Native Plant Profile: Violets

Marion Lobstein, PWWS Botany Chair

Introduction

Violets are among one of our most easily recognizable native, spring wildflowers. From March into late May or early June many species of violets bring simple but elegant beauty to our deciduous woods, fields, roadsides, and even lawns. In 1993, I authored an article on violets that was published in the 1993 March-April issue of *Wild News* and which was republished in 1999. Over the past thirty years, I have remained an enthusiastic admirer of Violets and have learned more about their ecology, life cycles, animal relationships, and the changes in their classification. This is an updated version of that original article.

Another article on the changes in taxonomy of Violet species found in our Northern Virginia region will be posted under the "Botany and Taxonomy" category of the Botanizing with Marion menu.

Violet Species Documented for the Northern Virginia Region

Although we usually think of violets as being shades of purple or blue, there are white, cream, and yellow violets as well as combinations of these colors. In the Flora of Virginia App, more than 30 species of Violets are covered and two-thirds of those are found in our Northern Virginia region. Most Violets seem to have a low rate of cross-pollination between species, but also can hybridize making it challenging to determine an exact identification.

Violet species are in the Violaceae, the Violet Family, and primarily in the genus *Viola*. *Viola* is based on the Latin term for purple, the color of most Violet species. The Green Violet (*Cubelium concolor*, formerly *Hybanthus concolor*) is in the other genus of the Violet Family in the Northern Virginia region. The Green Violet will be discussed in the taxonomy article.

The species found here are perennial species except for the annual Field Pansy that is native and the annual European Field Pansy, which is the only nonnative Violet species found here.

<u>Purple/Blue/Lavender</u>

Common Blue Violet

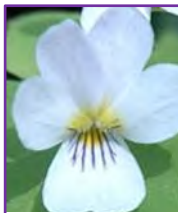
Common Blue Violet - *Viola sororia* (formerly *V. papilionacea*)
Le Conte's or Sand Violet - *V. affinis*
Bird's-foot Violet - *V. pedata* (may also be bicolor)
Marsh Blue Violet - *V. cucullata*
Northern Downy Violet - *V. fimbriatula*
Southern Wood Violet - *V. hirsutula*
Three-lobed Violet - *V. palmata* (formally *V. triloba*)
Arrow-leaved Violet - *V. sagittata*
Lance-leaved Violet - *V. lanceolata*
Dog Violet - *V. labradorica* (formerly *V. conspersa*)
Palmate Violet - *V. palmata*

Yellow

Smooth Yellow Violet
Nancy Vehrs

Smooth Yellow Violet - *V. eriocarpa* (formerly *V. pensylvanica*)
Downy Yellow Violet - *V. pubescens*
European Field Pansy - **V. arvensis* (yellow to yellow and white to white)

White or Cream



Canada Violet
Nancy Vehrs

Canada Violet - *V. canadensis*
Sweet White Violet - *V. blanda*
Northern White Violet - *V. pallens* (formerly *V. macloskeyi* var. *pallens*)
American Dog Violet - *V. labradorica* (formerly *V. conspersa*) (may be white)
Primrose-leaved Violet - *V. primulifolia*

Bicolor

Bird's-foot Violet
Larry Wilcox

Bird's-foot Violet - *V. pedate*
Field Pansy - *V. bicolor* (formerly *V. rafinesquii*)
Confederate Violet (a form of the Common Blue Violet *V. sororia*)

Vegetative Characteristics

Roots

Common Blue Violet

The *Viola* species in this area have well-developed rhizomes, horizonal underground stems, for energy storage and for asexual reproduction. The rhizomes have numerous fibrous roots. The Sweet White Violet, the Northern White Violet, and the Primrose-leaved Violet also have stolens, horizonal above ground stems, which also are for asexual reproduction of new plants.

Stems

Stemless Common Blue Violet (left) and Stemmed Cream Violet (right)

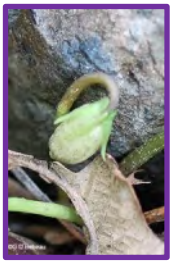
The Violet species that have leaves formed directly from their rhizomes are referred to as "stemless." Violets that also form leaves along their stem length are referred to as "stemmed." Most of the purple-flowered species, except for the Dog Violet, are stemless. Only eight species in this region are stemmed Violets: the Dog, the Smooth and Downy Yellow, the Canada, the Cream, the Primrose-leaved, and the native and European Field Pansies. On stemmed Violets the leaf arrangement is alternate.

Leaves


Simple leaves of Common Blue Violet (left) and deeply divided leaves of Bird's-foot Violet (right)

The leaves of Violets are simple although they may be deeply divided as with the Bird's-foot Violet. Leaf shapes are variable from one species to another, the most common being cordate or heart-shaped but oval, lance, hastate, reniform, and arrow, as well as other shapes are found. Leaf margins are usually toothed to some degree. Leaf tips are usually pointed or acute. The leaf base shape varies depending on the species or even within a species. Even in the same species there can be quite a bit of variation of shape as well as the presence or absence of pubescence or hairiness. Stipules, small leafy structures, are often present at the base of the petioles in stemmed species and vary in size, shape, and margin characteristics which may help with identification. Leaves of individual plants often begin to senesce or die back after the fruits mature or may remain photosynthetic into summer. The height of the plants varies from a few inches to a foot tall depending on the species and the environmental conditions.

Flowers

https://www.friendsofthewildflowergarden.org/pages/plants/blueviolet.html
Common Blue Violet chasmogamous or showy flower (left) and a cleistogamous or secret flower (right)

Violets typically have two types of flowers. The Violets in our area are primarily spring blooming, as far as their chasmogamous or showy flowers are concerned, but plants may bloom again in the fall. Most of the species in our region, except the Bird's-foot Violet, form petal-less cleistogamous or secret flowers in late spring and summer.

The chasmogamous flowers are usually solitary on peduncles or flowering stems of varying lengths. As the flower bud develops, the peduncle bends down in a shepherd's hook-like manner to present the flowers and their nectar to potential pollinators. These showy Violet flowers bloom in the spring and sometimes again in the fall when the daylight length and temperatures are like those of spring.

The typical chasmogamous flowers of Violets have five green sepals, five colored petals, five stamens, and a tricarpellate or three-parted pistil. The symmetry of the flower is bilateral or irregular with two upper petals, two lateral petals and a lower petal which forms a spur. The cleistogamous flowers emerge after the chasmogamous flowers have finished blooming.

Chasmogamous or Showy Flowers

Sepals

Sepals of Common Blue Violet

The five green leafy sepals of the chasmogamous flowers are separate or not fused, with the upper most one longer and recurved. The sepal margins are entire or smooth with cilia or short hair-like projections. The sepals surround the base of the flower except for where the spur protrudes between the sepals.

Petals

Petals of Common Blue Violet

The five petals of the chasmogamous flowers are separate and variously colored. The two lateral petals and the lower petal are more distinct with nectar lines. The nectar lines lead pollinators to the nectar stored in the spur. The two upper petals are without nectar lines. The lower petal forms a spur where nectar is stored. It also serves as a landing platform for pollinators. The two lateral petals in most species found here often have beards or pollen combs to ensure pollen capture, but they also help to protect the pollen from getting wet. Most of our species. except for the Bird’s-foot Violet, are bearded to some degree.

Stamens



Stamens of Common Blue Violet

The stamens typically have orange anthers with short filaments. The anthers produce pollen, and the filaments support the anthers. Two of the stamens have elongated filaments with nectary glands that extend down into the spur. These glands secrete nectar into the spur.

Pistil


Pistil of Common Blue Violet

The pistil has a broad stigma, a short style, and a three carpellate ovary in a superior position. The style is surrounded by a ring of the five anthers with the stigma protruding above this ring.

Cleistogamous or Secret Flowers

https://sidewalknature.com/2021/11/09/violets-go-ballistic/
Cleistogamous or secret flowers of a Violet

The smaller petal-less cleistogamous or secret flowers usually have 5 sepals, two stamens and a pistil. They typically form from short peduncles or flower stalks at the base of the plants or even underground. These flowers remain closed and are self-pollinating and prolific seed producers.

Pollination and Faunal Associations

http://www.restoringthelandscape.com/2013/05/pollination-of-downy-yellow-violets.html
Long-tongued bee pollinating Downy Yellow Violet

A variety of insects including bees, wasps, flies, and butterflies visit seeking nectar and pollinate the chasmogamous flowers. Particularly during cool damp springs, these flowers may even self-pollinate. The Violet Andrenid Bee is thought to depend on violets for its foraging. Several Fritillary Butterfly species use violets as a host plant on which to lay eggs and to serve as food sources for their caterpillars. The rhizomes, leaves, flowers, and even seeds may serve as a food source for birds and small mammals and deer.

Fruits and Seed Dispersal

Fruits

https://plants.ces.ncsu.edu/plants/viola/
Closed (left) and open (right) capsule of Common Blue Violet

The fruits of violets are 3-sided capsules made up of three boat-shaped segments that together contain several dozen seeds.

Seed dispersal of most violets occurs in two ways. The first happens when the fruit ripens and splits into three segments. As the segments ripen and become dry the sides of each segment contract and expel the seeds varying distances from the parent plant.

Video of Violet seeds being ejected: https://www.gettyimages.com/detail/video/violet-seed-pod-cracked-and-exploding-stock-video-footage/1226979299

Seeds

https://backyardnature.net/n/h/blueviol.htm
Violet seeds with elaiosomes

Secondary seed dispersal or diplochory involves ants. After the seeds are dispersed by the dry fruits ants often harvest them. On each dispersed seed is a white appendage called an elaiosome. The elaiosomes are rich in fats and proteins which are beneficial for ant larvae.

Ants take the seeds to their nests where the larvae will feed on the elaiosomes leaving the seeds intact. The ants remove the seeds from the nest to their trash pile which results in secondary seed dispersal or diplochory. This moves the Violet seeds even farther from the parent plant.

The dispersing of seeds and fruits by ants is known as myrmecochory. For additional information on myrmecochory see page 6 in the following link: https://vnps.org/princewilliamwildflowersociety/wp-content/uploads/filebase/pwws/pwws_wild_news/9pwws_newsletters_2018/Wild%20News%20May-June%202018.pdf

Medicinal and edible uses

Violets as a group have had many edible and purported medicinal uses. The flowers can be added to salads or candied by dipping into a sugar solution. Medicinal uses include treating the digestive, respiratory, urinary, and circulatory systems. Violets have purported laxative, emetic, expectorant, diuretic, emollient, and cough-suppressant properties. They contain salicylic acid, the active ingredient of aspirin, vitamin C (up to 260 milligrams per 100 grams of leaves compared to 50 milligrams in an orange), and vitamin A (up to 20,000 mg per 100 grams of leaves compared to 8,100 in spinach). Violets also have antiseptic and fungicidal properties and poultices of the leaves have been used to treat wounds, warts, and corns.

This spring, enjoy the beauty of Violets in a variety of habitats, including perhaps your own yard or garden. After the showy flowers have finished blooming, look for the petal-less secret flowers at the bases of the Violet plants. If you find that the Violets are spreading, blame the fruits that eject the seeds but also the ants!

Additional Information

The article contains links to several websites you may want to visit for additional information. Some other websites you may want to check also are:
http://www.illinoiswildflowers.info/ - Information on Violet species may be included in many of the habitats
https://www.permacultureapartment.com/post/wild-violet - The Many Benefits of Wild Violet: Uses and Folklore
https://newswire.caes.uga.edu/story/4633/wild-violets.html - One man's wild flower is another man's weed
https://discoverandshare.org/2022/06/16/climate-change-and-common-violets/ - Climate Change and Common Violets

In a separate posting on this website along with this Native Plant Profile: Violet, a separate article will include larger versions of the images from this article including labelled images of the structures of a Common Blue Violet.

A special note of appreciation to Linda Wilcox for her invaluable assistance in editing and suggestions for this article and to Mark Murphy for his suggestions and ideas for posting this article. Special thanks to Nancy Vehrs and Larry Wilcox for the use of their images included in the article. Unless otherwise credited, the images in this article are by Marion Lobstein.

Enlarged Images from the Lobstein Native Plant Profile: Violets

Photo(s) by Marion Lobstein unless otherwise credited.

Common Blue Violet

Smooth Yellow Violet
Credit: Nancy Vehrs

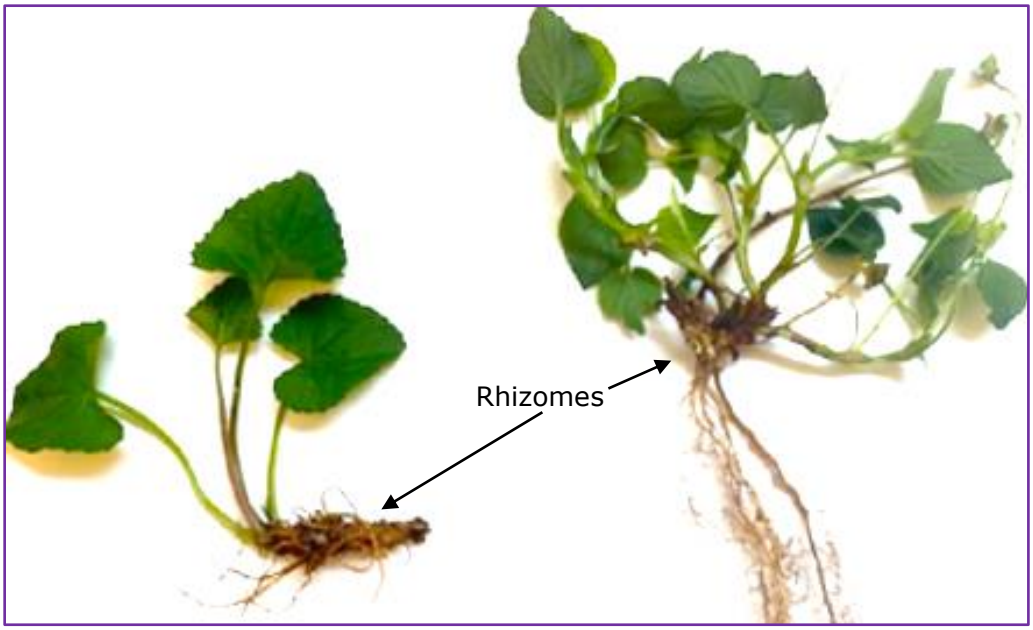
Photo(s) by Marion Lobstein unless otherwise credited.

Canada Violet
Credit: Nancy Vehrs

Bird’s-foot Violet
Credit: Larry Wilcox

Common Blue Violet-Top to bottom: leaves formed from the top of rhizome, rhizome, roots form from bottom of rhizome.

Photo(s) by Marion Lobstein unless otherwise credited.



Stemless Common Blue Violet (left) and Stemmed Cream Violet (right)

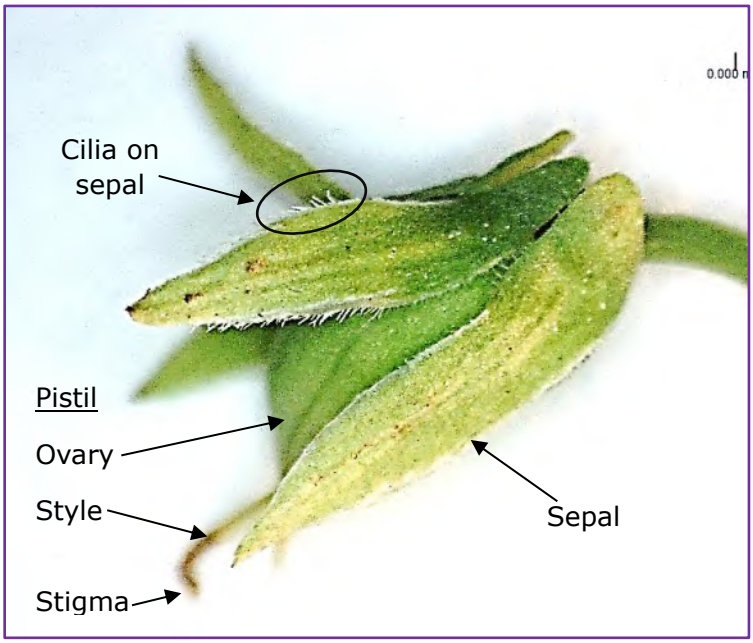
Simple leaves of Common Blue Violet

Deeply divided leaves of Bird’s-foot Violet (photo by Larry Wilcox)

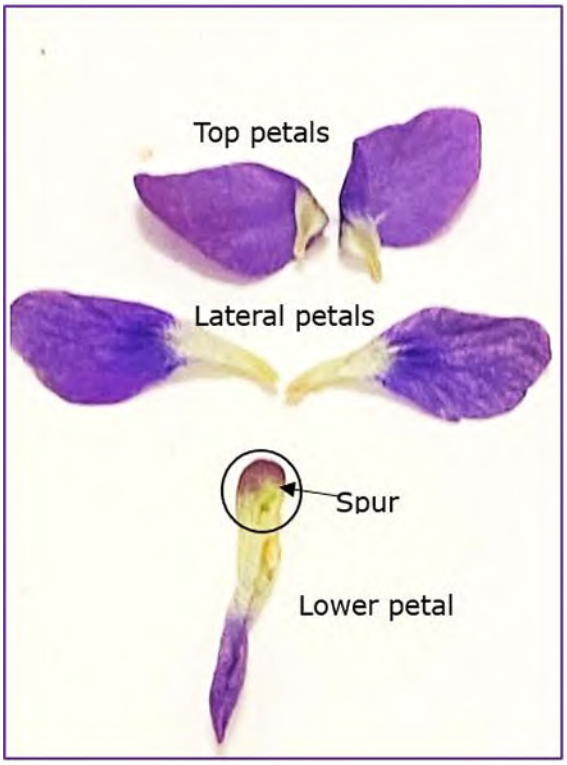
Chasmogamous or showy flowers of Common Blue Violet

Cleistogamous or secret flower of a Violet
https://www.friendsofthewildflowergarden.org/pages/plants/blueviolet.html

Photos by Marion Lobstein unless otherwise credited.

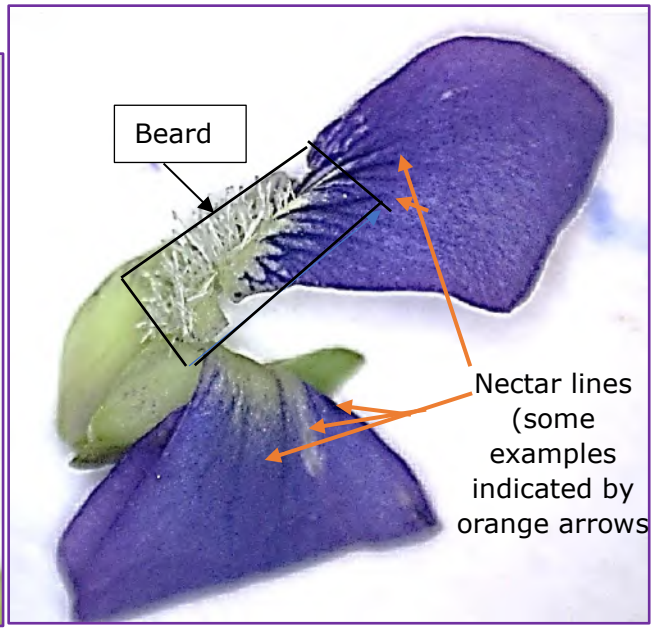


Sepals of Common Blue Violet

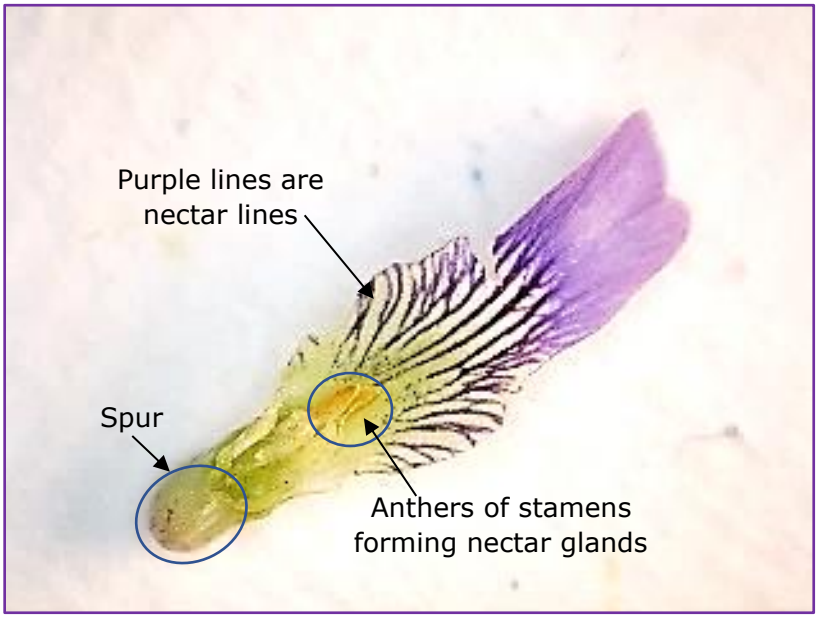


5 petals of a Common Blue Violet

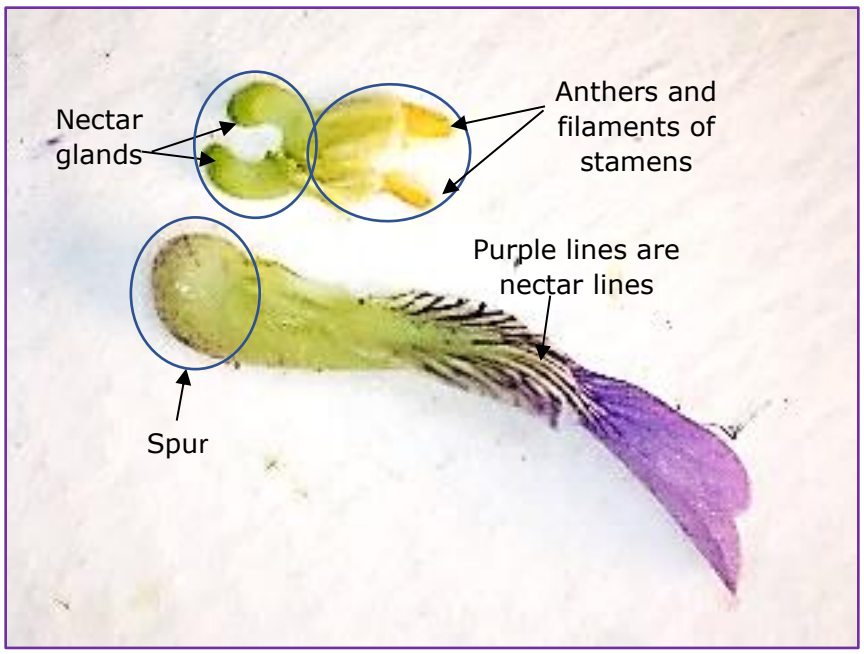
Top petals



Lateral petals

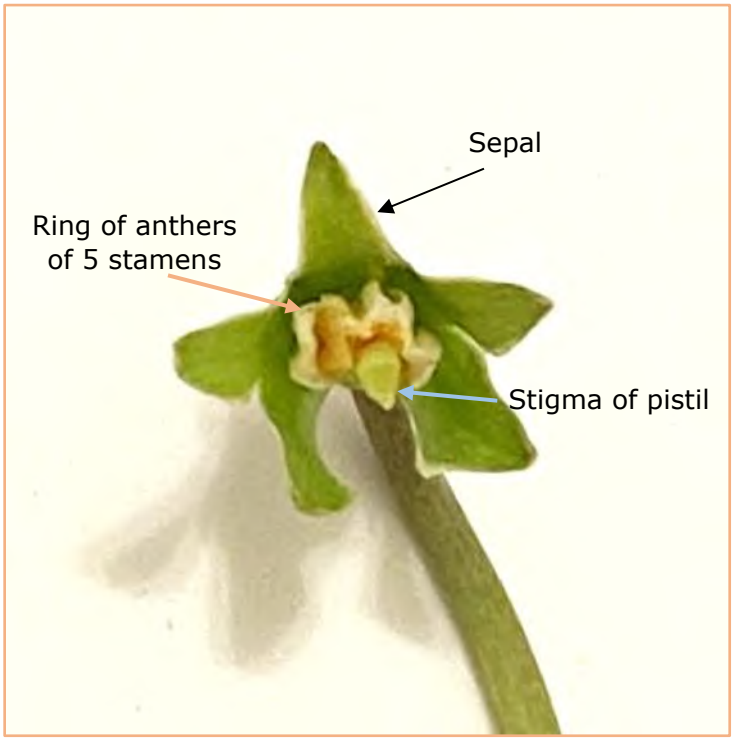


Purple lines are nectar lines

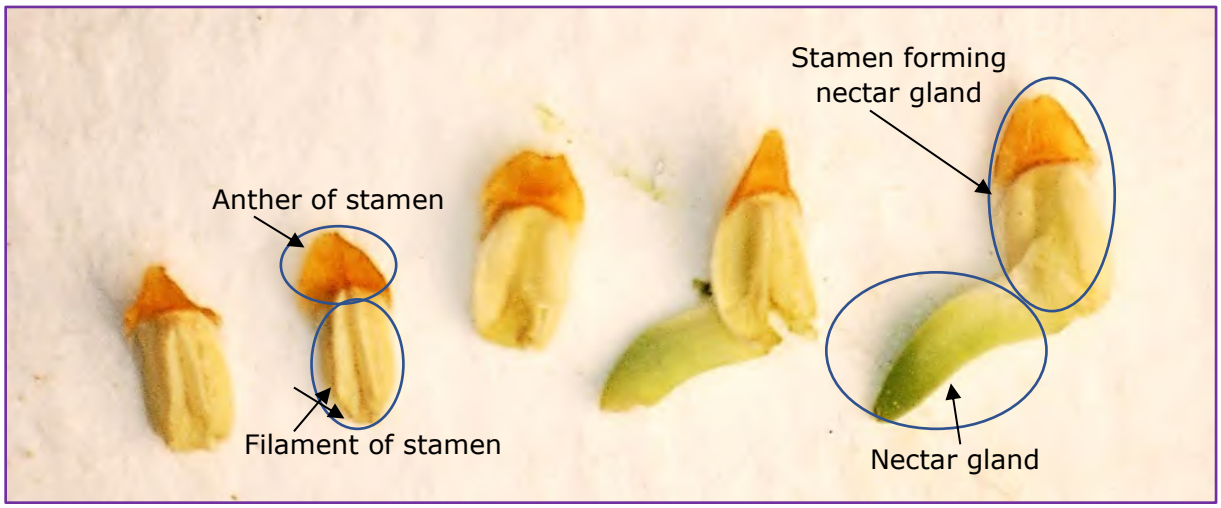


Lower petal of Common Blue Violet with spur and nectar lines. Image above shows two stamens with nectar glands that fit into the spur. These glands secrete nectar into the spur to attract pollinators. This petal serves as a landing stage for the pollinator and the nectar lines lead the pollinator to the nectar.

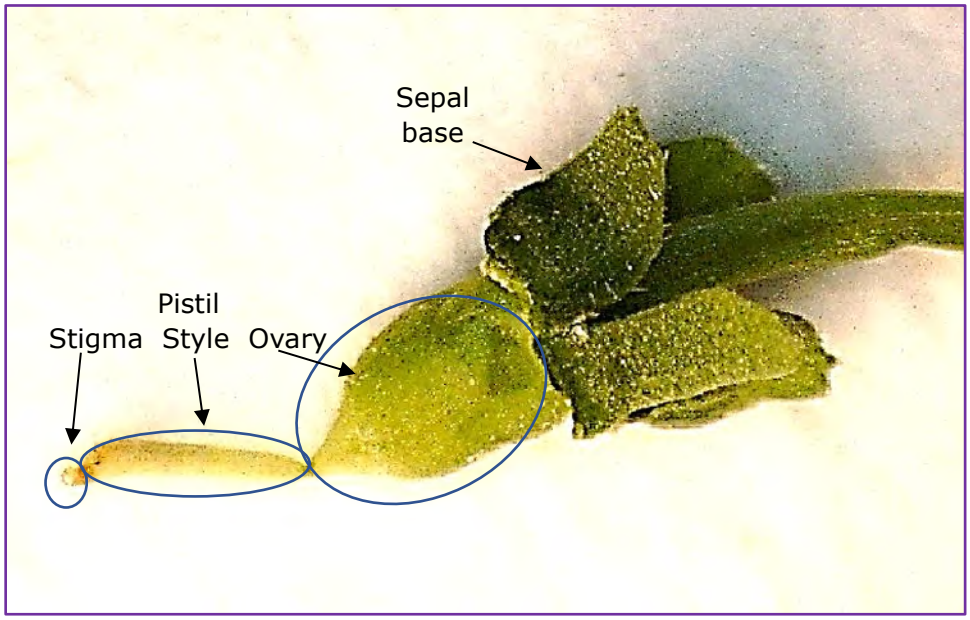
Photos by Marion Lobstein unless otherwise credited.



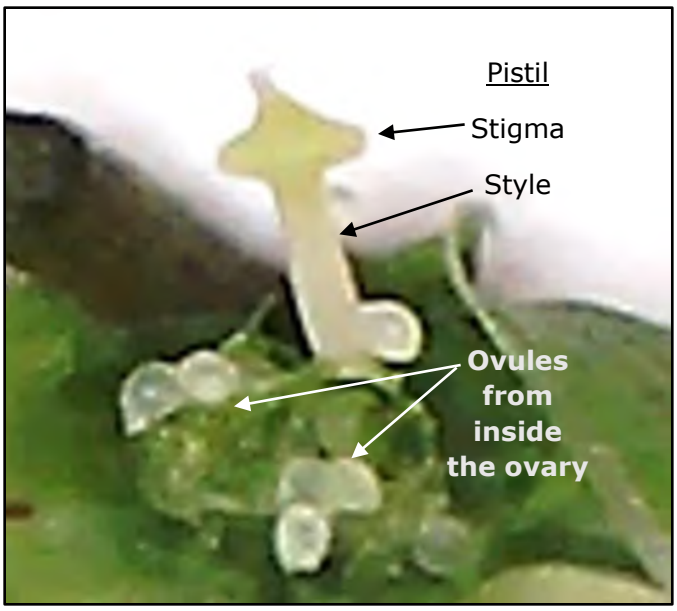
Ring of anthers of 5 stamens surrounding the stigma of the pistil of a Common Blue Violet



5 stamens of Common Blue Violet



Pistil of Common Blue Violet



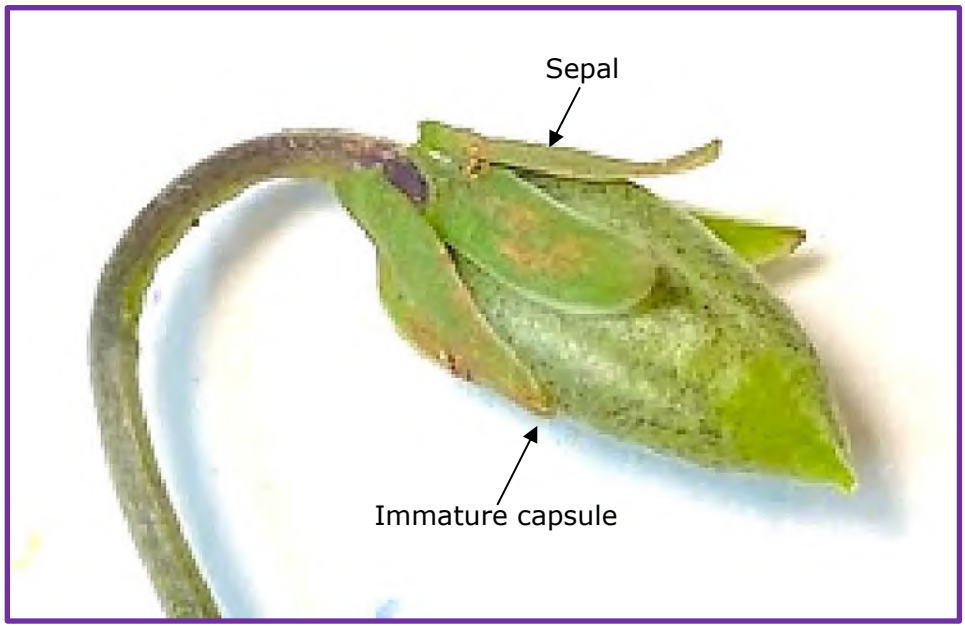
Details of parts of the pistil of a Common Blue Violet with ovary opened to reveal the ovules

https://sidewalknature.com/2021/11/09/violets-go-ballistic/
Cleistogamous or secret flowers of a Violet

Photos by Marion Lobstein unless otherwise credited.

Open secret flower

Long-tongued bee visiting a Downy Yellow Violet
http://www.restoringthelandscape.com/2013/05/pollination-of-downy-yellow-violets.html



Closed capsule of Common Blue Violet

https://plants.ces.ncsu.edu/plants/viola/
Open capsule of Common Blue Violet

https://backyardnature.net/n/h/blueviol.htm
Violet seeds with elaiosomes