

walls, and by the terminal position of the wood parenchyma cells and the thinness and cellulose nature of their walls.

The plants are very ornamental in their native habitat during late winter or early spring. The yellowish-green young foliage stands out in sharp contrast to the dark green foliage of the associated shrubs. Branches cut just as the silvery bud-scales are being pushed out by the expanding buds will continue to grow when placed in water until the flowers and leaves are completely developed. They make a unique and ornamental bouquet when other plant materials are not abundant.

Attempts at transplanting these shrubs into gardens have not been very successful. In nature they propagate by sending up new plants from underground stems which run parallel to the surface of the ground in the upper layer of loose soil which is usually covered by 3 to 6 inches of leaf mold. The roots penetrate the soil to great depths and it is difficult to find young plants without long roots or which are not connected to the parent plants.

The extremely limited distribution, the ornamental nature of the buds, flowers, and foliage, and the flexibility of the stems and branches make western leatherwood one of the most interesting of the California native shrubs.

Mills College, February, 1935.

THE WASHINGTON SPECIES AND VARIETIES OF ROSA

GEORGE NEVILLE JONES

In 1906 Piper (6, pp. 334-335) recorded only three species of *Rosa* for Washington. In 1915, one additional species, an adventive, was included (7, pp. 204-205). In the present paper¹ an attempt is made to record some of the distinguishing characteristics and distributional facts concerning the four non-native and the five native species (Linneons) and their several varieties. Two new varieties are proposed. The geographical distribution of the different species and varieties in Washington is shown in figure 1. An attempt is made to correlate taxonomic characters with geographical distribution and to furnish a usable key for identification of the plants. The application of this taxonomic-geographic method has aided in the solution of several perplexing problems of identity and relationship and has also pointed to the probability that one of the best methods of solving such problems is to be found in a local study of a small number of species over a long period of time. During a six year study of Washington roses in the field and in the herbarium no direct evidence of hybridity has been noted. This

¹ Since this paper was written there has appeared an excellent summary of certain data concerning the North American Cinnamomeae, by Dr. E. W. Erlanson (2).

does not mean that hybridization does not occur in the genus *Rosa* under natural conditions in Washington but that if it does occur it is at least not frequent enough to cause taxonomic difficulty. Possibly this revision does not deal with all the species and varieties of the genus that occur in this state. If, and when, other species are found, they too will have to be included, and,

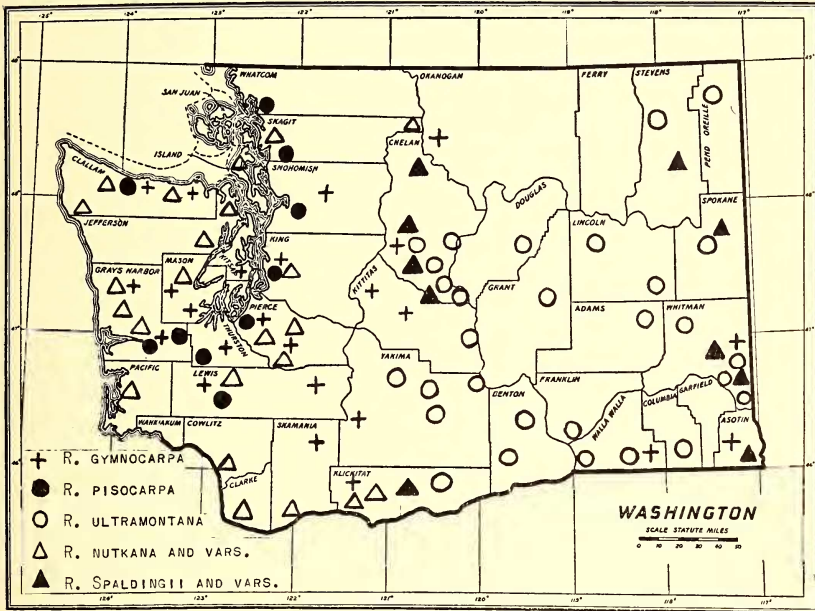


Fig. 1 Distribution of the native species of *Rosa* in Washington.

as Dr. L. H. Bailey remarks about another genus, "in the end we shall admit as many species as there are."

One cannot fail to be impressed with the appropriateness of Dr. Hultén's remark in his great work on the flora of Kamtchatka (4) concerning the genus *Rosa* in that region: "To judge from the literature on the subject the genus *Rosa* is very multiform and presents rather complicated conditions. . . . As a matter of fact, the conditions, when studied in nature, seem to be comparatively simple."

Thanks for the loan of specimens are due Professor John Davidson of the University of British Columbia, Dr. W. R. Maxon of the United States National Herbarium, Dr. E. D. Merrill and Dr. H. A. Gleason of the New York Botanical Garden, Mr. J. C. Nelson of Salem, Oregon, Dr. F. L. Pickett of the State College of Washington, and Mr. J. W. Thompson of Seattle. The majority of the specimens cited are in the herbaria of the University of Washington at Seattle and the State College of Washington at Pullman.

KEY TO THE SPECIES AND VARIETIES

1. Prickles strongly curved or hooked; adventive or naturalized species.
 2. Stems trailing or climbing; flowers white; sepals reflexed, deciduous from the mature fruit; styles much exserted beyond the mouth of the hypanthium.
 3. Flowers 1.5-2 cm. broad, very fragrant, in many-flowered pyramidal corymbs; leaflets usually 9, simply serrate, with non-glandular teeth; stipules pectinate 1. *R. multiflora*
 3. Flowers 3-5 cm. broad; scentless, in few-flowered corymbs or commonly solitary; leaflets usually 7; stipules entire or denticulate .. 2. *R. arvensis*
 2. Stems erect or arching; flowers rose or pink, 1-4 together, 3-5 cm. broad; styles not exserted or only slightly so.
 3. Leaflets doubly serrate with gland-tipped teeth, pubescent or more or less glandular-pruinose beneath; sepals glandular-hispid on the back; pedicels usually glandular-hispid.
 4. Leaflets suborbicular to broadly oval, obtuse or acutish, pubescent and glandular beneath, fragrant; styles pubescent; sepals tardily deciduous from the mature fruit or sometimes long-persistent. 3. *R. rubiginosa*
 4. Leaflets ovate or oval, acute or short-acuminate, more or less pubescent on both sides, more or less glandular beneath; styles glabrous or nearly so; sepals soon deciduous from the mature fruit 3a. *R. rubiginosa*
var. *micrantha*
 3. Leaflets simply and sharply serrate, glabrous on both sides, shining above, rarely slightly glandular on the midrib beneath, oval or ovate, acute; styles pubescent; sepals glabrous on the back, in fruit reflexed and tardily deciduous, two or more of them usually pinnately lobed .. 4. *R. canina*
 1. Prickles straight or none, never strongly curved or hooked; stems erect, not or scarcely arching; foliage not noticeably sweet scented; native species.
 2. Sepals persistent on the mature fruit; pistils numerous.
 3. Flowers mostly corymbose, if solitary, the petals 10-18 mm. long; hypanthium in fruit small, rarely more than 1 cm. in diameter; teeth of the leaflets simple, non-glandular.
 4. Sepals more or less glandular on the back, often densely so, rarely eglandular, sometimes prickly; leaflets oval to ovate, rounded at the base, finely serrate (average number of teeth per leaflet 29); coastal species 5. *R. pisocarpa*
 4. Sepals eglandular or nearly so, glabrous or puberulent; leaflets obovate or oval, usually cuneate at the base, coarsely and sharply serrate (average number of teeth per leaflet 21); species of eastern Washington 6. *R. ultramontana*
 3. Flowers mostly solitary, rarely 2-4 together;

- petals 2-4 cm. long; mature fruit large, 12-22 mm. in diameter.
4. Leaflets almost always doubly or triply serrate with gland-tipped teeth, more or less glandular-granuliferous beneath; stipules and rachises glandular; prickles large, stout, and more or less flattened at the base; coastal species.
 5. Hypanthium smooth.
 6. Leaflets not conspicuously glandular-muricate beneath; sepals glabrous or rarely glandular on the back; hypanthium in mature fruit 15-18 mm. in diameter 7. *R. nutkana*
 6. Leaflets conspicuously glandular-muricate beneath; sepals glandular-hispid on the back; hypanthium in mature fruit 12-15 mm. in diameter 7a. *R. nutkana*
var. *muriculata*
 5. Hypanthium setose 7b. *R. nutkana*
var. *setosa*
 4. Leaflets coarsely and more or less regularly simple-toothed, the teeth not glandular, or very rarely so; blades of the leaflets more or less puberulent beneath, but not or rarely glandular-granuliferous or glandular-muricate; rachises and petioles not or only sparingly glandular; prickles smaller, not conspicuously flattened at base; species of eastern Washington.
 5. Floral branches slender, glabrous, often somewhat prickly; leaflets thin, less than 3 cm. wide; hypanthium in fruit red, 12-18 mm. in diameter; stems usually armed with straight, paired prickles.
 6. Stipules, petioles, rachises, and leaflets puberulent; flowers 3-5 cm. in diameter.
 7. Hypanthium smooth or nearly so. 8. *R. Spaldingii*
 7. Hypanthium more or less densely prickly 8a. *R. Spaldingii*
var. *hispida*
 6. Stipules, petioles, rachises, and leaflets glabrous, non-glandular; flowers 5-8 cm. in diameter; floral branches unarmed; hypanthium smooth 8b. *R. Spaldingii*
var. *alta*
 5. Floral branches stout, pubescent, unarmed; leaflets large, coarse, thick, 4-6 cm. long, 3-4 cm. wide, very coarsely crenate-serrate; hypanthium in fruit smooth, orange, 20-22 mm. in diameter; stems unarmed 8c. *R. Spaldingii*
var. *chelanensis*
 2. Sepals deciduous with the upper part of the hypanthium, eglandular; pistils few; leaflets doubly serrate with glandular teeth; flowers solitary, about 2 cm. in diameter; stems bristly and prickly 9. *R. gymnocarpa*

Section I. SYNSTYLAE. Stems climbing or trailing, with hooked or curved prickles; flowers corymbose; sepals pectinately lobed or serrate, soon deciduous; styles united into a column, much exserted.

1. ROSA MULTIFLORA Thunb.

Rosa multiflora Thunb. Fl. Jap. 214. 1874; Rydberg, Bull. Torr. Club 48: 160. 1921.

Distribution: no Washington specimens of this oriental species have been seen by the present writer but Rydberg (9, p. 160) reports it "as a ballast plant at one station in Washington." Type locality: near Nagasaki, Japan.

2. ROSA ARVENSIS Huds.

Rosa arvensis Huds. Fl. Angl. ed. 1, 192. 1762; Rydberg, Bull. Torr. Club 48: 160. 1921.

Distribution: reported to be "common in the vicinity of Vancouver, Clark County, Washington, apparently fully spontaneous" by Rydberg, who quotes Mr. J. C. Nelson of Salem, Oregon, as the authority for the statement. However, Mr. Nelson in a personal letter dated February 28, 1934, states that *Rosa arvensis* is unknown to him and that he is at a loss to know where Rydberg got the information. Rydberg gives the following citation: "WASHINGTON: Vancouver, *R. V. Bradshaw 1053*." According to Dr. H. A. Gleason this specimen is not to be found in the Herbarium of the New York Botanical Garden. Since this species is often cultivated and is inclined to spread from old gardens additional reports of its occurrence in Washington are to be expected. Type locality: England.

Section II. CANINAE. Stems erect or arching, usually with hooked or curved prickles; leaflets mostly 7; flowers corymbose; sepals often lobed, reflexed after anthesis and usually soon deciduous; styles distinct, not exserted.

3. ROSA RUBIGINOSA L. Sweetbriar. Eglantine.

Rosa Eglanteria L. Sp. Pl. 491. 1753.

Rosa rubiginosa L. Mant. Pl. 564. 1771; Howell, Fl. Nw. Am. 1: 170. 1898; Frye & Rigg, Nw. Fl. 220. 1912, Elem. Fl. Nw. 132. 1914; Henry, Fl. S. B. C. 174. 1915; Piper & Beattie, Fl. Nw. Coast 205. 1915; Rydberg, N. Am. Fl. 22: 494. 1918; Carter & Newcombe, Prel. Cat. Fl. Vanc. & Q. C. Is. 50. 1921; Rydberg, Bull. Torr. Club 48: 161. 1921; Gilkey, Spr. Fl. Nw. Ore. 67. 1929; Benson, Contr. Dudley Herb. 2: 97. 1930.

Distribution: common along roadsides and in fields in western Washington; occurs also in a few localities in eastern Washington; thoroughly established and very abundant in gravelly soil, especially along roads and fences, on the "prairies" near

Tacoma, appearing as if native. It is said to have spread originally from the Hudson's Bay Company's Fort Nisqually (the first home of white men on Puget Sound), the site of which is now occupied by the town of Dupont in Pierce County. The Sweetbriar is common also along the north bank of the Columbia River in Clark County. Type locality: European.

Specimens examined: Clark County: Vancouver, *Jones 4716*. Cowlitz County: Kalama, *Jones 6068*. Island County: Coupeville, *Jones 4843*. Mason County: Skokomish River, *Schwartz*, July 1932. Pierce County: Tacoma, *Jones* in 1933. Skagit County: Mount Erie, *Hardin*, April 25, 1926. Whatcom County: Bellingham, *Hardin*, June 2, 1925. Whitman County: Pampa, *St. John 9700*; Pullman, *Jones* in 1930.

According to A. H. Wolley-Dod (11) there is much doubt as to what Linnaeus meant by the older name *R. Eglanteria*; "specimens and notes in his herbarium show that he intended to apply it to *R. lutea* Mill., which is corroborated by his differentiating it, in the 'Mantissa,' from *R. rubiginosa* by its yellow flowers."

3a. ROSA RUBIGINOSA VAR. MICRANTHA (Borrer) Lindl.

Rosa rubiginosa var. *micrantha* Lindl. Rosarum Monogr. 87. 1820.

Rosa micrantha Borrer, Sm. Engl. Bot. pl. 2490. 1813; Rydberg, Bull. Torr. Club 48: 161. 1921.

Distribution: "naturalized in Oregon and Washington" according to Rydberg. No Washington specimens seen. Type locality: England, "probably near London."

4. ROSA CANINA L. Dog Rose.

Rosa canina L. Sp. Pl. 491. 1753; Rydberg, N. Am. Fl. 22: 495. 1918.

Distribution: known in Washington only from the following collection: along roadside near Kennedy Creek, Mason County, *Jones 3488*. Type locality: Europe.

Section III. CINNAMOMEAE. Stems erect, either unarmed or with usually straight infrastipular, often paired prickles; leaflets 5-11; flowers solitary or corymbose; sepals usually entire, persistent after anthesis; pistils numerous; styles not exerted, persistent, as is also the upper part of the hypanthium.

According to a recent work by Erlanson (1) the Washington roses of the Section *Cinnamomeae* may be placed in two cytological groups: the diploid group, including *R. pisocarpa*, with $2n = 14$, and the hexaploid group, including *R. nutkana*, and *R. Spaldingii*, with $2n = 42$. This arrangement coincides with current taxonomic treatments. The diploid group is characterized by having the flowers mostly corymbose, or if solitary, the petals 2 cm. long or less, and the hypanthium in fruit rarely more than

1 cm. in diameter. The hexaploid group has the flowers mostly solitary, the petals usually 2.5 cm. or more in length, and the hypanthium in fruit 12–22 mm. in thickness. In a later paper (2, p. 203) Dr. Erlanson states: "In my experience chromosome number has proved to be no more than another important diagnostic characteristic. Cytological studies have helped to clarify the situation, but have not seriously affected the classification of the genus as worked out by Crépin in the last century and by Boulenger on purely morphological lines more recently."

5. *ROSA PISOCARPA* Gray. Bunch Rose.

Rosa pisocarpa Gray, Proc. Am. Acad. 8: 382. 1872; Howell, Fl. Nw. Am. 1: 169. 1898; Piper, Contr. U. S. Nat. Herb. 11: 335. 1906, as to w. Wash. specimens; Frye & Rigg, Nw. Fl. 221. 1912, Elem. Fl. Nw. 132. 1914; Henry, Fl. S. B. C. 174. 1915; Piper & Beattie, Fl. Nw. Coast 205. 1915; Rydberg, N. Am. Fl. 22: 522. 1918; Carter & Newcombe, Prel. Cat. Fl. Vanc. & Q. C. Is. 50. 1921; Jepson, Man. Fl. Pl. Calif. 499. 1925; Gilkey, Spr. Fl. Nw. Ore. 67. 1929; Benson, Contr. Dudley Herb. 2: 99. 1930.

Distribution: Humid Transition. British Columbia to California, west of the Cascade Mountains. Common at low elevations in western Washington, growing in thickets and swampy ground, often along the seashore. In eastern Washington it is replaced by *R. ultramontana*. Specimens without flowers or fruit can be readily distinguished from *R. nutkana* Presl, with which it frequently occurs, by the simple-toothed eglandular leaflets. The flowering period is from June 15 to July 20. Type locality: Multnomah County, Oregon. Collected by Elihu Hall.

Specimens examined: Grays Harbor County: Satsop, *Heller 4032*; McCleary, *Jones 4585*. King County: Seattle, *Piper*, September 1896; Kent, *Jones 896, 897, 900*. Snohomish County: Everett, *Jones 4895*. Thurston County: Grand Mound, *Jones 1422*. Kitsap County: Waterman, *Warren 94*; Orchard Point, *Piper*, July 1895.

6. *ROSA ULTRAMONTANA* (Wats.) Heller. Canyon Rose.

Rosa californica var. *ultramontana* Wats.; Brew. & Wats. Bot. Calif. 1: 187. 1876.

Rosa ultramontana (Wats.) Heller, Muhlenbergia 1: 107. 1904; Rydberg, Fl. Rocky Mts. 444. 1917, N. Am. Fl. 22: 523. 1918; Standley, Contr. U. S. Nat. Herb. 22: 366. 1921; Tidestrom, Contr. U. S. Nat. Herb. 25: 282. 1925.

Rosa chrysocarpa Rydberg, Bull. Torr. Club 44: 74. 1917.

Distribution: Upper Sonoran and Arid Transition. British Columbia to California, east of the Cascade Mountains. A com-

mon plant in the canyons and river valleys of eastern Washington. The flowering period is from May 10 to July 5. Type locality: Eastern side of the Sierra Nevada (California).

Specimens examined: Benton County: Prosser, *Cotton 1093*, *Henderson*, May 26, 1892, *Bennett*, May 6, 1926, *Jones 398*; Rattlesnake Hills, *Cotton 469*. Chelan County: Chiwaukum, *Jones 4798, 4783*; Wenatchee, *Whited 677, 1125, 1334*, *Griffiths & Cotton 148*; Entiat, *Jones 1401*; Entiat Valley, *Morrill 241*. Columbia County: Blue Mountains, *Lake & Hull 819*. Grant County: Wilson Creek, *Sandberg & Leiberg 320*. Kittitas County: Cle Elum, *Henderson*, June 11, 1892, *Palmer 37859*, *Jones 4402, 4395, 4392*; Ellensburg, *Whited 677, 443*, *Jones 1406*; Easton, *Jones 4405*; Skookumchuck Creek, *Jones 1405*. Klickitat County: Klickitat Hills, *Jones 4472*. Lincoln County: Sprague, *Taylor 357*; Wilbur, *Henderson*, July 12, 1892. Pend Oreille County: Ione, *Sprague 372*. Spokane County: Spokane, *Jones 587*; Clarks Springs, *Kreager 47*, *Beattie & Chapman 2003*. Stevens County: Kettle Falls, *Sprague 363*. Walla Walla County: Hill, May 15, 1911; Wallula, *Cotton 1057*. Whitman County: Almota Creek, *St. John 9253*; Pullman, *Piper 1538, 1541*, *St. John 9274*, *Jones 1949, 1950, 1951, 1952, 1947, 1940, 2046, 2050, 2054, 2047, 2342*; Colfax, *Parker 591*; Rock Lake, *Weitman 163*, *Beattie & Lawrence 2425*; Indian, *St. John & Warren 3397*; Snake River Canyon, *Jones 2037*; Wawawai, *Henderson*, July 19, 1892; Kamiak Butte, *Jones 968, 969*. Yakima County: Yakima, *Henderson*, May 5, 1892, *Jones 1421*; North Yakima, *Steinweg* in 1894; Naches, *Jones 2222, 2223*; Soda Springs, *Jones 1420*; Satus Creek, *Jones 4422*; Tieton, *Warren 1833, 2074*. Without locality, *Vasey* in 1889.

Rosa Macounii Greene, and *R. Woodsii* Lindl., attributed to Benton County by St. John & Jones (10) are better referred to *R. ultramontana*.

Rosa chrysocarpa Rydberg appears to be merely a glabrous or nearly glabrous form of *R. ultramontana*. *Warren 1833* and *2074* from the Tieton River match the type of *R. chrysocarpa* perfectly.

Rosa ultramontana often occurs with *R. Spaldingii*. It can be readily distinguished in the field by the following characteristics: it begins to flower a week or two later; the flowers are smaller, corymbose, rose instead of pink; there is a large, foliaceous bract-like stipule at the base of the inflorescence; the leaflets are paler green, smaller, and narrower; the branches are more slender and with a tendency to be arching, and the bark of the young branches is somewhat glaucous.

7. ROSA NUTKANA Presl. Nutka Rose.

Rosa nutkana Presl, *Epimel. Bot. 203*. 1849; Howell, *Fl. Nw. Am. 1*: 168. 1898; Piper, *Contr. U. S. Nat. Herb. 11*: 334. 1906; Frye & Rigg, *Nw. Fl. 221*. 1912, *Elem. Fl. Nw. 132*. 1914; Henry, *Fl. S. B. C. 175*. 1915; Piper & Beattie, *Fl. Nw.*

Coast 205. 1915; Rydberg, Fl. Rocky Mts. 442. 1917, N. Am. Fl. 22: 511. 1918; Rydberg, Bull. Torr. Club 48: 165. 1921; Carter & Newcombe, Prel. Cat. Fl. Vanc. & Q. C. Is. 50. 1921; Jepson, Man. Fl. Pl. Calif. 498. 1925; Gilkey, Spr. Fl. Nw. Ore. 66. 1929; Benson, Contr. Dudley Herb. 2: 97. 1930.

Rosa columbiana Rydberg, Bull. Torr. Club 48: 166. 1921, in part.

Rosa nutkana Presl var. *pallida* Suksd. Werdenda 1: 23. 1927.

Distribution: Humid Transition. Alaska to northern California. In moist thickets and open woods, especially near the seashore, where it is a common plant along the borders of salt marshes. Common west of the Cascade Mountains. No typical specimens have been seen from eastern Washington. The flowering period is from May 15 to July 15. Type locality: Nootka Sound, British Columbia. Collected by Haenke in 1791.

Specimens examined: Clallam County: *Elmer* 2519; Quilayute Prairie, *Jones* 3749, 3613; Beaver Creek, *Jones* 4545. Grays Harbor County: Lake Quinault, *Conard* 162; Montesano, *Heller* 3875; Humptulips, *Jones* 3763, 4582. Island County: Whidbey Island, *Gardner*, June 1, 1897; Langley, *Grant* 2020. Jefferson County: Port Hadlock, *Jones* 3099; Duckabush River, *Jones* 3088. King County: Seattle, *Piper* 81, *Jones* 903. Kitsap County: Charleston, *Rigg*, December 14, 1907. Klickitat County: Falcon Valley, *Suksdorf* 10244; Bingen, *Suksdorf* 10821. Mason County: *Kincaid*, May 1892. Pierce County: Goat Mountains, *Allen* 292; Mount Rainier, *Warren* 1549; Roy, *Jones* 4643. San Juan County: Friday Harbor, *Beattie* 3326, *Pope*, 1904; Stuart Island, *Lawrence* 414. Skagit County: Skagit Pass, *Lake & Hull* 770; Anacortes, *Hardin*, October 1925.

It is extremely probable that the *R. cinnamomea* Borrer; Hook. (Fl. Bor. Am. 1: 200. 1833, not *R. cinnamomea* L., 1753) collected by Scouler in 1825 on the "shores of the Columbia, near its confluence with the sea" should be regarded as a synonym of *R. nutkana*, the common species of that region, rather than as a synonym of *R. Spaldingii* as listed by Rydberg (9, p. 512), since that species is not known to occur within two hundred miles of the region about the mouth of the Columbia River. After the description of *R. cinnamomea*, Hooker (*loc. cit.*) includes the following statement: "Mr. Borrer observes that the specimens resemble the European plant, except that the flower stalks bear setae." It seems probable, therefore, that Dr. Scouler's specimen was a bristly variety of *R. nutkana* (possibly var. *setosa*). It is also probable that it is the same as the plants included by Jepson (5, p. 498) as *R. nutkana* var. *hispida*.

7a. *ROSA NUTKANA* VAR. *MURICULATA* (Greene) comb. nov.

Rosa muriculata Greene, Leaflets 2: 263. 1912; Rydberg, N. Am. Fl. 22: 511. 1918, Bull. Torr. Club 48: 165. 1921.

Rosa nutkana var. *hispida* Henry, Fl. S. B. C. 175. 1915, not *Rosa nutkana* var. *hispida* Fernald.

Distribution: with the typical form of the species, occurring sporadically, but chiefly near the seashore. British Columbia to southern Oregon. Type locality: near Woodland, Cowlitz County, Washington. Collected by F. V. Coville in 1898, no. 705 (type in U. S. Nat. Herb. 380003).

This phase of *R. nutkana* is characterized by the densely glandular-muricate stipules, the petioles and rachises strongly glandular and more or less prickly, the thick leaflets conspicuously glandular-muricate beneath "with callous white points which at first bear a small pellucid gland, this deciduous," the flowers 2-3 together or solitary, the petals 2-2.5 cm. long, the sepals glandular-hispid on back, and the mature fruits 12-15 mm. in diameter, sometimes more or less sparsely hispid. Typical *R. nutkana* has the stipules glabrous at least on the upper surface, the petioles and rachises glandular-puberulent but rarely slightly pubescent beneath on the veins, the flowers usually solitary, rarely 2-4 together, the petals 2.5-3.5 cm. long, the sepals glabrous or rarely glandular on the back, and the mature fruits 15-18 mm. in diameter.

Specimens examined: Cowlitz County: Woodland, *Coville 705* (type). Island County: Langley, *Grant*, June 1923; Oak Harbor, *Jones 4872*; Coupeville, *Jones 4844, 4929, 4932*; Useless Bay, *Jones 4964*. Jefferson County: Port Hadlock, *Jones 3099*. King County: Seattle, *Hindshaw* in 1897. San Juan County: Friday Harbor, *Pope*, July 27, 1904, *Peck 12894, Jones 3040*. Snohomish County: Mukilteo, *Jones 4851*.

Through the courtesy of Professor Davidson of the University of British Columbia, it has been possible to examine the following British Columbian specimens, which represent var. *muriculata*: Elgin, *J. K. Henry*, August 13, 1913 (4 sheets); Vancouver, *Davidson*, July 15, 1911.

7b. *ROSA NUTKANA* var. *SETOSA* var. nov.

Differt a forma typica hypanthia et pedicelli setosi, foliola 1-1.5 cm. longa, caules 30-60 cm. alti.

Type from a grass-covered rocky point in Deception Pass State Park, north end of Whidbey Island, Washington, June 2, 1934, *Jones 4908*.

8. *ROSA SPALDINGII* Crépin. Spalding Rose.

Rosa Spaldingii Crépin, Bull. Soc. Bot. Belg. 15: 42. 1876; Rydberg, Fl. Rocky Mts. 442. 1917, N. Am. Fl. 22: 512. 1918, Bull. Torr. Club 48: 165. 1921; Tidestrom, Contr. U. S. Nat. Herb. 25: 281. 1925.

Rosa nutkana Piper & Beattie, Fl. Se. Wash. 137. 1914, not *Rosa nutkana* Presl.

Rosa columbiana Rydberg, N. Am. Fl. 22: 514. 1918, in part.

Distribution: Arid Transition. British Columbia to Wyoming,

Utah, eastern Oregon, and eastern Washington. Common on hillsides and along creeks and rivers in eastern Washington, particularly in the southeastern part of the state where it is the common hexaploid rose of the region. The flowering period is from May 1 to July 5. Type locality: Clearwater, Idaho.

Specimens examined: Asotin County: Anatone, *Jones 462, 2860, Gessell*, May 16, 1926; Grand Ronde River, *St. John 4164*. Chelan County: Chiwaukum, *Piper 2547, Jones 4780, 4785, 4787, 4809*; Merritt, *Jones 4759*; Blewett Pass, *Jones 4819*; Cashmere, *Jones 4815*; Stehekin, *Griffiths & Cotton 222*; Wenatchee, *Whited 1268*. Columbia County: Blue Mountains, *Darlington 229*. Kittitas County: Roslyn, *Whited 464*; Teanaway Creek, *Thompson 9484*; Cle Elum, *Jones 4396*. Klickitat County: Carp Lake, *Jones 1417*. Skamania County: Underwood, *Beattie 3806*. Spokane County: Spokane, *Henderson* in 1893. Stevens County: Chewelah, *Sprague 367*. Whitman County: Colfax, *Parker 390*; Pullman, *Piper 1539, St. John 9275, Jones 1941, 1942, 1948, 2578, 2044, 2035, 1399, 1944, 2051, 1418*.

Occasionally this rose has a few stalked glands on the margins of the leaflets, but the dentition is almost always single, not double. Specimens which are anomalous in this respect may be distinguished at once from typical *R. nutkana* by the slender prickles and the non-glandular rachises.

An examination of the type specimen of *Rosa columbiana* Rydberg shows it to be perfectly good *R. Spaldingii*. In many of the species which have straight prickles, specimens may be found occasionally on which the prickles are more or less slightly curved. On *Sandberg, MacDougal & Heller 381* (the type of *R. columbiana*) there are eighteen observable prickles of which only the three lowest ones are curved, the remainder being straight. Hence there is very strong presumptive evidence for concluding that this curvature was produced in the process of pressing. Another specimen cited by Rydberg (9, p. 166), from Forest Grove, Oregon, collected by *F. E. Lloyd* in 1893, has been examined and proves to be *R. nutkana* Presl. Thus, Rydberg's *Rosa columbiana* is seen to consist of a mixture of *R. Spaldingii* and *R. nutkana*, the type belonging to the former species.

8a. *ROSA SPALDINGII* var. *HISPIDA* (Fern.) comb. nov.

Rosa nutkana var. *hispida* Fernald, Bot. Gaz. 19: 335. 1894.

Rosa MacDougalii Holz. Bot. Gaz. 21: 36. 1896; Frye & Rigg, Nw. Fl. 220. 1912, Elem. Fl. Nw. 132. 1914; Rydberg, Fl. Rocky Mts. 442. 1917, N. Am. Fl. 22: 510. 1918, Bull. Torr. Club 48: 164. 1921; Tidestrom, Contr. U. S. Nat. Herb. 25: 281. 1925.

Rosa nutkana MacDougalii (Holz.) Piper, Contr. U. S. Nat. Herb. 11: 335. 1906; Piper & Beattie, Fl. Se. Wash. 137. 1914.

Distribution: Arid Transition. British Columbia to Montana and northern Utah. Hillsides, roadsides, and along streams chiefly in southeastern Washington. The flowering period is from May 30 to July 5. Type localities: Rock Creek, Montana, and Pullman, Washington.

Specimens examined: Stevens County: Cooney Mountains, *Large 95*. Whitman County: Pullman, *Piper 1540* (type), also September 9, 1894; Palouse, *Jones 650*; Colfax, *Parker 591a*; Kamiak Butte, *Jones 2577*.

One of the most interesting of the local roses is the one which is passing under the name of *R. MacDougalii* Holz., a plant which was first designated by Fernald as *R. nutkana* var. *hispida* and later by Piper as *R. nutkana* subsp. *MacDougalii*. This appellation was used by Piper because Fernald's name was antedated by the *R. hispida* of Moench in 1770. Fernald described this prickly fruited rose from specimens from Rock Creek, Montana, collected by Sereno Watson, July 27, 1880 (no. 124), and from Pullman specimens collected by C. V. Piper, June and September, 1893 (no. 1540). Duplicates of the Pullman specimens have been examined in the herbaria of the State College of Washington at Pullman, and in the University of Washington at Seattle. Fernald described these plants as follows: "A form of *R. nutkana* made conspicuous by its strongly glandular hispid receptacle and glandular calyx, though not otherwise differing from the type." In 1895 specimens of this spiny fruited rose collected by Sandberg & Leiberg in "canyons near Farmington Landing, south end of Lake Coeur d'Alene (Idaho); July 7, (no. 572)" were described by J. M. Holzinger (3, p. 223) as follows: "Distinguished at once from all other North American roses by the densely spiny fruits, and the stem with few epidermal spines, or frequently with none. Infrastipular thorns none; flowers solitary at the ends of short, leafy branches. Leaves and size of flowers as in *R. lucida*." It should be noted here, however, that occasional specimens from Kamiak Butte, Whitman County, Washington, possess abundant infrastipular prickles.

Prior to the publication of Rydberg's comprehensive monograph in 1918 (8) the large-fruited rose of eastern Washington was considered to be *R. nutkana*. However, since 1918 it has been possible to re-evaluate the local species and we find that the common hexaploid rose of eastern Washington is not *R. nutkana* but *R. Spaldingii*, and therefore the specimens designated by Fernald as *R. nutkana* var. *hispida* belong, obviously, to the latter species, and are to be distinguished by no other character than the more or less glandular-hispid hypanthium. Furthermore, since *R. nutkana*, in its typical form at least, is not known to occur within several hundred miles of the known range of the prickly fruited plant under consideration, it seems to be somewhat illogical to consider the latter to be a mere variation of it.

Rather, the prickly fruited plant had better be regarded as a variety of *R. Spaldingii*. This conclusion is corroborated by the fact that intergrades between prickly fruited and smooth fruited plants of *R. Spaldingii* are found to occur within the range of that species (fig. 2).

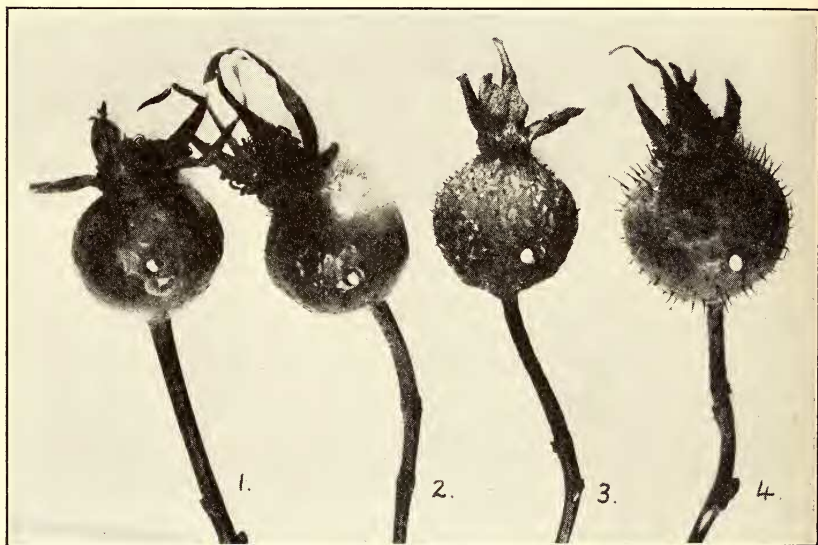


Fig. 2. *Rosa Spaldingii*, 1; *Rosa Spaldingii* var. *hispida*, 2, 3, 4.

Jepson (5, p. 498) includes *R. nutkana* var. *hispida* Fernald describing it as follows: "Calyx-tube with gland tipped bristles." He states that this variety has been collected at Eureka, California. It may well be that there is a hispid form of *R. nutkana* in California, but it cannot be properly called by Fernald's name, which, as has been noted above, should be applied to the prickly form of *R. Spaldingii*.

8b. *ROSA SPALDINGII* VAR. *ALTA* (Suksd.) comb. nov.
Large-flowered Rose.

Rosa nutkana Presl var. *alta* Suksd. Werdenda 1: 23. 1927.
Rosa megalantha G. N. Jones, Proc. Biol. Soc. Wash. 41: 194. 1928.

Distribution: Arid Transition. Type locality: Bingen, Washington.

Specimens examined: Chelan County: Entiat Valley, *Morrill 275*. Klickitat County: Bingen, *Suksdorf 10821* (type). Spokane County: Spokane, *Jones 614* (type of *R. megalantha*).

8c. *ROSA SPALDINGII* var. *CHELANENSIS* var. nov. Chelan Rose.

Caulibus inermibus erectis 1.5–2.5 m. altis glanduloso-granuliferis, ramis florentibus inermibus, stipulis dilatatis adnatis 1.5–3 cm. longis plus minusve glanduloso-denticulatis, petiolis rachidibusque velutinus, foliolis 7 ovalibus argute serratis supra glabris subtus sparse pilosis 3–5 cm. longis 1.5–3 cm. latis, floribus ignotis, pedicellis 2–4 cm. longis plus minusve velutinis vel glabris, fructibus globosis 18–20 mm. diametro sine collo, seminibus in partibus inferioribus lateralibusque affixis oblongis ca. 5 mm. longis et 3 mm. latis glabris, sepalis velutinis lanceolatis caudato-appendiculatis sub anthesin divergentibus vel reflexis persistentibus laminis 10–15 mm. longis appendiculo 10–15 mm. longo.

Type locality: in thickets along the Wenatchee River, near Cashmere, Chelan County, Washington, August 23, 1927, *Jones 1402*. A robust plant of very distinctive appearance; not seen in flower, but probably closely related to *R. Spaldingii* Crépin, from which it may be distinguished as follows:

*R. Spaldingii*var. *chelanensis*

Stems usually armed with straight, paired prickles.

Stems unarmed.

Floral branches slender, glabrous.

Floral branches stout, glandular-granuliferous.

Hypanthium in fruit red, 12–18 mm. in diameter.

Hypanthium in fruit orange, 20–22 mm. in diameter.

Sepals erect, glabrous or very rarely glandular on the back, not velutinous.

Sepals spreading or reflexed, velutinous on the back.

Leaflets smaller, thinner, less than 3 cm. wide, less coarsely serrate, the teeth more acute.

Leaflets large, thick, 4–6 cm. long, 3–4 cm. wide, very coarsely crenate-serrate.

Section IV. GYMNOCARPAE. Stems erect, slender with numerous bristles and straight infrastipular spines; leaflets 5–7, usually doubly serrate; flowers solitary or few; pistils few; styles, sepals, and the upper part of the hypanthium deciduous.

9. *ROSA GYMNOCARPA* Nutt. Sylvan Rose.

Rosa gymnocarpa Nutt.; T. & G. Fl. N. Am. 1: 461. 1840; Howell, Fl. Nw. Am. 1: 169. 1898; Piper, Contr. U. S. Nat. Herb. 11: 334. 1906; Frye & Rigg, Nw. Fl. 220. 1912; Piper & Beattie, Fl. Se. Wash. 137. 1914; Frye & Rigg, Elem. Fl. Nw. 132. 1914; Henry, Fl. S. B. C. 174. 1915; Piper & Beattie, Fl. Nw. Coast 205. 1915; Rydberg, Fl. Rocky Mts. 445. 1917, N. Am. Fl. 22: 631. 1918, Bull. Torr. Club 48: 169. 1921; Carter & Newcombe, Prel. Cat. Fl. Vanc. & Q. C. Is. 50. 1921; Standley, Contr. U. S. Nat. Herb. 22: 365. 1921;

Jepson, Man. Fl. Pl. Calif. 449. 1925; Tidestrom, Contr. U. S. Nat. Herb. 25: 282. 1925; Gilkey, Spr. Fl. Nw. Ore. 67. 1929; Benson, Contr. Dudley Herb. 2: 100. 1930 (contains comprehensive synonymy).

Distribution: Transition and Canadian. British Columbia to Montana and California. In dry woods, common throughout the state, except in the sagebrush area and on the higher mountains. It is the only local species in the genus that is "shade-tolerant." It may be found in flower from May 15 to August 10. Type locality: "Oregon, in shady woods, common, *Nuttall! Douglas!*"

Specimens examined: Asotin County: Blue Mountains, *Jones 985*; Anatone, *Jones 463*. Chelan County: Chiwaukum, *Piper 2510*, *Jones 4789*; Merritt, *Jones 4761*. Columbia County: Wildcat Springs, *St. John 8314*; Blue Mountains, *Darlington 140, 218*. Clallam County: Port Crescent, *Lawrence 245, 226*; Sequim, *Grant 210*, *Elmer 2515*. Grays Harbor County: Quinault, *Conard 194*; Montesano, *Heller 3897*. Island County: Langley, *Grant* in 1923. King County: Seattle, *Piper 82*, *Meany* in 1885. Kitsap County: Charleston, *Rigg* in 1907. Kittitas County: Kashess Lake, *Jones 1415*; Cle Elum, *Henderson* in 1892. Klickitat County: Trout Lake, *Pearson 298*. Lewis County: Centralia, *Owen*, June 16, 1928. Mason County: New Kamilche, *Beattie 3678*; Mt. Ellinor, *Jennie V. Getty* in 1902. Okanogan County: War Creek, *St. John 3699*. Pierce County: Camp Lewis, *Davison*, July 4, 1925; Mt. Rainier, *Allen 72*. San Juan County: Friday Harbor, *Beattie 3331*. Snohomish County: Silverton, *Mrs. L. A. Bouck 60*. Skagit County: Cypress Island, *Hardin*, May 15, 1925. Thurston County: Chambers Prairie, *Henderson*, August 23, 1892. Walla Walla County: Blue Mountains, *Piper*, August 2, 1896. Whitman County: Kamiak Butte, *Piper*, July 20, 1899. Without locality, *Vasey* in 1889.

EXCLUDED SPECIES

Rosa anacantha Greene, Leaflets 2: 265. 1912. The type was collected in 1889 in thickets near the salt marshes near Tacoma. It is said to have crenate leaflets and "wholly unarmed" stems. It may be one of those not altogether rare species which was, to use M. L. Fernald's apt phrase, "exterminated by its discoverer."

Rosa collaris Rydberg, Fl. Rocky Mts. 441. 1917. According to the appearance of the type specimen this is a rather distinctive species, but until undoubted specimens are collected in Washington it cannot be admitted as a member of the flora of this state.

Rosa Fendleri Crépin, Bull. Soc. Bot. Belg. 15: 91. 1876. The following note appears on page 335 of Piper's "Flora of Washington": "The typical form of this species [*i.e.*, *Rosa piso-*

carpa] occurs west of the Cascade Mountains. The eastern Washington forms are very variable as to leaf and fruit and consist, perhaps, of two species. Specimens have frequently been referred to as *Rosa fendleri* Crépin, but it is not at all clear how this is to be distinguished." *R. Fendleri* ranges from Minnesota to British Columbia and southward to Arizona and Mexico, but it is not known to occur in Washington.

University of Washington, Seattle,
February 18, 1935.

LITERATURE CITED

1. ERLANSON, E. W. Cytological conditions and evidences for hybridity in North American wild roses. *Bot. Gaz.* 87:443-506. 1929.
2. ————. Experimental data for a revision of the North American wild roses. *Bot. Gaz.* 96:197-259. 1934.
3. HOLZINGER, J. M. Report on a collection of plants made by J. H. Sandberg and assistants in northern Idaho, in the year 1892. *Contr. U. S. Nat. Herb.* 3:205-287. 1895.
4. HULTÉN, E. Flora of Kamtchatka and the adjacent islands. *K. Svenska Vetenskapsakad. Handl.* 8, part 1:1-213. 1929.
5. JEPSON, W. L. Manual of the Flowering Plants of California. 1925.
6. PIPER, C. V. Flora of the State of Washington. *Contr. U. S. Nat. Herb.* 11:1-637. 1906.
7. ————, and BEATTIE, R. K. Flora of the Northwest Coast. 1915.
8. RYDBERG, P. A. [*Rosa*] North American Flora 22:483-533. 1918.
9. ————. Notes on Rosaceae—XIII. Roses of the Columbia region. *Bull. Torr. Club* 48:159-172. 1921.
10. ST. JOHN, H., and JONES, G. N. An annotated catalogue of the vascular plants of Benton County, Washington. *Northwest Science* 2:73-93. 1928.
11. WOLLEY-DOD, A. H. A revision of the British roses. *Journ. Bot.* 69: suppl. 17-111. 1931.

NOTES ON THE GERMINATION OF CEANOTHUS SEEDS

CLARENCE R. QUICK

The writer became interested in the seed germination of native California shrubs through work on *Ribes* seed germination in the Office of Blister Rust Control, United States Department of Agriculture. The object of the experiments reported below was to determine and define a satisfactory experimental method of forcing the germination of *Ceanothus* seeds.

In 1931 seeds of *Ceanothus cordulatus* Kell. and *C. integerrimus* H. & A. were collected by the writer in the Stanislaus National Forest. Preliminary tests showed that the planting of untreated seeds of these species was futile. Martin¹ has reported that the morphological structure which caused seed coats of *Melilotus alba* Desr. to be impermeable was rapidly hydrated in

¹ Abstr. in *Proc. Iowa Acad. Sci.* 29: 345-346. 1922.