

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 4

December, 1902

No. 48

THE VARIATIONS AND DISTRIBUTION OF AMERICAN CRANBERRIES.

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(Plate 40.)

THE AMERICAN VARIETY OF *VACCINIUM VITIS-IDAEA*.

THE Mountain or Rock Cranberry abounds on the eastern coast and on the mountains of New England where it has long been familiar to botanists and where, either from its lustrous box-like foliage, its delicate rose-pink flowers, or its clusters of tart dark red berries so often gathered for sauce and pies, it is better known than are most of our plants to the non-botanical visitor. The plant has long prostrate stems which creep and freely root in the crevices of rocks or in damp carpets of moss, and from which spring the densely leafy branches. On bare slopes and dry plains the branches are very short and often prostrate, and the plant forms close mats rising only 3 or 4 centimeters above the surface of the ground. In more favorable situations, as the mossy crests of headlands and cliffs, the plant is of looser habit and the branches, rising through the moss, are sub-erect and 8 or 10 (very rarely even 15 or 20) centimeters long. The oblong-obovate lustrous leaves are very thick and coriaceous like those of the box, with strongly revolute margins, and they vary in size from 0.5 to 1.8 cm. long and 4 to 9 mm. broad. The flowers in terminal clusters are bright rose-pink or tinged with deep red.

This little evergreen shrub ordinarily only a few centimeters high, with leaves usually about a centimeter long and with bright rose or red-tinged flowers, occurs throughout arctic America, extending south to the mountains of Maine, New Hampshire and Vermont, the

coast of Cape Ann, Massachusetts, the Great Lakes, and British Columbia. It occurs also on the islands of Behring Sea, and from Kamtschatka to Japan, in Greenland, and very locally on the mountains of Europe.

True *Vaccinium Vitis-Idaea*, the *Preisselbeere* of Germany, *Cowberry* of England, *Lingonris* of Sweden, and *Tyttebaer* of Denmark and Norway, is a much larger plant than our Mountain Cranberry, the branches sometimes 2 to 2.5 dm. (8 to 10 inches) high, the thinner leaves 1.5 to 2.7 cm. long, 7 to 16 mm. broad; and the flowers are white or pale pink.

By European authors the differences between this typical large-leaved form and the small-leaved variety have often been noted, but by American students these distinctive points have been very generally overlooked. In fact, Dr. Gray, following the then established precedent of treating the European and American plants as one, seems to have drawn his description from European specimens for in the first edition of the Manual (1848) the plant is described as "6'-10' high," a stature double that ordinarily reached by the American form. This statement of the height has been repeated unchallenged in the later editions of the Manual, though altered by Dr. Gray in the Synoptical Flora to the more satisfactory "3 inches to a span or more high," thus covering the average height of the American and the extreme height of the European forms. In the most recent exhaustive treatment of the genus *Vaccinium*, however, the traditional statement "Plants low (6-10 inches)"¹ occurs. Thus for more than a half century, in spite of the modification to "3 inches" made by Dr. Gray in 1878, the unfortunate "6-10 inches" has been forced to serve as an unattainable goal for the lowly plant of our mountains and coast.

Pursh alone among those who have specially commented on the two extremes has said, "The American plant is more robust than the European, and the leaves are considerably larger,"² a statement which, in view of the facts, seems quite reversed from the meaning probably intended by its author. By others, however, the larger plant has been consistently treated as the normal and common form

¹ Munson, Me. Agr. Expt. Sta. Bull. No. 76, 138 (1901), and in Bailey, Cyc. Am. Hort. 1892 (1902).

² Pursh, Fl. 289 (1814).

of Europe, while the infrequent occurrence of the dwarf form on the mountains of northern Europe has been considered worthy of special comment. Thus in 1821 Sir William Hooker in his *Flora Scotica* (118) said "A dwarf variety, very bushy, with leaves much crowded, and only half the size of the common plant, but having flowers full as large, is found by *Mr. Murray* on the Campsie hills, near Glasg-[ow], and on hills in Arran. This retains its characters in the gardens, where in England it has been long known under the name of *V. buxifolium*." ¹

In 1825 an excellent plate of the dwarf plant was published by Loddiges as *Vaccinium Vitis-Idaea minor*, "a very pretty variety of the *Vitis-idaea*: it is a native of the north of Europe and America, and is a low evergreen shrub, growing not more than four or five inches in height, and flowering with us [in England] in May and June." ² The varietal name *minor*, applied by Loddiges to the small American plant, was obviously in contradistinction to his *Vaccinium Vitis-Idaea major* "which grows in many of the northern parts of Europe," and which he had previously illustrated. ³

Early in the last century Chamisso, botanist to the Romanzoff expedition, collected in Kamtschatka and on the island of Unalaska the small form characteristic of North America, and soon thereafter Mertens collected the same plant at Sitka. A specimen of the Unalaska plant in the Gray Herbarium is labelled in the handwriting of Chamisso "*Vaccinium Vitis-Idaea* L. var.," and in commenting upon the plant its collector compared its small foliage with that of the Greenland form of the species: "Parvitate foliorum cum specimenibus groenlandicis convenit." ⁴ The Mertens specimens collected at Sitka were likewise distributed as an unnamed variety, while Bongard who critically studied them emphasized their divergence from the European type: "Foliorum parvitate ab europaea planta recedens." ⁵

At about the same time Ernst Meyer identified ⁶ the American plant with the small form mentioned by Hooker as *Vaccinium*

¹ Possibly *V. buxifolium*, Gilib. Fl. Lituan. i. 4 (1781), which is referred by European authors to *V. Vitis-Idaea*.

² Loddiges, Bot. Cab. xi. no. 1023 (1825).

³ Loddiges, l. c. vii. no. 616 (1822). ⁴ Cham. & Schl. Linnaea, i. 526 (1826).

⁵ Bongard, St. Pétersb. Acad. Sci. Mém. ii. 152 (1832).

⁶ E. Meyer, Pl. Labr. 55 (1830).

buxifolium from the Scotch Highlands; and in 1837 Hornemann described the small plant of Greenland as *V. Vitis-Idaea*, var. *pumilum*.¹ Under this name the Greenland plant has since been known to the Danish botanists, and it was described by Lange and beautifully illustrated in *Flora Danica* (xvii. t. 2960). More recently Lange has recognized in Labrador material the Greenland plant, but at the same time he considered the American plants in the main identical with the European: "Hovedformen i Nord-Amerika, Sibirien, hele Europa."²

Thus by different European authors the plant of Alaska and of Labrador has been distinguished from the commoner form of the plant in Europe and identified with var. *pumilum* of Greenland and the local plant described by Hooker from the Scotch Highlands, while by Loddiges as early as 1825 the American form was distinguished as var. *minor*. In a large series of American material the writer has been unable to find any specimens which can be satisfactorily identified with the large-leaved plant of Europe. All the American material agrees, however, with the Greenland and Alaska plants and these are well represented by the plate of var. *minor*, Loddiges. Under this name, then, the American plant should be known.

The more important bibliography of the dwarf small-leaved form is as follows:

VACCINIUM VITIS-IDAEA, L., var. MINOR, Loddiges, Bot. Cab. xi. no. 1023 (1825). *V. Vitis-Idaea*, American authors. *V. buxifolium*, Hook. Fl. Scot. 119 (1821). *V. Vitis-Idaea*, var., Cham. & Schl. Linnaea, i. 526 (1826); Bongard, St. Pétersb. Acad. Sci. Mém. ii. 152 (1832). *V. Vitis-Idaea*, var. *pumilum*, Hornem. Oec. Pl. ii. 177 (1837); Lange, Fl. Dan. xvii. t. 2960, and Fl. Groenl. 90. *V. Vitis-Idaea*, var. *microphyllum*, Herder, Acta Hort. Petrop. i. 313 (1872). *Vitis-Idaea Vitis-Idaea*, Britton, Man. 706 (1901), as to American plant.

VACCINIUM OXYCOCCUS AND MACROCARPON.

The Large Cranberry, *Vaccinium macrocarpon*, the common species of coastal bogs in eastern America, is readily distinguished in

¹ Horn. Oec. Pl. i. 177 (1837). ² Lange, Fl. Groenl. 90. (1880).

its characteristic form from the Small Cranberry, *V. Oxycoccus*. Usually *V. macrocarpon* is a coarser plant with larger obtuse veiny leaves which are pale but not whitened beneath and with very slightly revolute margin, and the pedicels of the larger flowers and fruits are produced upon an elongated rachis from the tip of which arises a leafy shoot. *V. Oxycoccus* on the other hand, in its typical form, has almost capillary stems, and the leaves are smaller than in *V. macrocarpon*, whitened beneath and so conspicuously revolute above the middle as to produce a narrow triangular acute-tipped outline. The flowers and fruits are smaller than in *V. macrocarpon* and the pedicels ordinarily arise from a very short terminal axis or rachis, although in rare individuals the rachis is elongated and proliferous as in *V. macrocarpon*. The flowers of the two species also present differential characters, the larger flowers of *V. macrocarpon* having the anthers proportionately longer than in smaller flowers of *V. Oxycoccus*.

But although the typical forms of *Vaccinium macrocarpon* and *V. Oxycoccus* are clearly enough distinguished by their ordinarily defined characters, a third plant of New England has proved more puzzling. *V. macrocarpon* is confined for the most part to grassy swamps or sandy bogs of the coastal plain or to wet shores at low altitudes inland, while *V. Oxycoccus*, at least in New England and eastern Canada, is a plant of cold sphagnum bogs or of humus. The third cranberry which has recently attracted the attention of New England botanists grows like *V. Oxycoccus* in sphagnum bogs, but superficially it seems exactly intermediate between that and the larger species of the warmer swamps. The stems are quite as coarse as in small plants of *V. macrocarpon*, the leaves, much larger than in *V. Oxycoccus*, are only slightly revolute and often quite obtuse at tip, the flowers and fruit are larger, though small for *V. macrocarpon*, and the rachis shows a decided tendency to proliferation.¹

On account of its somewhat intermediate characters this larger plant of the New England sphagnum bogs has been thought to represent a transition between the two well-known species, or perhaps to be of hybrid origin. The latter origin of the plant is, however, quite improbable since in northern Maine it is abundant in swamps far outside the range of *V. macrocarpon*, and, furthermore, the intermediate plant is exactly matched by material from eastern Asia and

¹Of 64 inflorescences examined, 27 (or .42) show more or less proliferation, of 90 inflorescences of *V. Oxycoccus* 18 (or .20) show proliferation, while of 140 inflorescences of *V. macrocarpon* 132 (or .94) exhibit this characteristic.

northwestern America where no *V. macrocarpon* is known to occur. This Pacific coast form, nevertheless, was taken by Sir William Hooker for the larger eastern species for he states¹ that at the mouth of the Columbia *V. macrocarpon* is very abundant. Later, however, Dr. Gray in studying the *Vacciniums* considered the Pacific slope cranberry best treated as a large variety of *V. Oxycoccus*.

The material now at hand shows that this intermediate form, *V. Oxycoccus*, var. *intermedium*, Gray, is not confined to northwestern America and eastern Asia as originally supposed by Dr. Gray, but that as already stated it is in the upland bogs of New England. In fact many specimens previously referred on account of their size to *V. macrocarpon* have the more pointed foliage and the characters of inflorescence of *V. Oxycoccus*, var. *intermedium*. To this form belongs the Saskatchewan material of Bourgeau formerly referred to *V. macrocarpon*, a species which apparently reaches inland only to the Great Lakes.

The characters — size of plant, size and outline of leaf, size of flower and fruit and proliferation of the flowering rachis — ordinarily relied upon to separate the circumboreal *Vaccinium Oxycoccus* and the strictly American *V. macrocarpon* are so mingled in *V. Oxycoccus*, var. *intermedium* as to render their use as final criteria too misleading. But another character apparently overlooked by students of the group very materially reinforces the traditional ones. In *V. macrocarpon*, with the flowers borne on a proliferous rachis, the pedicels bear, usually toward their tips, a pair of subapproximate leaf-like bracts. Ordinarily these bracts are 4 or 5 mm. long, green and of firm texture, but occasionally they become nearly or quite twice that size. In the smaller *V. Oxycoccus*, with the flowers on a short terminal rachis which is rarely proliferous, the pedicels bear, usually near or below their middle, a pair of lanceolate or lance-ovate often strongly involute colored bracts 1 to 2.5 mm. long. In the larger plant of the northwest, now found to occur likewise in the east, the bracts are exactly those of *V. Oxycoccus*, and, in view of its leaves with more whitened under surface, its ordinarily terminal inflorescence and its range, it is undoubtedly a very large development of *V. Oxycoccus*.

The three true Cranberries may be readily recognized by the following characters:

¹ Hook. Fl. Bor.-Am. ii. 35.

V. OXYCOCCUS, L. Sp. 351 (1753).—Stems slender, creeping, the branches almost capillary, erect or ascending: leaves oblong or oval, 3 to 8 mm. long, 1 to 3 mm. broad, strongly revolute, becoming narrowly triangular in outline, conspicuously whitened beneath: pedicels 1 to 4, capillary, from a terminal (rarely proliferating) short rachis (at most 3 or 4 mm. long), bearing near or below the middle 2 lanceolate or lance-ovate often involute colored bracts: corolla-segments 5 to 6 mm. long: berry 6 to 8 mm. in diameter.—In sphagnum and wet humus, boreal regions generally, coming south in America to Pennsylvania, Michigan and Wisconsin.

Var. *INTERMEDIUM*, Gray, Syn. Fl. ii. pt. 1, ed. 2, 396 (1886).—Coarser: leaves 6.5 to 15 mm. long, 3 to 6.5 mm. broad, acute or obtuse, only slightly revolute: pedicels 2 to 10, from a longer (often 5 to 10 mm. long) rachis: corolla-segments 6 to 8 mm. long: berry 8 to 10 mm. in diameter.—Japan, Sachalin Isl., etc.; Maine to British Columbia, south in the mountains to North Carolina and to Lake Superior and Oregon. The following eastern specimens have been examined:—MAINE, Ft. Kent, no. 2416; Blaine, no. 2417; Orono (*Fernald*): VERMONT, Colchester (*Oakes*); Willoughby (*Kennedy*): CONNECTICUT, without locality—probably Norfolk (*Robbins*): NEW YORK, western section (*Gray*): NORTH CAROLINA, without locality (*Croom*): ONTARIO, Pic River, Lake Superior (*Loring*): SASKATCHEWAN, without locality (*Bourgeau*).

V. MACROCARPON, Ait. Hort. Kew. ii. 13, t. 7 (1789).—Stems comparatively stout: leaves oblong-elliptic, blunt or rounded at the tip, 6 to 17 mm. long, 2 to 8 mm. broad, pale or somewhat whitened beneath, flat or very slightly revolute: pedicels 1 to 10, from an elongated (1 to 3 cm. long) proliferating rachis, bearing toward the tip 2 flat leaf-like bracts (4 to 10 mm. long): corolla-segments 6 to 10 mm. long: berry 1 to 2 cm. in diameter.—Open bogs and swamps, and wet shores, Newfoundland to north central Maine, Lake Champlain, and western New York, south to West Virginia and Arkansas, mostly east of the Alleghanies and on the coastal plain.

GRAY HERBARIUM.

EXPLANATION OF PLATE 40.—Fig. 1, *Vaccinium Vitis-Idaea*, tip of branch of the larger European form from the Giant Mountains, Silesia; fig. 2, *V. Vitis-Idaea*, var. *minor*, small alpine specimen from White Cap Mountain, Rumford, Maine; fig. 3, *V. Oxycoccus*, tip of flowering branch from Newton, Massachusetts; fig. 4, *V. Oxycoccus*, var. *intermedium*, tip of an original specimen from Klikitat Co., Washington; fig. 5, *V. macrocarpon*, flowering tip from Stony Creek Ponds, New York.



Fernald, Merritt Lyndon. 1902. "THE VARIATIONS AND DISTRIBUTION OF AMERICAN CRANBERRIES." *Rhodora* 4, 231–237.

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