Viola brittoniana var. *pectinata*

Cut-leaf Coast Violet

Violaceae

Viola brittoniana var. *pectinata* by David Kunz, 2014

***Viola brittoniana* var. *pectinata* Rare Plant Profile**

New Jersey Department of Environmental Protection
State Parks, Forests & Historic Sites
Forests & Natural Lands
Office of Natural Lands Management
New Jersey Natural Heritage Program

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Life History

Two varieties of *Viola brittoniana* have been described: *V. brittoniana* var. *brittoniana* (Britton's Coast Violet) and *V. brittoniana* var. *pectinata* (Cut-leaf Coast Violet). Both are rare and listed in New Jersey (NJNHP 2024). *Viola brittoniana* was first described by Britton (1897) as *V. atlantica* and it was renamed in his honor the following year (Pollard 1898). Only a few years later, *Viola pectinata* was described as a distinct species by Bicknell (1904), who noted that it was similar to *V. brittoniana* in many aspects but had markedly different leaves. Since *V. brittoniana* and *V. pectinata* had overlapping ranges, occupied similar habitats, and were often found growing together, botanists soon began to view them as a single dimorphic species (House 1906, Stone 1911, Russell 1965). Ongoing questions regarding their relationship have resulted in a wide variety of approaches to interpreting their taxonomic status (see Synonyms and Taxonomy section). Recent treatments of the genus place them in *Viola* section *Nosphinium* subsection *Borealiamericanae*, *Pedatifida* group, and *V. pedatifida* appears to be their nearest North American relative (Marcussen et al. 2022, Ballard et al. 2023).

Comparison of *V. brittoniana* var. *brittoniana* (left) and var. *pectinata* (right), Britton and Brown 1913, courtesy USDA NRCS 2025a.

Viola brittoniana var. *pectinata* has short, thick, upright rhizomes and long-stalked (10–30 cm) basal leaves. The leaves are not lobed or divided. The stems and blades are glabrous or nearly so, and the margins of the blades are toothed. The teeth on Cut-leaf Coast Violet are distinctive

because they are longer than wide, with the lowest teeth being considerably larger than those near the leaf tips. At maturity the leaf blades are 6–10 cm wide and 4–6 cm long but they are often narrower relative to their length early in the season. The flower stalks usually surpass the leaves in height. *V. brittoniana* var. *pectinata* flowers have five linear-lanceolate sepals and five purple petals that are white at the base and marked with dark purple lines. The two lateral petals are densely bearded, and the hairs are not clubbed at the tips. Later in the season the plants produce flowers that remain closed (cleistogamous), the stalks of which are often shorter than the leaves. The fruits are oblong capsules 6–13 mm in length. (See Bicknell 1904, Britton and Brown 1913, Fernald 1950, Ballard et al. 2023, Weakley et al. 2024). Although the leaves of *V. brittoniana* var. *pectinata* can distinguish it from other local violets, *Viola* species—including *V. brittoniana*—hybridize frequently so the resulting offspring might cause some confusion (Stone 1903, Brainerd 1906, House 1906 & 1914, Forbes 1909, Dowell 1910, Russell 1965, Ballard et al. 2023).

John Baur, 2018.

David Kunz, 2014.

Viola brittoniana var. *pectinata* produces typical (chasmogamous) flowers from April through June while the cleistogamous flowers appear later in the season (Hough 1983, Weakley et al. 2024). In New Jersey the plants have usually been found in flower during late April or May (House 1905, NJNHP 2024). The fruits of the chasmogamous flowers develop soon after blooming and usually mature by July, while cleistogamous fruits may be present from July through September (Hough 1983, Weakley et al. 2024). House (1905) noted that withered leaf stems can persist on *V. brittoniana* var. *pectinata* for multiple years.

Pollinator Dynamics

Beattie (1974) observed that the morphology of chasmogamous violet flowers allows them to be pollinated by a wide variety of insects. One bee that occurs in the eastern United States, *Andrena violae*, is a specialist pollinator of *Viola* species (Fowler 2016, Fowler and Droege 2020). Generalist bees that have been observed on violets include a variety of *Andrena*, *Apis*, *Augochlorella*, *Bombus*, *Ceratina*, *Dialictus*, *Evylaeus*, *Halictus*, *Lasioglossum*, and *Osmia* species (Stubbs et al. 1992, Holm 2014). Additional pollinators include bee flies, syrphid flies, butterflies, skippers, and hawkmoths (Little and McKinney 2020). Beattie (1971) studied the

way different insects transport *Viola* pollen. He determined that cross-pollination is more likely to occur early in the blooming period and it is carried out mainly by insects with long to medium length tongues. As the flowers age pollen accumulates in the fold of the lower petal and short-tongued insects facilitate both cross-fertilization and self-pollination.

Violets are generally not dependent on insect activity to reproduce because many species, including *Viola brittoniana* var. *pectinata*, also have cleistogamous flowers that remain closed and are entirely self-pollinated (Brizicky 1961). In some violet colonies the cleistogamous flowers appear to be the primary source of seeds, while the insect-pollinated flowers serve as a local back-up mechanism but also create an opportunity for gene exchange over longer distances (Beattie 1976).

Seed Dispersal and Establishment

The fruiting capsules of *Viola* species initially point downward but as they mature they become upward-facing and the capsules open, exposing the seeds. When the capsules dry their segments (valves) squeeze together, ejecting the seeds. The first seeds to be released land nearest to the parent plants but as the pressure increases others fly farther. The process results in a circular scattering of seeds that may extend for several meters around a source plant (Leavitt 1902, Beattie and Lyons 1975, Little and Leiper 2012, Kilgore et al. 2022).

Most violets, including *Viola brittoniana* var. *pectinata*, have small arils (elaiosomes) on their seeds so they are often secondarily dispersed by ants (Beattie and Lyons 1975, Gil-Ad 1988, Warren et al. 2017). Culver and Beattie (1978) noted that ants usually transport violet seeds over distances less than those achieved by the initial explosion but provide an added advantage by placing the propagules in favorable germination sites. The relative importance of ballistic and ant-mediated dispersal can vary depending on local conditions or on the seed characteristics of the *Viola* species (Bülow-Olsen 1984, Ohkawara and Higashi 1994).

Viola seeds are dormant at maturity and typically require a period of stratification before they can germinate. Studies of other species suggest that the majority of violet seeds germinate during the first spring following their dispersal (Baskin and Baskin 1988, Deno 1993). Although no germination studies were found for *Viola brittoniana* var. *pectinata*, the related *V. pedatifida* achieved maximum benefits from four months of cold stratification (Kilgore et al. 2022). *Viola* seeds that do not germinate during the first growing season may form a seed bank (Bülow-Olsen 1984, Solbrig et al. 1988, Leckie et al. 2000, Schulz et al. 2018). Associations with mycorrhizal fungi appear to be facultative in the genus (Wang and Qiu 2006).

Habitat

Viola brittoniana var. *pectinata* grows in moist, sandy soils near the coast. The plants are slightly tolerant of shade but they are most likely to be found in open, sunny habitats (Weakley et al. 2024). The two varieties of *Viola brittoniana* have similar habitat preferences and often co-occur (Bicknell 1904, House 1906). In New Jersey they were found growing together along with

other violets such as *V. affinis* and *V. primulifolia* (NJNHP 2024). In southern populations of *Viola brittoniana* the varieties may either grow together or occur in separate locations (Ahles and Radford 1959, Weakley et al. 2024).

The sites where *Viola brittoniana* var. *pectinata* has been found include moist or wet meadows, woodland edges, and the margins of salt marshes or ditches (Bicknell 1904, House 1905 & 1918, Graves et al. 1910, Taylor 1915, Ahles and Radford 1959, Hough 1983, NJNHP 2024). Latham (2003) listed it as a species that may be found in shrublands or thickets. The violet occasionally utilizes slightly disturbed habitats such as trail edges, forest clearings, and utility right-of-ways (NJNHP 2024, Weakley et al. 2024).

Wetland Indicator Status

Viola brittoniana is a facultative species, meaning that it occurs in both wetlands and nonwetlands (U. S. Army Corps of Engineers 2020).

USDA Plants Code (USDA, NRCS 2025b)

VIBRP

Coefficient of Conservancy (Walz et al. 2020)

CoC = 8. Criteria for a value of 6 to 8: Native with a narrow range of ecological tolerances and typically associated with a stable community (Faber-Langendoen 2018).

Distribution and Range

The global range of *Viola brittoniana* var. *pectinata* is restricted to the eastern United States (POWO 2025). The map in Figure 1 depicts the extent of the variety in North America.

The USDA PLANTS Database (2025b) shows records of *Viola brittoniana* var. *pectinata* in one New Jersey county: Cape May (Figure 2). It has also been documented in Middlesex County (House 1905), and that is the only county where it is currently thought to be extant (NJNHP 2024).

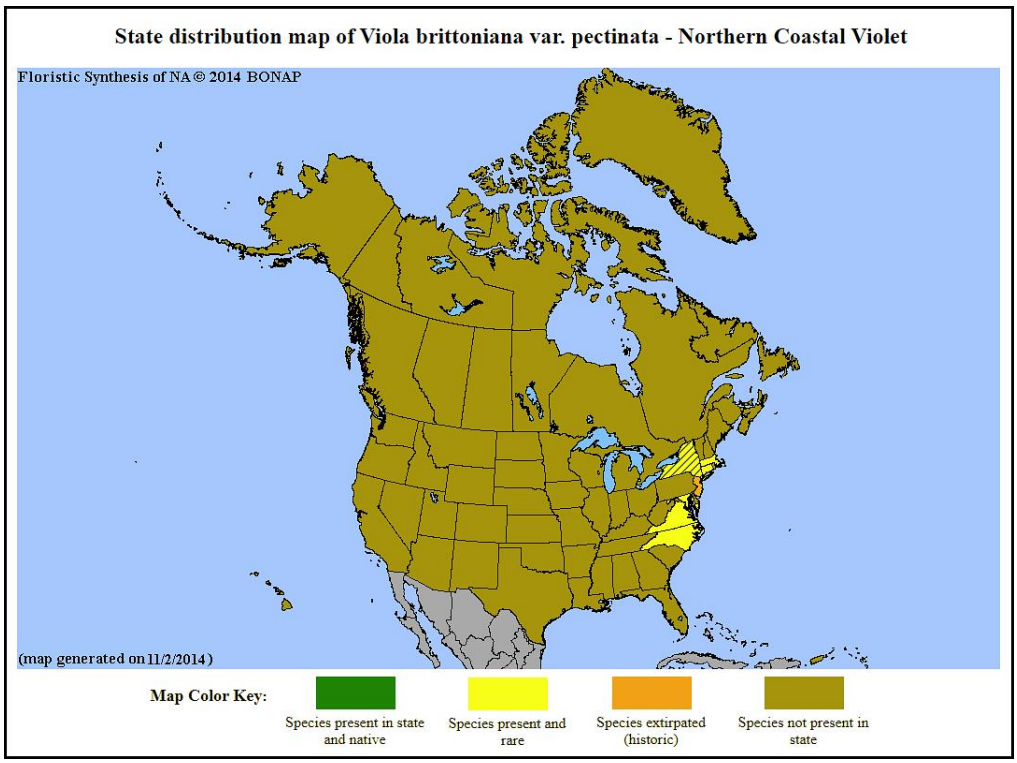

Figure 1. Distribution of V. brittoniana var. pectinata in North America, adapted from BONAP (Kartesz 2015).

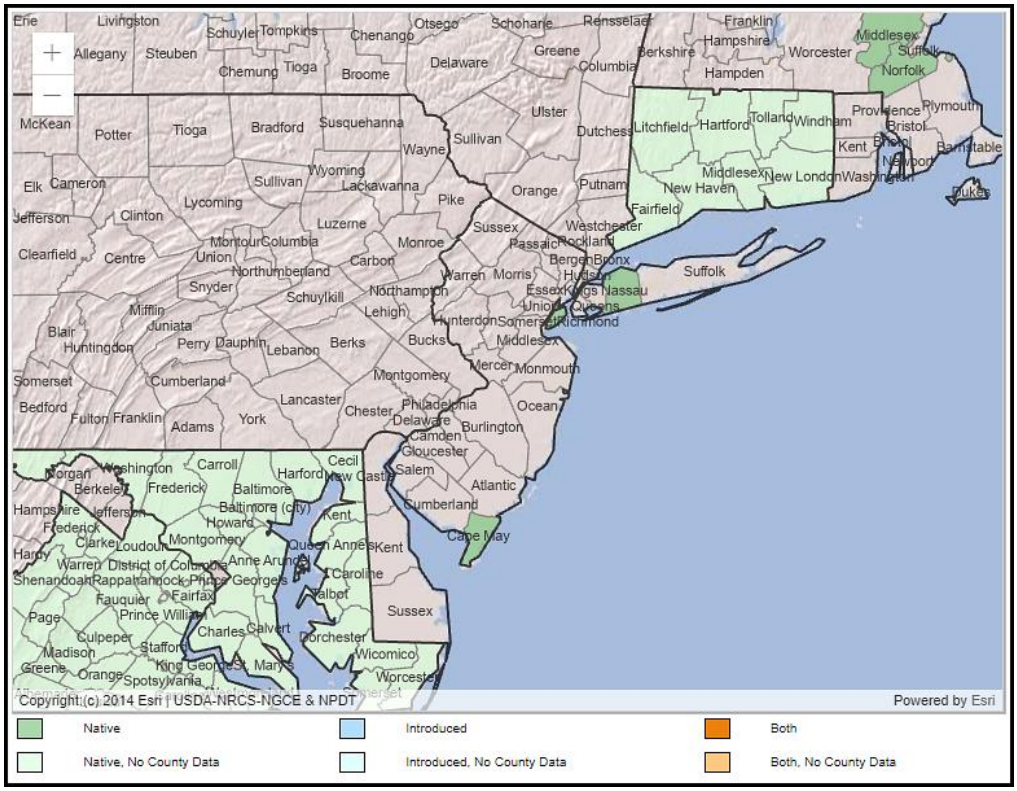

Figure 2. County records of V. brittoniana var. pectinata in New Jersey and vicinity (USDA NRCS 2025b).

Conservation Status

NatureServe does not presently recognize varieties of *Viola brittoniana* but the species as a whole is globally vulnerable. The G3? rank means that *V. brittoniana* has a moderate risk of extinction or collapse due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors, although the question mark indicates that there is some uncertainty due to insufficient data (NatureServe 2025). The map below (Figure 3) illustrates the conservation status of *V. brittoniana* throughout its range. Britton's Coast Violet is shown as vulnerable (moderate risk of extinction) in one state, imperiled (high risk of extinction) in one state, critically imperiled (very high risk of extinction) in four states, and possibly extirpated in Maine. The New Jersey status is not shown on the map because the state lists *V. brittoniana* at the varietal level.

Viola brittoniana var. *pectinata* has been identified as a plant species that is likely to be a high conservation priority for the North Atlantic region, which includes four Canadian provinces and twelve U. S. states. However, it is currently deemed unrankable (RU) due to lacking or conflicting information about its regional status and trends (Frances 2017).

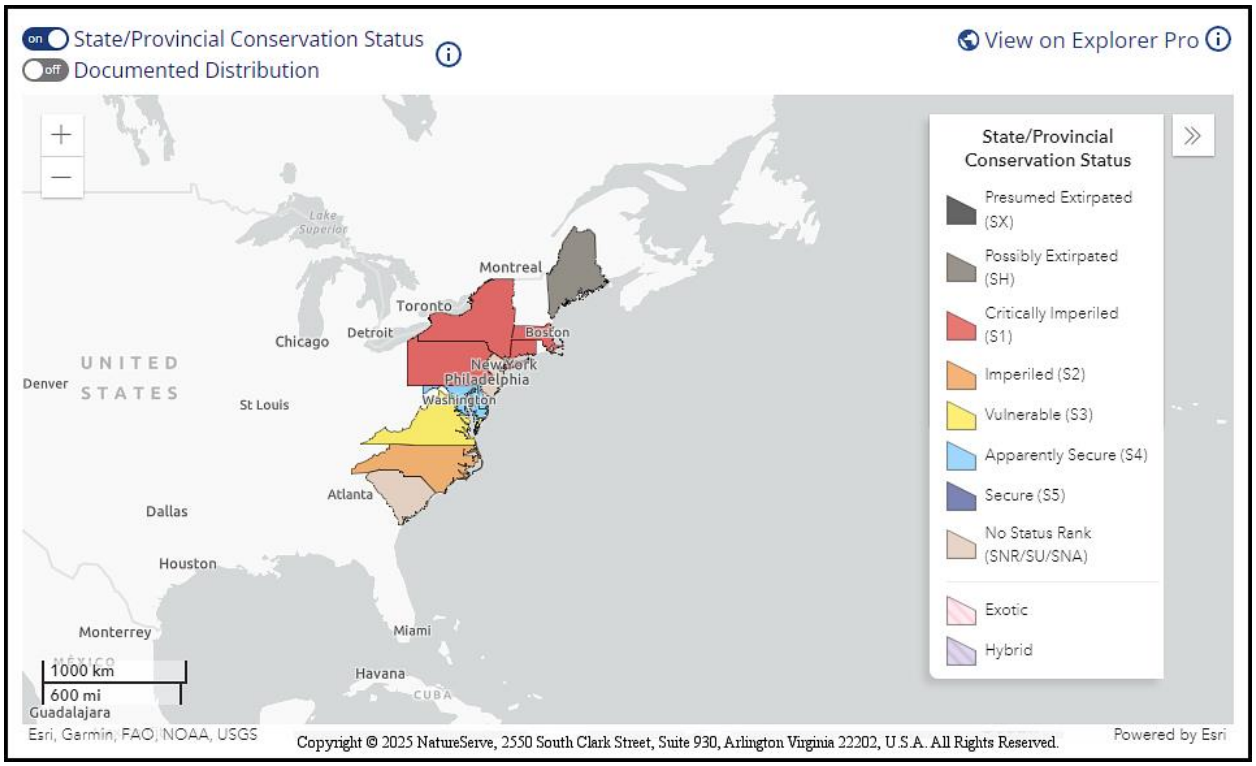

Figure 3. Conservation status of V. brittoniana in North America (NatureServe 2025).

Viola brittoniana var. *pectinata* is critically imperiled (S1) in New Jersey (NJNHP 2024). The rank signifies five or fewer occurrences in the state. A species with an S1 rank is typically either restricted to specialized habitats, geographically limited to a small area of the state, or significantly reduced in number from its previous status. The other variety of *V. brittoniana* (var. *brittoniana*) is rare (S3) in New Jersey. That rank is applied to a species with 21 to 50 occurrences. A rank of S3 may indicate a species that is widely distributed throughout the state

but in small populations, or one that is found in a limited number of locations but may be locally abundant where it occurs. Both of the varieties have also been assigned a regional status code of HL, signifying that they are eligible for protection under the jurisdiction of the Highlands Preservation Area (NJNHP 2010).

Viola brittoniana var. *pectinata* was collected in Middlesex County, New Jersey by House (1905) several months before its description was first published by Bicknell (1904). Bayard Long soon found a population in Cape May County (Stone 1911) and several additional collections were made at that site between 1912 and 1923 (Mid-Atlantic Herbaria 2025). After that, there were no additional records of *V. brittoniana* var. *pectinata* for nearly a century until David Kunz located a population in Middlesex County during 2014. Both varieties of *V. brittoniana* are present at the extant site (NJNHP 2024). One Salem County occurrence of *V. brittoniana* var. *brittoniana* may also include a small number of *V. brittoniana* var. *pectinata* plants (Gordon and Arsenault 2016).

Threats

No specific threats to New Jersey's extant population of *Viola brittoniana* var. *pectinata* have been noted, although the occurrence was monitored as recently as 2023 (NJNHP 2024). Fairbrothers and Hough (1973) identified *Viola brittoniana* as a species that was rare and apparently decreasing in New Jersey but offered no reason for its decline. An apparent range-wide reduction in the abundance of *V. brittoniana* has likely been caused by issues such as development, habitat degradation, succession, or invasive species but data regarding the scope and severity of individual factors is lacking (Russell and Soteropoulos 2024). Since *Viola brittoniana* can still thrive in the northeast when grown in controlled conditions, the proliferation of invasive flora seems likely to be at least partially responsible for the loss of regional populations (Sundberg 2010).

Climate Change Vulnerability

Information from the references cited in this profile was used to evaluate the vulnerability of New Jersey's *Viola brittoniana* var. *pectinata* population to climate change. The species was assigned a rank from NatureServe's Climate Change Vulnerability Index using the associated tool (Version 3.02) to estimate its exposure, sensitivity, and adaptive capacity to changing climactic conditions in accordance with the guidelines described by Young et al. (2016) and the state climactic computations by Ring et al. (2013). Based on available data *V. brittoniana* var. *pectinata* was assessed as Moderately Vulnerable, meaning that it is likely to show some decrease in abundance or range extent in New Jersey by 2050. However, the conclusion was reached with only moderate confidence due to uncertainty regarding the importance of two potential risk factors.

Shifting climactic conditions in New Jersey are resulting in higher temperatures, more frequent and intense precipitation events, and increasing periods of drought (Hill et al. 2020). Since *V. brittoniana* var. *pectinata* is near the center of its range in the state it is likely to have some

tolerance for higher temperatures. Its seeds appear to be somewhat flexible in their dormancy requirements and able to defer germination until a time when temperatures are suitable (Kilgore et al. 2022). Because Cut-leaf Coast Violet is usually found in relatively moist sites, lengthy periods of drought might take a toll. Poor long-distance dispersal capabilities limit the species' opportunity to colonize new sites if existing locations become unsuitable. Climate change is expected to increase the spread of non-native flora in the region (Bellard et al. 2013, Salva and Bradley 2023) but—as noted in the previous section—the extent of the impact of invasive plants on *V. brittoniana* is unclear. Global warming might also disrupt the life cycle patterns of ant species that disperse the violet's seeds (Warren et al. 2017, Parr and Bishop 2022). However, the relative importance of the role that ants play in distributing the seeds of *V. brittoniana* var. *pectinata* is not known.

Management Summary and Recommendations

The utility right-of-way where New Jersey's extant population of *Viola brittoniana* var. *pectinata* is situated has been managed by periodic mowing, and that approach appears to be benefitting the rare violet (Kunz, pers. comm.). No additional management needs have been identified for the occurrence (NJNHP 2024).

Russell and Soteropoulos (2024) noted a need for both population monitoring and surveys of historic occurrence sites throughout the range of *Viola brittoniana* in order to gain a better understanding of the species' status and conservation needs. In New Jersey, there is one historic site in Cape May County that could be searched and the potential occurrence reported for Salem County could also be examined.

It would be useful to know whether ants play a significant role in the distribution of *Viola brittoniana* var. *pectinata* seeds, whether the species forms a seed bank, and whether mycorrhizae are important to its establishment and success. It appears that competition with both native and non-native plants could be contributing to the violet's range-wide decline, but the competitive abilities of the species have not been studied. As discussed below, additional research is also needed to resolve the taxonomic status of *Viola brittoniana* and its varieties.

Synonyms and Taxonomy

The accepted botanical name of the species is *Viola brittoniana* var. *pectinata* (E. P. Bicknell) Alexander. Orthographic variants, synonyms, and common names are listed below (POWO 2025, USDA NRCS 2025b). There are unresolved questions about the status of the taxon. No varieties of *V. brittoniana* were recognized by Little and McKinney (2020) or NatureServe (2025) but the varieties were accepted by Kartesz (2015) and USDA NRCS (2025). Some sources have reinstated *Viola pectinata* as a distinct species (e.g. Marcussen et al. 2022, Ballard et al. 2023, Weakley et al. 2024, POWO 2025). ITIS (2025) lists the plant as *Viola pedatifida* var. *brittoniana* (Pollard) R. J. Little and L. E. McKinney, although the authors of that name have since concluded that *V. brittoniana* and *V. pedatifida* are distinct. Despite their different

taxonomic approaches, both Little and McKinney (2010, 2020) and Weakley et al. (2024) have noted the need for further study.

Botanical Synonyms	**Common Names**
Viola pectinata E. P. Bicknell	Cut-leaf Coast Violet
Viola *brittoniana* f. *pectinata* (E. P. Bicknell) Gil-ad	Pectinate Violet
	Pectinate-leaved Violet

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