

# Botanical Notes

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## ***VIOLA* × *LESMEHRHOFFII*, A NEW VIOLET HYBRID FROM THE NORTHEASTERN UNITED STATES**

The genus *Viola* contains approximately 35 species in the New England region with at least 32 documented hybrids (Haines 2011 and updates). Hybrids have been and continue to be a source of confusion. Hybrids in the genus create taxonomic confusion through several mechanisms. An important issue is that their expressed intermediacy in morphology can appear to close the morphological gaps between species, leading to misunderstanding of species boundaries. As a result, the circumscription of taxa can differ between violet authors based, in part, on misidentifications. This phenomenon has led to the overlooking of a *Viola* hybrid in subsection *Boreali-Americanae* (i.e., acaulescent, cyanic-petaled species) for nearly a century, despite the fact that it was identified early through annotations on museum specimens by the prominent violet researcher Ezra Brainerd.

A critical piece of this taxonomic story is the failure to recognize *Viola pectinata* Bickn. as a distinct species. Due to similarities in flowers and fruits to *V. brittoniana* Pollard, most violet researchers have considered the former conspecific with the latter (though sometimes treated at the rank of forma or variety; Russell 1965, McKinney 1992, Gil-Ad 1997). For examples, Russell considered it a case of genetic dimorphism and McKinney considered it a sporadic form. The fact that *V. pectinata* also is similar ecologically to *V. brittoniana* and occasionally co-occurs with that species also contributed to this violet not being recognized as distinct species. However, *V. brittoniana* and *pectinata* are manifestly different in their leaf blade outline (Figures 1 and 2). *Viola brittoniana* has leaf blades divided into elongate, narrow lobes whereas *V. pectinata* shows unlobed blades that are merely toothed. Additionally, *V. brittoniana* has the margins of the basal lobes subentire to entire, the summer leaves with ovate to triangular-ovate blades. *Viola pectinata*, on the other hand, has teeth becoming more elongate (i.e., more prominent) toward the basal margins and summer blades that are broad-triangular to reniform-triangular. Further corroborating their status as distinct taxa is that these two species form recognizable hybrids with each other (again, nothotaxa that Brainerd diagnosed and annotated on many herbarium collections). These hybrids offer evidence of a distinct genetic identity and, given the intermediacy of the leaf blades, indicate that *V. pectinata* is more than just a form with one or few genes difference between it and *V. brittoniana*. Ballard (2023) provides additional rationale for the recognition of *V. pectinata* as a distinct species.



Figures 1 (left) and 2 (right). 1—leaf blade of *Viola pectinata* during vernal flowering. 2—leaf blade of *V. brittoniana* during vernal flowering.

Landon McKinney, author of several *Viola* treatments, made many annotations at the Gray Herbarium (GH) using a taxonomic scheme that largely ignored hybrids (i.e., his determinations placed hybrid taxa with violet orthospecies). Despite the fact that Brainerd had published extensively on hybridization in *Viola* (e.g., Brainerd 1904a, 1904b, and 1924), McKinney's museum identifications suggested he did not believe interspecific hybridization to be a frequent phenomenon. Consequently, the hybrid between *V. brittoniana* and *V. pectinata* was determined by him as *V. brittoniana* (using the nomenclatural synonym *Viola pedatifida* G. Don subsp. *brittoniana* (Pollard) McKinney), despite several evident differences between the hybrid plants and *V. brittoniana* (described below). To facilitate discussion, the hybrid is here named.

***Viola* ×*lesmehrhoffii* A. Haines**, nothosp. nov.

**Holotype:** United States. Massachusetts. Sherborn, meadows along Charles River, 18 Sep 1898, *Robinson s.n.* (GH!). Figure 3.

**Description:** Rhizomes vertical to ascending, 4.3–5.5 mm thick. Leaves heterophyllous. Summer leaf blades triangular to broad-triangular, lobed, the primary lobes extending 13–65(–72)% of the distance from the margin to the midrib, with lower lobes more coarsely toothed than the upper lobes, acute at the apex, subcordate at the base, 25–42 × 23–47 mm, glabrous, ciliate on the margin, held on petioles 114–125 mm long. Flowers 15–17 mm long, on peduncles 45–130 mm long, with lanceolate, eciliate sepals that are long-acute to acuminate at the apex, with purple petals, the lateral petals and spurred petal pubescent on the adaxial surface with pointed hairs. Capsules 8–11 mm long, green, borne on erect peduncles, the cleistogamous ones with sepal auricles 3–3.4 mm long. Seeds ca. 1.5 mm long.

**Etymology:** This violet nothospecies is named for the late Leslie Mehrhoff of Connecticut, a fellow botanist, friend, and mentor.

**Common Name:** Mehrhoff's violet.

**Paratypes:** United States. Massachusetts. Middlesex County. Sherborn, meadows along Charles River, 11 Sep 1898, *Purdie s.n.* (GH!). Sherborn, wet meadow, 18 Sep 1898, *Williams s.n.* (GH!). Sherborn, 18 Sep 1898,

*Greenman s.n.* (GH!). Norfolk County. Dedham, Charles River Meadows, 4 Aug 1905, *Forbes s.n.* (NEBC!). Dedham, knoll by wells, 23 May 1906, *Forbes s.n.* (NEBC!; #4)



Figure 3. Holotype of *Viola*  $\times$  *lesmehrhoffii*—Robinson s.n. (GH), the upper right label on the sheet. Image used with permission from Gray Herbarium of Harvard University.

Identification of *Viola*  $\times$  *lesmehrhoffii* is facilitated by understanding the morphology of *V. brittoniana*. *Viola brittoniana* is a homophyllous species with lobed leaf blades. The homophyllous refers to all leaf blades being similar in that they are all lobed (early, middle, and late leaves). To contrast this, we can observe a species such as *V. triloba* Schwein., which is a heterophyllous species—the first set of leaves produced in the spring are unlobed and then the later leaves become lobed. *Viola*  $\times$  *lesmehrhoffii* is +/- a heterophyllous species with the first leaves unlobed or scarcely lobed and the later leaves prominently lobed with deep sinuses (though the sinuses are not as deep as in *V. brittoniana*). In *V. xlesmehrhoffii*, the sinuses extend 13–65(–72)% of the distance from the margin to the midrib. In New England collections of *V. brittoniana*, the sinuses extend 61–88% of the distance between the leaf blade margin and the midrib. Additionally, the central lobe is much broader (actually and relatively) in *V. xlesmehrhoffii*, a feature it shares with many other *V. brittoniana* hybrids that have as one parent a species with unlobed leaf blades. Lastly, the tothing of the lobes is more prominent near the base than in *V. brittoniana* (Figure 4). In regard to reproductive structures, *V. xlesmehrhoffii* is similar

to *V. brittoniana*, which is to be expected given that its other parent, *V. pectinata*, is also similar in reproductive characteristics to *V. brittoniana*.



Figure 4. Comparisons of summer leaf blades of *Viola brittoniana* (left), *V. xlesmehrhoffii* (center), and *V. pectinata* (right).

Corroborating the morphological evidence is the fact that both *Viola brittoniana* and *V. pectinata* co-occur at sites where the hybrid has been identified. In fact, they are mixed together on some herbarium sheets. Brainerd also considered these morphologically intermediate plants to be hybrids and annotated those from Sherborn and Dedham, Massachusetts, as *Viola brittoniana*  $\times$  *V. pectinata*. Other botanists realized that these intermediate plants were neither *V. brittoniana* nor *V. pectinata*. For example, the holotype sheet of *V. xlesmehrhoffii* has two collections (one by Robinson and one by Purdie). Both were determined as *V. palmata* L. because the leaf blade outline was clearly not similar to the either of the aforementioned species. Interestingly, collections from Sherborn contain flowering material in September, apparently an anomalous late summer flowering.

One collection labeled as *Viola brittoniana*  $\times$  *V. pectinata* at the Harvard University Herbaria is not this nothospecies: Connecticut. Fairfield County. Stratford, old meadow by salt marsh, 21 May 1910, *Blewitt s.n.* (NEBC!). The subclavate petal hairs and leaf lobes with very few crenations on the lower margin indicate this plant is *V. brittoniana*  $\times$  *V. cucullata* (= *V. xnotabilis* Bickn.). Another collection may be this nothospecies but is not typical and is not a well-pressed specimen: Massachusetts. Norfolk County. Needham, May 1877, *Faxon s.n.* (GH!).

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#### A NEW COMBINATION IN *ELYMUS*

*Elymus* (wild rye) is a small but complicated genus of allopolyploids in New England (Barkworth et al. 2007). Some of the species are polymorphic in respect to spikelet pubescence (specifically, presence/absence of hairs on the glumes and lemmas). In some cases, the different morphotypes have long been recognized as distinct taxa (usually as varieties), whereas in other cases they have been ignored and considered to represent variation that didn't require a formal name. Recently, Haines (2020) named the plants of *Elymus macgregorii* R. Rooks & J.J.N. Campb. with pubescent spikelets and provided brief rationale for doing so.

*Elymus wiegandii* Fern. is a species primarily of the northeast and Great Lakes region of the United States and Canada. In New England, it is chiefly found in rich, mesic soils on terraces adjacent to major rivers. Most of the collections throughout the range demonstrate pubescent spikelets. However, a far less common morphology occurs with glabrous or scabrous glumes and lemmas. This morphology was named as forma *calvescens* by Fernald (1933). It is noted by Bowden (1964) to occur in Manitoba, New Brunswick, and Quebec within Canada and sporadically throughout the range of the species in the United States. Preliminary review of specimens suggests this variety is rare within New England and not found in all the states where this species occurs.

In an effort to create a consistent naming system where similar amounts of morphological variation are afforded similar ranks with the genus *Elymus* and to highlight this potentially rare taxon, the following new combination is made.

*Elymus wiegandii* Fern. var. *calvescens* (Fern.) A. Haines, comb. et stat. nov.

**Basionym:** *Elymus wiegandii* Fern. forma *calvescens* Fern.; *Rhodora* 35: 192. 1933.

**Holotype:** United States. Maine: Somerset County, Dead River, river-intervale, 13 Aug 1896, *Fernald & Strong s.n.* (NEBC!).

**Synonym:** *Elymus canadensis* L. var. *wiegandii* (Fern.) Bowden forma *calvescens* (Fern.) Bowden; *Canadian Journal of Botany* 42: 575. 1964.

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