 1927; Kirkwood, N. Rocky Mt. Trees Shrubs 296. 1930; Dayton, U. S. Dept. Agric. Misc. Publ. **101**: 152, f. 39. 1931; Raup, Nat. Mus. Canada Bull. **74**: 163. 1935; St. John, Fl. SE. Wash. Adj. Idaho 395. 1937.

Symphoricarpos montanus sensu Watson in Bot. King Exped. **5**: 132. 1871, ex p.; Porter & Coulter, Syn. Fl. Colorado 53. 1874, ex p. Non H.B.K. 1818.

Symphoricarpos mollis sensu Torrey in Bot. Wilkes Exped. **17**: 328. 1874. Non Nutt. ex Torrey & Gray 1841.

Symphoricarpos mollis var. *acutus* Gray, Syn. Fl. **1**²: 14. 1886, ex p.

Symphoricarpos rotundifolius sensu Gray, Syn. Fl. **1**²: 14. 1886, ex p.; Dippel, Handb. Laubholz. **1**: 283, f. 189. 1889; Howell, Fl. NW. Am. 281. 1900; Jepson, Man. Fl. Pl. Calif. 967. 1925, ex p.; Tidestrom, Contr. U. S. Nat. Herb. **25**: 515. 1925, ex p.; Graham, Ann. Carnegie Mus. **26**: 341. 1937; McMinn, Ill. Man. Calif. Shrubs, 535, f. 637. 1939, ex p. Non Gray 1853.

- Symphoricarpos Austinae* Eastwood, Bull. Torr. Bot. Club **30**: 499. 1903.
Symphoricarpos acutus sensu Piper, Contr. U. S. Nat. Herb. **11**: 529.
1906; Piper & Beattie, Fl. SE. Wash. Adj. Idaho 236. 1914. Non
Dieck 1888.
Symphoricarpos rotundifolius vaccinioides A. Nelson in Coulter & Nel-
son, Man. Bot. Rocky Mts. 471. 1909.
Symphoricarpos rotundifolius acutus Frye & Rigg, Northwest Flora 366.
1912.
Symphoricarpos oreophilus sensu Tidestrom, Contr. U. S. Nat. Herb.
25: 515. 1925, ex p.; Dayton, U. S. Dept. Agric. Misc. Publ. **101**: 150,
f. 39. 1931. Non Gray 1873.

A branched low shrub to 1.5 m. tall; branches dark brown, the bark smooth or shreddy; young branchlets light or yellowish brown, finely and often rather densely grayish pubescent or puberulent with short, curved hairs; leaves dark green above, somewhat paler beneath, puberulent, oval, acute or acutish at each end, 1–2 cm. long, entire, or slightly dentate, the veins conspicuous, the margins slightly thickened-revolute; petioles slender, 2–4 mm. long, dilated and somewhat connate at the base; flowers solitary or in pairs in the axils of the uppermost leaves, drooping on short pedicels; bracts lanceolate, 1.5–2 mm. long, these and the pedicels and calyces puberulent; calyx-lobes triangular, about 1 mm. long; corolla 7–8 mm. long, pink, cylindrical-campanulate, symmetrical, not at all ventricose, sparsely pilose within just above the 5 small basal nectaries, the lobes rounded, about one-third the length of the tube; anthers 1.5 mm. long, two-thirds the length of the corolla-lobes, and about equalling the filaments; style glabrous, 4 mm. long, one-half to two-thirds the length of the corolla; fruit white, about 1 cm. long, 6–8 mm. in diameter, ellipsoid; nutlets 4.5–6.5 mm. long, 2–3 mm. wide, flattened-ellipsoid, obtuse at each end, or acutish at the base.

TYPE LOCALITY: "Forks of the Madison," Montana. Collected by P. A. Rydberg and C. E. Bessey in 1897.

RANGE: British Columbia to California, and eastward to Colorado and Montana.

REPRESENTATIVE SPECIMENS: BRITISH COLUMBIA: Sophie Mt., Macoun 64660 (NY, Mo, Can, Cal). WASHINGTON: Mt. Paddo [Adams], Suksdorf in 1883 (NY, Can, UC, F, paratypes); Blue Mts., Piper 2394 (NY, US); Egbert Springs, Sandberg & Leiberg, 367 (NY, Cal, Can, P, UI, UC, US); East of the Cascade Mts., Wilkes Exped. 803 (US). OREGON: Bear Buttes, Leiberg 334 (NY, F, US, UC); Siskiyou Mts., Heller 13638 (NY, Mo, F, US); Canyon City, Peck 10189 (NY, F); Anderson Valley, Leiberg 2383 (NY, F, US, UC). IDAHO: Sawtooth, Evermann 639 (NY, US, F); Soda Springs, June 22, 1892,

Mulford (NY, Mo); St. Anthony, *Quayle* 85 (NY); Owyhee Co., *Macbride* 478 (NY, Mo, US); Martin, *Macbride & Payson* 3085 (NY, US, Mo, UC, Cal). MONTANA: Lima, *Rydberg* 2795 (NY); Indian Creek, *Rydberg & Bessey* 5018 (NY). YELLOWSTONE NATIONAL PARK: Mammoth Hot Springs, *Mearns* 1450 (NY, US), *Scheuber* 192 (NY). WYOMING: Sweetwater Co., *Nelson* 7162 (NY); Hanna, *Payson & Payson* 1696 (NY, Mo, Cal); Point of Rocks, *Merrill & Wilcox* 455 (NY, US); North Platte River, *Pammel* 2 (NY, Mo); Leucite Hills, *Merrill & Wilcox* 691 (NY, US); Rocky River, *Goodding* 37 (NY, US, Mo); Rawlins, *Pammel* 54 (NY, Mo); Casper Mt., *Nelson* 608 (NY, US, P, F, Mo). COLORADO: Horsetooth Mt., *Crandall* 236 (NY); Wolcott, *Osterhout* 2104 (NY); Mt. Carbon, *Eggleston* 6155 (NY, US); Ouray, *Underwood & Selby* 16 (NY); Pagosa Peak, *Baker* 619 (NY, Mo, US); Spicer, *Goodding* 1534 (NY, UC, Mo, US). UTAH: La Sal Mts., *Rydberg & Garrett* 8868 (NY); southern Utah, *Parry* 88 (NY, Mo); Bear Valley, *Palmer* 185 (NY, US, Mo); Poison Creek, *Rydberg & Carlton* 7398 (NY); Fish Creek Canyon, *Garrett* 2583 (NY); Bear River, *Goodman* 1839 (NY, US, Mo); Sheep Creek Canyon, *Williams* 548 (NY, Cal, Mo); Wasatch Mts., *M. E. Jones* 1134 (US, Cal, UC, P); Sunnyside, *Graham* 9570 (US). NEVADA: Galena Creek, *Kennedy* 1229 (NY, P, UC, US, Mo, UC); Wells, *E. J. Palmer* 38028 (NY, Mo, US, A); Deeth, *Heller* 9115, 9093 (NY, US, Mo, P); Hunter Creek Canyon, *Heller* 10352 (NY, Mo, F, US); Snow Valley, *Baker* 1283 (NY, Mo, Cal, Can, US, UC); Mt. Rose, *Tidestrom* 10574 (US); Reno, *M. E. Jones* in 1897 (Mo, US). CALIFORNIA: Warner Mts., *Griffiths & Hunter* 448 (NY, US), *J. T. Howell* 12105 (Cal); Modoc Co., *Austin & Bruce* 2339 (NY, UC), *Austin* in 1887 (Cal, TYPE of *S. Austinae*); Truckee, *Heller* 7170 (NY, P, UC, US, Mo); Lake Tahoe, *Sonne* 129 (NY, UC, F, Mo, P); Highland Lake, *Abrams* 4749 (NY); Tuolumne Co., *Quick* 1964 (Cal); Eldorado Co., *Heller* 12512 (F, Cal, UI, US, P); Mono Pass, *Bolander* 6339 (US), *Eastwood* 589 (Cal); Piute Pass, *Ferris* 8939 (NY, UC).

This plant was first described by Gray in 1886 as a part of his *S. mollis* var. *acutus* on the basis of a single specimen collected by Pickering & Brackenridge of the Wilkes Expedition (no. 803) in eastern Washington in 1841. This specimen lacks flowers or fruits, and, as already pointed out by Piper, has unusually narrow leaves, but this condition is matched by other specimens examined (e.g., Oregon, *Leiberg* 2383). The identification of this sterile narrow-leaved specimen with *S. vaccinioides* Rydb., is rendered quite clear by a drawing of parts of the flower evidently made from fresh specimens by Pickering or Brack-

enridge in 1841 at the "1st Camp beyond Mts. to Chief's Place," and attached to an isotype sheet in the United States National Herbarium. The locality mentioned is somewhere on the eastern slope of the Cascade Mountains below Naches Pass, probably in what is now northeastern Yakima County.

The leaves of *S. vaccinioides* are as a rule sufficiently uniform to be of service in identifying sterile specimens. They are characteristically numerous, oval, acute or acutish at each end, small, and with the principal veins moderately evident. Thus, Dr. Gray's name was not altogether inappropriate, especially since he mistook the plant for a new variety of *S. mollis*, whose leaves are characteristically rounded. Rydberg (Fl. Rocky Mts.) reports *S. vaccinioides* from Alberta, but I have seen no specimens from that province. Tidestrom's inclusion of this species under the key statement "Twigs glabrous" is plainly an error, as Rydberg's type has the young twigs puberulent.

Several botanists, including Gray, Piper, and Howell, have confused this species with *S. acutus* (Gray) Dieck, but these are distinct entities belonging to different sections of the genus. *S. acutus* is a member of EUSYMPHORICARPOS, and is a trailing, subalpine shrub with villous branchlets, short, campanulate corollas, and globose fruits. It is known only from California, adjacent Nevada, and southern Oregon.

12. **Symphoricarpos Parishii** Rydb. Bull. Torr. Bot. Club **26**: 545, 1899; Hall, Univ. Calif. Publ. Bot. **1**: 122. 1902; Abrams, Bull. N. Y. Bot. Gard. **6**: 457. 1910; Parish, Plant World **20**: 255. 1917; I. M. Johnston, Plant World **22**: 118. 1919; Davidson & Moxley, Fl. S. Calif. 343. 1923; Keck, Bull. S. Calif. Acad. Sci. **25**: 72. 1926.

Symphoricarpus montanus sensu Watson in Bot. King Exped. **5**: 132. 1871, ex p. Non H.B.K. 1818.

Symphoricarpos oreophilus sensu Davidson, Cat. Pl. Los Angeles Co. **12**. 1896. Non Gray 1873.

Symphoricarpos glaucus Eastwood, Bull. Torr. Bot. Club **30**: 497. 1903.

Symphoricarpos parvifolius Eastwood, *ibid.* 498.

Symphoricarpos rotundifolius sensu Greene, Fl. Franciscana 345. 1892; Coville, Contr. U. S. Nat. Herb. **4**: 117, 1893; Tidestrom, Contr. U. S. Nat. Herb. **25**: 515, ex p.; Jepson, Man. Fl. Pl. Calif. 967. 1925, ex p.; Munz, Man. So. Calif. Bot. 496. 1935; McMinn, Ill. Man. Calif. Shrubs 535. 1939, ex p. Non Gray 1853.

A low, spreading shrub, the branches declined, sometimes rooting at the tips, 50–100 cm. long; young twigs glaucous, sparsely pilosulous, or sometimes the internodes glabrous; bark on the older branches thin, shreddy, grayish, or sometimes reddish tinged; leaves of the flowering

branches oval, usually acute or acutish, chiefly entire, 1–2 cm. long, 5–13 mm. wide, grayish green, glaucous, paler beneath, thickish, narrowed at the base; upper surface sparsely short-pilose, the trichomes nearly straight, the lower surface paler and more glaucous, pilosulous at least along the veins and margins, or rarely the leaves completely glabrous; leaves of young shoots frequently lobed; petioles 1–3 mm. long, pilosulous; flowers chiefly in axillary pairs and in small few-flowered terminal, bracted racemes 5–10 mm. long; bracts and bractlets oval, acute, glaucous, pubescent; calyx glaucous, campanulate, the lobes scarious-margined, ciliolate, about 1 mm. long; corolla pink, elongate-campanulate, 6–7 mm. long, (rarely slightly larger), with 5 distinct basal glandular areas (nectaries), the tube pilose within, the lobes 5, slightly irregular, each 2–3 mm. long, slightly more than one-third the length of the corolla; anthers 1.5–2 mm. long, versatile, equalling or slightly shorter than the free portion of the filament; style glabrous, 3 mm. long, nearly half the length of the corolla; stigma capitate, about 1 mm. broad; fruit white, shortly ellipsoid or subglobose, 6–8 mm. in diameter; nutlets usually 2, oval, plano-convex, flattened, straw-colored, obtusish at each end, smooth or nearly so, 3.5–4.5 mm. long, 2–2.5 mm. wide.

TYPE LOCALITY: San Bernardino Mountains, California. Discovered by S. B. Parish in 1892.

RANGE: Southern California (as far north as Tulare County), and adjacent Nevada and Arizona.

REPRESENTATIVE SPECIMENS: CALIFORNIA: Tulare Co., *Purpus* 1792 (UC, Cal, TYPE of *S. parvifolius*); Mineral King, *Coville & Funston* 1445 (US), *Culbertson* 4557 (Cal); Farewell Gap, *Culbertson* 4316 (UC, NY, Cal, F, Mo); Tehachapi, *Greene* in 1889 (F); Zaca Peak, *Eastwood* 750 (Cal, US); Griffins, *Elmer* 3861 (NY, Mo, UC, US); Mt. Pinos, *Grinnell* in 1904 (UC), *Dudley & Lamb* 4740 (UC, F); San Gabriel Mts., *Abrams & McGregor* 638 (US), *Peirson* 4506 (Cal); San Bernardino Mts., *Parish* 2514 (NY, TYPE, F), 10940 (UC, Mo), 3024 (NY, Mo, US), *Abrams* 2865 (Mo, Can, P, US), *Munz* 10456 (UC), *Ewan* 2759 (Cal), *M. E. Jones* in 1923 (Cal), *Grinnell* 76 (UC), *Grinnell* 266 (US), *Hall* 7622 (UC); Bluff Lake, *Clokey* 5309 (US), *Goodman & Hitchcock* 1800 (Mo); San Jacinto Mts., *Condit* in 1910 (UC), *Parish* 481 (F), *Hall* 2485 (US, Mo, UC), *Munz* 6016 (UC); Santa Rosa Mts., *Munz* 5879 (UC); San Antonio Mts., *Hall* 1262 (UC), *I. M. Johnston* 1727 (UC). NEVADA: Stampede, *Kennedy* 503 (Cal, TYPE of *S. glaucus*); Jarbidge, *Nelson & Macbride* 1924 (US, Mo); Austin, *Hitchcock* 652 (US); Ely, *Hitchcock* 1268 (US); E. Humboldt

Mts., July 1868, *Watson* 475 (US). ARIZONA: Grand Canyon of the Colorado River, *Eastwood* 5718 (Cal), *Knowlton* 259 (US); Williams, Coconino Co., *Barber* 90 (US); Walnut Canyon, *Goldman* 2090 (US); Mormon Lake, *MacDougal* 58 (F, US, NY); Fort Mohave, *Lemmon* in 1884 (US); Flagstaff, *Purpus* 8093 (Mo, US).

This species is locally abundant in scattered situations on dry hills in the Upper Transition and Canadian zones in the San Bernardino Mountains of California, northward into Nevada, and eastward to the Grand Canyon in Arizona. In some areas it is the dominant member of the chaparral; in other places it often forms dense spreading mats on exposed slopes. The flowering period is during June and July; the altitudinal amplitude is from 5000 to 9500 feet. It is apparently closely related to *S. vaccinioides*, but may be distinguished by the characters listed in the key. The corollas of *S. Parishii* tend to be slightly shorter than those of *S. vaccinioides*, and the shape is somewhat different — campanulate and slightly tapering to the base, instead of cylindrical- or oblong-campanulate as in the latter species; the lobes are slightly longer in proportion to the length of the tube, and the interior of the tube is pubescent throughout, the hairs extending from the upper edge of the nectaries to the base of the lobes. In the field there will be no confusion between these two entities since their ranges are widely separate.

Symphoricarpos Parishii sometimes has been confused with *S. oreophilus*, but that species is entirely different in its longer, tubular-funnel-form corollas, and in its glabrous twigs and leaves. It is not known to occur in California. Specimens of *S. Parishii* from California are usually labeled *S. rotundifolius*, an entirely distinct species of Arizona and New Mexico, with the young twigs spreading-villosulous, the leaves roundish-oval, obtuse, dark green, not glaucous, and the corolla tubular-funnel-form, 9–10 mm. long, with the anthers reaching scarcely beyond the base of the corolla-lobes.

13. ***Symphoricarpos utahensis*** Rydberg, Bull. Torr. Bot. Club **26**: 544. 1899, Fl. Colorado 324. 1906, Fl. Rocky Mts. 813. 1917; Tidestrom, Contr. U. S. Nat. Herb. **25**: 515. 1925; Rehder, Man. Cult. Trees Shrubs 812. 1927; Graham, Ann. Carnegie Mus. **26**: 342. 1937.

Symphoricarpos oreophilus utahensis A. Nelson in Coulter & Nelson, New Man. Rocky Mt. Bot. 470. 1909.

Shrub 1–1.5 m. tall; young twigs crisp-puberulent; bark on the older branches brown; leaves oval or ovate, 1.5–4 cm. long, 8–25 mm.

wide, obtuse at the apex, acutish at the base, sometimes those of the young shoots coarsely sinuately toothed or repand, green and not at all glaucous, puberulent on both surfaces; petioles puberulent, 2–4 mm. long; flowers in terminal, unilateral, drooping short spikes, or some of them in smaller clusters in the axils of the uppermost leaves; calyx-teeth glabrous or ciliolate; corolla tubular-funnelform, symmetrical, with 5 small nectaries in the base of the tube, pubescent within, 9–12 mm. long, the lobes about 3 mm. long, slightly spreading; anthers 2 mm. long, about two-thirds the length of the corolla-lobes, shorter than the filaments; style glabrous, 3 mm. long, scarcely more than one-fourth the length of the corolla; fruit white, ellipsoid, 8–10 mm. long; nutlets lanceoloid or fusiform, acute or apiculate at the base, 5–7 mm. long.

TYPE LOCALITY: Logan, Utah. Collected by P. A. Rydberg in 1895.

RANGE: Wyoming, Utah, Colorado, and northern Arizona.

REPRESENTATIVE SPECIMENS: WYOMING: Medicine Bow Mts., *C. L. Porter 1367* (US, Mo). UTAH: Salt Lake City, *Leonard 90* (NY); Bullion Canyon, *Rydberg & Carlton 7314* (NY); La Sal Mts., *Rydberg & Garrett 8613* (NY); Beaver City, *Palmer 186* (NY, Mo, F); Central Utah, *Parry 34* (NY, P); Big Cottonwood Canyon, *Garrett 6971* (F), *Rydberg 6799* (NY, Can, US); Provo, *Goodding 1117* (NY, UC, Mo, F, US); Loa Pass, *M. E. Jones 5639* (NY, UC, Mo, US); Ephraim Canyon, *Coville* in 1912 (US); Timpanogos Canyon, *Palmer 38079* (P, A); Cold Water Canyon, *Williams 629* (NY); Wasatch Mts., *Tidestrom 1909* (US), *M. E. Jones 1134* (NY), *Garrett 6506* (F); Vernal, *Harrison & Larsen, 7786* (Mo); Mt. Nebo, *Harris C27172*, *C2872* (Mo). COLORADO: Golden, *M. E. Jones 252* (NY); Gunnison Watershed, *Baker 384* (NY, US, UC); West Mancos Canyon, *Baker, Earle, & Tracy 312* (NY, Mo, US). ARIZONA: Navajo Indian Reservation, *Standley 7384* (US).

Symphoricarpos utahensis is said to be not uncommon on hillsides or in canyons from 6000 feet to 9000 feet altitude in Utah, Colorado, Wyoming, and northern Arizona. Perhaps most nearly related to *S. oreophilus* through the characters of the corolla, it is, nevertheless, quite distinct from that species in the pubescence of its branchlets and leaves, the shorter corolla, and in the different-shaped leaf buds. The inclusion of this species by Tidestrom under the key statement "Twigs glabrous" is due, apparently, to a misinterpretation of Rydberg's type.

14. *Symphoricarpos Palmeri*, sp. nov.

Symphoricarpos pauciflorus sensu Wootton & Standley, Contr. U. S. Nat. Herb. 19: 610. 1915, ex p. Non *S. racemosus* var. *pauciflorus* Robbins 1867.

Symphoricarpos oreophilus sensu Palmer, Jour. Arnold Arboretum 10: 44. 1929. Non Gray 1873.

Frutex prostratus, 1–3 m. longus, ramis brevibus erectis vel ascendentibus, ramulis hornotinis pilis brevibus curvatis tomentellis puberulis; folia ovalia vel ovata, acuta, basi cuneata et sensim in petiolum attenuata, supra pilosula, subtus pilosa, reticulata; petioli teretes, 1–2 mm. longi; flores solitarii vel duo axillares; calycis dentes ovati, acuti, ciliolati, circa 1 mm. longi; corolla infundibulari-tubulosa, rosea, 9–12 mm. longa, intus pilosa, extus glabra, lobis ovalibus, tubi tertiam vel quartam partem aequantibus; stamina corollam subaequantia, antheris 2–2.5 mm. longis; stylus glaber; stigma capitatum; drupa alba, ellipsoidea, 6–8 mm. longa; nuculae 2, ovaes, albae, 4–5 mm. longae, 2–3 mm. latae.

A trailing shrub 1–3 m. long, the branches short, erect or ascending; young twigs tomentulose-puberulent with short, curved trichomes; bark gray and shreddy on the older branches; leaf-buds puberulent, acute, 1–2 mm. long; leaves oval or ovate, 1–2 cm. long, 5–18 mm. wide, acute or acutish or even apiculate at the apex, cuneate at the base, the upper surface finely reticulate, dark green, pilosulous or glabrescent, the veins obscure, the lower surface paler, prominently reticulate, grayish pilosulous on the veins, the margins somewhat ciliate and usually often or less sinuate or lobulate, or crenate; leaves of the sterile branches larger, roundish oval, sinuate or crenate, or lobulate, 2–3 cm. long, 2–2.5 cm. wide, obtuse or apiculate at the apex; petioles 1–3 mm. long, pilosulous; flowers short-pedicelled, in axillary pairs or solitary; bracts lanceolate, acute, puberulent; bractlets oval, acute, puberulent; calyx glaucous, glabrous or nearly so, nearly regularly and very shallowly 5-toothed, the teeth about 0.3 mm. long; corolla pinkish, tubular-funnelform, symmetrical, 9–12 mm. long, the lobes one-fourth to one-third the length of the tube, which is pilose within on the lower part; anthers 2–2.5 mm. long, shorter than the filaments, and reaching about to the middle of the corolla-lobes; style glabrous, 2–4 mm. long; stigma capitate; fruit white, ellipsoid, 6–8 mm. long; nutlets 2, oval or ellipsoid, flattened, plano-convex, whitish, rounded at the apex, somewhat acutish at the base, 4–5 mm. long, 2–3 mm. wide.

TYPE LOCALITY: Davis Mountains, Texas. Collected by E. J. Palmer.

RANGE: Southern Colorado, Arizona, New Mexico, and western Texas.

REPRESENTATIVE SPECIMENS: COLORADO: Alder, *Ramaley & Johnson* 14974 (NY). ARIZONA: Chiricahua National Forest, *Eggleston*

10849 (US); White Mountains, *Coville 1994* (US), *Hough* in 1901 (US); Navajo Co., *Peebles & Smith 13426* (US); Alto, *Fisher 36148* (US); Cuba, *Read 2* (US); Zuni Mts., *Goldman 1600, 1594* (US); Sierra Blanca Peak, *Wolf 2867* (Cal); San Antonita, *Bigelow* in 1853–4 (US). NEW MEXICO: Organ Mts., May 14, 1899, *Wooton* (NY, Mo, US); White Mts., *Wooton & Standley* in 1907 (US), *Wilkins 2404B* (P); Bear Mts., *Rusby 150* (F, UC, US, NY); St. Magdalena Mts., *Vasey* in 1881 (US, F). TEXAS: Mt. Livermore, *Palmer 30777* (Mo), *Hinckley 78* (F), *Sperry T15* (US), *Ferris & Duncan 2531* (Cal, NY), *Palmer 30853* (Mo, P, UC); Sawtooth Mt., *Palmer 31940* (US, P, Mo); Davis Mts., *Bailey 403* (US), *Palmer 34273* (NY, Mo, US, P, A, TYPE); Chisos Mts., *Palmer 34176* (Mo, NY), *Havard* in 1883 (US).

I dedicate this distinctive species to my friend and former colleague, Ernest Jesse Palmer of the Arnold Arboretum of Harvard University, who has devoted a considerable part of his life to the study of the vascular plants of the central and western parts of the United States. Mr. Palmer was the first botanist to secure an adequate series of specimens, and to publish an ecological account of the shrub. In his interesting discussion of the ligneous flora of the Davis Mountains of Texas, he says, (under *S. oreophilus*), that this species is "Found only at the higher altitudes above approximately 2100 m., where it grows on banks and rubble. The rather large pinkish flowers are borne in great profusion and are followed by an abundance of white berries. The plant trails or inclines over banks, and grows in great luxuriance in certain favorable localities." According to herbarium labels it grows on shaded banks of canyons, or about springs, or in deep rocky ravines, and flowers in June or July.

The character of the flowers and leaves relate this species to *S. utahensis*, from which it differs in having a trailing rather than an erect habit, smaller, usually more or less sinuate leaves, and the type of pubescence is more of the pilosulous order, rather than merely puberulent with short curved trichomes as in *S. utahensis*. Additional phylogenetic characters are to be found in the very different nutlets of the two species. It is somewhat similar to *S. oreophilus*, and has been mistaken for a "pubescent form" of that species. *Symphoricarpos Palmeri* is apparently confined to the mountains of Arizona, southern Colorado, adjacent New Mexico, and western Texas.

15. ***Symphoricarpos oreophilus*** Gray, Jour. Linn. Soc. Bot. **14**: 12. 1873, in Brewer & Watson, Bot. Calif. **1**: 279. 1876; Coulter, Man. Bot. Rocky Mt. Reg. 125. 1885; Gray, Syn. Fl. **1**²: 14. 1886;

Dippel, Handb. Laubholz. **1**: 284, *f.* 190. 1889; Greene, Fl. Franciscana 345. 1892; Howell, Fl. NW. Am. 281. 1900; De Wildeman, Ic. Hort. Thenens. **3**: 69–72, *pl.* 98. 1902; Rydberg, Fl. Colorado 324. 1906; Schneider, Ill. Handb. Laubholz. **2**: 674, *f.* 430, *f.-1*, *f.* 428, *q.-t.* 1911; Bean, Trees Shrubs Hardy Brit. Isles **2**: 563. 1914; Wootton & Standley, Contr. U. S. Nat. Herb. **19**: 611. 1915; Armstrong, Field Book W. Wild Fl. 517. 1915; Rehder in Bailey, Stand. Cyclop. Hort. 3293. 1917; Rydberg, Fl. Rocky Mts. 814. 1917; Tidestrom, Contr. U. S. Nat. Herb. **25**: 515. 1925; Rehder, Man. Cult. Trees Shrubs 812. 1927; Longyear, Trees Shrubs Rocky Mt. Reg. 218, *f.* 120. 1927; Kirkwood, N. Rocky Mt. Trees Shrubs 296. 1930; Krüssmann, Laubgehölze 315. 1937; Van Dersal, U. S. Dept. Agric. Misc. Publ. **303**: 268. 1938.

Symphoricarpos vulgaris sensu Gray in Plantae Fendler. 60. 1848. Non Michx. 1803.

Symphoricarpos montanus sensu Gray, Am. Jour. Sci. ser. 2. **34**: 249. 1862; Watson in Bot. King Exped. **5**: 132. 1871, ex p.; Porter & Coulter, Syn. Fl. Col. 53. 1874, ex p. Non H.B.K. 1818.

Symphoricarpos rotundifolius var. *orcophilus* M. E. Jones, Proc. Calif. Sci. ser. 2. **5**: 690. 1895.

Symphoricarpos glabratus Eastwood, Bull. Torr. Bot. Club **30**: 499. 1903.

An erect shrub 1–1.5 m. tall, divaricately branched; branches slender, spreading, the bark becoming brown and shreddy; young branchlets completely glabrous; leaves oval, rather thin, perfectly glabrous on both surfaces (or very rarely with a few short, scattered trichomes), usually acutish at the apex, entire or dentate, scarcely paler beneath, those of the flowering branches 1–2.5 cm. long, 8–16 mm. broad, tapering to the very short petiole; petioles broader at the base, about 2 mm. long, enclosing the pointed buds; flowers rose, mostly in axillary pairs, or in few-flowered terminal spikes; bracts oval, acute, connate at the base, glabrous, 1 mm. long; calyx glabrous, the lobes deltoid, 0.5–1 mm. long; corolla tubular-funnelform, 11–13 mm. long, symmetrical, the tube slender, sparsely pilose to nearly glabrous within, and with 5 small basal nectaries, the lobes 2–3 mm. long, slightly spreading, less than one-fourth the length of the tube; anthers 2 mm. long, about two-thirds the length of the corolla-lobes and about as long as the filaments; style glabrous, 3 mm. long, about one quarter the length of the corolla; stigma capitate; fruit white, ovoid or ellipsoid, 8–10 mm. long; nutlets flattened-lanceoloid, 5–6 mm. long, 2–2.5 mm. wide, tapering to the acute base, obtusish at the apex.

TYPE LOCALITY: At the headwaters of South Clear Creek and the

alpine ridges east of Middle Park, Rocky Mountains, Colorado. Collected by C. C. Parry (no. 223) in 1861.

RANGE: Colorado, Utah, Nevada, Arizona, New Mexico, and Sonora, Mexico.

REPRESENTATIVE SPECIMENS: COLORADO: Idaho Springs, *Nelson* 10950 (Mo); Canyon City, *Brandegee* 47 (UC); Clear Creek, *Hall & Harbour* 225 (P, F, US, Mo); "Upper Arkansas," *Porter* in 1872 (P); S. Colorado, *Brandegee* in 1872 (P); Ouray, *Underwood & Selby* 26 (NY); Montrose, *Rollins* 1600 (NY); Paradox Creek, *Walker* 233 (NY, Mo, US); Fishers Peak, *Beckwith* 175 (NY); Golden, *Cary* 156 (US), *Knowlton* 78 (US), *Pammel* 307 (Mo); Trinidad, *Beckwith* 207 (NY), *Eastwood* in 1891 (Cal, TYPE of *S. glabratus*); Gunnison, *Clements* 228 (NY); Steamboat Springs, *Shear & Bessey* 3974 (NY); Norwood Hill, *Walker* 425 (NY, US, Mo); Turkey Creek, *Rydberg & Vreeland* 5579 (NY, Can); Gilpin Co., *Tweedy* 5540 (NY); Durango, *Eastwood* in 1891 (NY); Rocky Mts., *Parry* 223 (P, Mo). UTAH: Salt Lake City, *Rydberg* 6260 (NY); Marysvale, *Rydberg & Carlton* 7132 (NY); Poison Creek, *Rydberg & Carlton* 7438 (NY); Red Butte Canyon, *Garrett* 2493 (NY). NEVADA: Ruby Mts., *Eggleston* 7709 (NY, US). ARIZONA: San Francisco Mt., *Rehder* 70 (A, US); Winona, *Goldman* 2855 (US); Rincon Mts., *Blumer* 3415 (Mo, UC, F); Tucson, *Fisher* 219 (P); Willow Spring, *Palmer* 521 (US); Mt. Graham, *Kearney & Peebles* 9789 (US); Kaibab Plateau, *Eastwood & Howell* 6406B (Cal); Chiricahua Mts., *Goodman & Hitchcock* 1218 (Cal, UC, P, NY, F, Mo), *Witmer Stone* 304 (P); Huachuca Mts., *Goodding* 131, 867 (NY); Santa Rita Mts., *Pringle* in 1884 (NY, P, US, F, Mo); Cooley Butte, *Coville* 512 (NY), 1112 (US); Santa Catalina Mts., *Shreve* 5312 (UC), *Livingston & Thornber* in 1901, (NY), *Harris* C16302 (NY), *Lemmon* in 1905 (UC). NEW MEXICO: Cimarron Canyon, *Nelson & Nelson* 422 (UC); Cloudcroft, *Wooton* in 1899 (US); Tunitcha Mts., *Standley* 7684 (US); Chama, *Standley* 6668 (US); Sandia Mts., *Eastwood* 15675a (Cal), *Ellis* 60 (Mo, US); Brazos Canyon, *Standley & Bollman* 10777 (US); Turkey Mt., *Harris* 17 (US); White Mt., *Wooton* in 1895 (US); Santa Fe Creek, *Fendler* 284 (Mo); Sacramento Mts., *Rehder* 366 (NY, A); Winsors Ranch, *Standley* 4065 (NY, Mo, US); Mogollon Mts., *Metcalf* 314 (NY, US, UI, UC, Mo); Sierra Co., *Metcalf* 994 (US, NY, F); Jemez Springs, *Nelson* 11682 (NY, US, Mo). TEXAS: Guadalupe Park, *Moore & Steyermark* 3671 (UC, NY, Mo, P). MEXICO: San Jose Mts., Sonora, *Mearns* 1588, 1643 (US), *Wolf* 2508 (Cal).

By the elongated, tubular-funnelform corolla, glabrous twigs and foliage, and the long, flattened-lanceoloid sharp-based nutlets, this characteristic shrub of the southern Rocky Mountain region can be readily distinguished from all other members of the genus. *Symphoricarpos tetonensis*, the only species for which this might be mistaken, differs in its shorter, cylindrical-campanulate corollas, and the smaller, obtusish nutlets.

As in most of the other species of this genus, the leaves of the young shoots are extremely variable in size, and extent of lobation. On the same branch they may vary from entire to dentate, or they may be many-lobed with the lobes sometimes reaching half way to the midvein, usually deeper on the lower half of the blade, and thus frequently giving the leaf a somewhat oak-like appearance. The blades are from 1–4 cm. long and wide, or occasionally slightly larger. The upper surface is pale or glaucous green and finely reticulate with the numerous veinlets impressed; the lower surface is paler green, with the principal veins rather prominent.

The herbarium specimens distributed as *Heller 3591* from Barranca, Taos County, New Mexico, consist of a mixture of *S. oreophilus* and *S. Palmeri*. For example, US and Mo sheets belong to *S. oreophilus*; those from F and UI are *S. Palmeri*. They are all good flowering specimens and the specific identity can be determined at a glance by the length of the corollas and the indument of the leaves and young twigs.

16. ***Symphoricarpos rotundifolius*** Gray, *Plantae Wrightianae* 2: 66. 1853, Jour. Linn. Soc. Bot. 14: 11. 1873, in Brewer & Watson, Bot. Calif. 1: 279. 1876; Hemsley, Biol. Centr.-Am. 2: 4. 1881; Gray, Syn. Fl. 1²: 14. 1886; Greene, Fl. Franciscana 345. 1892; Koehne, Deutsche Dendrol. 557. 1893; Rydberg, Fl. Colorado 324. 1906; Coulter & Nelson, New Man. Bot. Rocky Mts. 470. 1909; Garrett, Spring Fl. Wasatch Reg. 91. 1911; Schneider, Ill. Handb. Laubholzk. 2: 674, 1911; Bean, Trees Shrubs Hardy Brit. Isles 2: 564. 1914; Wooton & Standley, Contr. U. S. Nat. Herb. 19: 611. 1915; Rehder in Bailey, Stand. Cyclop. Hort. 3293. 1917; Rydberg, Fl. Rocky Mts., 813. 1917; Standley, Contr. U. S. Nat. Herb. 23: 1399. 1924; Tidestrom, Contr. U. S. Nat. Herb. 25: 515. 1925; Longyear, Trees Shrubs Rocky Mt. Reg. 217, f. 119b. 1927; Rehder, Man. Cult. Trees Shrubs 812. 1927; Dayton, U. S. Dept. Agric. Misc. Publ. 101: 152. 1931; Munz, Man. S. Calif. Bot. 495. 1935; Krüssmann, Laubgehölze 315. 1937; Van Dersal, U. S. Dept. Agric. Misc. Publ. 303: 269. 1938.

Symphoricarpos montanus sensu Watson, Bot. King Exped. 5:132. 1871; Porter & Coulter, Syn. Fl. Colorado 53. 1874, ex p. Non H.B.K. 1818.

A low, erect, slender, straggling shrub less than 1 m. tall; young branches softly and densely pubescent with short, straight, spreading hairs; leaves 1–3 cm. long, 6–18 mm. wide, grayish green, suborbicular to broadly oval or ovate, obtuse or rounded at the apex, rarely acutish, usually entire, or some of the larger ones repand or sinuately dentate or lobed, decidedly pubescent, usually puberulous above, pilosulous and grayish beneath; petioles 1–3 mm. long, densely short-villous; flowers almost sessile in the axils of the upper leaves; bracts shorter than the ovary; corolla light pink, tubular-funnelform, symmetrical, 9–10 mm. long, the tube pilose within on the lower part, and with 5 small glandular nectaries in the base, the lobes 2 mm. long, slightly spreading; calyx campanulate, the lobes about 1 mm. long; anthers 2–2.5 mm. long, reaching only to the base of the corolla-lobes, equalling or somewhat shorter than the free portion of the filament; style glabrous, 3–4 mm. long, about one-third the length of the corolla; fruit white, ovoid or ellipsoid, about 1 cm. long, 6–7 mm. wide; nutlets oval, flattened, striate, pointed at each end, 4.5–5 mm. long, 3 mm. wide.

TYPE LOCALITY: "Sides of mountains around the copper mines," Santa Rita, New Mexico. Collected in August, 1851, by Charles Wright, no. 1388.

RANGE: New Mexico, Arizona, and southern Colorado.

REPRESENTATIVE SPECIMENS: COLORADO: Canyon City, *Brandege* 47 (Mo); Grand Canyon of the Arkansas, *Engelmann* in 1874 (Mo). ARIZONA: near Prescott, *Toumey* 200a (US), *Sparks* in 1902 (US), *McKelvey* 1210 (US), *Eastwood* 17644 (Cal), *Wolf* 2320 (Cal), *Kearney & Peebles* 9754 (US); Matzatzal Mts., *Collom* 300 (NY, Mo); Fort Whipple, *Coues & Palmer* 242 (Mo); Pinal Mts., *M. E. Jones* in 1890 (Mo, UC); Oak Creek Canyon, *Goddard* 584 (UC, F), *Rehder* 45 (Mo), *Nelson & Nelson* 2084 (Mo), *Goldman* 2176 (US); Navajo Reservation, *Darsie* in 1933 (Cal), *Vorhies* (UC, Mo). NEW MEXICO: Copper Mines, *Parry* 421 (NY, US); *Wright* 1388 (NY, TYPE, Mo, P, US); Organ Mts., *Standley* in 1906 (US), *Wootton & Standley* in 1906 (US); Bear Mountain, *Metcalf* 76 (Mo, UI, US, UC); Animas Mts., *Goldman* 1391, 1392 (US); Santa Fe, *Mulford* 1272 (Mo); valley of the Rio Grande, *Parry* 421 (US).

Symphoricarpos rotundifolius is a rather local species confined to the mountainous areas of southwestern New Mexico, Arizona, and adjacent Colorado, where it occurs on rocky slopes between the altitudes of 4000

and 10,000 feet. It is very similar in the shape of the leaves and in the character of the pubescence to the Californian *S. mollis*, but that is a trailing shrub with shortly campanulate corollas. In the original description of *S. rotundifolius*, Gray says: "The leaves are rounded and more downy than in Nuttall's *S. mollis*, and the inflorescence as well as the shape of the corolla is entirely different."

S. rotundifolius can be readily distinguished from all other species of the subgenus ANISANTHUS by the fact that the pubescence of the young twigs is dense, spreading, and villosulous. In this respect it is entirely different qualitatively from all the other species within its cycle of affinity. This character, in combination with the tubular-funnelform corolla 9–10 mm. long, will readily distinguish it from every other species. It has been the custom, however, for nearly half a century to confuse this shrub with a more common member of the genus that has a northerly range, *S. vaccinioides*, but as long ago as 1900, when he first described that species, Rydberg pointed out quite clearly that "all the specimens from the northern Rockies referred to either *S. oreophilus* or *S. rotundifolius*, belong to *S. vaccinioides*." Nevertheless, even during the last decade, several botanists have not distinguished between *S. vaccinioides* and the entirely different *S. rotundifolius*, but instead have grouped their specimens under this latter species, which is not known to occur north of latitude 39° N.

The type locality, according to a statement in the original description of *S. rotundifolius*, is near Santa Rita, New Mexico. Wright's specimens were collected in August 1851, hence, according to Gray's account in the introduction to the second part of *Plantae Wrightianae*, they were collected "during a journey from El Paso to the copper mines of Santa Rita del Cobre, in the southwestern part of New Mexico, . . ."

17. ***Symphoricarpos longiflorus*** Gray, Jour. Linn. Soc. Bot. **14**: 12. 1873, in Brewer & Watson, Bot. Calif. **1**: 279. 1876, Syn. Fl. **1**²: 14. 1886; Coville, Contr. U. S. Nat. Herb. **4**: 117. 1893; Brandegee, Zoe **5**: 149. 1903; Schneider, Ill. Handb. Laubholzk. **2**: 675. 1911; Armstrong, Field Book West. Wild Fl. 517. 1915; Rehder in Bailey, Stand. Cyclop. Hort. 3294. 1917; Rydberg, Fl. Rocky Mts. 814. 1917; Jepson, Man. Fl. Pl. Calif. 967. 1925; Tidestrom, Contr. U. S. Nat. Herb. **25**: 515. 1925; Munz, Man. So. Calif. Bot. 495. 1935; McMinn, Ill. Man. Calif. Shrubs 535, f. 638. 1939.

Symphoricarpos fragrans A. Nelson & Kennedy, Muhlenbergia **3**: 143. 1908.

A low spreading shrub, the branches somewhat declined, 50–100 cm. long; young twigs glaucous, glabrous, or sparsely pilosulous; bark of the older branches thin, whitish, fibrous, shreddy; leaves lanceolate to oval or oblanceolate, acute to obtuse at the apex, narrowed at the base, entire, 6–15 mm. long, 2–5 mm. wide, completely glabrous to sparsely pilosulous, thick, pale green and glaucous; petioles 1–3 mm. long, glabrous or ciliate; flowers solitary or in pairs in the axils of the upper leaves, or in small terminal, few-flowered racemes, very fragrant; calyx 5-lobed, glabrous and glaucous, or somewhat pubescent, the lobes deltoid, about 1 mm. long; corolla 11–13 mm. long, salverform, symmetrical, pink, the tube narrow, 3–5 times as long as the widely spreading lobes, glabrous inside and out, with one small basal nectary; stamens about as long as the tube of the corolla, the anthers versatile, sessile or nearly so, 2–3 mm. long, about one-fourth the length of the lobes of the corolla, the filaments scarcely if at all free; style 5–7 mm. long, usually pilose above the middle; stigma capitate or slightly bilobed; fruit white, ellipsoid, 8–10 mm. long; nutlets 2, oval, glabrous, 4.5–5 mm. long, 2.5–3 mm. wide, acute at the base.

TYPE LOCALITY: Pahrnagat Mountains, southeastern Nevada. Collected by Miss Searles in 1871.

RANGE: Southeastern Oregon to Colorado, Texas, and southeastern California.

REPRESENTATIVE SPECIMENS: OREGON: Trout Creek, *Percy Train* 35 (US). NEVADA: Charleston Mts., *Clokey* 7732 (US, F, NY, Cal); Ely, *Hitchcock* 1231 (US); Rabbit Hole, *Griffiths & Hunter* 541 (NY, US); Silver Peak Mts., *Goldman* 2580 (US); Mormon Mts., *Kennedy & Goodding* 122 (UC, US); Peavine, *Bailey* 110 (US); Currant, *Bentley* 67 (Mo, NY); Truckee, *Kennedy* 1590 (F, P, US, UC, NY, Mo, ISOTYPES of *S. fragrans*), *Kennedy* 2012 (UC, Mo, P), *Kennedy* 1313 (UC); Goldfield, *Heller* 10409 (Mo, NY, US, Cal, F); Pioche, *Minthorn* in 1909 (UC); Candelaria, *M. E. Jones* in 1897 (US, P, Mo); Caliente, *Tidestrom* 9487 (NY, US). CALIFORNIA: Topaz, *Bolton* in 1915 (Cal); Argus Peak, *Purpus* 5480 (UC, US, Mo); Providence Mts., *Munz, Johnston & Harwood* 4388 (US); Death Valley, *Coville & Funston* 941 (US); Panamint Mts., *Howell* 3895 (Cal), *Munz* 14839 (Cal, Mo), *Hoffman* 451 (Cal), *Ferris* 7966 (Mo, F, UC); Bishop, *Heller* 8274 (Mo, F, P, Cal, NY, US); White Mts., *Duran* 2648 (US, NY, Cal, F, Mo, UC), *Tidestrom* 9949 (US, F); Clark Mt., *Munz* 12892 (UC). UTAH: Santa Clara Valley, *M. E. Jones* 5137 (UC, NY, US, Mo); near St. George, *Parry* 87 (US, Mo, F); Diamond Valley,

Goodding 838 (UC, NY, Mo, US); Bear River, *Greenman* 4623 (Mo); Richfield, *Ward* 179 (US, Mo, P); Smithsonian Butte, *M. E. Jones* 5264a (US); Fruita, *Harrison* 7383 (Mo); La Verkin *Maguire & Blood* 4483 (Mo, UC); Sevier River Canyon, *Eastwood & Howell* 627 (Cal). COLORADO: western Montrose Co., *Payson & Payson* 3923 (Mo). ARIZONA: Pagumpa, *M. E. Jones* in 1894 (US); Peach Springs, *Wilson* in 1893 (Cal, UC); Grand Canyon, *Eastwood* 5749 (Cal). TEXAS: Guadalupe Mts., *Moore & Steyermark* 3478 (UC, NY, Mo, P, Cal, US), *Standley* 40538 (US, NY).

This distinctive species is not uncommon on rocky slopes and hill-sides in the foothills and canyons of the artemisia, pinyon, and yellow pine belts in southwestern United States, from 4500 to 7500 feet altitude, flowering in May and June. The leaves and young twigs vary from completely glabrous, which is the usual condition, to sparsely pilosulous. This variation is apparently not correlated with any other character, or with any distinct geographical distribution. Gray's type is completely glabrous, a fact noted in the original description as "*Fere glaberrimus*." The plants described by Nelson & Kennedy do not differ in any detectable respect from *S. longiflorus*. Their comparative statement, applied to *S. fragrans*: "Plainly a northern ally of *S. longiflorus*, from which it differs in the size of its leaves, and the size, character, and color of the flowers," can be interpreted only on the assumption that they were comparing it with some plant other than *S. longiflorus*, because, as noted above, there is no difference in the size of the flowers, neither are there any distinctive leaf characters.

DEPARTMENT OF BOTANY,
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