

TAXONOMIC REVISION OF *VACCINIUM MYRTILLUS* (ERICACEAE)

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ABSTRACT

Vaccinium myrtillus has commonly been recognized as encompassing plants from Eurasia, Japan, and North America. Published molecular-based phylogenetic data, however, suggest that *V. myrtillus* is not monophyletic and might best be divided into distinct taxonomic entities. I examined herbarium specimens collected from throughout the range of *V. myrtillus* s.l., finding morphological characters that serve to justify the division of *V. myrtillus* into such entities. On this basis, I present a taxonomic revision of *V. myrtillus* that recognizes three species and includes a key, descriptions, and representative specimens examined. *Vaccinium oreophilum* has been the name applied to the North American component of the group, as either a distinct species or a synonym of *V. myrtillus*. I found that none of the original material referenced in the protologue of *V. oreophilum* is included in the circumscription of the North American element, and that no other name applies to these plants. I therefore provide a species name for the North American entity, *V. americanum*, and designate a holotype. The other two species are *V. myrtillus* s.s., which spans much of northern Eurasia, and the Japanese endemic *V. yatabei*.

RESUMEN

Se ha aceptado comúnmente que el género *Vaccinium myrtillus* engloba plantas de Eurasia, Japón y América del Norte. Sin embargo, los datos filogenéticos basados en análisis moleculares publicados sugieren que *V. myrtillus* no es monofilético y que lo más adecuado sería dividirlo en entidades taxonómicas distintas. He examinado especímenes de herbario recogidos en toda el área de distribución de *V. myrtillus* s.l. y he encontrado caracteres morfológicos que justifican la división de *V. myrtillus* en dichas entidades. Sobre esta base, presento una revisión taxonómica de *V. myrtillus* que reconoce tres especies e incluye una clave, descripciones y los especímenes representativos examinados. *Vaccinium oreophilum* ha sido el nombre aplicado al componente norteamericano del grupo, ya sea como especie distinta o como sinónimo de *V. myrtillus*. He constatado que ninguno de los materiales originales a los que se hace referencia en el protólogo de *V. oreophilum* está incluido en la circunscripción del elemento norteamericano, y que ningún otro nombre se aplica a estas plantas. Por lo tanto, propongo un nombre de especie para la entidad norteamericana, *V. americanum*, y designo un holotipo. Las otras dos especies son *V. myrtillus* s.s., que abarca gran parte del norte de Eurasia, y la especie endémica japonesa *V. yatabei*.

KEY WORDS: bilberry, Eurasia, Japan, new species, North America, plant taxonomy, *Vaccinium*

INTRODUCTION

The only globally comprehensive taxonomic treatment of *Vaccinium* sect. *Myrtillus* Dumort. (Ericaceae: Vaccinioideae Arn.: Vaccinieae Rchb.) treated *V. myrtillus* L. as encompassing plants from north-temperate and north-polar Eurasia, Japan, and north-temperate North America [Vander Kloet & Dickinson 1999; henceforth “*V. myrtillus* sensu lato (s.l.)”]. In that treatment, the species was distinguished from others of the section by twigs of the current season green, angular (versus not green, $\pm$ terete), stature < 1 m tall, and leaves bright green and glandular beneath (versus pale green and glabrous beneath). The Eurasian component occurs from ca. 40°N to 70°N and 20°W to 140°E, from Iceland east to northern Krasnoyarsk Krai, Russia, southeast to the coast of the Russian Far East, and west through northern Mongolia, northern Xinjiang Province, China, and northern Kazakhstan to Iberia (Shishkin & Bobrov 1967; Popova 1972; Fang & Stevens 2005; Malyshev 2006; Fig. 1). In Japan, it occurs from ca. 34°N to 41°N and 135°E to 142°E on the island of Honshu (Ohwi 1984; Yamazaki 1993; Fig. 1). The North American component occurs from ca. 33°N to 53°N, 105°W to 123°W, from south-central Arizona to western Colorado, U.S.A., north to western Oregon, U.S.A. through southern British Columbia and southern Alberta, Canada, and south to New Mexico, U.S.A. (Vander Kloet 1988, 2009; Fig. 2).

Most floristic and other taxonomic studies that focus on areas of western North America and which include the North American component of *Vaccinium myrtillus* have treated this species in this broad sense

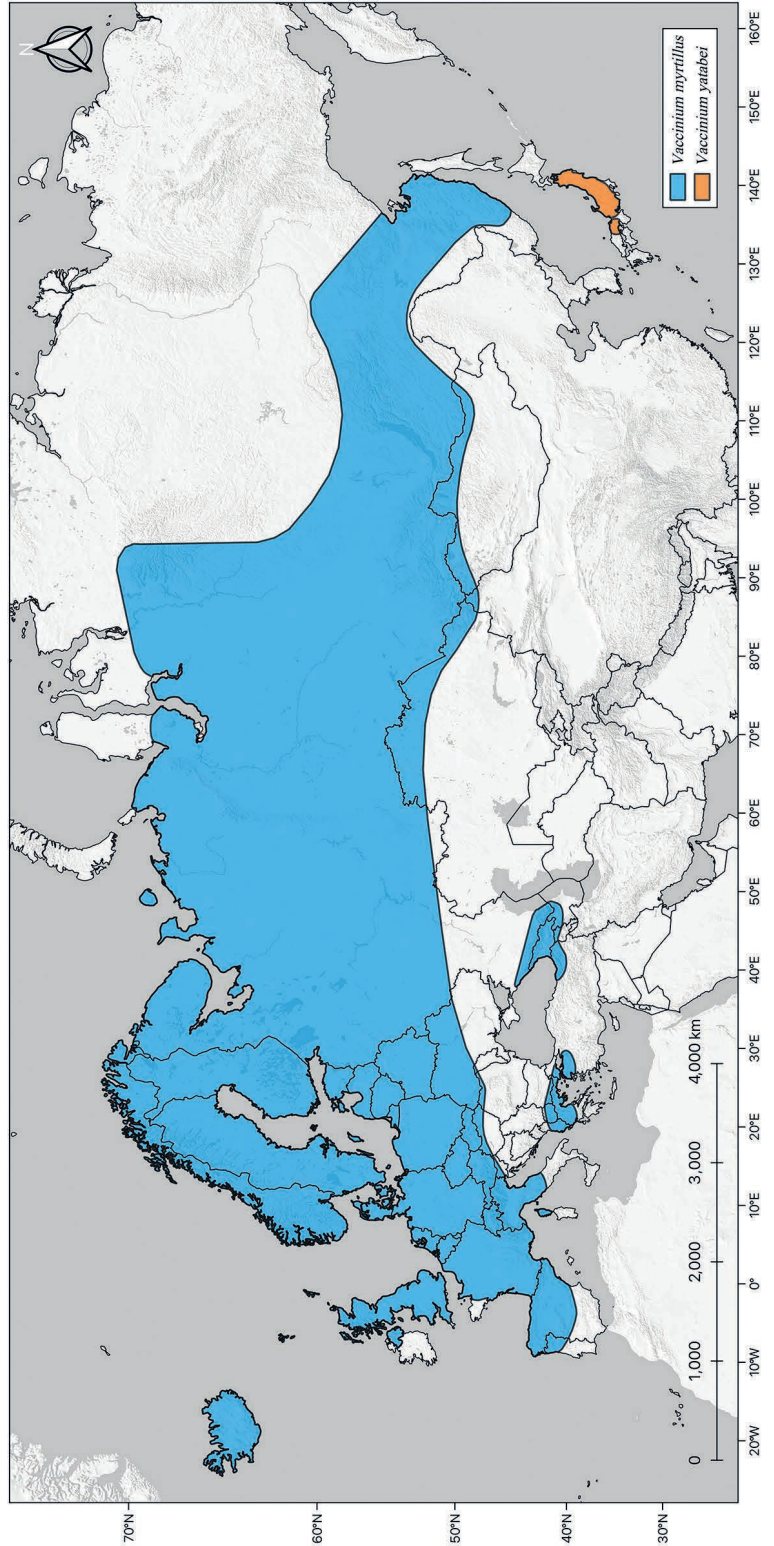


FIG. 1. Geographic distribution of *Vaccinium myrtillus* s.l. in Eurasia (*V. myrtillus* s.s., as shown in legend) and Japan (*V. yatabei*). Base map WGS 84 pseudo-Mercator projection, World Shaded Relief, copyright © 2009 Esri.

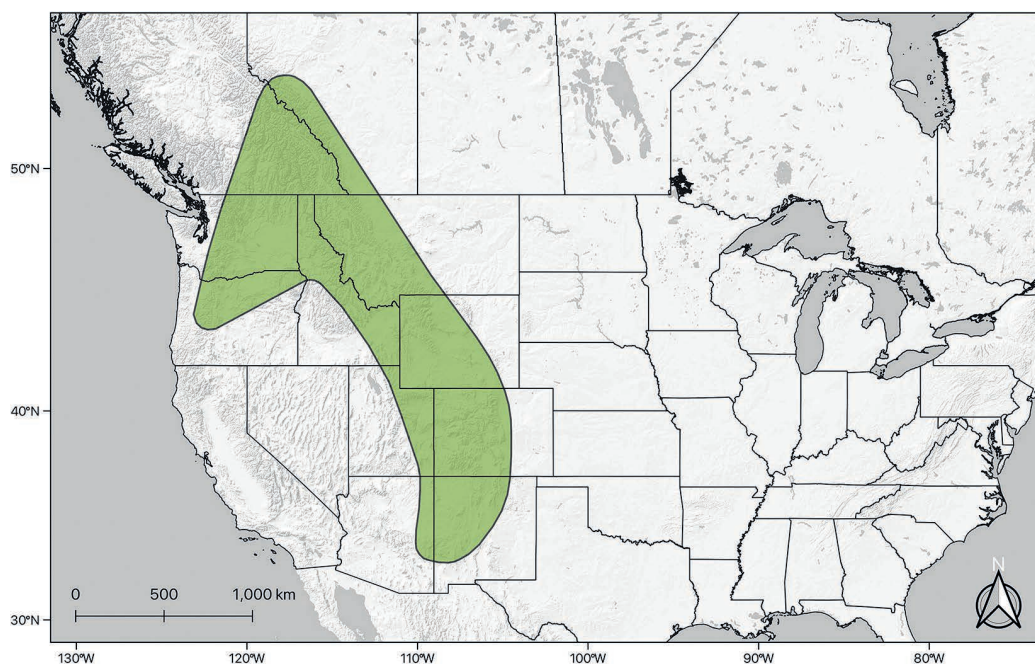


FIG. 2. Geographic distribution of *Vaccinium myrtillus* s.l. in North America (*V. oreophilum* sensu authors, *V. americanum* in the present work). Base map WGS 84 pseudo-Mercator projection, World Shaded Relief, copyright © 2009 Esri.

(e.g., Camp 1942; Davis 1952; Hitchcock et al. 1959; Moss 1959; Dorn 1988, 2001; Vander Kloet 1988, 2009; Meidinger 1999; Biek 2000; Holmgren et al. 2005; Lesica 2012; Ackerfield 2015; Meyers 2015; Welsh 2015; Heil & O’Kane 2025). Camp (1942) was the first to treat the North American component as a synonym of *V. myrtillus* s.l., using the name *V. oreophilum* Rydb. Subsequent workers who treated the North American plants of *V. myrtillus* s.l. also have employed *V. oreophilum* for these plants, either as a species to be recognized (accepted species name) or as a synonym of *V. myrtillus* s.l. In a floristic account of the plants of Arizona, Kearney & Peebles (1951) recognized the North American component as *V. oreophilum*, although no justification for this treatment was provided. In an account of these plants in Wyoming, Dorn (1988) recognized them as *V. myrtillus* var. *oreophilum* (Rydb.) Dorn, apparently based only on “different twig coloration than the European material;” this treatment was adopted by Biek (2000) for the flora of Mount Rainier National Park. Löve et al. (1971) erected *V. myrtillus* subsp. *oreophilum* (Rydb.) Á.Löve, D.Löve & B.M.Kapoor based on geographical isolation and slight morphological differences between this and the nominate subspecies in hairiness, color, and leaf form, characters that they (erroneously) stated were cited by Rydberg (1906).

The Japanese species *Vaccinium yatabei* Makino was originally described by Makino (1901). Vander Kloet & Dickinson (1999) treated it as a synonym of *V. myrtillus* based on the assertion that it differs only in fruit color (presumably red or reddish versus purple, black, or bluish black). When the Japanese entity has been recognized as distinct, it has been either as a species (Ohwi 1984; Yamazaki 1993) or variety [*V. myrtillus* var. *yatabei* (Makino) Matsum. & Komatsu; Matsumura 1911–1913]. The basis for the separation of the Japanese component from the Eurasian component was not made clear in these treatments.

Despite the widespread treatment of *Vaccinium myrtillus* s.l. as a species without further division, the combined results from two studies based on DNA sequence data provide evidence for the taxonomic recognition of each of the Eurasian, Japanese, and North American components. As part of a study on introgression among three western North American species of *V. sect. Myrtillus* (*V. cespitosum* Michx., *V. myrtillus*, and

V. scoparium Leiberg ex Coville) with RADseq data, Beeler et al. (2020) found that Eurasian and North American samples of *V. myrtillus* s.l. each formed clades but did not group together. Instead, the North American clade of *V. myrtillus* s.l. grouped as sister to a clade of *V. cespitosum*, with a clade of *V. scoparium* and a sample of *V. membranaceum* Douglas ex Torr. grouping as successive sisters; this entire clade grouped as sister to the Eurasian clade of *V. myrtillus* s.l. These clades were all strongly supported, with bootstrap values of 100. To reflect the strong genetic distinction between Eurasian and North American entities, Beeler et al. (2020) proposed the resurrection of *V. oreophilum* from the synonymy of *V. myrtillus*. Samples of *V. myrtillus* from Japan were not included in their study. Further evidence for dividing *V. myrtillus* s.l. has come from a phylogenetic study of tribe Vaccinieae based on a target-enrichment DNA sequence dataset with the Angiosperms353 probes (Becker et al. 2024). In that study, the three samples of *V. myrtillus*—one each from Eurasia, Japan, and North America—resolved in a separate clade within a monophyletic *V. sect. Myrtillus*, suggesting that they should be treated as distinct entities.

Although the molecular-based studies support distinct taxonomic status for each of the Eurasian, Japanese, and North American components of *Vaccinium myrtillus* s.l., their morphology has not yet been re-evaluated. Therefore, in this context, I conducted a morphological examination of this group based on herbarium material and available photographic images. Having found clear morphological characters that distinguish each of the three components, I here provide a taxonomic revision of *V. myrtillus* s.l., recognizing three species. The revision includes a key to species, expanded parallel descriptions, and representative specimens examined.

MATERIALS AND METHODS

The morphological descriptions were based on the in-hand examination of herbarium specimens as supplemented with online herbarium specimen images, photographic images of in-situ plants on iNaturalist (www.iNaturalist.org), and, for Eurasia and Japan, the floristic literature (Shishkin & Bobrov 1967; Hess et al. 1970; Popova 1972; Guinochet & de Vilmorin 1982; Ohwi 1984; Yamazaki 1993; Malyshev 2006; Stace 2019). The data from floristic treatments of the North American plants of *V. myrtillus* s.l. were not included for the description out of concern that the treatments could have been based in part on misidentified plants of other western North American species of *V. sect. Myrtillus*. Similarly, only iNaturalist images that could confidently be identified as the North American plants of *V. myrtillus* s.l. were used for the description. Specimens from the following herbaria were examined in hand: BRIT, COLO, MHA, NLU, NY, SMU, and VDB (herbarium acronyms from Thiers 2025). Images of specimens from the following herbaria were examined via the Global Biodiversity Information Facility (www.gbif.org), TORCH Data Portal (<https://portal.torchherbaria.org/portal/index.php>), or JSTOR Global Plants (<https://plants.jstor.org>), or sent by mail from the herbarium of origin: BRY, GH, K, KAG, LINN, LY, TI, and US. Citations for these specimens are followed by “[image!]” or (under representative specimens examined) “[image]” to indicate that they were examined only as images. The species distribution maps were created with QGIS 3.34.4-Prizren (QGIS Development Team 2023).

The format of the descriptions generally follows that of Fritsch et al. (2020). Character variation based on literature sources is indicated in italicized font. The descriptions include only characters that vary among the three species, or at most within *Vaccinium sect. Myrtillus*; for characters in common among the species of the section, see Sleumer (1941), Camp (1942), Vander Kloet (1988, 2009), and Vander Kloet & Dickinson (1999, 2009). Microscopic plant parts were measured by stereo microscopy (usually with a Leica MZ6) up to 64× magnification. Second-year stem width measurements were taken separately for the main body of the stem and its winged portion. Leaf measurements were taken from the larger examples on each specimen. Pedicel width was measured at the midpoint of its length. Hypanthium width was measured at its apex. Corolla dimensions were measured from corollas estimated to be at full expansion (immature corollas are often narrower in all species). Corolla lobe width was measured at the base of the lobe.

RESULTS AND DISCUSSION

From detailed examination of physical herbarium material and online images, I found clear morphological characters that distinguish entities within *Vaccinium myrtillus* s.l. from each of Eurasia, Japan, and western North America (Table 1). In addition to morphology, these entities differ in their geographic and elevational ranges. The longitude components of their ranges are distinct, each exclusively occurring in Eurasia, Japan, and western North America (Figs. 1 and 2). The latitude components are largely distinct as well, with the Eurasian plants distributed from ca. 40°N to 70°N, the Japanese plants from 34°N to 41°N, and the North American plants from 33°N to 53°N (Figs. 1 and 2). Elevational ranges exhibit more overlap, with the Eurasian plants ranging from 0 to 2840 m (Ritchie 1956), the Japanese plants from (700–)1200–2570 m (Yamazaki 1993 and ex herbarium material), and the North American plants from 1219–3834 m. Like many species of *Vaccinium*, the plants generally occur in damp acidic habitats.

The finding of distinct entities within *Vaccinium myrtillus* s.l. as presented herein corroborates those derived from other studies bearing on this issue. They are consistent with the conclusions of Beeler et al. (2020), who proposed distinct species status for the North American and Eurasian components on the basis of their distinct phylogenetic placement with RADseq data (the Japanese component was not sampled in their study). Furthermore, they support the molecular phylogenetic results of Becker et al. (2024) based on Angiosperms353 probes, in which none of the three samples representing each of these entities were found to group together. Although not definitive because of potential issues bearing on reticulate evolution or gene coalescence (see Beeler et al. 2020), the results are at least consistent with distinct species status. The topology of Becker et al. (2024) suggests that strongly winged stems are plesiomorphic in the section, because *V. shastense* J.K.Nelson & Lindstrand, Eurasian *V. myrtillus*, the clade of [*V. ovalifolium* Sm. + *V. parvifolium* Sm.], Japanese *V. myrtillus*, North American *V. myrtillus*, and *V. scoparium*—all of which except *V. ovalifolium* have prominently winged stems—group as successive sister lineages to a clade of the non-winged or slightly winged species *V. cespitosum*, *V. deliciosum* Piper, and *V. membranaceum*. Finally, the findings agree with the taxonomic treatment of the Japanese component as a distinct species in floristic treatments of Japanese *Vaccinium* (Ohwi 1984; Yamazaki 1993).

Because the three entities are distinguishable with morphological characters and do not form an exclusive clade or clades (Beeler et al. 2020; Becker et al. 2024), they should not be considered part of the same least-inclusive “group” (otherwise implied by “*Vaccinium myrtillus* s.l.”), but rather as three distinct entities distributed within the larger clade of *V. sect. Myrtillus*. The character variation distinguishing these entities is sufficient to recognize each of them at the species rank. Therefore, I present a taxonomic revision of *V. myrtillus* s.l., dividing it into three species corresponding to the areas of Eurasia, Japan, and western North America. The revision includes a key with the most reliable characters for delimitation and detailed descriptions for each of the three species recognized. During the course of this study, I found that the name *V. oreophilum* has been misapplied to the North American species and that there is no other name available for it. Therefore, I provide a species name, *V. americanum*, with a description, and designate a holotype.

TAXONOMY

KEY TO *VACCINIUM AMERICANUM*, *V. MYRTILLUS*, AND *V. YATABEI* OF *V. SECT. MYRTILLUS*

1. Second-year branchlets generally zigzag and strongly twisted, with stem width/wing width ratio 0.5–1.6; flowering occurring slightly before leaf expansion or when leaves 0–ca. 50% expanded; pedicels to 2.0 mm long; corolla pale greenish white or greenish yellow; fruit bright red _____ ***V. yatabei***
1. Second-year branchlets generally straight and only slightly twisted, with stem width/wing width ratio 1.3–3.3; flowering occurring when leaves ca. 50–100% expanded or rarely less; pedicels to 9.3 mm long; corolla white to pink, or green flushed pink, or occasionally pale green; fruit dark purple to nigrescent or occasionally dark red.
2. Branchlets glabrous or rarely pubescent with trichomes generally straight or slightly curved; second-year branchlets 0.8–1.2 mm wide with wings 0.3–0.6 mm wide; reticulate veins of leaf blades with closed loops to ca. 1.5 mm diam.; corolla 4.5–9.0 mm wide _____ ***V. myrtillus***
2. Branchlets pubescent (rarely glabrous) with trichomes generally incurved-uncinate; second-year branchlets 0.4–0.8 mm wide with wings 0.2–0.4 mm wide; reticulate veins of leaf blades with closed loops to ca. 3.0 mm diam.; corolla 2.9–5.5 mm wide _____ ***V. americanum***

TABLE 1. Morphological differences between *Vaccinium americanum*, *V. myrtillus*, and *V. yatabei*. Characters in italicized font are taken from the literature.

Character	<i>V. americanum</i>	<i>V. myrtillus</i>	<i>V. yatabei</i>
Plant height (dm)	1.0–3.0	1.3–5.0(–12.0?)	1.1–1.5(–3.0)
Second-year branchlet shape	Straight and only slightly twisted	Straight and only slightly twisted	Zigzag and strongly twisted
Second-year branchlet width (mm)	0.4–0.8	0.8–1.2	0.3–0.8
Second-year branchlet wing width (mm)	0.2–0.4	0.3–0.6	0.4–0.6
Second-year branchlet stem width/wing width	1.3–3.3	2.0–3.3	0.5–1.6
Branchlet surface	Puberulent in patches with trichomes strongly incurved-uncinate, or rarely glabrous	Glabrous or rarely puberulent in patches with trichomes straight or slightly curved	Puberulent in patches with trichomes straight to incurved-uncinate
Leaf versus floral phenology	Flowering when leaves ca. 50–100% expanded or rarely less	Flowering when leaves ca. 50–100% expanded, rarely less	Flowering slightly before leaf expansion or when leaves 0–ca. 50% expanded
Leaf blade midvein and secondary vein color abaxially	Tawny	Tawny to cinnamon	Tawny to cinnamon
Leaf blade reticulate vein closed loop diam. (mm)	To ca. 3.0	To ca. 1.5	To ca. 1.0
Pedicle length (mm)	1.0–8.0	3.0–9.3	1.3–2.0
Corolla color	White, white flushed with pink, or pink	Deep pink to salmon pink and often flushed green, or pale green flushed pink, occasionally pale green	Pale greenish white or greenish yellow
Corolla width (mm)	2.9–5.5	4.5–9.0	4.4–7.0
Fruit color	Dark purple to nigrescent or occasionally dark red	Dark purple to nigrescent	Bright red

1. *Vaccinium americanum* P.W. Fritsch, **sp. nov.** (Figs. 2–5). TYPE: U.S.A. NEW MEXICO. Santa Fe Co.: Santa Fe National Forest, Ski Santa Fe above the terminus of NM-475, W-facing slope near Lake Peak, S end of Sangre de Cristo Mountains, 3404 m, 26 Jun 2026 (fl), P.W. Fritsch 2668 (HOLOTYPE: BRIT BRIT1176390!; ISOTYPES: CAS, K, NY, RM, UNM).

Description.—**Shrublet**, deciduous, 1.0–3.0 dm tall, clonal, sprawling or prostrate. **Branchlets** 2-winged, white-puberulent mostly in patches (minimally at some nodes) or rarely glabrous, trichomes generally strongly incurved-uncinate, up to 0.05(–0.08) mm long, second-year branchlets in sicco light green, yellowish green or grayish green to light brown or grayish brown, generally straight and only slightly twisted, 0.4–0.8 mm wide, wings 0.2–0.4 mm wide, stem width/wing width ratio 1.3–3.3. **Leaves:** petiole 0.3–1.1 × 0.3–0.4 mm, abaxial surface glabrous, adaxial surface slightly white-puberulent at least distally, trichomes generally incurved-uncinate; blades elliptic to lanceolate-elliptic or ovate-elliptic, 1.0–3.7 × 0.7–2.0 cm, chartaceous, dull to slightly shiny on both sides, abaxial surface with scattered appressed stipitate-glandular trichomes at least when young especially along major veins (stipitate glands up to 0.24 mm long, ± oriented toward distal end of leaf, stipes generally translucent, heads pale to dark orange, elongate), otherwise glabrous, adaxial surface puberulent with white simple trichomes along midvein and occasionally on major veins on at least proximal half of blade or occasionally throughout, rarely without simple trichomes, occasionally stipitate-glandular proximally on midvein and major veins, base cuneate to rounded or occasionally subtruncate to truncate or rarely subcordate, slightly attenuating into petiole, margin serrulate, 18- to 55-toothed per side, planar, apex acute to obtuse, marginal teeth tipped by translucent to orangish brown stipitate-glandular



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PLANTS OF NEW MEXICO

Ericaceae

Vaccinium myrtillus L.

USA, New Mexico, Santa Fe County, Santa Fe National Forest, Ski Santa Fe above the terminus of NM-475, W-facing slope near Lake Peak, S end of Sangre de Cristo Mountains.
35.78610°, -105.79368°, WGS 84, 3404 m elevation.

Spruce forest (*Picea engelmannii*); granite bedrock. Roadbank, thin spruce needle leaf litter in partial shade among mosses and lichens.

Deciduous clonal shrub to 13 cm tall; above-ground stems lime green to base, narrowly winged; leaf blades lime green and dull to slightly lustrous above, slightly paler green beneath, flowers generally pendent; hypanthium slightly glaucous; corolla white, occasionally tinged pink, slightly translucent, broadly urceolate; young fruit green, slightly glaucous; plants in area mostly past flowering. Frequency: abundant.

26 June 2026

Peter W. Fritsch 2668

Phileology Herbarium, Botanical Research Institute of Texas [BRIT]

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Fig. 3. P.W. Fritsch 2668 (BRIT BRIT1176390), the holotype of *Vaccinium americanum*. Source: Botanical Research Institute of Texas. CC BY-SA 4.0.

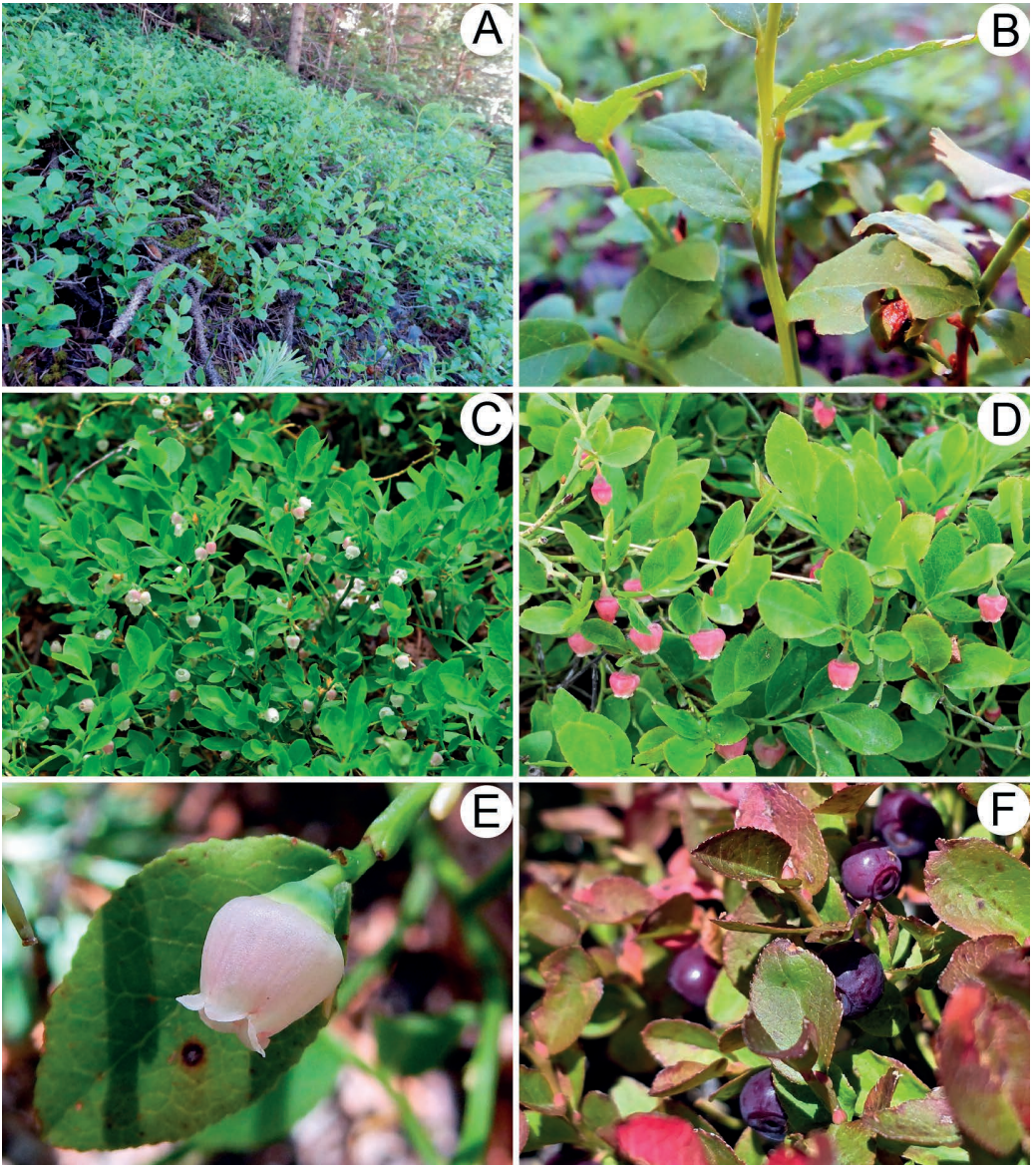


FIG. 4. *Vaccinium americanum*. A. Habit, Santa Fe County, New Mexico. B. Stem and leaves in adaxial view, Santa Fe County, New Mexico. C. Flowering branchlets, Gunnison County, Colorado. D. Flowering branchlets, Nathrop, Colorado. E. Flower, Santa Fe County, New Mexico. F. Fruits, Nederland, Colorado. Photos: A, B, E, Peter W. Fritsch, from the type locality. C, © Matt Langemeier, CC BY-NC 4.0. <https://www.inaturalist.org/observations/174268514>. D, © Elliott Gordon, CC BY 4.0. <https://www.inaturalist.org/observations/85413082>. F, © Karlos Bellerjeau, CC BY-NC 4.0. <https://www.inaturalist.org/observations/239721393>. C, D, F, modified from originals.

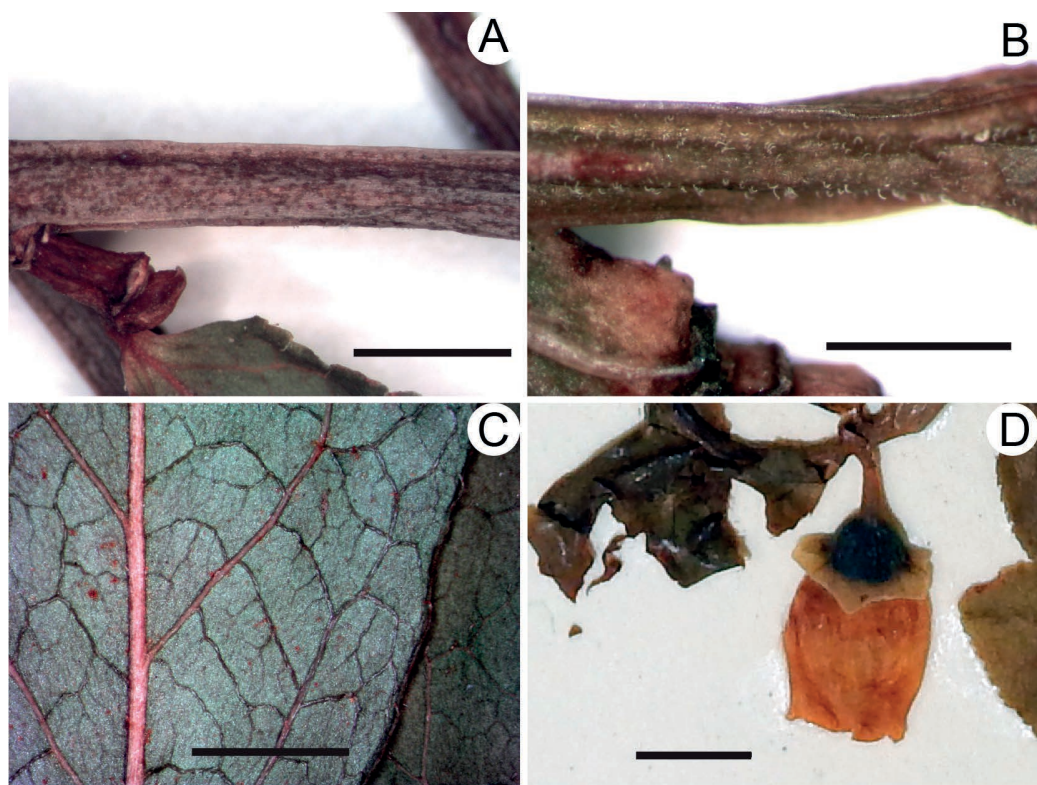


FIG. 5. *Vaccinium americanum*. A. Stem, second-year branchlet. B. Stem, first-year branchlet. C. Leaf surface, abaxial view. D. Flower. (scale bars, A, C = 2 mm, B = 1 mm, D = 3 mm). A, *L. Bougere* 1829 (SMU BRIT61547); B, *B. Elliott* 8709b (BRIT BRIT6549); C, *A. Romano* 31 (COLO 02349108); D, *K.E. Rogers* 10431 (SMU BRIT61556).

trichomes, trichomes to 0.30 mm long, oriented toward apex but often incurved, borne at outer edge of each tooth, midvein and secondary veins tawny abaxially, midvein raised abaxially, slightly raised adaxially, secondary veins slightly raised on both sides, 5 to 8 on each side of midvein, meeting in intramarginal loops or otherwise anastomosing well away from margin, reticulate veins slightly raised on both sides, forming closed loops to ca. 3.0 mm diam. **Flowers** opening when leaves ca. 50–100% expanded or rarely less. **Pedicels** 1.0–8.0 × 0.3–0.7 mm, glabrous. **Hypanthium** cupuliform to rarely nearly obconic, 0.3–2.0 × 0.9–3.0 mm, often glaucous, base broadly rounded to broadly cuneate, calyx limb 0.2–0.8 mm long. **Corolla** white, white flushed with pink, or pink, campanulate-urceolate, 2.8–4.5 × 2.9–5.5 mm, slightly longer than wide to slightly wider than long, glabrous, lobes 5, often white to greenish white, 0.9–1.5 × 0.7–1.5 mm. **Stamens** 2.2–3.0 mm long, filaments ca. 1.0–1.2 mm long, glabrous, anthers 1.6–2.5 mm long, thecae 0.9–1.1 mm long, tubules 0.6–1.4 mm long, spurs borne at base of tubules, up-angled, curved to nearly straight, 0.7–1.2 mm long. **Style** 2.8–5.2 mm long, exserted from corolla 0–1.5 mm. **Fruit** dark purple to nigrescent or occasionally dark red, 3–10 × 4–12 mm, not glaucous or occasionally slightly glaucous, disk 2.0–3.0 mm diam.

Phenology.—Flowering mid-May to late July; fruiting late June to early September.

Distribution and habitat.—Southern British Columbia and Alberta, Canada, and in the U.S.A. in Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Idaho, Oregon, and Washington; 1219–3834 m elevation; conifer woods and clearings, meadows, scrub.

Chromosome number.— $2n = 2x = 24$ (diploid), $2n = 4x = 48$ (tetraploid).

Illustrations.—Hitchcock et al. 1959; Meidinger 1999; Holmgren et al. 2005.

Discussion.—The name *Vaccinium oreophilum* Rydb. has long been applied to the plants here named as *V. americanum*, usually as a synonym of *V. myrtillus* or less commonly either as an infraspecific taxon of *V. myrtillus* or a distinct species. Below I explain the nomenclatural rationale underpinning the need for a new name with a new type for the North American component of *V. myrtillus* s.l. if it is to be recognized as taxonomically distinct, as is herein done at the species level.

When Rydberg (1906) published *Vaccinium oreophilum*, he did so without indicating a type or directly citing specimens in the protologue. However, Rydberg did cite two species entries with two publications indicated: “*Vaccinium myrtilloides* S. Wats. Bot. King Exp. 209. 1871. Not *V. myrtilloides* Michx. 1803” and “*V. Myrtillus* A. Gray, Syn. Fl. 2¹: 24. 1878. Not *V. Myrtillus* L. 1753.” The specimens cited in these entries can be considered to be original material used as the basis for describing *V. oreophilum*.

In the first publication cited by Rydberg, Watson (1871) cited under his entry for *Vaccinium myrtilloides* the collection “Uintas; 9,000 feet altitude; July. (735)” with “(735)” indicating the specimen *S. Watson* 735. This collection was also cited as a syntype by Rydberg (1900) in the protologue of *V. globulare* Rydb., but Rydberg must have later considered *V. oreophilum* to be distinct from *V. globulare*. In publishing *V. globulare*, Rydberg (1900) cited specimens in the protologue but did not indicate a type. Although Camp (1942) recognized *V. globulare* as distinct from *V. membranaceum*, it has been considered a synonym of *V. membranaceum* by most subsequent authors (e.g., Vander Kloet 1988, 2009; Vander Kloet & Dickinson 1999; Holmgren et al. 2005; Wallace 2012). *Vaccinium globulare* was lectotypified by P.K. Holmgren in Holmgren & Holmgren (2004) on *W.M. Canby* 217 (NY 00622172).

I examined duplicates of *S. Watson* 735, either in hand (NY 00622153) or as online images (GH 00112694 and US 01075184). It can be established that Rydberg saw the NY specimen because “*V. Myrtillus* L. fide A. Gray” is written on the sheet in Rydberg’s handwriting; the duplicates from the other two herbaria (GH and US) do not have Rydberg’s handwriting. Under their entry for *Vaccinium oreophilum*, Vander Kloet & Dickinson (1999) stated “Type: United States, Utah, Uintah Mountains, *Watson* 735 (US-n.v.).” Because Vander Kloet & Dickinson’s (1999) article was published prior to January 1, 2000, their inclusion of the US specimen must be considered an inadvertent lectotypification, with “type” correctable to “lectotype” by Article 9.10 of the *International Code of Nomenclature* (ICN, Turland et al. 2025). Holmgren et al. (2005) referred to the NY specimen of *S. Watson* 735 as the holotype of *V. oreophilum*, but because the text did not state “designated here” or equivalent (Article 7.11, ICN), it was not an effective designation and in any case the earlier lectotypification of Vander Kloet & Dickinson (1999) would take precedence, even though the latter chose one of the specimens without Rydberg’s handwriting (Article 9.19, ICN). I provide the full citation and homotypic synonymy of *Vaccinium oreophilum* here:

***Vaccinium oreophilum* Rydb., Bull. Torrey Bot. Club 33:148. 1906. (Fig. 6).** *Vaccinium myrtillus* subsp. *oreophilum* (Rydb.) Á. Löve, D. Löve & B.M. Kapoor, Arctic Alpine Res. 3(2):155. 1971. *Vaccinium myrtillus* var. *oreophilum* (Rydb.) Dorn, Vasc. Pl. Wyoming, 296. 1988. TYPE: U.S.A. Utah. [Duchesne Co.:] Uintas [Uinta Mountains], 9,000 ft., Jul 1869, *S. Watson* 735 (LECTOTYPE, designated by Vander Kloet & Dickinson 1999: US 01075184 [image!]; ISOLECTOTYPES: GH 00112694 [image!], NY 00622153!).

From careful examination of the three specimens of *S. Watson* 735, I conclude that *S. Watson* 735 is *Vaccinium membranaceum* (= *V. globulare*). This assessment is supported by, e.g., stems flushed dull pink and merely angular (versus greenish and strongly winged in *V. americanum*) and corollas broadly urceolate (versus more narrowly urceolate). Further, the leaves in *S. Watson* 735 appear not to be fully expanded and so are likely larger than those of *V. americanum* and the plants are more robust overall, with thicker stems, which is most obvious in the main stem of the NY specimen. Exemplar specimens of *V. membranaceum* that appear comparable in morphology to *S. Watson* 735 are: Utah, Uintah Co., Ashley National Forest, Uinta Mtns., Manila Park, 9,900 ft, 21 Jul 1995, *S. Goodrich* 25206 (BRY BRYV025516 [image!]) and Colorado, Routt Co., Rainbow Lake, ca. 10,000 ft, E slope of Park Range, N-facing slope, 5 August 1983, *D.J. Cooper* 1207 (COLO 00300582 [image!]). As indicated on the GH and NY annotation labels, respectively, W.H. Camp also



Fig. 6. The lectotype of *Vaccinium oreophilum*, S. Watson 735 (US 01075184). Source: Smithsonian Institution. CC0 1.0 Universal.

considered *S. Watson 735* to be *V. globulare* or “near *V. globulare*.” The NY specimen was perhaps annotated as such because Camp (1942) considered *V. globulare* to include *V. myrtillus* (sensu Camp; i.e., *V. americanum*) in its genetic complement. The reason for the differing annotations on the two specimens is not clear because there are no obvious differences among the duplicates, and the evidence presented by Camp for concluding that *V. globulare* is a hybrid species is dubious. Regardless, even if *S. Watson 735* contains some genetic element of the North American plants placed under *V. myrtillus* by various authors (*V. americanum*), it should be excluded from the circumscription of these plants. Further taxonomic study on the status of *V. globulare* in relation to *V. membranaceum* appears to be warranted.

In the second publication cited in Rydberg’s (1906) protologue of *Vaccinium oreophilum*, i.e., that of Gray (1878), no collections were cited directly, but four publications were referenced. The citation “*V. myrtilloides*, Watson, Bot. King Exp. 209, not of others” indirectly refers to *S. Watson 735*. The other three publications were cited as “Schk. Handb. t. 107; Reichenb. Ic. Germ. l.c. t 1169; Hook. Fl. ii. 33.” The first and second of these, Schkuhr (1791–1803) and Reichenbach & Reichenbach (1854–1855), respectively, restricted their focus to *V. myrtillus* of Europe. In the third, Hooker (1834–1840) focused on the flora of North America, citing under the entry for *V. myrtillus* “Hab. Unalaschka? Chamisso.” This citation refers to the entry of “*V. myrtillus*. L.??” in Chamisso & Schlechtendal (1826). From Hooker’s comments about Chamisso’s specimens of *V. myrtillus*, i.e., “Chamisso’s specimens from Unalaschka were so imperfect that he could not determine whether they really belonged to this species or not; their leaves are said to be entire at the margin, or with a very few and obsolete teeth,” it can be concluded that Hooker did not see these specimens. However, the entire margin type referred to in Hooker’s comment matches that of the circumboreal species *V. uliginosum* L., not the North American plants placed under *V. myrtillus* by authors, which is serrulate. In any case, the latter plants are not known to occur north of southern British Columbia and southern Alberta (Vander Kloet 1988). Thus, Chamisso’s material can also be excluded from the North American plants placed under *V. myrtillus* by authors.

From the evidence presented above, it is clear that neither the original material of *Vaccinium oreophilum* nor duplicates of this material include any specimens of the North American plants placed under *V. myrtillus* by authors. Because no other name is applicable to these plants, and if they are to be recognized as a species as is done herein, a new name along with the selection of a type is needed; I have provided the name *V. americanum* for this purpose.

Notes.—I have not assessed the taxonomic implications of mixed ploidal levels within *Vaccinium americanum*, with both diploids and tetraploids having been documented (Vander Kloet & Dickinson 1999; Hummer et al. 2015). These levels appear to be only weakly if at all correlated with geographic location. Although I have not detected morphological differences between these ploidal levels, the morphology should be investigated in more detail. For example, there may be characters associated with the gigas effect, as documented in *V. sect. Cyanococcus* (see Fritsch et al. 2024 for review), or characters independent of this effect not yet detected. It is possible that the tetraploids recorded for *V. americanum* are misidentifications of *V. globulare/V. membranaceum*, which has been documented as solely tetraploid (Vander Kloet 1988, 2009; Vander Kloet & Dickinson 1999).

The description under *Vaccinium myrtillus* in Holmgren et al. (2005) states “Shrubs to 1–4 (12) dm tall ...”. I have seen no specimens of *V. myrtillus* s.l. from North America with a height of 12 dm and this descriptor is likely either derived from confusion with plants of the generally much taller species *V. membranaceum* or taken verbatim from Vander Kloet’s descriptions, which include the Eurasian plants of *V. myrtillus* s.l.

Representative specimens examined.—**CANADA. ALBERTA. Banff National Park:** Banff and vicinity, Sulphur Mtn., 1829–2438 m, 14 Jun 1906, *S. Brown 137* (NY 02547333); trail to Moraine Lake, 25 Jun 1909, *M.C. Ferguson & A.M. Ottley s.n.* (NY 02547037); vicinity of Banff, Mt. Edith Pass, 1981 m, 30 Jun–1 Aug 1899, *W.C. McCalla 2167* (NY 02547332); Rocky Mtn. National Park, Pipestone Creek, 9 Jul 1904, *J. Macoun 66493* (NY 02547329). **Census Division No. 15:** vicinity of Lake Louise, 11 Jul 1915, *Fairview 3776* (NY 02547023); on trail from Lake Louise to the saddle, 20 Jul 1904, *J. Macoun 66495* (NY 02547334). **Crowsnest Pass Municipality:** Crow Nest Pass [Crowsnest Pass], 49.50°N, Aug 1897, *J. Macoun 23415* (NY 02547326). **Improvement District No. 4:** ca. 1 mi E of Cameron Lake, Waterton Lakes National Park, 1950 m, 7 Aug 1941, *C.L. Hitchcock & J.S. Martin 7923* (NY 02551834). **Improvement District No. 12:** Jasper Park, Tonquin Valley, Aug 1926, *N.B. Sanson 924 p.p.* (NY 02547335). **Kananaskis Country:** Kananaskis Valley, Mt. Allen, Marmot Experimental

Watershed, Middle Creek cirque trail, 2150 m, 31 Jul 1976, *J.H. Richards 156* (COLO 02098374); Spray Valley, 17 Mile Camp, Jun 1926, *N.B. Sanson 938* (NY 02547331). **BRITISH COLUMBIA. Central Kootenay District:** Yahk, 4 Aug 1929, *J.H. Christ 602* (NY 02547391). **East Kootenay Regional District:** Kicking Horse Lake, 1676 m, 10 Aug 1890, *J. Macoun s.n.* (NY 02547336). **Kootenay Land District:** Deer Park, Lower Arrow Lake, 16 May 1890, *J. Macoun s.n.* (NY 02547338). **Nanaimo Regional District:** Long Lake, Vancouver Island, 13 Jun 1887 and 27 Jul 1887, *J. Macoun s.n.* (NY 02547330).

U.S.A. ARIZONA. Apache Co.: Thomas Peak, White Mtns., 8 Jul 1912, *L.N. Goodding 1134* (NY 02547347); summit of Mt. Baldy, 3414–3536 m, 19 Jul 1973, *L.A. McGill & J. Dahl 736* (NY 02547379). **COLORADO.** Snowy Range, Wet Mtn. Valley, 1872, *T.S. Brandegee B474* (NY 02547393); Berthoud Pass, 4 Aug 1878, *A. Brown s.n.* (NY 02547400); mtn. near Twin Lakes, 3353 m, Jul–Aug 1877, *A.J. McCosh & C.G. Greene s.n.* (NY 02547390, NY 02547392); East Indian Creek, 2400–2700 m, 1 Jun 1900, *P.A. Rydberg & F.K. Vreeland 5783* (NY 02547374); mtn. near Veta Pass, 3000 m, 20 Jun 1900, *P.A. Rydberg & F.K. Vreeland 5784* (NY 02547402); Alpine Tunnel, 17 Jul 1897, *C.L. Shear 4848* (NY 02547411). **Archuleta Co.:** Wolf Creek, N Pagosa Sp. Colo., 16 Aug 1931, *O.M. Clark 4490* (SMU BRIT61536); San Juan National Forest, ca. 12 mi SE of Pagosa Springs, just W of V Rock, 3048 m, 37.12306°, –106.79578°, 10 Jun 2013, *M.T. Sharples 151* (COLO 02170447); San Juan National Forest, ca. 14.5 mi SW of Platoro, ca. 1 mi E of Flattop Mt. off of Fish Creek Trail, 2911 m, 37.20493°, –106.70980°, 21 Jul 2014, *M.T. Sharples 954* (COLO 02170454); Rio Grande National Forest, ca. 12 mi E of Chromo, S slopes of Chama Peak, 3536 m, 37.03819°, –106.62745°, 9 Aug 2014, *M.T. Sharples 1004* (COLO 02170488); 15 mi from Pagosa Springs on Wolf Creek Pass, 2896 m, 28 May 1934, *F.M. Stone 586* (NY 02547404). **Boulder Co.:** Rocky Mtn. National Park, trail on N St. Vrain, 3 mi from campgrounds, 27 Jul 1949, *L. Bougere 1829* (SMU BRIT61547); Lake Eldora, 2829 m, 7 Aug 1918, *J.W. Clokey 3218* (NY 02547398); city of Boulder Mtn. Park, upper Panther Canyon, 2286 m, 39.99068°, –105.30433°, 17 Jul 2014, *T. Hogan 5363* (COLO 01821420); Roosevelt National Forest, vicinity of Fourth of July Trailhead, 3048 m, 30 Jun 1993, *Plants of Colorado (EPOB 4520) s.n.* (NLU NLU0141085); along trail from Rainbow Lakes Campground to Horseshoe Cirque, 10 mi NW of Nederland, 3048 m, 20 Jun 1950, *W.A. Weber 5498* (SMU BRIT61548). **Chaffee Co.:** Sawatch Range, E slope Continental Divide, Little Willis Gulch on Colorado Trail, Trail 1776, ca. 2 air mi S of Twin Lakes, 2865–3353 m, 16 Aug 2000, *E.A. Holt 4112* (BRIT BRIT528958). **Clear Creek Co.:** near Empire, 10 Aug 1892, *H.N. Patterson 285* (BRIT BRIT61546, NY 02547039, NY 02547397). **Conejos Co.:** 1 mi E of Platoro, on N slope, 3 Jul 1939, *R.K. Gierisch 1025* (NY 02547370); Rio Grande National Forest, ca. 8 mi SSE of Platoro, ridge N of S Fork of Conejos Valley (E of Hansen Creek jct.), 3459 m, 37.23975°, –106.49901°, 25 Jun 2014, *M.T. Sharples 777* (COLO 02170462). **Custer Co.:** Wet Mtns., Wet Mtn. Valley, Sangre de Cristo Range and vicinity, San Isabel National Forest, along South Creek, ca. 0.5 mi N of jct. of Colo hwy. 165 and 78, ca. 3 mi N of San Isabel, 2804 m, 5 Jun 1999, *B. Elliott 6560* (NY 02547346); Wet Mtns., Wet Mtn. Valley, Sangre de Cristo Range and vicinity, San Isabel National Forest, along the Saint Charles Peak Trail from Colo Hwy. 165 to the first gap, ca. 4 air mi NW of San Isabel, 2743 m, 15 Jul 1999, *B. Elliott 8709b* (BRIT BRIT61549). **Delta Co.:** 0.1 mi W of on Island Lake Road (Z Road) from the intersection with Hwy. 65, 3155 m, 39.04007°, –107.98858°, 4 Jul 2010, *R. Harner s.n.* (COLO 00974733). **Eagle Co.:** Sawatch Range, White River National Forest, Holy Cross Wilderness, Eagle Lake Trail to Halfmoon Lake, between Eagle and Avalanche peaks, along Lime Creek, ca. 18 air mi SSE of Eagle, 3048–3170 m, 39.4303°, –106.5854°, 21 Jul 2011, *M.K. Kirkpatrick 7686* (NY 02730835). **Gilpin Co.:** Baltimore, 2438 m, 6 Jul 1903, *F. Tweedy 5502* (NY 02547341); Tolland, 2743 m, 17 Jun 1914, *L.O. Overholts s.n.* (NY 02547324); Tolland, Jenny Canyon, 2743 m, Aug 1910, *W.M. Rankin s.n.* (NY 02551705). **Grand Co.:** Arapaho National Forest, Williams Fork Mtns., ca. 1.5 mi S of jct. of secondary Forest Road 141 and secondary Forest Road 138, ca. 0.3 mi W of secondary Forest Road 138 on tributary of Williams Fork, 2686 m, 12 Jul 2003, *E. Foley 2198* (NY 02547365); Valley Spur, 3000 m, 13 Sep 1901, *L.M. Underwood & A.D. Selby 455* (NY 02547409); ca. 2000 ft below Berthoud Pass, 4 Jul 1947, *E. Whitehouse 18987* (SMU BRIT61540). **Gunnison Co.:** Kebler Pass, 3048 m, 14 Aug 1901, *C.F. Baker 784* (NY 02547407); NW of Scofield Pass, 3246 m, 19 Jul 1965, *Dunn 15098* (NLU NLU0141084); along trail going to North Pole Basin after leaving Scofield Pass Road, 14 Jun 1955, *H. Gentry 2208* (BRIT BRIT61550); Ruby Range, 3 air mi W of Crested Butte, Mt. Emmons Iron Fen, Mt. Emmons, 2914 m, 38.86413°, –107.04176°, 20 Jul 2018, *A. Romano 31* (COLO 02349108); Monarch Pass, 3 Jul 1956, *Tietje s.n.* (VDB BRIT311372); Poverty Gulch, ca. 0.5 mi NW of confluence of Slate River, 2926 m, 7 Jul 1984, *D.H. Wilken 14112* (NY 02547344). **Huerfano Co.:** Wet Mtns., Wet Mtn. Valley, Sangre de Cristo Range and vicinity, Bartlett Trail from base up ca. 2.5 trail mi, 2316–2835 m, 25 Jul 1998, *R.L. Hartman 62777* (BRIT BRIT61551); Little Veta Mtn., 3000–3300 m, 22 Jun 1900, *P.A. Rydberg & F.K. Vreeland 5785* (NY 02547396). **Larimer Co.:** Burn Mtn., 13 Jul 1907, *F.E. Clements s.n.* (NY 05122228); Front Range, 2896 m, 6 Aug 1892, *C.S. Crandall s.n.* (NY 02547403); Emerald Lake, 25 Jun 1934, *H. Zobel & E. Roscoe s.n.* (NY 02547363). **Las Animas Co.:** San Isabel National Forest, 6.5 mi SW of Cuchara, ca. 1 mi E of Trinchera Peak, ca. 0.25 mi S of Cucharas Creek, 3490 m, 37.29512°, –105.15319°, 16 Jul 2014, *M.T. Sharples 889* (COLO 02170439). **Mesa Co.:** Grand Mesa National Forest, 2743 m, 3 Jun 1981, *V. Siplivinsky 1121* (NLU NLU0141083). **Mineral Co.:** near Pagosa Peak, 2743 m, 15 Aug 1899, *C.F. Baker 513* (NY 02547342); SW slope, Wolf Creek Pass, Continental Divide on U.S. 160, 26.1 mi E of Pagosa Springs, 3322 m, 19 Jun 1958, *P. Sage 192* (NY 05122229); Rio Grande National Forest, ca. 10 mi NW of Platoro off Forest Road 380 near Fivemile Park, 3292 m, 19 Jul 2014, *M.T. Sharples 928* (COLO 02170637). **Montezuma Co.:** Bob Creek, W La Plata Mtns., 3048 m, 27 Jun 1898, *C.F. Baker et al. 163* (NY 02547399); upper Dolores River Drainage and adjacent areas, San Juan National Forest, ca. 7.5 air mi S of Rico, along the Colorado Trail at Big Bend Creek Trail intersection, 3231–3292 m, 17 Aug 1995, *L.M. Moore 8688* (COLO 00303974). **Ouray Co.:** Uncompahgre National Forest, ca. 7 mi NW of Silverton, ca. 0.75 mi E of Red Mtn. Pass, 3627 m, 37.89934°, –107.70568°, 3 Jul 2014, *M.T. Sharples 847* (COLO 02170819); Red Mtn. S of Ouray, 3300 m, 11 Sep 1901, *L.M. Underwood & A.D. Selby 281* (NY 02547327). **Park Co.:** Pike National Forest, Platte River Mtns., Lost Creek Wilderness Area, along the Ben Tyler trail, 3048 m, 12 Jun 2001, *T. Hogan 3819* (COLO 00569582). **Pitkin Co.:** McClure Pass summit, N of border to Gunnison National Forest on 133 to Greenwood on Pitkin Co. line, 7 Jun 1985, *C.C. Chinnappa 1821* (NLU NLU0140981). **Pueblo Co.:** Wet Mtns., Wet Mtn. Valley, Sangre de Cristo Range and vicinity, Wet Mtn., drainage N of North Peak, 3475–3536 m, 5 Jul 1998, *R.L. Hartman 62161* (NY 02547345). **Saguache Co.:** Wet Mtns., Wet Mtn. Valley, Sangre de Cristo Range and vicinity, Rio Grande National Forest, up Sand Creek

from Music Pass to Peak 12579, 3834 m, 16 Jul 1999, *B. Elliott* 8997 (BRIT BRIT528959); Rio Grande National Forest, northern Sangre de Cristo Mtns., upper Dorsey Creek drainage, ca. 3 mi ESE of Poncha Pass, 3170 m, 38.43833°, -106.02383°, 22 Jul 2008, *T. Hogan* 4782 (COLO 00926550). **San Juan Co.:** 0.5 mi N of Red Mtn. Pass, Hwy. 550, 30 Jun 1951, *S.J. Preece Jr. & B.L. Turner* 2778 (SMU BRIT61553). **Summit Co.:** White River National Forest, ca. 2.5 mi S of Breckenridge, off of Spruce Creek Road, 3185 m, 39.43825°, -106.04971°, 4 Aug 2014, *M.T. Sharples* 986 (COLO 02170793). **IDAHO. Bonner Co.:** Queen Mt., Pend Oreille Forest, 1700–1800 m, 6–7 Aug 1913, *W.W. Eggleston* 9764 (BRIT BRIT61537); 9 mi WNW of Sandpoint in first large saddle below Sandpoint Baldy Mt., 1798 m, 8 Jul 1988, *F. Johnson* 88052 (NY 02547367); summit of Packsaddle Peak near Lake Pend d'Oreille, 5 Aug 1892, *J.H. Sandberg* 829 (NY 02547389). **Boundary Co.:** Roman Nose, 24 Jun 1934, *J.H. Christ* 4891 (NY 02547387); near Black Mtn. Lookout, 5–6 air mi SE of Bonners Ferry, Kaniksu National Forest, 26 Jun 1988, *F. Johnson* 88025 (NY 02547366). **Shoshone Co.:** 1 mi below Sunset Peak along access road, 1768 m, 10 May 1985, *F.D. Johnson s.n.* (NY 02547385). **MONTANA. Flathead Co.:** Glacier National Park, near Hidden Lake, Logan Pass, 2134 m, 21 Aug 1932, *W.H. Camp* 164 (NY 02547405); Columbia Falls, 30 Aug 1895, *R.S. Williams s.n.* (NY 02547352). **Glacier Co.:** Glacier National Park, vicinity of Lake McDermott, 1450–1470 m, 2 Aug 1919, *P.C. Standley* 16903 (NY 02547412). **Meagher Co.:** Harley Park, ca. 6 mi W of Neihart, Little Belt Mts., 13 Jul 1945, *C.L. Hitchcock & C.V. Muhlick* 12304 (SMU BRIT61538). **NEW MEXICO. Catron Co.:** upper Willow Creek drainage, Mogollon Range, Gila National Forest, 60 mi NW of Silver City, 18 mi E of Mogollon, 2400–2700 m, 13 Jun 1964, *M. Baad* 178 (VDB BRIT311551); Mogollon Mts., Gila Wilderness, Gila National Forest, vicinity of Mogollon & Whitewater Baldy, Black and Sacaton Mts., Mogollon Baldy Peak, 3261 m, 25 Aug 1968, *W. Hess* 2307 (SMU BRIT61539); Gila National Forest, 25 mi E of Mogollon, Sandy Point trail to Mogollon Baldy, 3018 m, 21 Sep 1969, *W. Hess* 2553 (BRIT BRIT61555); canyon side, Mogollon to Willow Creek, Mogollon Mts. E side of Silver Creek Divide, 2591 m, 10 Jul 1965, *W.A. Weber & P. Salamun* 12812 (COLO 02098457, NY 02547377). **Mora Co.:** Cerro Vista, just E side of fence, 3060 m, 20 Jun 1979, *P.C. Holm* 66 (BRIT BRIT61557). **Rio Arriba Co.:** Santa Fe National Forest and vicinity, Jemez Mtns., Forest Road 70 and Forest Road 50, Padomas Trail, NW into San Pedro Parks Wilderness to Vacas Trail, Forest Road 51, 2834–3089 m, 36.042133°, -106.79243° to 36.06625°, -106.81210°, 20 Jun 2002, *R.L. Hartman* 74995 (COLO 02098267). **San Miguel Co.:** top of Las Vegas Range, Jun 1901, *T.D.A. Cockerell* 16 (NY 02547353); Pecos River National Forest, Winsor Creek, 2743 m, 5 Jul 1908, *P.C. Standley* 4210 (NY 02547354). **Sandoval Co.:** Valles Caldera National Reserve, Jemez Mtns., Rito de los Indios, 2.3 air mi NNE of Pipeline Road, 2797–2801 m, 35.997712°, -106.47213° to 36.00085°, -106.46858°, 18 Aug 2003, *R.L. Hartman* 78707 (COLO 02098259). **Santa Fe Co.:** below Lake Peak, Santa Fe National Forest, 3353 m, 22 Jun 1976, *K.E. Rogers* 10431 (SMU BRIT61556). **Taos Co.:** ca. 9.5 mi on Forest Road 438 going in the direction of Taos from Fort Burgwin, 19 Jun 1979, *T. Cornitius* 61 (BRIT BRIT61559); Bear Wallow Ridge Road, Forest Road 441, 19 Jun 1979, *P.C. Holm* 57 (BRIT BRIT61565); Bear Wallow Ridge Road, Forest Road 441, S entrance, 19 Jun 1979, *M.W. Holmes* 40 (BRIT BRIT61561); along Hwy. 22 to the Santa Fe Ski Basin, 4 Jul 1973, *L.C. Higgins* 7556 (NY 02547378). Vermejo Park Ranch, slope above E side of Costilla Creek 0.42 air mi SE of Lake No. 1, 36.97944°, -105.24722°, 28 Jun 2007, *B. Legler* 5140 (COLO 02098242); between Osha Park and Forest Road jct. of 441 & 478 on 441, Bear Wallow Ridge Road, Carson National Forest, 3048 m, 6 Jun 1976, *W.F. Mahler* 8143 (SMU BRIT61652); Forest Road 153 above headwaters of Rito de la Olla, Carson National Forest, 3261 m, 28 Jun 1977, *S. Moffat* 23 (BRIT BRIT61564); Bear Wallow Ridge Road, Forest Road 441 at Puertocito, 22 Jun 1979, *W.R. Pace* 34 (BRIT BRIT61558); 6 mi off Hwy. 3 at Puertocito Park, 19 Jun 1979, *K. Pierce* 52 (BRIT BRIT61560); Forest Road 441 E of Osha Park, Carson National Forest, 3048 m, 6 Jun 1976, *K.E. Rogers* 10129 (SMU BRIT61562); between Osha Park and Forest Road jct. of 441 & 478 on 441, Bear Wallow Ridge Road, Carson National Forest, 3048 m, 7 Jun 1976, *K.E. Rogers* 10266 (SMU BRIT61563). **OREGON. Hood River Co.:** Mt. Hood, Aug 1880, *J. Howell & T.J. Howell* 331 (NY 02547038). **Linn Co.:** Cascade Range, Willamette National Forest, Bruno Meadows, along Forest Service Road 2234, ca. 5 air mi SE of Idanha, 1244 m, 18 Aug 1993, *R.R. Halse* 4682 (COLO 02098465, NY 02547322). **UTAH. Daggett Co.:** W side of Hoop Lake, 2743 m, 25 Jun 1953, *A.H. Holmgren & S.S. Tillett* 9500 (SMU BRIT61439). **San Juan Co.:** Dark Canyon NE of Mt. Peale, 3353 m, 21 Jul 1981, *N.D. Atwood* 8103 (NY 00661866); Geyser Pass Road just E of Gold Basin Road, La Sal Mtns., 12 Jul 1984, *N.D. Atwood* 10395 (NY 00661867); La Sal Mtns., ridge NE of Gold Basin, 3341 m, 13 Jul 1986, *M.A. Franklin* 3737 (NY 00661869); 0.5 mi W of Geyser Pass, La Sal Mts., 19 Aug 1954, *B.F. Harrison* 12494 (NY 00661868); La Sal Mtns., Geyser Pass Road, ca. 2.5 km (1.5 mi) W of the pass, 29 km (18 mi) air distance ESE (111°) of downtown Moab, 3050 m, 26 Jun 1985, *N.H. Holmgren* 10925 (NY 00223422); Gold Basin, La Sal Mtns., 3000–3300 m, 11 Jul 1911, *P.A. Rydberg & A.O. Garrett* 8844 (NY 00661870); Abajo Mtns., near Spring Creek, 2700–3000 m, 17–20 Aug 1911, *P.A. Rydberg & A.O. Garrett* 9811 (NY 00661871). **WASHINGTON. Chelan Co.:** Lake Wenatchee, 607–914 m, Jun 1893, *J.H. Sandberg & J.B. Leiber* s.n. (BRIT BRIT61541); near Lake Clara, 23 Jun 1984, *R. Naas & D. Naas* 4640 (BRIT BRIT61543); Trail 1200 to Lake Clara, 23 Jun 1984, *R. Naas & D. Naas* 4641 (BRIT BRIT61509); Chumstick Mtn. near Buck Spring, 1737 m, 4 Jul 1944, *J.H. Schultz* 4411 (SMU BRIT61567, COLO 02098366, NY 02547373); near summit of Chumstick Mt., 1524 m, 23 Jun 1932, *J.W. Thompson* 8487 (NY 02547337); S side of Entiat River at Tommy Creek Crossing, 14 May 1946, *G.H. Ward* 387 (SMU BRIT61566, NY 02547395). **Okanogan Co.:** in mtns. SW of Conconully, 1219 m, s.d., *C.B. Fiker* 783 (NY 02547340); in mtns. W of Conconully, 4 Jun 1932, *C.B. Fiker* 784 (NY 02547339). **Yakima Co.:** Breitenberg, Mt. Adams, 18 Aug 1898, *W.N. Suksdorf* s.n. (COLO 02098358). **WYOMING. Carbon Co.:** Sierra Madre Mtns., ca. 13.5 air mi SW of encampment, ca. 29 air mi ENE of Dixon, 2865–3048 m, 19 Jul 1979, *B.E. Nelson* 4117 (NY 02547171). **Natrona Co.:** Centennial Hills, 9 Jun 1895, *A. Nelson* 1292 (BRIT BRIT61568).

2. *Vaccinium myrtillus* L., Sp. Pl. 1:349. 1753 (Figs. 1, 7–9). TYPE: SWEDEN: habitat in Europe borealis sylvis umbrosis, C. von Linné s.n. (LECTOTYPE, designated by Vander Kloet 1989: LINN LINN-HL497-1 [image!]).

Description.—**Shrublet**, deciduous, 1.3–5.0(–12.0?) dm tall, clonal, sprawling or prostrate. **Branchlets** 2-winged, glabrous or rarely sparsely white-puberulent in patches, trichomes erect and generally straight or slightly curved, up to 0.05 mm long, second-year branchlets in sicco deep green to olive-green or chestnut-brown, occasionally grayish green or flushed pale maroon, generally straight and only slightly twisted, 0.8–1.2 mm wide, wings 0.3–0.6 mm wide, stem width/wing width ratio 2.0–3.3. **Leaves:** petiole 0.5–1.9 × 0.3–0.7 mm, abaxial surface glabrous, adaxial surface slightly white-puberulent at least distally, trichomes generally erect and straight or slightly curved; blades elliptic to lanceolate-elliptic or ovate, 0.9–3.6(–4.0) × 0.4–2.1 cm, chartaceous, dull to slightly shiny on both sides, abaxially with scattered appressed stipitate-glandular trichomes at least when young especially along major veins (stipitate glands up to 0.30 mm long, ± oriented toward distal end of leaf, stipes generally translucent, heads pale to dark orange, elongate), otherwise glabrous, adaxial surface puberulent with white simple trichomes along midvein and occasionally on major veins on proximal half of blade or occasionally farther distally, occasionally stipitate-glandular proximally on midvein and major veins, base cuneate to rounded or occasionally subtruncate to truncate or rarely subcordate, slightly attenuating into petiole, margin serrulate, 12- to 45-toothed per side, planar, apex acute to obtuse or rarely subrounded, marginal teeth tipped by translucent to orangish brown stipitate-glandular trichomes, trichomes to 0.26 mm long, oriented toward apex but often incurved, borne at outer edge of each tooth, midvein and secondary veins tawny to cinnamon abaxially, midvein raised abaxially, slightly raised adaxially, secondary veins slightly raised on both sides, 4 to 9 on each side of midvein, meeting in intramarginal loops or otherwise anastomosing well away from margin, reticulate veins slightly raised on both sides, forming closed loops to ca. 1.5 mm diam. **Flowers** opening when leaves ca. 50–100% expanded or rarely less. **Pedicels** (2.5–)3.0–9.3 × 0.3–1.0 mm, glabrous. **Hypanthium** cupuliform to nearly obconic, 0.6–3.0 × 1.8–4.0 mm, often glaucous, base narrowly to broadly rounded or rarely broadly cuneate, calyx limb 0.4–0.9 mm long. **Corolla** deep pink to salmon pink and often flushed green, or pale green flushed pink, occasionally pale green, broadly urceolate, 3.0–5.5 × 4.5–9.0 mm, usually distinctly wider than long, glabrous, lobes 5, green to greenish white, 0.6–1.5 × 1.0–2.2 mm. **Stamens** 2.2–3.6 mm long, filaments ca. 0.7–1.6 mm long, glabrous, anthers 1.8–2.9 mm long, thecae 0.8–1.5 mm long, tubules 0.7–1.6 mm long, spurs borne at base of tubules, up-angled, curved, 0.7–1.2 mm long. **Style** 3.3–6.0 mm long, included or exserted from corolla 0–1.6 mm. **Fruit** dark purple to nigrescent, 4–14 × 5–16 mm, glaucous or not glaucous, disk 2.0–3.3 mm diam.

Phenology.—Flowering late March to mid-July; fruiting early June to early November.

Distribution and habitat.—Across much of northern Eurasia, from Iceland east to northern Krasnoyarsk Krai, Russia, southeast to the coast of the Russian Far East, west through northern Mongolia, northern Xinjiang Province, China, and northern Kazakhstan to Iberia; disjunct in the Caucasus Mountains, the southern Balkans, and northwestern Türkiye; from 0 to 2840 m elevation; coniferous forests, mixed forests, deciduous forests, heathlands, and tundra.

Chromosome number.— $2n = 2x = 24$ (diploid).

Illustrations.—Hess et al. 1970; Guinochet & de Vilmorin 1982; Stace 2019.

Notes.—No attempt has been made here to assess the justification for recognizing infraspecific taxa named within *Vaccinium myrtillus* of Eurasia [var. *artvinense* Akpulat & Eminag, Ann. Agrar. Sci. 8(1):145. 2010; and subsp. *compactum* Timoschok, Sist. Zametki Mater. Gerb. Krylova Tomsk. Gosud. Univ. 91:3(–4). 2000].

From iNaturalist and physical specimens, I have only seen 5-lobed corollas in *Vaccinium myrtillus*. Reports of 4-lobed corollas (Shishkin & Bobrov 1967; Hess et al. 1970; Sell & Murrell 2014) might be based on misidentifications of *V. uliginosum*, *V. vitis-idaea* L., or *V. × intermedium* Ruthe, or the rare occurrence of 4-parted corollas, as can occur occasionally in other species of *Vaccinium* with typically 5-parted corollas.



FIG. 7. The lectotype of *Vaccinium myrtillus*, C. von Linné s.n. (LINN-HL497-1). Source: The Linnean Society of London, LINN-HL497-1. CC BY-NC 4.0.

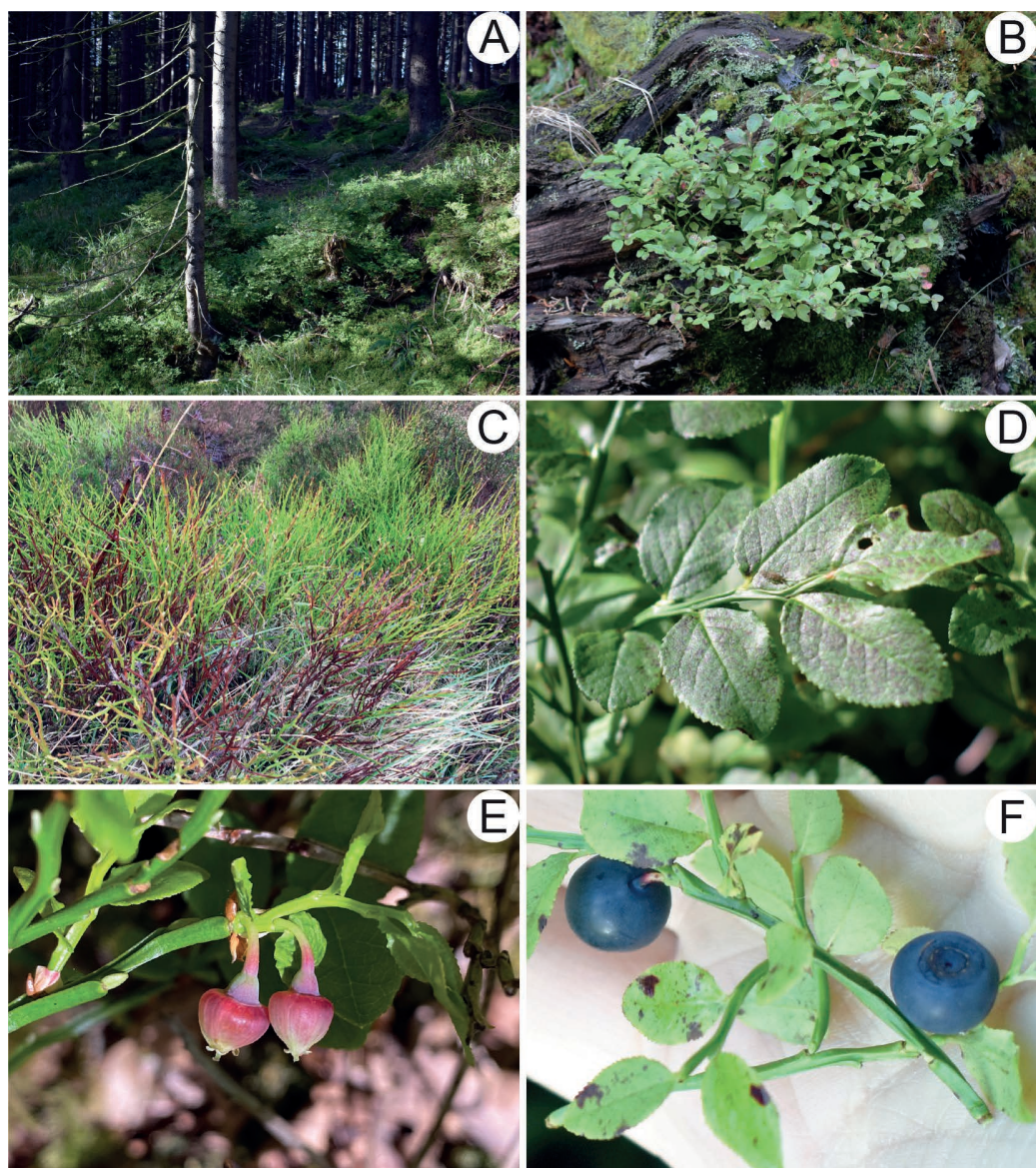


FIG. 8. *Vaccinium myrtillus*. A. Example of habitat, coniferous forest, Czech Republic. B. Habit. C. Habit, nearly leafless winter condition in heathland, Ireland. D. Branchlet with leaves in adaxial view. E. Branchlets with two flowers, United Kingdom. F. Branchlets with two fruits. Photos: A, B, D, F, Manuela Dal Forno; C, P.W. Fritsch; E, © Wendy Herniman, CC BY 4.0. <https://www.inaturalist.org/photos/500112985>.

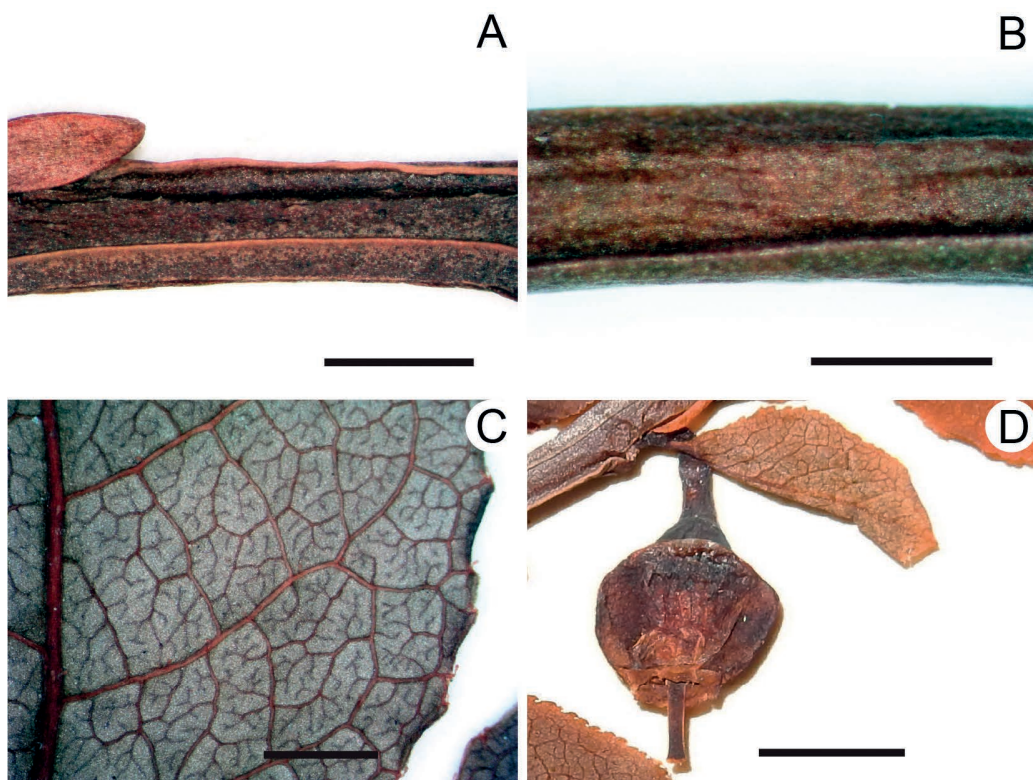


FIG. 9. *Vaccinium myrtillus*. A. Stem, second-year branchlet. B. Stem, first-year branchlet. C. Leaf surface, abaxial view. D. Flower. (scale bars, A, C = 2 mm, B = 1 mm, D = 3 mm). A, C, May 1937, *H. Iltis* s.n. (SMU BRIT1105696); B, *M.T. Sharples* 1234 (COLO 02170744); D, *M.T. Sharples* 1168 (COLO 02170652).

Representative specimens examined.—AUSTRIA. UPPER AUSTRIA. Aistersheim, without date, *Keck* s.n. (NY).

CZECHIA. HRADEC KRÁLOVÉ REGION. Krkonoše National Park, along road toward mtn. cottage “Patejdlova bouda,” a facility belonging to the Faculty of Science, Charles University, 932 m, 50.75444°, 15.59444°, 30 Sep 2021, *M. Dal Forno* 4092 (BRIT BRIT1105695).

SOUTH BOHEMIAN REGION. Blatná District, village of Chobot, 450 m, 9 Jul 1970, *B. Deylová* 399 (NY). **VYSOČINA REGION.** Darskoteich, near Saar [Žďár nad Sázavou], 50 km WNW of Brno, Moravia, May 1937, *H. Iltis* s.n. (SMU BRIT1105696).

DENMARK. CENTRAL DENMARK REGION. Overskov at Skørting, ca. 20 km W of Aarhus, central Jutland (TBU-district 21), 22 Apr 1974, *H. Balslev* s.n. (NY); Trøld sø near Hampen sø, ca. 25 km SW of Silkeborg in central Jutland lakeland (TBU-district 20), 22 Sep 1974, *H. Balslev* s.n. (NY); Hald Ege at Viborg, 10 May 1966, *B. Øllgaard* & *P. Pedersen* s.n. (SMU BRIT1105707, COLO 02533149). **FAROE ISLANDS.** Sandoy, 37, Høvdahagi, 300 m, 28 Jul 1960, *Vascular plants* 4203 (VDB BRIT446314).

FINLAND. KAINUU REGION. Puolanka, Puokio, Utavaara, along road to Saarijärvi, ca. 1 km E of jct. with the Puolanka road, 205 m, 9 Jun 1979, *M. Ohenoja* s.n. (COLO 02533222); N of Puolanka (northern middle Finland), 10 Jul 1952, *H. Wagner* s.n. (NY 04206135).

LAPLAND REGION. Lapponica kemensis, in pasenis ad pagum Muonio Kyrkoby, 68°N, 30 Jun 1924, *J. Montell* s.n. (NLU NLU0142182).

NORTH OSTROBOTHNIA REGION. Oulu, 65°N, 25 Jun 1961, *P.S. Jokela* s.n. (COLO 20533115, NY); Ylikiminki (Oulu), Huuonjärvi Lake, halfway Kiviharjuntie, 20 Jun 1963, *P.S. Jokela* s.n. (COLO 02533073). **NORTHERN SAVONIA REGION.** 7.5 mi N of Suveka, 0.5 mi SW of lake Tavilampi, off of Haapaklujuntie Road, 182 m, 63.96426°, 27.36495°, 8 Jul 2015, *M.T. Sharples* 1197 (COLO 02170678).

SOUTHWEST FINLAND REGION. Varsinais-Suomi (Ab), Raisio, Kuloinen, 100 m W of the school, 3 Jun 1964, *T. Laine* s.n. (NLU NLU0142183); Parainen, ydmo [Sydmo], Mustfinnō [Mustfinn], NW side of lake, N of Santala farmstead, 60.3°, 22.1°, 7 Jun 1977, *T. Lemianinen* & *O. Ravanko* s.n. (NY); Varsinais-Suomi (Regio aboensis, V/Ab), Korppoo, Jurmo Island, 10 Jul 1952, *H. Luther* s.n. (NLU NLU0142181). **UUSIMAA REGION.** Nylandia, Helsinki, Laajasalo, 6 Jun 1972, *A. Haakana* s.n. (NY).

FRANCE. AUVERGNE-RHÔNE-ALPES REGION. Haute-Savoie Department: Pitons du Salève near Geneva, Jul 1865, *H. Bernet* s.n. (NY). **Puy-de-Dôme Department:** Puy de Dôme, 12 Jun 1935, *J. Butler* s.n. (NY). **BOURGOGNE-FRANCHE-COMTÉ REGION. Saône-et-Loire Department:** Roussillon (Saône-et-Loire), Grand Mizieux, 1 May 1871, *D. Gillot* s.n. (NY). **BRITTANY REGION.**

Morbihan Department: Forêt de Carnset, 8 Jul 1934, *J. Butler s.n.* (NY). **NORMANDY REGION.** **Orne Department:** Écouves, 10 May 1909, *A.L. Letacq s.n.* (COLO 02533131).

GEORGIA. ABKHAZIA AUTONOMOUS REPUBLIC. **Gudauta District:** Western Caucasus, near Mzymt [Mzymta] Lake, 1800–2000 m, 24 Jun 1977, *V. Vašák s.n.* (COLO 02533180). **Gulripshi District:** Western Caucasus, near village of Saken, Mt. Khasan-tub, place called Skimer, 1400–1600 m, 10 Jun 1981, *V. Vašák s.n.* (COLO 02533172); near village of Saken, NE slope of Mt. Lachult, 1600–2000 m, 14 Jul 1981, *V. Vašák s.n.* (COLO 02533214). **ADJARA AUTONOMOUS REPUBLIC.** Sarbiela Mtn., 2200 m, 27 Jun 1952, *A.K. Skvortsov s.n.* (MHA MHA0224889). **GURIA REGION.** Western Caucasus, district Chokhatauri, near village of Bakhmaro, Meskhadski [Meskheti] Range, NE slope of Mt. Sakornia, 2000–2400 m, 20 Jul 1980, *V. Vašák s.n.* (COLO 02533198). **KAKHETI REGION.** Kavareli, Lagodekhi Nature Reserve, Malyy Chochal Ridge, 2300 m, 18 Jun 1971, *E.E. Gogina* 2258 (MHA MHA0224878). **Lagodekhi District:** Lagodekhi Reserve, below spring along trail leading from field station to summit and Gung Chi, 41.87483°, 46.37532°, 1 Jul 2003, *D.E. Atha* 3860 (NY). **MTSKHETA-MTIANETI REGION.** Along trail from Tsminda Sameba (The Holy Trinity Church) to the Meteorological Station on the SE base of Kazbegi Peak, around and above a spring and campsite just N of a southern branch of the Chkheri River S of Glacier Gergeti, ca. 6.75 air km W of Kazbegi, 9 Aug 2005, *J. Reveal* 8654 (NY 01158765). **Kazbegi District:** Kazbegi region (The Central Caucasus), Chkheri River gorge, between Sameba Church and Gergeti Glacier, 20 Sep 2003, *O. Abdaladze* 187 (NY 02211325). **RACHA-LECHKHUMI AND KVEMO SVANETI REGION.** Road to Mamisoni Pass, 2200 m, 21 Jul 1971, *L.S. Plotnikova & Smirnova s.n.* (MHA MHA0224881). **REPUBLIC OF SOUTH OSSETIA.** NE part, South Ossetian meadow station, middle German gorge, 3 Jul 1988, *M.V. Kostina s.n.* (MHA MHA0224877). **SAMTSKHE-JAVAKHETI REGION.** Akhalkalaki, 21 Aug 1938, *Mgaloblishvili s.n.* (MHA MHA0224887).

GERMANY. Mt. Sytro, 15 May 1882, *A.E. Lomax s.n.* (ex herb. C.H. Sylvester) (NY). **BAVARIA STATE.** Hohenfels Training Area C, CERL Transect #54, UTM 7132-54572k, 17 Jul 1988, *S.L. Hatch & J.K. Wipff* 5531 (NLU NLU0141082); mtns. between Kempten and Lindau, 4 May 1845, *Meisner s.n.* (NY). **BERLIN STATE.** Berlin, Tegel, Jun 1879, *C. Müller & W. Retzdorff s.n.* (NY); Berlin, May 1933, *A. Guyot s.n.* (NY). **HESSE STATE.** **Vogelsbergkreis District:** Oberhessen, Kreis Lauterbach, Hoher Rodskopf, near Forellenteichen, 26 May 1963, *H. Hupke s.n.* (SMU BRIT1105709). **MECKLENBURG-VORPOMMERN STATE.** **Vorpommern-Rügen District:** Prerow, 17 Jul 1918, *R. Gross s.n.* (SMU BRIT1105699). **NORTH RHINE-WESTPHALIA STATE.** **Aachen District:** Monschau, Eifel region, 6 May 1960, *E. Meijer Drees* 44 (SMU BRIT1105703).

ICELAND. AUSTURLAND REGION. Seyðisfjörður, S of the path just beyond the bridge, 65.294447°, –13.700761°, 3 Jul 2019, *A. Elewski* 36 (NY 04206337); Grjótháls [Hill], 27 Jul 1910, *H. Jónsson* 568 (NY). **BORGARFJARÐARSÝSLA REGION.** Andakill Parish, Brekkufjall, 180 m, 25 Jun 1949, *A. & D. Löve* A0316 (COLO 02533164). **WESTFJORDS REGION.** Cliffs of Bildudalur, 17 Jul 1937, *G. Þorlákss s.n.* (NY 02547172).

IRELAND. County Antrim: Glynn, 8 Apr 1878, *S.A. Stewart* 5793 (NY).

ITALY. Piedmont Region: Turin Metropolitan City, Cuorné, località Valassa, 400 m, 5 May 1988, *R. Camoletto s.n.* (NY). **Tuscany Region:** Appenino del Casentino, 24 May 1871, *without name s.n.* (NY).

KAZAKHSTAN. EAST KAZAKHSTAN REGION. **Altai District:** Zyryan District County, ca. 11 mi S of Ridder, 50.19241°, 83.59916°, 4 Aug 2015, *M.T. Sharples* 1227 (COLO 02170710).

LATVIA. Latgale Historical Lands, 31 Jul 1970, *L.S. Plotnikova s.n.* (MHA MHA0146857).

NETHERLANDS. Gelderland Province: along road from Berg en Dal to Wyler, vicinity of Nijmegen, 29 Apr 1959, *T.W.J. Gadella et al. s.n.* (NY); Wyler Estate near Berg en Dal, vicinity of Nijmegen, 21 May 1956, *P. Kokke & A.J.M. Leeuwenberg* 299 (SMU BRIT1105704, NY); vicinity of Beek near Nijmegen, 24 Apr 1949, *E.A. Mennega s.n.* (SMU BRIT1105702, NY). **Limburg Province:** St. Jansberg, hill near Plasmolen, vicinity of Mook, 4 May 1960, *W.H.A. Hekking* 845 (NLU NLU0142180).

NORWAY. Innlandet District: Gudbrandsdal District, Opland, Sel, Hovringen in Norway, 15 Aug 1962, *B. Osburn & E. Dahl s.n.* (COLO 02533123). **Møre og Romsdal Co.:** above Geiranger, 1524 m, 6 Jul 1969, *L.M. Andrews* 662 (NY); mtn. slope overlooking Molde Fjord, Molde, 21 Jul 1936, *E.T. Moldenke & H.N. Moldenke* 9433 (NY). **Oslo Co.:** Lake Sognsvann, near Oslo, 20 May 1971, *J. Fryxell* 1 (NY). **Troms Co.:** Baldwin, Ziegler Polar Expedition, Tromsø [Tromsø], 26 Jun–16 Jul 1901, *R.L. Shainwald s.n.* (NY). **Vestland Co.:** Bergen Fylke, falls on railroad line from Flåm to Myrdal, 20 Jun 1978, *P.P. Lowry* II 1255 (NY).

POLAND. LESSER POLAND VOIVODESHIP. Limanowa Co.: Carpathian Mtns., Mt. Beskid Wyspowy, between Widoma and Laskowa, 7 May 1970, *A. Jasiewicz & L. Frey s.n.* (BRIT BRIT1105698, COLO 02533156). **Myslenice Co.:** Plebańska Góra Mt. near Myslenice (Western Carpathians - the Beskid Makowski Mts.), ca. 470 m, 49.825°, 19.925°, 6 May 2006, *W. Bartoszek s.n.* (NLU NLU0453718, NLU NLU0454456); Mt. Strzebel [Szczebel] near Lubień, 650 m, 49.70°, 20.02°, 4 May 1972, *H.T. Tacik s.n.* (NLU NLU0455707, COLO 02533024). **Wadowice Co.:** Jaroszwicka near Wadowice, 400 m, 49.833°, 19.550°, 6 May 2006, *K. Kozłowska s.n.* (NLU NLU0455567).

LOWER SILESIAN VOIVODESHIP. Kłodzko Co.: Lower Silesia, Spalona area, Bystrzyca Kłodzka, 20 May 1958, *S. Golowin* 163 (NY).

RUSSIA. Mtns. of Dahuriae [Dauria], 1832, *N. Turczaninow s.n.* (NY 04367155). **ALTAI KRAI. Barnaul Urban District:** around South Siberian Botanical Garden, 189 m, 53.26587°, 83.67448°, 17 Aug 2015, *M.T. Sharples* 1274 (COLO 02170694). **ALTAI REPUBLIC. Ongudaysky District:** 3–4 km E of Seminsky Pass, 1780 m, 51.04894°, 85.65987°, 11 Aug 2015, *M.T. Sharples* 1234 (COLO 02170744). **Shebalinsky District:** Gorno-Altaysk Autonomous Region, Altai Mts., ca. 90 km SSW of Gorno-Altaysk, drainage of the Sema River, WNW slope not far N of Seminsky Pass, 7 Jul 1988, *A. Cronquist et al.* 12153 (NY 04367151); Gorno-Altaysk Autonomous Oblast, Syeminsky [Seminsky] Pass, 1760 m, 19 Aug 1978, *T.S. Elias et al.* 4266 (NY 04367149); Schebalino, Onghudaj, Ust-Koksa, Ust-Ulagan, Kosch-Agatsch, 1100 m, 10 Sep 1972, *L. Plotnikova et al.* 329 (MHA MHA0391410). **Ust-Kansky District:** Mul'ta near Nizhneye-Multinskoye Lake, 1400 m, 50.0°, 85.8°, 28 Aug 1983, *I.M. Krasnobor s.n.* (COLO 02533032). **ARKHANGELSK OBLAST. Pinezhsky District:** 2 km SE of Pirinerm Elnik on the right bank of Pinega River, 64.21627°, 44.26229°, 22 Aug 2015, *L. Abramova et al. s.n.* (MHA MHA0008971). **IRKUTSK**

OBLAST. Slyudyansky District: 15 Aug 1951, [collector name illegible] s.n. (MHA MHA0391415). **KARACHAY-CHEKES REPUBLIC.** Teberda Nature Reserve, Gitche-Murudzhu, 13 Aug 1976, T.N. Evtyukhova s.n. (MHA MHA0224883); Dombay, Teberda Nature Reserve, 8 Aug 1971, L.S. Plotnikova & Smirnova s.n. (MHA MHA0224882). **KRASNODAR KRAI. Tuapsinsky District:** 1300 m, 29 May 1992, V.P. Ternovoy s.n. (MHA MHA0224884). **KRASNOYARSK KRAI. Evenkiysky District:** Podkamennaya Tunguska River, 25 Jun 1967, E. Meshkova 88 (MHA MHA0391414); **Tungusko-Chumsky District:** Tunguska meteorite impact site, 6 Jul 1961, V.I. Nekrasov s.n. (MHA MHA0391411). **LENINGRAD OBLAST. Priozersky District:** ca. 1.25 mi SE of Orekhova [Orekhovo] village, 0.25 mi E of Lake Borkova [Borkovo], 88 m, 60.48541°, 30.29417°, 17 Jun 2015, M.T. Sharples 1168 (COLO 02170652). **MARI EL REPUBLIC. Zvenigovsky District:** 5 km NE of Zvenigovo, 55.98672°, 48.90195°, 28 May 2017, P. Volkova & L. Abramova s.n. (MHA MHA0009028). **MURMANSK OBLAST.** Kola Peninsula, 29 Jun 1985, Proskuryakova s.n. (MHA MHA0146886). **Kandalakshsky District:** Luvenga, western outskirts of Yelnik near road to Umba, 67.10232°, 32.72027°, 12 Aug 2015, L. Abramova & P. Volkova s.n. (MHA MHA0008951). **Kirovsky District:** vicinity of Kirovsk on left bank of Vudjavriok [Vud'Yavryok] River adjacent to Hortum Botanicum Polarem [Polar-Alpine Botanical Garden], Aug 1936, M. Kaczurin s.n. (NY 04367152). **NOVGOROD OBLAST. Okulovsky District:** near village of Melnitsa, 17 Sep 1976, A.A. Davydova s.n. (MHA MHA0146847, NY). **NOVOSIBIRSK OBLAST. Novosibirsk City:** Akademgorodok, Ob River, 15 Aug 1978, T.S. Elias et al. 4045 (COLO 02533057, NY 04367153). **REPUBLIC OF ADYGEA. Maykopsky District:** upper reaches of Belaya River, Oshten Mtn., 2600 m, 18 Jul 1968, E.E. Gogina 111 (MHA MHA0224893). **REPUBLIC OF BASHKORTOSTAN. Duvansky District:** 13 Jun 1966, A.P. Khokhriakov & M.T. Mazurenko s.n. (MHA MHA0146873). **REPUBLIC OF BURYATIA. Kurumkansky District:** Barguzinsky Range near Shamanka, 1500 m, 13 Aug 1988, I.M. Krasnoborov 802 (MHA MHA0391416). **REPUBLIC OF DAGESTAN. Tlyaratinsky District:** N slope of Mt. Arabek, 2100 m, 27 Jun 2021, P. Volkova & N. Tikhomirov s.n. (BRIT BRIT698168); 0.5 km NE of Salda, 2400 m, 25 Jun 2021, P. Volkova & N. Tikhomirov s.n. (BRIT BRIT698169). **REPUBLIC OF KARELIA. Medvezhyegorsky District:** coast of the Povenets Bay, village of Fedotovo, 13 Jul 1981, T.N. Ulyanova et al. 836 (NY 04367148). **REPUBLIC OF NORTH OSSETIA-ALANIA. Alagirsky District:** valley of Tseydon River, 24 Jul 1971, L.S. Plotnikova & Smirnova s.n. (MHA MHA0224885). **TOMSK OBLAST. Tomsky District:** near town of Tomsk, 18 Jul 1923, L. Sergievskaja s.n. (NY 04367154). **TUVA REPUBLIC.** Upper right bank of Yenisei Basin, Kopto Mine and vicinity, 12 Jul 1975, I. Krasnoborov & G. Yakovleva 1488 (MHA MHA0391409). **Chedi-Kholsky District:** Khovu-Aksy, N slope of ridge, Tannu-Ola Mtns., 1700 m, 10 Jul 1973, V. Khanminchun & D. Shaulo 771 (MHA MHA0391408). **Kaa-Khemsky District:** N slope of the Khorumnug-Taiga Ridge, 5 km W of Odroek-Taiga River, 2 Aug 2016, P. Volkova et al. s.n. (MHA MHA0391407). **TYUMEN OBLAST. Yamalo-Nenets Autonomous Okrug:** Krasnoselkupsky District, Sidorovsk, 22 Jun 1950, Voynitsky s.n. (MHA MHA0391412); Priuralsky District, Polar Urals, upper reaches of Khadata River (Shchuchya River), 400 m, 26 Jul 1964, A.K. Skvortsov et al. 10713 (MHA MHA0391413). **YAROSLAVL OBLAST.** Pereyaslavl [Pereaslavl-Zalessky], 1 km W of the ESTC meteorological station, 20 Jun 1994, N. Prilipsky s.n. (COLO 02533065).

SPAIN. Principality of Asturias: La Bobia [La Bovia], 18 Jul 1956, E. Carreira s.n. (NLU NLU0142177).

SWEDEN. Ängermanland, Nora su., Hörnökrången, 10 Jun 1957, E. Evers s.n. (NLU NLU0142176, SMU BRIT1105710); Nerike [Närke traditional province], May 1868, P. Larson s.n. (NY); Upland, 22 May 1883, Shredholm [spelling?] 1484 (NY). **Dalarna Co.: Leksand & Siljansnäs, 1919, A. Ericsson s.n. (NY). **Gävleborg Co.:** Hälsingland, Loos [Los], 1895–1906, R. Thelander s.n. (NY); Hälsingland, Hudiksvall, Östbergsskogen, 15 Jun 1954, A.F. Westerlund s.n. (SMU BRIT1105701). **Kronoberg Co.:** Smolandia, Gäröby, 14 Jun 1882, P.A. Svensson s.n. (COLO 02533107); Grimslof [Grimslov], May 1901, T. Vijell s.n. (NY). **Norrbotnen Co.:** Torne Lappmark, Jukkasjärvi Parish, Lake Torneträsk District, Abisko, W of the Natural Science Research Station, 350 m, 21 Jun 1952, C.G. Alm 1288 (NY); Mt. Muolja near Abisko, Swedish Lappland, 450 m, 23 Jul 1950, E.T. Moldenke & H.N. Moldenke 20745 (NY); Torne Lappmark, Kiruna, Torneträskområdet, Vabbe-Ljäckr, 2 lun SV p 993, Hrdsbog, 3 Aug 1952, Å. Persson s.n. (NLU NLU0142178). **Skåne Co.:** Jonstorp s.n., Svanshall, 21 May 1966, C.M. Norrman s.n. (NY). **Södermanland Co.:** Strängnäs Parish, Långberget, 20 May 1915, V. Samuelsson s.n. (COLO 02533206). **Stockholm Co.:** Bromma, Stockholm, 15 Jul 1950, A.L. Moldenke & H.N. Moldenke 20646 (NY); Södermanland, Överenhörna, Horn, 1896, J. Strandberg s.n. (NY); Uppland, Lidingö City, Ekholmsnäs, 4 Jun 1958, W.A. Weber 10686 (COLO 02533040). **Uppsala Co.:** Hargshamn (70 km NE of Uppsala), edge of the sea, 7.6 m, 60.25°, 18.30°, 25 May 1967, R. Gaulthier 11423 (NLU NLU0142206); Gamla Uppsala, 7 May 1959, C.M. Norrman s.n. (SMU BRIT1105700). **Värmland Co.:** Vermlandia, Sunne, Bergahöjden, 15 Jul 1913, H.A. Fröding s.n. (NLU NLU0142179). **Västerbotten Co.:** Åsele Lappmark, Blaikfjället, 4 Jul 1913, J.G. Gunnarsson s.n. (NY). **Västra Götaland Co.:** Västergötland, par. Toarp, Slätthult, 5 Jul 1919, A.O. Olson s.n. (SMU BRIT1105697); Tädene, Storeberg, 25 Jun 1936, A. Stalin s.n. (NY); Skallsjö Parish, 5 Jun 1899, C.G.H. Thedenius s.n. (NY); Kåsjön (Västergötland), 10 Jul 1923, O. Valentine s.n. (NY).**

SWITZERLAND. Vaud Canton: Jorat, Jorat d'Echallens, 29 Apr 1952, P. Villaret 13029 (SMU BRIT1105705).

TÜRKIYE. GÜMÜŞHANE PROVINCE. Armenia turcica, Szandschak Gümüşchkhane [Gümüşhane], Artabir: Kalis-baschi-Orman, 29 Jul 1894, P. Sintenis 6298 (BRIT BRIT1150590).

UKRAINE. LVIV OBLAST. Yavoriv District: Ivano-Frankove, Sosnovy, 3 Jun 1976, O. Procyk s.n. (MHA MHA0146866). **RIVNE OBLAST. Rivne District:** RSSUcr, dit. Rovensciens, distr. Kljevanj [Klevan], pr. pag. Zumanj, 22 Jun 1957, M. Kotov s.n. (NY).

UNITED KINGDOM. ENGLAND. North West England: Holker Moss, N. Lancs [Lancashire], 19 Apr 1889, T.W. Edmondson s.n. (NY). **South East England:** Woods O'Heather, Sussex, Jul 1875, H.E. Fox s.n. (BRIT BRIT528909); Europe, without date, A.H. Haworth s.n. (NY); Leith Hill, Surrey, 6 Sep 1936, E.T. Moldenke & H.N. Moldenke 9247 (NY). **West Midlands:** Shropshire, near Ratlinghope, Wild Moor, The Long Mynd, V.C.40, 7 May 1980, M. Chorley s.n. (NLU NLU0142184). **Yorkshire and the Humber:** Rambalds Moor, Skipton-in-Craven [Skipton], W. Yorkshire, 274 m, 7 Jun 1884, T.W. Edmondson 1032 (NY); 6 mi S of Kettlewell, 29 Jul 1987, R.W. Kelting 87-36 (BRIT BRIT792942). **SCOTLAND.** s.d., C.M. Lemann s.n. (NY). **Dunbartonshire:** near Cumbernauld, 106 m, 3 May 1957, P.S. Green s.n. (SMU BRIT1105708). **Midlothian:** near Edinburgh, J. Ball 183 (NY). **North Ayrshire:** Buteshire County, [Isle of Arran,] ca. 2.5 mi from the A841,

up the NW approach to Mullach Buidhe, 518 m, 10 Jun 1973, L.J. Tuttle 90 (NY 04417412). **WALES. Carmarthenshire:** Cwmdau, Breconshire, Vice-County 42, 1 May 1954, J.W. Davies s.n. (SMU BRIT1105706). **Powys:** along Hwy. A470 ca. 10 mi S of Brecon, Brecon Beacons National Park, mtns. N of Cardiff, 457 m, 14 Aug 1998, L.E. Brown 22636 (NLU NLU0142185); North Wales, Tanat Valley, 29 Aug 1938, W.H. Welch 5561 (NY).

3. *Vaccinium yatabei* Makino, Bot. Mag. (Tokyo) 15:141. 1901 (**Figs. 1, 10–12**). *Vaccinium myrtillus* var. *yatabei* (Makino) Matsum. & Komatsu in Matsum., Icon Pl. Koisik. 1:51, t. 31. 1912. TYPE: JAPAN [Tochigi Prefecture]: Shimotsuke, Nikkō, Jul 1877, R. Yatabe s.n. (LECTOTYPE, designated by Vander Kloet & Dickinson 1999 [or perhaps HOLOTYPE]: TI 00353748 [image!]).

Description.—**Shrublet**, deciduous, 1.1–1.5(–3.0) dm tall, probably clonal, sprawling. **Branchlets** 2-winged, sparsely white-puberulent in patches (at some nodes), trichomes erect and generally straight to incurved-uncinate, up to 0.05 mm long, second-year branchlets in sicco reddish brown to grayish brown, generally zigzag and strongly twisted, 0.3–0.8 mm wide, wings 0.4–0.6 mm wide, stem width/wing width ratio 0.5–1.6. **Leaves:** petiole 0.4–1.0 × 0.3–0.5 mm, abaxial surface glabrous or often sparsely stipitate-glandular distally, adaxial surface slightly white-puberulent at least distally, trichomes generally erect and straight to incurved-uncinate; blades elliptic to ovate, 1.4–2.0(–2.5) × 1.0–1.3(–1.5) cm, chartaceous, dull to slightly shiny on both sides, abaxially with scattered appressed stipitate-glandular trichomes at least when young especially along major veins (stipitate glands up to 0.20 mm long, ± oriented toward distal end of leaf, stipes generally translucent, heads pale to dark orange, elongate), otherwise glabrous, adaxial surface puberulent with white simple trichomes along midvein and occasionally on major veins on proximal half of blade or occasionally farther distally or occasionally throughout, occasionally stipitate-glandular proximally on midvein and major veins, base broadly cuneate to rounded or truncate, slightly attenuating into petiole, margin serrulate, 22- to 34-toothed per side, planar, apex acute to obtuse or rarely subrounded, marginal teeth tipped by translucent to orangish brown stipitate-glandular trichomes, trichomes to 0.18 mm long, oriented toward apex but often incurved, borne at outer edge of each tooth, midvein and secondary veins tawny to cinnamon abaxially, midvein raised abaxially, slightly raised adaxially, secondary veins slightly raised on both sides, 4 to 9 on each side of midvein, meeting in intramarginal loops or otherwise anastomosing well away from margin, reticulate veins slightly raised on both sides, forming closed loops to ca. 1.0 mm diam. **Flowers** opening *slightly before leaf expansion* or when leaves 0–ca. 50% expanded. Pedicels 1.3–2.0 × 0.4–0.5 mm, glabrous. **Hypanthium** cupuliform to nearly obconic, 0.5–1.3 × 2.0–2.7 mm, not glaucous, base broadly cuneate, calyx limb annular-undulate, 0.6–0.8 mm long. **Corolla** *pale greenish white or greenish yellow*, broadly urceolate, 4.0–5.0 × 4.4–7.0 mm, generally wider than long, glabrous, lobes 5, *pale greenish white or greenish yellow*, 0.7–1.2 × 0.5–1.6 mm. **Stamens** 3.0–3.5 mm long, filaments ca. 1.7–1.9 mm long, glabrous, anthers 2.0–2.5 mm long, thecae 0.7–1.2 mm long, tubules 1.0–1.4 mm long, spurs borne at base of tubules, up-angled, curved, 0.8–1.2 mm long. **Style** 5.2–6.5 mm long, exserted from corolla 0.5–2.5 mm. **Fruit** bright red, ca. 9 × 7 mm, not glaucous, disk ca. 2.5 mm diam.

Phenology.—Flowering late May to mid-June; fruiting early July to mid-September.

Distribution and habitat.—The island of Honshu, Japan; (700–)1200–2570 m elevation; coniferous forests.

Chromosome number.—Not documented.

Illustrations.—No published illustrations are known.

Notes.—The only original material of *Vaccinium yatabei* known to me is the specimen R. Yatabe s.n. at TI (00353748; Fig. 10). “R. yatabe” is written on this specimen, and although the collection is cited in the protologue, no herbarium was indicated. If this is the only specimen of this gathering, then it can be considered the holotype. If there is more than one specimen, then, unless there is more than one specimen at TI, Vander Kloet & Dickinson (1999) effectively lectotypified *V. yatabei* on this specimen (McNeill 2014). There appears to be only a single specimen of this collection at TI (D. Tavares Vasques, TI herbarium, pers. comm.).

Representative specimens examined.—**JAPAN. Fukushima Prefecture:** Iwashi Province, Oze, 9 Jul 1905, *without collector s.n.* (LY LY0405354 [image!]); Numayama Pass, Oze, Hinoemata Village, 1680–1760 m, 36.93°N, 139.20°E, 27 Jul 1967, T. Abe s.n. (BRIT BRIT698164).

Gunma Prefecture: Mt. Keizuru, Oze, Tokura, Katashina Village, 1420–2000 m, 36.95°N, 139.20°E, 4 Jun 1969, T. Abe s.n. (BRIT BRIT698167);



FIG. 10. The lectotype of *Vaccinium yatabei*, R. Yatabe s.n. (TI 00353748). Source: University of Tokyo Herbarium. Used by permission.

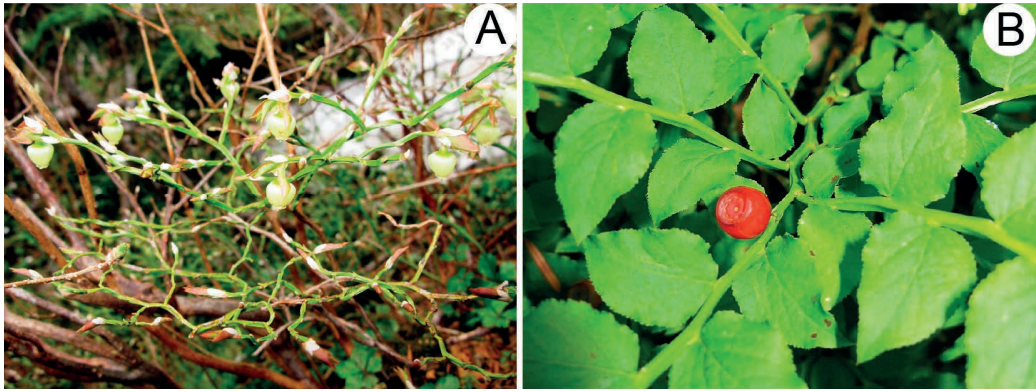


FIG. 11. *Vaccinium yatabei*, Mt. Hiuchi, Japan. A. Branchlets with flowers. B. Branchlets with fruit. Photos: © Qwert1234, CC BY-SA 3.0. https://commons.wikimedia.org/wiki/File:Vaccinium_yatabei_3.JPG, https://en.wikipedia.org/wiki/Vaccinium_yatabei#/media/File:Vaccinium_yatabei_4.JPG.

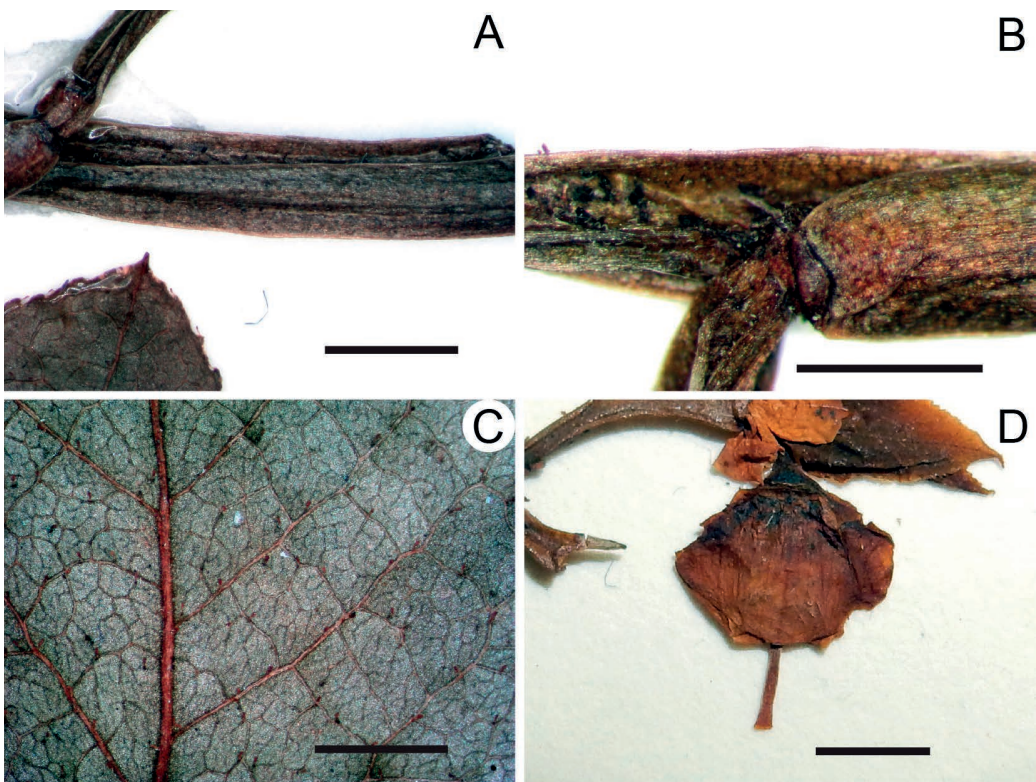


FIG. 12. *Vaccinium yatabei*. A. Stem, second-year branchlet. B. Stem, first-year branchlet. C. Leaf surface, abaxial view. D. Flower. (scale bars, A, C = 2 mm, B = 1 mm, D = 3 mm). A, B, 8 August 2014, *T. Abe s.n.* (BRIT BRIT698166); C, 27 July 1967, *T. Abe s.n.* (BRIT BRIT698164); D, 4 June 1969, *T. Abe s.n.* (BRIT BRIT698167).

Ken-ga-mine, Mt. Hotaka, Kawaba-yuraba, Kawaba Village, 2030 m, 36.79388°, 139.14336°, 8 Aug 2014, *T. Abe s.n.* (BRIT BRIT698166). **Nagano Prefecture:** Kitaazumino-gun, Shirouma-mura, Mt. Shirouma, 12 Aug 1925, *without collector s.n.* (KAG KAG033990 [image]); Shinano Province, Somazoye-one, Yoki-dake, Mt. Yatsu-gatake, Minami-saku-gun, 1600–2100 m, 3 Sep 1961, *M. Furuse s.n.* (KAG KAG033994 [image]); Prov. Shinano, around Aka-dake Mineral Spring, Mt. Yatsu-gatake range, Chino-shi, 2200 m, 19 Aug 1950, *M. Furuse 22915* (K K006435458 [image]); Shinano Province, Somazoye-one, Yoki-dake, Mt. Yatsu-gatake, Minami-saku-gun, 1600–2100 m, 3 Sep 1961, *M. Furuse 39199* (K K006435460 [image]); Shinano Province, to halfway up from foot of Mt. Kurohime, Kashiwa-bara, Shinano-choo, Kami-mino-chi-gun, 700–1300 m, 13 Sep 1968, *M. Furuse 47000* (K K006435459 [image]); Kiso-gun, Kiso-cho, Shikase, 1300 m, 22 Aug 1951, *S. Hatusima 15262* (KAG KAG033992 [image]); Chino-Shi, Mt. Yatsugatake, 13 Aug 1925, *T. Naito s.n.* (KAG KAG033991 [image]). **Tochigi Prefecture:** Mt. Nikko-shirane, Yumoto, Nikko City, 1600–2570 m, 36.80°, 139.38°, 19 Jul 1985, *T. Abe s.n.* (BRIT BRIT698165); Nikko, *s.d.*, *H. Takeda s.n.* (K K006435461 [image]).

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