

How to Identify New Brunswick Violets

Sponsored by the New Brunswick Botany Club

Introduction :

Violets are always exciting to find while walking in the field in early summer. They are so easy to identify as to their genus. However, most people will stop there, because they are not easy to identify at the species level - many minute characteristics must be examined...and they easily form difficult to describe hybrids. *Approached in the right mix of adventurousness and humility, sorting out violets can be fun. However, should efforts end in exasperation, just keep in mind that the violets never read the botany books.* (Choukas-Bradley 2004).

In order to correctly identify violets the following features must be examined :
these are stems, leaves and flowers.

Above-ground **stems** are :



a) acaulescent (stemless)



b) caulescent (stemmed)

In acaulescent species the rhizomes or stolons gives rise to a crown of basal leaves and flowers. Care should be taken to assess the position of leaves since some species (i.e. *Viola adunca* and *Viola labradorica* - caulescent species) may have very short (less than 1 cm) stems at flowering and may appear acaulescent.

Below-ground **stems** are :



a) slender rhizome



b) stout rhizome



c) taproot

Rhizomes are slender (mostly 1 to 3 mm thick) and travel horizontally underground, or stout (mostly 4 to 6 mm thick) and are usually oriented vertically underground - these are the perennials. Annuals have a vertical, fibrous root known as a taproot. To evaluate a slender versus a stout rhizome in the field, just place your thumb and index vertically around the base of a plant, near the soil. If your thumb and finger touch, then you have a slender rhizome, otherwise the rhizome is stout.

On-the-ground **stems** are :

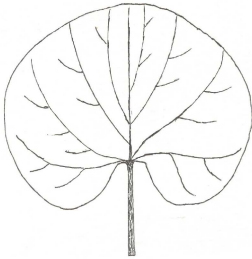
Stolon ⇒



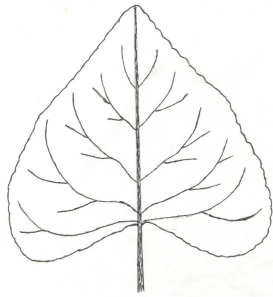
Stolons are horizontal stems that may be naked or with small leaves. These are usually not produced until after flowering and care should be taken to assess their presence with old (last year's) stolons.

Leaves :

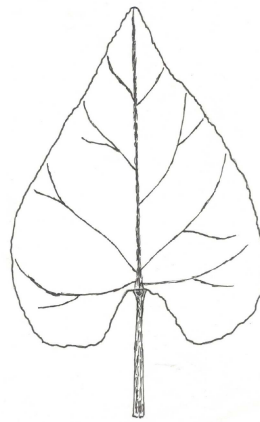
Shape -



a) reniform



b) broad cordate-ovate



c) cordate-ovate



d) lanceolate

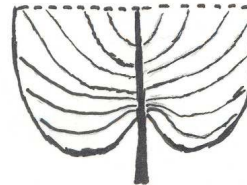
Base -



a) broadly cuneate

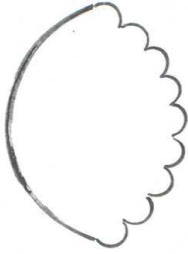


b) truncate

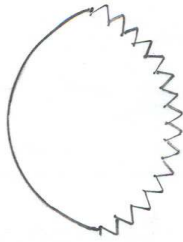


c) cordate

Margin -



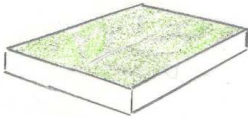
a) crenate



b) serrate

The margin is often identified by a combination of features, i.e crenate-serrate.

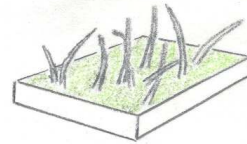
Pubescence -



a) glabrous

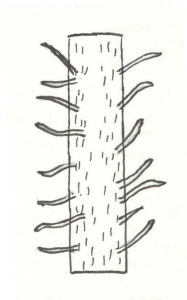


b) strigose

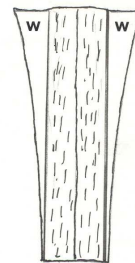


c) pilose

Petioles -



a) pubescence



b) winged (w) or not

Stipules - are found at the base of the leaf; the margin of the stipule is characteristic :



a) entire



b) toothed



c) lacinate

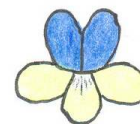
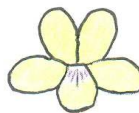
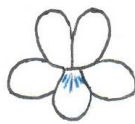


d) pinnatifid

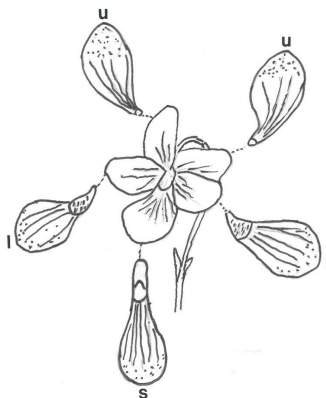
Stipules are usually attached only at the base to the petiole. In one *Viola*, however, the stipule is attached for a short distance (connate) to the petiole (see *V. selkirkii*).

Flowers :

Corolla -



Petals -

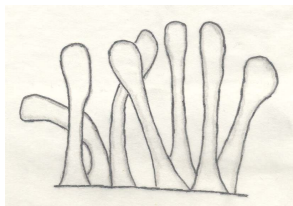


u - upper petals ; l - lateral petals ; s - spurred petal

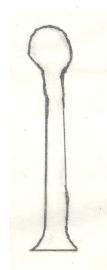
Petals -

hair on petals :

short →

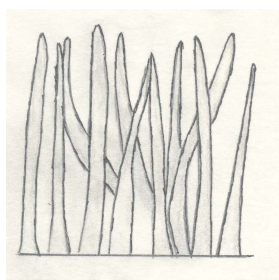


'Bearded' petals

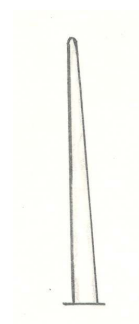


round (clavate) hair

long →

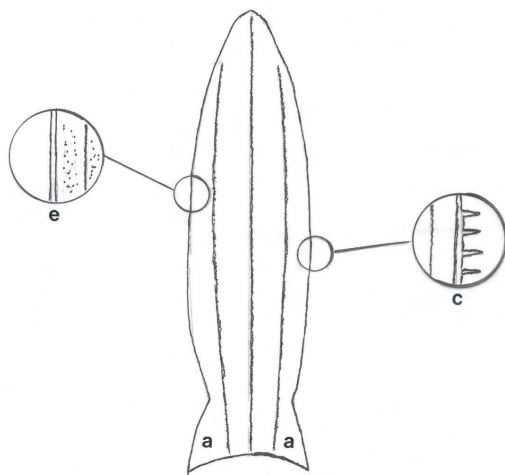


'Bearded' petals



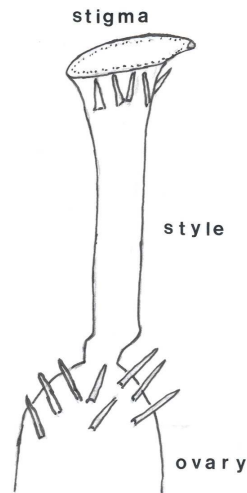
pointed hair

Sepals -



a - auricle ; e - eciliate ; c - ciliate (resemble short eyelashes)

Style and stigma and ovary -



The identification of infrageneric groups of violets is possible by looking at the style, the stigma and the ovary. The ovary can be with or without hairs. The style may be very bent, slightly bent, or not bent ; it can be thin and uniform in thickness or distinctly enlarged near the apex. The apex can be with or without hairs ; various forms of the stigma are present. Use your 10 x hand lens to identify the features of the flower...this takes a steady hand.

Other features -

Capsules and seeds are often used to separate the violets, but they require higher magnification from a microscope. They are not presented here.

Violets produce in early or mid-summer a second type of flower that does not bear petals and does not expand. These are called cleistogamous flowers. They can be used to identify violets but are usually combined with stem and leaf characters...these types of flowers should be left to enthusiasts and experts.

Before we begin :

Many textbooks contain information on species of *Viola* (Violets) and all are adequate to good. However, if you are very interested in violets we suggest to you a treatise by Arthur Haines (2001. The Genus *Viola* of Maine, A taxonomic and Ecological Reference. V.F. Thomas Co., Bowdoin, Maine). This covers all the species found in New Brunswick. Arthur may be reached at <http://www.arthurhaines.com> .

The second point is a request. The NB Botany Club advocates the ethical use of our flora. Violets are beautiful and appear to be plentiful, so there is no harm in picking a flower to examine it !!!

Please do not. That flower you pick indiscriminantly may be a rare violet. **Leave it where it is.**

Examining and identifying violets can be challenging and may involve a bit of gymnastics. Take out your 10x hand lens (**a must**) and bend down to examine the plant. Checking out the 3 main identification features (stems, leaves and flowers) can be easily done with the plant in its natural state.

Let us begin :

What is the first thing you notice when you spot a violet ? The color of the corolla, of course. That is usually what first catches your eye. We will use this as the first identification characteristic. Here we use a tool called a dichotomous key... you have to make a choice between two statements and accept or reject one statement, this points you to the next set of statements, until you identify the violet.

KEY FOR THE SPECIES OF VIOLETS

VIOLET or PURPLE or BLUE corolla



These are usually easy to identify. However, some forms with white flowers (albinos) do exist, and some species fade towards the end of their flowering. A flower from this group can be identified by its large size and the lateral petals are almost always pubescent (except in *V. selkirkii*).

Next check the stem ... the plants in these groups are...

ACAULESCENT (without a stem)

Viola selkirkii
Viola cucullata
Viola x bissellii
Viola sagittata* var. *ovata
Viola sororia
Viola novae-angliae
Viola nephrophylla

CAULESCENT (with a stem)

Viola adunca
Viola labradorica

Acaulescent violet/purple/blue violets :**(A)** Check the lateral and spur petals for hairs →

- i) if there are no hairs, then check the length of the spur → if the spur is long (4-6 mm long), or about as long as the blade of the spurred petal, then you probably have
Viola selkirkii (check below)

ii) if there are hairs, go to **(B)** →**(B)** Check the lateral petals for the types of hairs →

- i) if there are short hairs dilated (swollen) at the apex → then you probably have
Viola cucullata (check below)
(see also V.x bissellii - hybrid with V. sororia)

ii) if there are long hairs that taper to the apex, go to **(C)** →**(C)** Check the margins of the sepals →

- i) if there are short hairs (ciliate) → a) the blade of the leaf is 1.5 - 3.0 times as long as wide ; the base of the blade has coarse pointed teeth, then you probably have
Viola sagittata var. ovata (check below)

OR

- b) the blade of the leaf is 1.0 or less times as long as wide ; the base of the blade has small rounded teeth, then you probably have
Viola sororia (check below)

- ii) if there are no short hairs (eciliate) → a) the blade of the leaf is longer than wide, then you probably have
Viola novae-angliae (check below)

OR

- b) the blade is as wide or wider than long, then you probably have
Viola nephrophylla (check below)

Caulescent violet/purple/blue violets :

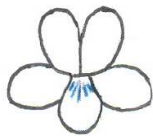
note : these two species are very similar to each other, all the characteristics indicated below should be examined before you decide on the species.

- i) a) the **spur** is 5 to 7 mm long, curved upwards at the end ;
- b) **leaves** thick, commonly with sparse to dense pubescence, the hairs can be found on the upper and/or lower surfaces ;
- c) the upper **leaves** are ovate to triangular-lanceolate and mostly truncate at the base, dark green, revolute (rolled backwards) on the margin ;
- d) the **petioles** are distinctly winged ;
- e) the **style** is slightly expanded near the apex, terminating in a stout, bent tip as long as the diameter of the style, then you probably have

Viola adunca (check below)

- ii) a) the **spur** is 2.5 to 5 mm long, not curved at the end ;
- b) **leaves** thin, commonly glabrous, when pubescent, the hairs are restricted to the upper surface ;
- c) the upper **leaves** are usually ovate to orbicular, with a cordate base, light green, flat on the margin ;
- d) **petioles** are not distinctly winged ;
- e) the **style** is nearly uniform in diameter throughout, terminating in a bent tip nearly twice as long as the diameter of the style, then you probably have

Viola labradorica (check below)

WHITE corolla**ACAULESCENT (without a stem)**

Viola lanceolata
Viola primulifolia
Viola macloskeyi
Viola renifolia
Viola blanda
Viola blanda var. palustriformis

CAULESCENT (with a stem)

Viola canadensis (check below)
 this is the only violet in this group in New Brunswick.

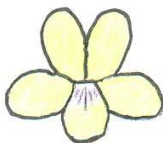
Acaulescent white violets :

- (A) i) **Leaf blades** are 1.5 - 7.0 times as long as wide,
only slightly or not cordate at the base, go to (B) →
- ii) **Leaf blades** are less than 1.5 times as long as wide,
cordate at the base, go to (C) →
- (B) i) **Leaf blades** 3.0 - 7.0 times as long as wide,
narrowly tapering at the base ;
margins are denticulate (fine toothed), each tooth
with a distinct red-brown to black gland at the apex,
then you probably have,
Viola lanceolata (check below)
- ii) **Leaf blades** 1.5 - 3.0 times as long as wide,
widely tapering to truncate or subcordate at the base ;
margins are crenate, the teeth with
inconspicuous, pale glands,
then you probably have,
Viola primulifolia (check below)
- (C) i) **Leaf blades** small, usually longer than wide, strictly glabrous (no hairs) and thin ;
margins are low-crenate or subentire (almost no teeth),
then you probably have,
Viola macloskeyi (check below)
- ii) **Leaf blades** usually as wide as long, or wider, commonly have some pubescence and are thick ;
margins are low-serrate, go to (D) →
- (D) i) **Leaf blades** wider than long (reniform), the midrib usually
equaling 50 - 77 % of the total blade width ;
leaf pubescence variable (sometimes glabrous), usually found
on the lower surface ;
stolons not produced,
then you probably have,
Viola renifolia (check below)
- ii) **Leaf blades** about as long as wide (cordate-ovate), the midrib usually
equaling 75 - 90 % of the total blade width ;
leaf pubescence usually found on the upper surface ;
stolons present, at least later in the season, go to (E) →

(E) i) **Lateral petals** commonly glabrous (no pointed hairs) ;
leaf blades pointed (sharp-acute) at the apex,
nearly glabrous, the hairs often restricted to the basal lobes
on the upper surface ;
basal sinus of leaf blades narrow,
commonly 0.8 - 1.0 times as long as wide ;
flower peduncles tinged with red and glabrous,
then you probably have,
Viola blanda var. blanda (check below)

ii) **Lateral petals** pubescent with pointed hairs ;
leaf blades rounded (obtuse) at the apex,
with sparse to dense pubescence on one or both surfaces ;
basal sinus of leaf blades wide,
commonly 0.75 - 0.85 times as long as wide ;
flower peduncles green and pubescent,
then you probably have,
Viola blanda var. palustriformis (check below)

Yellow corolla



ACAULESCENT (without a stem)

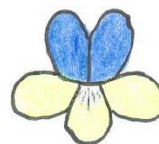
none in New Brunswick

CAULESCENT (with a stem)

**Viola pubescens var. scabriuscula
(check below)**

+ see multicolored violets in next section

Multicolored (white-yellow or with purple/blue) violets



These introduced violets may be separated from the native violets by their foliaceous (leaf-like) stipules that are lacinate or pinnatifid.

ACAULESCENT (without a stem)

none in New Brunswick

CAULESCENT (with a stem)

**Viola arvensis
Viola tricolor**

Caulescent multicolored violets :

- (A) i) **Sepals** shorter than the petals by more than 2 mm
(about 70 % the length of the petal)
flowers longer than 1.5 cm ;
corolla yellow-white or yellow-orange with a
yellow center, and the upper petals dark blue
on the apical half, or dark blue throughout with
a yellow center,
then you probably have,
Viola tricolor (check below)
- ii) **Sepals** longer than or at most 2 mm shorter than the petals
flowers less than 1.0 cm long ;
corolla often yellow-white with a yellow center,
then you probably have,
Viola arvensis (check below)

The next section contains the violet species description. Some images are presented but we suggest that you do a Google image search if you wish to see various photos of the plants.

VIOLETS BY COROLLA COLORS

VIOLET or PURPLE or BLUE corolla

Viola selkirkii Pursh ex Goldie (pronounced : VY-oh-lah sel-KIR-kee-eye) great-spurred violet
(named for Thomas Douglas, Earl of Selkirk, 1771-1820, by Frederick Pursh)

Rarity Ranking in NB : **S4** (2007) - fairly common.

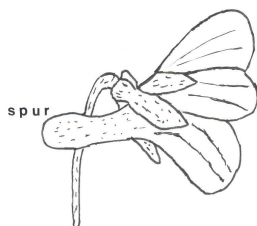
Habitat : This violet is found in cool, rich hardwood forests, usually in sheltered areas at the base of rocky calcareous slopes, moist ravines and outcrops in nutrient rich soil or rotting logs and stumps.

Flowering : early to mid-May (start of spring, before maple leaves emerge from winter buds). Usually the first acaulescent blue violet to bloom in the spring.

Notable features :

- 1) **long spur**, the longest of our violets, from which its name is derived ;
- 2) leaf **blade very small** (the size of a canadian toonie at time of flowering), with converging or overlapping basal lobes, leaving a characteristic **rounded notch at the base of the leaf** ; upper surface covered with abundant whitish strigose hairs (this feature changes with the age of the leaf) ; margins crenate, without hairs ; petioles glabrous ;
- 3) **petals**, all **without hairs** ;
- 4) **stipules connate** to the petiole for a short distance (the only one of our violets with this feature) ;
- 5) flowers about 2 cm wide, pale violet, often white at the the centre ; sepals eciliate, purple-tinged, usually pointed at the apex ; flower peduncles glabrous, purple-tinged ;
- 6) "style is upwardly dilated towards the apex, the stigma is shaped like a head (capitate), with a conical beak on the lower side" (Haines 2001). This is the only representative of the infrageneric group Adnatae (the others in this group belong to the infrageneric group Boreali-Americanae), the style is nearly straight.
- 7) rhizome thin, less than 3 mm thick.

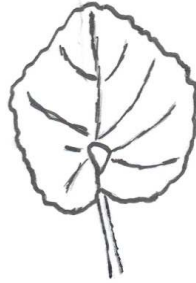
spur -



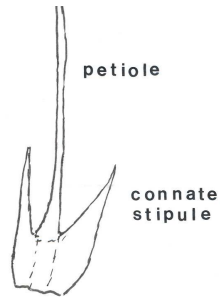
Viola selkirkii ...cont...

basal lobes (leaf) -

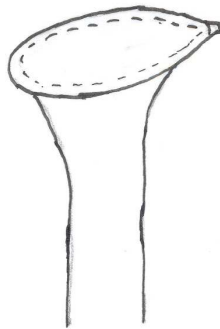
notice that the overlapping basal lobes create a distinct heart-shaped hole at the base of the leaf



stipule -



style & stigma -



Viola cucullata Aiton (pronounced : VY-oh-lah kuk-yoo-LAY-tuh) marsh blue violet
(means hood-shaped, for the form of the emerging young leaves)

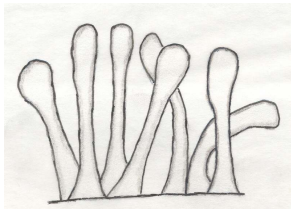
Rarity Ranking in NB : S5 - abundant. **This is the official flower of New Brunswick.**

Habitat : This violet is found in wet meadows, in open or forested wetlands where the soil is saturated but not inundated. It also frequents swamps dominated by *Thuja occidentalis*. It is also found along brooks, streams and wet seeps.

Flowering : mid to late May (mid to late spring, when maple leaves are expanding or have reached their full size)

Notable features :

- 1) the **lateral petals** (but not the spur petal) have short hairs (sometimes you will see the term *bearded* to describe the presence of hairs), each with a **dilated, often knob-shaped**, apex. This is the only member of the Boreali-Americanae infrageneric group (i.e., most of the acaulescent blue violets) with this type of hair. The others have long hairs, that taper to a point at the apex.
- 2) **spurred petal glabrous** ;
- 3) leaf blade usually held at an angle to the petiole, **commonly glabrous** on both surfaces, rarely with a few scattered hairs on the basal lobes on the upper surface, sometimes with scattered reddish glands ;
- 4) flowers on long **peduncles usually taller than the leaves**, light violet with a white center, usually with a purple border surrounding the white center. An all white flower is known as *forma albiflora* House. A white flower with blue splotches is known as *forma thurstonii* House.
- 5) sepal margins with no cilia (**eciliate**).



knob-shaped hairs on lateral petals -



Viola cucullata -

Viola x bissellii House (pronounced : VY-oh-lah ex bis-SEL-ee-eye) Bissell's violet
(named for Charles Humphrey Bissell, 1857-1925)

This is the fertile hybrid between *Viola cucullata* and *Viola sororia*.

A hybrid with the same parents has been named *Viola x melissifolia* Greene (pronounced VY-oh-lah ex mel-his-SEE-pho-lee-ah) (having leaves like the honeybee, i.e. Melissa). One of the parents is *Viola septentrionalis*, which has recently been placed in synonymy with *Viola sororia* (see below). Hal Hinds (2000) recognized this situation but kept the name of *V. x melissifolia* for the hybrid between *V. cucullata* x *V. sororia*

Rarity Ranking in NB : hybrids do not usually receive a ranking. According to Hal Hinds (2000) "it occurs occasionally in the southern part of the province".

Habitat : This hybrid violet is found in habitats similar to its parents. i.e., in forested or open areas, and in riparian areas with moist to saturated soils.

Flowering : late May (late spring, when maple leaves are expanding).

Notable features :

- 1) lateral and spur **petals** with a mixture of long **hairs**, some with a **knob-shaped** apex, some with a **pointed** apex and some with a **blunt** apex ;
- 2) leaves abundant and luxuriant ; leaf blades with **sparse pubescence** on the upper surface ;
- 3) flowers larger than those of the parents ; corolla blue, similar to the parents, sometimes mostly "white with blue streaking or splotches on the proximal portion of the petal" (Haines 2001) ; peduncles taller than those of the parents (more than 20 cm) but not erect as in *V. cucullata* but reclining as in *V. sororia*.
- 4) sepals sometimes with a few hairs (cilia) on the margins, especially near the base.



Viola x bissellii (*V. cucullata* x *V. sororia*)

Viola sagittata var. ovata (Nuttall) Torrey & Gray (pronounced : VY-oh-lah saj-ih-TAY-tuh variety oh-VAY-tuh) arrowhead violet (named for the ovate arrow head shape)

Rarity Ranking in NB : **S1** - very rare ; according to Hinds (2000) it has been found on Grand Manan Island, north of Fredericton and near Harvey.

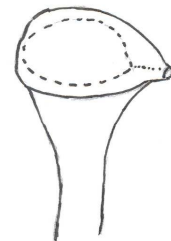
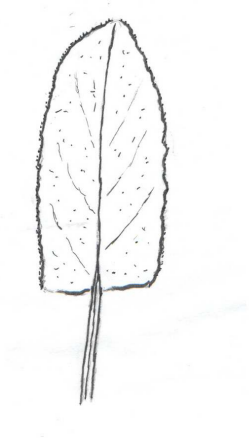
Habitat : this violet is found on dry, well drained, open habitats, like sandy fields, abandoned gravel lots, railroad tracks, roadsides. Sometimes it is found under broken canopy in Pine-Oak woodlands.

Flowering : mid-May to early June (late spring, when maple leaves are expanding and have reached their full size)

Notable features :

- 1) **sepals ciliate** on the margin (this feature is used to separate this species from *Viola novae-angliae*) ;
- 2) **leaf blades are densely short-pubescent**, the pubescence is mostly stigose, occurring throughout or concentrated along the veins ;
- 3) leaf **blades arrow-shaped**, wide ovate to ovate-oblong, with coarse teeth near the base, the **base is truncate**.
- 4) leaves usually prostrate or are slightly ascending ; the petioles are equal to or shorter than the blade ;
- 5) "style dilated toward the apex, capitate, with a conical beak on the lower side, the stigma (is) located within the tip of the beak " (Haines 2001) (Infrageneric group : Boreali-Americanae), the style is nearly straight.

leaf -



style & stigma -

Viola sororia Willdenow (pronounced : VY-oh-lah so-ROAR-ih-ah) Woolly blue violet (dooryard violet) (means : sisterly, resembling) ; synonym : *Viola septentrionalis* Greene (pronounced : VY-oh-lah sep-ten-TREE-oh-nay-lis)

Note : Some authors still recognize *V. septentrionalis* as a distinct species. It was formerly separated from *V. sororia* on the basis of pubescence on the spurred petal (pubescent in *V. septentrionalis* ; not pubescent in *V. sororia*).

Rarity Ranking in NB : S5 - abundant.

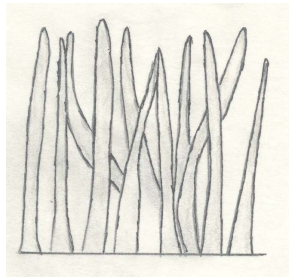
Habitat : in forests, along paths and old logging roads ; in moist clearings, meadows and lawns ; in riparian forests, along beaches and streams. It requires less humid sites and tolerates more sunlight than *V. cucullata*.

Flowering : May to mid-June (middle of spring, when maple leaves are expanding).

Notable features :

- 1) **sepals ciliate** (this feature distinguishes *V. sororia* from *V. cucullata*) ;
- 2) lateral and sometimes spurred petals pubescent with **long pointed hairs** ;
- 3) leaves **pubescent on both surfaces** and along the petiole ; margin ciliate ;
- 4) flowers violet-purple, rarely white in *forma Beckwithae* ; usually mixed with the leaves on reclining peduncles ; in **profile**, the **flower is bent between the spur and the petal** (this bend is not seen in *V. cucullata*) ;
- 5) “style dilated toward the apex, capitate, with a conical beak on the lower side, the stigma (is) located within the tip of the beak” (Haines 2001) (Infrageneric group : Boreali-Americanae), the style is slightly bent.

hairs on petals -



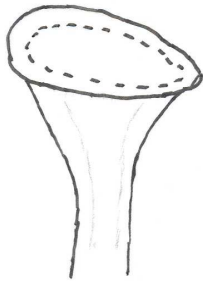
Viola sororia...cont...

profile of the flower -



Viola sororia

style -



Viola sororia

Viola novae-angliae House (pronounced : VY-oh-lah no-vee-ANG-lee-a) New England violet
(of or from New England - USA)

Rarity Ranking in NB : **S2 - rare** ; occurs mostly along the Saint John River.

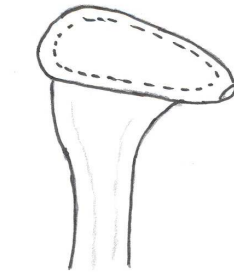
Habitat : xeric, calcareous rock outcrops and gravelly rocky shores above the normal high-water line. It is found exclusively in the spring scour zone of rivers.

Flowering : late-May to mid-June (late spring, when maple leaves have reached their full size).

Notable features :

- 1) lateral and spurred petals pubescent with **long pointed hairs** ;
- 2) sepals **eciliate** (this feature separates *V. novae-angliae* from *V. sagittata* var. *ovata*), sometimes the upper surface of the sepal has reddish glands ;
- 3) leaf blades are usually long **triangular**, longer than wide, cordate at the base, with **minute pubescence** along the veins on the lower surface, and glabrous above, sometimes the lower surface has reddish glands ; the margins contain 6 - 12 large rounded teeth ; petiole is usually sparsely pubescent ;
- 4) flowers light to dark purple, with a white center ;
- 5) "style dilated toward the apex, capitate, with a conical beak on the lower side, the stigma(is) located within the tip of the beak" (Haines 2001) (Infrageneric group : Boreali-Americanae), the style is slightly bent.

style & stigma -



Viola novae-angliae...cont...



Viola novae-angliae



Viola novae-angliae

Viola nephrophylla Greene (pronounced : VY-oh-lah neh-FRO-fil-uh) northern bog violet
(nepbro - phylla means with kidney shaped leaves, which is not the case for this violet)

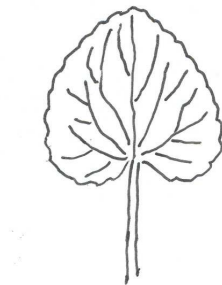
Rarity Ranking in NB : **S3 - Uncommon**

Habitat : in circumneutral fens and under sparse canopy of woodland fens ; on gravelly calcareous or peaty shores of rivers and lakes ; open prairies, sedge meadows, arborvitae swamps on calcareous soils ; it is found exclusively on high pH and mesic to wet substrates.

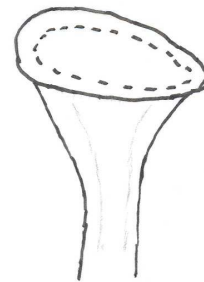
Flowering : late-May through June (late spring, when maple leaves have reached their full size)

Notable features :

- 1) leaf blade nearly as wide or wider than long, firm to **leathery, glabrous** or rarely with fine hairs on the lobes of the upper surface, lower surface often tinged with **purple (in the spring)** or blue ; margin crenate, with flattened teeth ;
- 2) sepals **eciliate** (this separates *V. nephrophylla* from *V. sororia*) ;
- 3) lateral and spurred petals (and sometimes the upper petals) with **long, pointed hairs** ;
- 4) flowers violet with a white center, color is usually intense without splotches ; in profile shows a slight bent on the spur petal ; on peduncles exceeding the leaves ; a white form is *forma albinea* Farwell
- 5) "style dilated toward the apex, capitate, with a conical beak on the lower side, the stigma (is) located within the tip of the beak" (Haines 2001) (Infrageneric group : Boreali-Americanae), the style is slightly bent.



leaf -



style & stigma -

Viola adunca J. E. Smith (pronounced : VY-oh-lah AD-un-kuh) hook-spurred violet (early blue violet)
(means bent towards or inwards, i.e. hooked)

Rarity Ranking in NB : **S3 - Uncommon.**

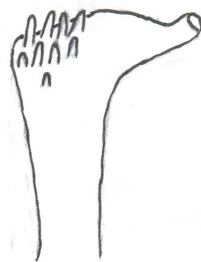
Habitat : prefers xeric habitats with a sand substrate, in full sunlight or shaded, in pine forests, sandy clearings, sandy plains, dry pastures, shores and dunes ; it is also found on rocky slopes and rock outcrops along rivers.

Flowering : May through mid-June (mid to late spring, when maple leaves are developping and when they have reached full size).

Notable features :

- 1) **spur** 5 - 7 mm long, **curved upwards** (i.e. hook-like) at the apex, from which its name is derived ;
- 2) leaf blades thick, leathery, rough to the touch, **dark green**, mostly **truncate at the base** ; pubescence is variable, usually with strigose hairs on both surfaces (a glabrous form is usually found on exposed rocky outcrops along rivers) ; the margin is **revolute** (turned inwards) ; the petiole is distinctly **winged**
- 3) lateral petals (not spurred petal) pubescent with **long, pointed hairs** ;
- 4) flowers pale blue or deep violet, usually numerous on each plant ; a white flower is known as *forma albiflora* Victorin & Rousseau ;
- 5) "style slender, **slightly widened apically**, not capitate, the **tip bent and about as long as the diameter of the style** " (Haines 2001) (Infrageneric group : Rostratae), **short hairs** are present near the tip of the style (there is evidence that the eastern population of *V. adunca* is diploid $2n = 20$, and variations are found within this group for the presence of short hairs on the tip of the style) ; the style is nearly straight.

style & stigma :



Viola adunca...cont...



Viola adunca



Viola adunca

Viola labradorica Schrank (pronounced : VY-oh-lah lab-rah-DOOR-ih-kah) American dog violet (alpine violet) (means : of or from Labrador, Canada) (synonym : *Viola conspersa* Reichenbach)

Many authors recognize *Viola conspersa* (among them is Hinds 2000) as a separate species based on certain morphological features such as stipule shape, prominence of stipule teeth and plant height. These features have been found to be continuous and to be modified by environment. Therefore, *V. conspersa* has been placed in synonymy (see Arthur Haines' website for a complete explanation).

Rarity Ranking in NB : S4S5 - fairly common to abundant

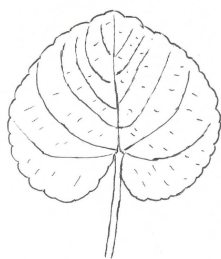
Habitat : found on mesic to sometimes saturated sites, in full sunlight or in shade ; it is found in forest clearings and fields, along the margins of infrequently used roads, in borders of woods, in bottomlands, thickets, along brooks and streams, on the gravelly or sandy shores of rivers ; it also occurs in alpine habitats.

Flowering : May through mid-June (mid to late spring, when maple leaves are developping and when they have reached full size).

Notable features :

- 1) spur is 2.5 - 5.0 mm long, **shorter** than and not curved upwards like *V. adunca*.
- 2) leaf blades thin, membranous, **light green**, mostly **cordate at the base** ; usually glabrous, sometimes pubescent on the upper surface; the margin is **flat** ; the petiole is not or barely winged ;
- 3) lateral petals (not spurred petal) pubescent with **long, pointed hairs** ;
- 4) flowers light blue or lilac, with darker veins ;
- 5) "style slender throughout, not capitate, the **tip bent and nearly twice as long as the diameter of the style** " (Haines 2001) (Infrageneric group : Rostratae), **short hairs** are present near the tip of the style ; the style is nearly straight

leaf -



style & stigma -

Hybrids of Blue Violets :

Except for *V. x bisseilii* House (*V. x melissifolia* Greene) presented above, no other blue violet hybrids have been reported for New Brunswick.

Other recognized hybrids among species of the Infrageneric group : Boreali-Americanae are :

Viola x conjugens Greene (*V. sagittata* var. *ovata* x *V. sororia*) - found in Maine
(syn : *V. x fernaldii* House)

Viola x incessa House (*V. cucullata* x *V. nephrophylla*)

Viola x mckinneyi House (*V. adunca* x *V. labradorica*)

Viola x napae House (*V. nephrophylla* x *V. sororia*)

Viola x porteriana House (*V. cucullata* x *V. sagittata* var. *ovata*) - found in Maine

These hybrids exhibit features that are intermediate between the parents. In a population of violets, some individuals will show features that do not immediately place them in one group or another. Then you may suspect that you have a hybrid.

WHITE corolla

Viola lanceolata Linnaeus (pronounced : VY-oh-lah lan-seeoh-LAY-tuh) strap-leaved violet
(means : lance-shaped) (lance-leaved violet)

Rarity Ranking in NB : S4 - fairly common (mostly in southern New Brunswick)

Habitat : in wet, open areas, on sand and thin organic soil over sand, on coarse gravel and sandy loams ; it is found in open bogs, moist meadows, in sand pits, on shores of rivers, streams , ponds and lakes, ditches.

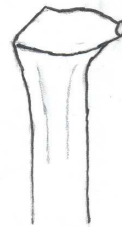
Flowering : May through early-June (mid spring, when maple leaves are developing).

Notable features :

- 1) leaf blades **3 to 7 times as long as wide** (the narrowest violet leaf in New Brunswick) ; margin **minutely serrate**, with a distinct red-brown to black gland on each tooth ;
- 2) lateral and spurred petals **glabrous** (or rarely with a few hairs) ;
- 3) flowers white with purple-brown veins ;
- 4) stolons present after flowering ; rhizomes slender 1 - 2 mm thick ;
- 5) sepals eciliate ;
- 6) "style dilated toward the apex, with a conical beak on the lower side, the stigma (is) located within the tip of the beak" (Haines 2001) (Infrageneric group : Stolonosae), the style is nearly straight.



leaf -



style & stigma -

Viola primulifolia Linnaeus (pronounced : VY-oh-lah pree-muh-lee-FOH-lee-uh)
 (means : Primrose-leaved) primrose-leaved violet

Note: this is the fertile hybrid between *Viola lanceolata* x *Viola macloskeyi* ssp. *pallens*
 (Syn : *Viola x sublanceolata* House). It often grows in the absence of the parents.

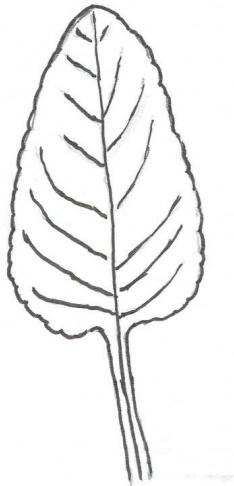
Rarity ranking in NB : not yet ranked, has been found only in the southwest portion of New Brunswick

Habitat : it is found in open, wet (hydric) soils, wet sands, in wet depressions of fields and meadows, shores of rivers, streams and lakes.

Flowering : May through early-June (mid spring, when maple leaves are developing).

Notable features :

- 1) leaf blades **1.5 to 2.5 times as long as wide**, usually oblong ovate, broad-cuneate to truncate at the base ; margin crenate, with a minute pale to dark red gland (not black) at the tip of each tooth ;
- 2) lateral and spurred petals **glabrous** (or rarely with a few hairs) ;
- 3) flowers white with purple-brown veins ;
- 4) stolons present after flowering ; rhizomes slender 1 - 2 mm thick ;
- 5) sepals eciliate ;
- 6) "style dilated toward the apex, with a conical beak on the lower side, the stigma (is) located within the tip of the beak" (Haines 2001) (Infrageneric group : Stolonosae), the style is nearly straight.



leaf -



style & stigma -

Viola macloskeyi F. E. Lloyd (pronounced : VY-oh-lah mah-KLOSS-kee-eye) wild white violet
(named for George Macloskie (1834-1919) Irish born botanist living in the USA) (northern white violet)

Note : our plants are *Viola macloskeyi* ssp. *pallens* (Banks ex DeCandolle) Baker
(pronounced : pal-LENS) (means : pale)
(syn : *Viola pallens* (Banks ex DeCandolle) Brainerd)

Rarity Ranking in NB : S5 - abundant

Habitat : in cool, wet areas, in full sunlight or partially shaded ; alder thickets, open woods, forested bogs and fens, wet fields, stream shores, shaded seeps, roadside ditches ; also grows in boreal and subalpine areas.

Flowering : late May through mid-June (late spring, when maple leaves have reached their full size).

Notable features :

- 1) leaf blades thin, usually **longer than wide**, with a prominent basal sinus (see *V. renifolia* for comparison) ; both surfaces are **glabrous** (see *V. blanda* for comparison) ; the color is light green or yellow-green with a dull or glossy, but not a satiny, sheen (see *V. blanda* for comparison) ; the petiole is glabrous or usually with sparse, long, curved hairs, usually with a green coloration, and with red dots ;
- 2) lateral and spurred petals **glabrous** (or rarely with a few hairs, not forming a patch) ;
- 3) flowers white with purple veins , usually **overtopping the leaves** ;
- 4) stolons present after flowering ; rhizomes slender 1 - 2 mm thick ;
- 5) sepals eciliate ;
- 6) "style dilated toward the apex, with a conical beak on the lower side, the stigma (is) located within the tip of the beak" (Haines 2001) (Infrageneric group : Stolonosae), the style is slightly bent.

stigma & style -



Viola macloskeyi...cont...



Viola macloskeyi -

Viola renifolia A. Gray (pronounced : VY-oh-lah ren-ee-FOH-lee-uh) kidney-leaved violet
(means : kidney-leaved) (syn : *Viola renifolia* var. *brainerdii* (Greene) Fernald)

Rarity Ranking in NB : S4S5 - fairly common to abundant

Habitat : in forests, usually cool and moist, or on rocky slopes, prefers calcareous soils, or rich humus ; in arborvitae swamps, boreal conifer woods, upland hardwoods, shores of streams and rivers, also found in shaded limestone ravines.

Flowering : May through early-June (mid spring, when maple leaves are developping).

Notable features :

- 1) leaf blades thick, **reniform, broader than long**, the midrib is usually 50 to 77 % of the total blade width, the basal sinus is usually shallow ; the margins are low-serrate, with **upturned teeth** ; both surfaces are sometimes pubescent (rarely glabrous), more frequently, only the lower surface is pubescent ; the petiole is usually pubescent (rarely glabrous), green to purplish ;
- 2) lateral and spurred petals **glabrous** (or rarely with a few hairs, not forming a patch) ;
- 3) flowers white with purple veins, usually **at same the level or lower than the leaves**
- 4) stolons **not present** (i.e., look for individual plants, not colonies) ; rhizomes slender 1 - 2 (- 4) mm thick ;
- 5) sepals eciliate (rarely ciliate on the auricles) ;
- 6) "style dilated toward the apex, with a conical beak on the lower side, the stigma (is) located within the tip of the beak" (Haines 2001) (Infrageneric group : Stolonosae), the style is slightly bent.

stigma & style -



Viola renifolia...cont...



Viola renifolia -



Viola renifolia -

Viola blanda var. **blanda** Willdenow (pronounced : VY-oh-lah BLAN-duh) sweet white violet
(means : mild, agreeable, for flower odour)

Rarity Ranking in NB : S5 (for var. *palustriformis*) ; var. *blanda* appears to be less common ;

Habitat : mesic to wetter, open to shaded forests, hardwoods, mixedwoods and sometimes in conifers stands, alder thickets, cool ravines and moist, shady slopes in deep humus, moist and shaded roadsides and lawns ; var. *blanda* prefers rich hardwood stands.

Flowering : mid-May through June (mid spring, when maple leaves are developing).

Notable features :

- 1) leaf blades **firm, flattened** and prostrate, dark green, with a **satiny sheen** ; usually **about as long as wide** (heart-shaped), the midrib usually equaling 75 to 90 percent of the total width of the blade ; the basal **sinus** is **narrow**, 0.8 to 1.0 times as long as wide ; blade **acute** at the **apex** ; the surface is usually **glabrous** or sometimes with hairs on the basal lobes of the upper surface ; the petioles are **tinged with red** and **glabrous** ;
- 2) lateral petals **glabrous** (or rarely with a few hairs) ;
- 3) flowers white with purple veins, usually **at same the level or lower than the leaves** ; flower peduncles tinged with red and glabrous ;
- 4) stolons present ; rhizomes slender 1 - 3 mm thick ; plants forming small mats ;
- 5) sepals eciliate ;
- 6) "style dilated toward the apex, with a conical beak on the lower side, the stigma (is) located within the tip of the beak" (Haines 2001) (Infrageneric group : Stolonosae), the style is slightly bent.

style & stigma -



Viola blanda var. *blanda* ...cont...



Viola blanda var. *blanda*



Viola blanda var. *blanda*

Viola blanda var. **palustriformis** A. Gray large-leaved white violet
 (pronounced : VY-oh-lah BLAN-duh variety pah-luss-TREE-for-miss)
 (means : marsh form) (syn : *Viola incognita* Brainerd (means: unknown))

Rarity Ranking in NB : S5 - abundant (this is the more common variety in New Brunswick)

Habitat : mesic to wetter, open to shaded forests, hardwoods, mixedwoods and sometimes in conifers stands, alder thickets, cool ravines and moist, shady slopes in deep humus, moist and shaded roadsides and lawns ;

Flowering : mid-May through June (mid spring, when maple leaves are developing).

Notable features :

1) leaf blades **membranous, rugulose** (nerves pronounced) and ascending, dark green, with a **satiny sheen** ; usually **about as long as wide** (heart-shaped), the midrib usually equaling 75 to 90 percent of the total width of the blade ; the basal **sinus is wide**, 0.75 to 0.85 times as long as wide ; blade **obtuse to broadly rounded** at the **apex** ; one or both surfaces has sparse to dense **pubescence** ; the petioles are **usually green** and **pubescent** ;

2) lateral petals **pubescent** ("bearded") with hairs rounded at the apex ; this feature alone can separate this violet from the other white acaulescent violets ;

3) flowers white with purple veins, usually **at same the level or lower than the leaves** ; flower peduncles green and pubescent ;

4) stolons present ; rhizomes slender 1 - 3 mm thick ; plants forming intricate carpets ;

5) sepals eciliate ;

6) "style dilated toward the apex, with a conical beak on the lower side, the stigma (is) located within the tip of the beak" (Haines 2001) (Infrageneric group : Stolonosae), the style is slightly bent. The style is identical to the one for var. *blanda*.

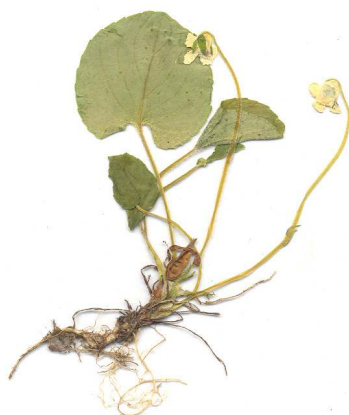
Flower -



Viola blanda var. *palustriformis*...cont...



Viola blanda var. *palustriformis*



Viola blanda var. *palustriformis*

Viola canadensis Linnaeus (pronounced : VY-oh-lah KAN-ah-den-siss) tall white violet (Canada violet)

Rarity Ranking in NB : **S1S2 - extremely rare to rare**

Habitat : rich hardwood forests, often with Sugar maple (*Acer saccharum*), White ash (*Fraxinus americana*) and Basswood (*Tilia americana*), found at the base of calcareous rocky slopes and ledge outcrops in these forests (these types of forests are found in western New Brunswick along the NB-Maine border)

Flowering : mid-May through early-June (early spring, when maple leaves are emerging)

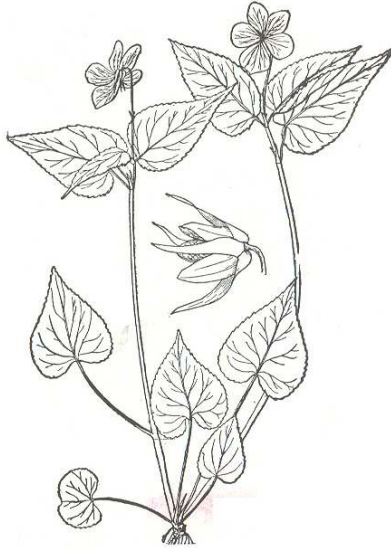
Notable features :

- 1) the only **caulescent** (stemmed) white violet in New Brunswick ;
- 2) leaf blades heart-shaped with a very **long, pointed apex** ;
- 3) flowers white with a yellow center, with purple lines at the base and purple tinged on the back ;
- 4) lateral petals **pubescent** (“bearded”) with hairs rounded at the apex ;
- 5) stolons absent ; rhizomes 3 to 5 mm thick ; plants form small colonies ;
- 6) sepals eciliate (rarely with a few cilia near the base) ;
- 7) “style capitate, nearly beakless, provided with minute hairs on either side of the summit, the stigma (is) located at the apex a tiny tip” (Haines 2001) (Infrageneric group : *Canadenses*), the style is distinctly bent ; the ovary is minutely hairy ;

stigma & style -



Viola canadensis...cont...



Viola canadensis (Hinds 2000)

Hybrids of White Violets

Except for *Viola primulifolia* (*V. lanceolata* x *V. macloskeyi* ssp. *pallens*), no white violet hybrids (of infrageneric group : *Stolonosae*) have been reported for New Brunswick.

Possible hybrids among species of this group are :

Viola blanda var. *palustriformis* x *Viola macloskeyi* ssp. *pallens*

Viola blanda var. *palustriformis* x *Viola renifolia*

Viola x *modesta* (*Viola lanceolata* x *Viola primulifolia*) - found in Maine in Washington County
(Haines 2001) - should be searched for in
southwestern New Brunswick

Viola x *molliculata* (*Viola macloskeyi* ssp. *pallens* x *Viola primulifolia*)

Yellow corolla :

Viola pubescens var. **scabriuscula** Torrey & Gray smooth yellow violet (yellow forest violet)
 (pronounced : VY-oh-lah pew-BES-senz variety ska-BREE-huss-kew-lah)
 (*pubescens*..means ; pubescent, i.e., with hairs ; *scabriuscula*..means : somewhat scabrous, i.e., rough)
 (syn: *Viola pensylvanica* Michaux)

Rarity Ranking in NB : S4S5 - fairly common to abundant (all our plants are var. *scabriuscula*)
 (The variety *pubescens* is found in western and southern Quebec, and central Maine, where it is uncommon to rare)

Habitat : in deciduous hardwoods in association with Sugar maple (*Acer saccharum*), White ash (*Fraxinus americana*), Red ash (*Fraxinus pennsylvanica*) and Basswood (*Tilia americana*), in moist high-terrace floodplain forests in rich loam, in cool, shaded rocky slopes, and at the edge of woods.

Flowering : mid-May to early-June (early spring, when maple leaves are emerging)

Notable features :

- 1) the only yellow flowered **caulescent** (stemmed) violet in New Brunswick ;
- 2) **stems two or more** from the apex of the rhizome, with 1 to 3 basal leaves ;
- 3) leaf blades dark green, with a **short apex**, glabrous or sparsely pubescent, usually 8 to 15 teeth per margin ;
- 4) flowers yellow, with brown-purple lines ;
- 5) lateral petals **pubescent** ("bearded") with hairs rounded at the apex ;
- 5) stolons absent ; rhizomes 3 to 5 mm thick ; plants in tufts or form dense colonies ;
- 6) sepals **ciliate**, at least at the base (rarely eciliate) ;
- 7) "style capitate, beakless, provided with minute hairs at or around the sides of the summit, the stigma (is) located in a round opening in front of the capitate portion" (Haines 2001)(Infrageneric group : *Chamaemelanium*), the style is distinctly bent ; the ovary is minutely hairy ;

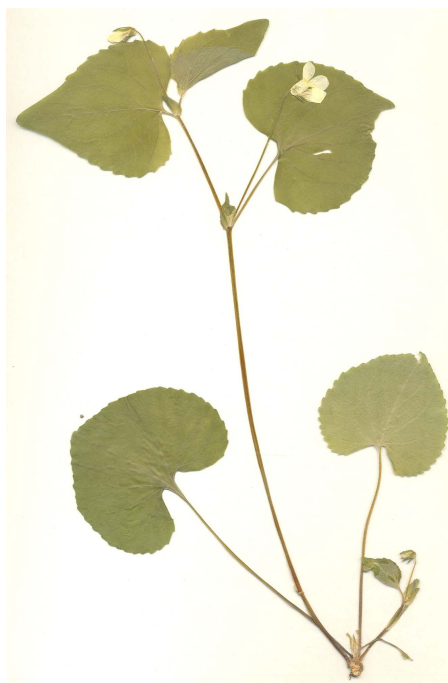
stigma & style -



Viola pubescens var. *scabriuscula*...cont...



Viola pubescens var. *scabriuscula*



Viola pubescens var. *scabriuscula*

Multicolored corolla (introduced violets)

Viola arvensis Murray (pronounced : VY-oh-lah ar-VEN-siss) European field pansy (wild pansy)
(means : of farmed or cultivated land, of fields) (syn: Viola tricolor var. arvensis (Murray) Boissier)

Rarity Ranking in NB : SE (exotic) ; is **rarely** introduced in New Brunswick

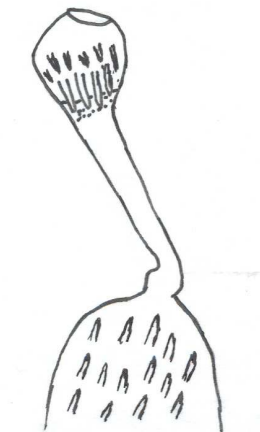
Habitat : usually dry, sandy, open, disturbed areas, such as cultivated fields, prairies, pastures, edges of lawns, and roadsides.

Flowering : late-May through June (late spring, when maple leaves have reached their full size)

Notable features :

- 1) stems **caulescent** ;
- 2) leaf blades longer than wide, bases cuneate ; glabrous to pubescent ; margin crenate-serrate and ciliate ;
- 3) stipules foliaceous (leaf-like), **lacinate** into 5 to 9 lateral segments and a larger terminal segment ;
- 4) flowers less than 1.5 cm long, **cream** (pale yellow) **with a yellow center**, sometimes with purple tips ; usually frontally flattened ;
- 5) sepals ciliate, **longer than or at most 2 mm shorter than the petals** ;
- 6) lateral petals **pubescent** with hairs rounded at the apex ;
- 7) plants **taprooted annuals** ;
- 8) "style dilated upward into a globose, hollow apex with a wide orifice on the lower side "(Haines 2001)
(Infrageneric group : Melanium), style is distinctly bent, the ovary has minute hairs.

style & stigma -



Viola arvensis...cont...



Viola arvensis



Viola arvensis

Viola tricolor Linnaeus (pronounced : VY-oh-lah TRY-kull-lur) Johnny-jump-up
(means : three colors, of the petals)

Rarity Ranking in NB : SE (exotic), is **rarely** introduced in New Brunswick

Habitat : garden escape around habitations, lawns, cultivated fields, roadsides ;

Flowering : mid-May through June (mid to late spring, when maple leaves are developing and when they have reached their full size) ;

Notable features :

- 1) stems **caulescent**, angled ;
- 2) leaf blades longer than wide, bases cuneate ; glabrous to pubescent ; margin crenate-serrate and ciliate ;
- 3) stipules foliaceous (leaf-like), **pinnatifid**, the terminal lobe toothed ;
- 4) flowers 1.5 cm to 2.5 cm long, **cream** (pale yellow) **with a yellow center**, the tips of the upper petals are **purple** ;
- 5) sepals ciliate or eciliate, **shorter than the petals by more than 2 mm** (about 70 % the length of the petal) ;
- 6) lateral petals **pubescent** with hairs rounded at the apex ;
- 7) plants **annuals** ; taproot 1 to 3 mm thick
- 8) "style dilated upward into a globose, hollow apex with a wide orifice on the lower side "(Haines 2001) (Infrageneric group : Melanium), style is distinctly bent, the ovary has minute hairs.

style & stigma -



Viola tricolor...cont...



Viola tricolor (Haines 2001)

What good are violets ?

Except for their intrinsic beauty violets provide nectar (at a price) for many foraging insects, especially the bees. The lines on the petals are nectar guides, evident under ultra-violet light, easily visible to the potential pollinators. The various color schemes of petals - white with violet, white with yellow, and yellow with purple serve as flags for pollinators.

Those industrious ants relish the nutrient rich caruncle (i.e., the spongy tissue) of the seeds and place them in their larder. By removing (eating away) the caruncle, ants are aiding the germination process of the seeds when they leave their nest after a month.

Violet petals are used in the beauty industry as scents for soaps, eau-de-toilette and perfumes.

In the popular culture violets are symbols of modesty, simplicity and fidelity. Violets are the official flowers of the US states of Wisconsin, Rhode Island, New Jersey & Illinois, as well as New Brunswick, Canada.

Pick the first violet you see in spring and make a wish...you will be protected for the rest of the year... (maybe this works without having to pick the flower). Giving a violet to your loved one was a gift for luck. The pansy (English term for the French "pensée" i.e., remembrance) was named for this custom. However, young women were forbidden from touching a white violet until they were wed. In the secret language of flowers giving violets implicitly said "I share your love".

In our pharmacopoeia violets were listed for many ailments : violets contain "salicylic acid which is an active disinfectant..it is applied in ointments to soften the hard skin, corns and warts, it is also a fungicide." "The roots of *V. odorata* ..are used in cough syrup and for rheumatic diseases." Some remedies were somewhat bizarre "1633 Gerarde-Johnson 852. 'The floures are good for all inflammations especially of the sides and lungs ; they take away the hoarseness of the chest, the ruggedness of the winde-pipe and jaws, allay the extream heate of the liver, kidneys and bladder ; mitigate the fierie heate of burning agues ; temper the sharpness of choler, and take away thirst. There is an oyl made of Violet, which is likewise cold and moist. The same being annointed upon the testicles, doth gently provoke sleepe which is hindered by a hot and dry distemper : mixed or laboured together in a wooden dish with a yelke of an egge, it asswageth the pain of the fundament and hemorrhoides : it is likewise good to be put into cooling clisters, and into pultesses that coole and ease pain...the later Physitians do thinke it good to mix dry Violets with medicines that are to comfort and strenghten the heart' (Erichsen-Brown 1979). **Needless to say, do not try this at home.**

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