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# A RESURVEY OF THE VIOLETS (*VIOLA*) OF TENNESSEE

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## ABSTRACT

A resurvey of the violets *(Viola)* of Tennessee is presented. A dichotomous key is provided for the twenty-two species and two varieties known to occur within the state. Comments are presented on each taxon in reference to habitat, distribution, and taxonomic and/or nomenclatural problems.

## INTRODUCTION

The most recent survey of the violets in Tennessee (Russell 1958) has served us well, but work in the fields and herbaria of Tennessee convinces one of the need for an update of Russell's original work. Russell recognized 29 species and two varieties while in this study 22 species and two varieties are recognized (Table 1). The nomenclature and taxonomy of the acaulescent blue violets as presented here is based on a forthcoming completed revision of that group by this author. Abbreviated comments as to certain changes are provided.

The results of this paper are based on field and herbarium studies conducted over fourteen years. A dichotomous key is provided as well as comments on habitat, distribution, and taxonomic and nomenclatural problems when applicable. Dot distribution maps by county are also provided.

## RESULTS

The primary objective is to provide a treatment that best organizes the diversity that exists in nature. Hopefully, this treatment will stimulate renewed interest in the genus and eliminate much of the taxonomic confusion. Any attempt to collect and identify violets should include a careful search for both typical and atypical specimens as well as to collect throughout the growing season so as to record seasonal changes in both habit and structure. Any morphological discontinuity, sympatry, suspected hybrid activity, etc., should be noted. Information of this nature will be quite useful for future herbarium studies of this taxonomically difficult group.

**Table I. Tennessee Violets recognized in the present study as compared with those listed by Russell (1958).**

| Present Study | Russell (1958) |
|---|---|
| **Pansies** | |
| *V. arvensis* | |
| *V. rafinesquii* | *V. kitaibeliana* var. *rafinesquii* |
| **Caulescent Yellow Violets** | |
| *V. eriocarpa* | *V. pensylvanica* |
| *V. hastata* | *V. hastata* |
| *V. tripartita* | *V. tripartita* var. *tripartita* |
| | *V. tripartita* var. *glaberrima* |
| | *V. pubescens* |
| **Caulescent White Violets** | |
| *V. canadensis* | *V. canadensis* |
| **Caulescent Blue Violets** | |
| *V. conspersa* | *V. conspersa* |
| *V. rostrata* | *V. rostrata* |
| *V. striata* | *V. striata* |
| *V. walteri* | *V. walteri* |
| **Acaulescent White Violets** | |
| *V. blanda* | *V. blanda* |
| | *V. incognita* |
| | *V. macloskeyi* ssp. *pallens* |
| *V. lanceolata* | *V. lanceolata* |
| *V. primulifolia* | *V. primulifolia* |
| **Acaulescent Yellow Violets** | |
| *V. rotundifolia* | *V. rotundifolia* |
| **Acaulescent Blue Violets** | |
| *V. cucullata* | *V. cucullata* |
| *V. hirsutula* | *V. hirsutula* |
| *V. palmata* | *V. stoneana* |
| | *V. triloba* var. *triloba* |
| | *V. triloba* var. *dilatata* |
| *V. pedata* | *V. pedata* |
| *V. sagittata* var. *sagittata* | *V. sagittata* |
| | *V. emarginata* |
| *V. sagittata* var. *fimbriatula* | *V. fimbriatula* |
| *V. septemloba* var.*egglestonii* | *V. egglestonii* |
| *V. sororia* var. *sororia* | *V. sororia* |
| | *V. papilionacea* |
| | *V. septentrionalis* |
| *V. sororia* var.*missouriensis* | *V. missouriensis* |

## KEY TO THE SPECIES OF VIOLETS *(VIOLA)* IN TENNESSEE

**Plants caulescent.**

Flowers pansy-like, stipules foliaceous and deeply lobed.
- Sepals exceeding petals or nearly so. — *V. arvensis*
- Sepals not exceeding petals. — *V. rafinesquii*

Flowers not pansy-like, stipules entire or merely laciniate
- Basal leaves absent or infrequent.
  - Leaf blade deltate, base cordate to hastate. — *V. hastata*
  - Leaf blade ovate to trifid, base cuneate or only slightly cordate. — *V. tripartita*
- Basal leaves typically present.
  - Plants prostrate and stoloniferous: flowers blue. — *V. walteri*
  - Plants upright and not stoloniferous; flowers blue, yellow, or white.
    - Stipules laciniately toothed.
      - Spur of basal petal elongate and curving upwards. — *V. rostrata*
      - Spur of basal petal not elongate or curving upwards
        - Leaf apices acute to acuminate; flowers white. — *V. striata*
        - Leaf apices obtuse to slightly acute; flowers blue. — *V. conspersa*
    - Stipules typically entire, if toothed,only slightly so.
      - Upper leaf blades longer than broad, apices acute to acuminate; flowers white. — *V. canadensis*
      - Upper leaf blades not longer than broad, apices obtuse or slightly acute; flowers yellow. — *V. eriocarpa*

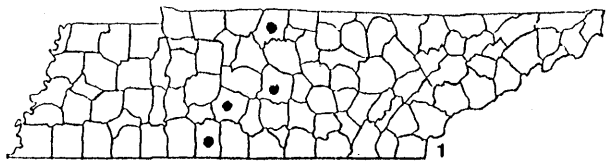
**Plants acaulescent.**

Flowers yellow or white.
- Leaf blades ovate to rounded; flowers yellow. — *V. rotundifolia*
- Leaf blades ovate to lanceolate; flowers white.
  - Plants stoloniferous, leaf blades ovate to rounded. — *V. blanda*
  - Plants not stoloniferous, leaf blades narrowly ovate to lanceolate.
    - Leaf blades narrowly ovate. — *V. primulifolia*
    - Leaf blade lanceolate to almost linear. — *V. lanceolata*

Flowers blue.
- Leaf blades cleft, parted, or divided, at least the midseasonal ones.
  - Plants homophyllous, all leaf blades cleft, parted or divided.
    - Chasmogamous flowers with protruding stamens andbeardless petals; cleistogamy absent; leaf blades parted or divided into 7 major segments. — *V. pedata*
    - Chasmogamous flowers without protruding stamens and at least the lateral petals bearded; cleistogamy present; leaf blades cleft or parted into 5 to 9 narrowly triangular, narrowly elliptic, or falcate segments. — *V. subsinuata*
  - Plants heterophyllous, only the midseasonal leaf blades cleft, parted, or divided.
    - Leaf blade cleft or incised at base only, creating a sagittate/hastate base; cleistogamous sepal auricles prominent and 1/2 as long to almost as long as sepals. *F. sagittata* var. *sagittata*
    - Leaf blade cleft, parted, or divided throughout, base cordate, reniform, or truncate; cleistogamous sepal auricles not prominent and less than 1/3 as long as sepals.
      - Midseasonal leaf blades cleft or parted into three primary segments with two secondary segments occasionally arising from the base of the middle one. — *V. palmata*
      - Midseasonal leaf blades parted or divided into five to nine primary segments.
        - Leaf blades divided into five primary elliptic, spatulate, or broadly falcate segments, segments often appearing petiolate. — *V. palmata*
        - Leaf blades parted or divided into five to nine primary narrowly elliptic, spatulate, or somewhat falcate segments, segments never appearing petiolate. — *V. septemloba* var. *egglestonii*
- Leaf blades neither cleft, parted, or divided.
  - Leaf blades triangular to deltate. — *V. sororia* var. *missouriensis*
  - Leaf blades elliptic, cordiform, reniform, or rounded.
    - Plants of very wet areas; chasmogamous peduncle erect or nearly so. — *V. cucullata*
    - Plants of xeric or mesic areas; chasmogamous peduncles ascending.
      - Leaf blade with a silvery mottled appearance to the upper leaf surface; pubescence usually limited to the upper leaf surface. — *V. hirsutula*
      - Leaf blade without the silvery mottling; pubescence scattered throughout or absent.
        - Leaf base truncate to attenuate, leaf blade elliptic; pubescence throughout. — *V. sagittata* var. *fimbriatula*
        - Leaf base cordate to reniform, leaf blade cordiform to reniform; pubescence may be absent or present. — *V. sororia* var. *sororia*

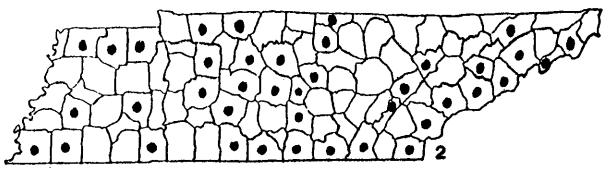
## Discussion

### Pansies




1. *V. arvensis* Murr.

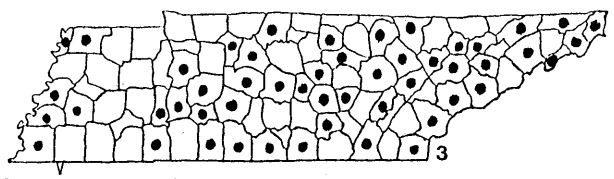
*Viola arvensis* likely occurs sporadically throughout the state. However, due to its frequent association with cultivated fields, this species is frequently overlooked by collectors.




2. *V. rafinesquii* Greene

This violet occurs frequently throughout the state and is one of our weedier species.

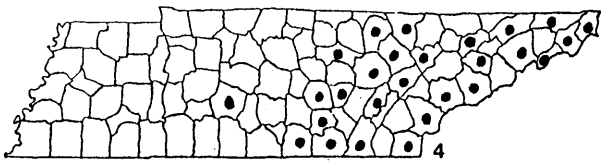
### Caulescent Yellow Violets




3. *V. eriocarpa* Schwein.

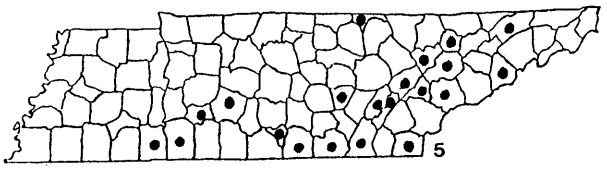
This violet occurs frequently in deciduous forests throughout the state. The nomenclatural history of this violet has been quite troublesome. Over the years, many have preferred the use of *V. pensylvanica* as the correct name for this species based primarily on Fernald (1941). However, Jones (1959) provided convincing evidence for the use of *V. eriocarpa*, provided it remained as a separate entity from its closest relative *V. pubescens*. Russell (1965) placed *V. eriocarpa* as a variety of *V. pubescens* which was followed by Kartesz and Kartesz (1980). However, Levesque and Dansereau (1966) maintained both as separate species. This study will follow their revisionary treatment.

Two distinct forms are recognized. The first, f. *eriocarpa* is distinguished by its densely tomentose capsules while the second, f. *leiocarpa* (Fern. and Weig.) Deam, may be distinguished by its glabrous capsules. Both forms occur in Tennessee and have never been found in the same population although populations of each may be found in close proximity.




4. *V. hastata* Michx.

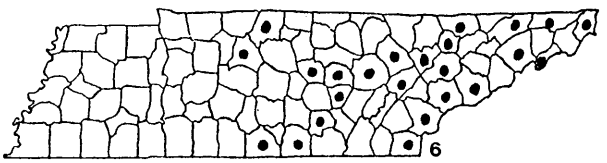
This violet, considered by some to be one of the lovelier of the species, inhabits rich deciduous forests throughout the Eastern portion of the state.




5. *V. tripartita* Ell.

As a rather infrequent species, this violet occurs from the Western Highland Rim eastward although appearing absent from the Central Basin. Although originally considered as varieties, Levesque and Dansereau (1966) recognized two forms. The first, f. *tripartita* is distinguished by its triparted leaf blades while the second, f. *glaberrima* (DC) Fern., may be recognized by its uncut leaves. Both forms occur in Tennessee.

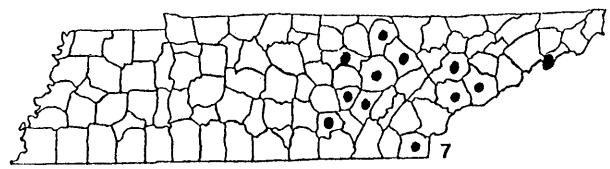
### Caulescent White Violets




6. *V. canadensis* L.

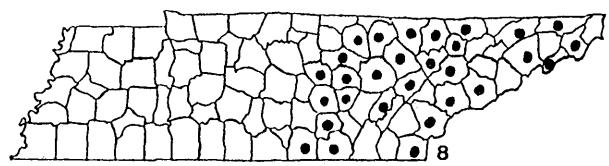
This violet occurs in rich deciduous forests throughout East Tennessee. It may be differentiated from the only other caulescent white violet in the state, *V. striata*, by its smaller entire stipules.

### Caulescent Blue Violets



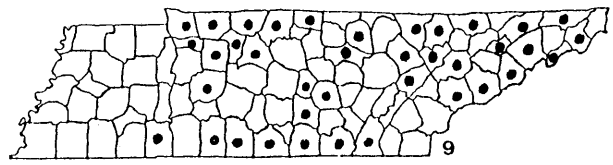

7. *V. conspersa* Reichenb.

Although infrequently collected, this violet occurs in deciduous forests throughout East Tennessee. Vegetatively, it is quite similar to the two following species.



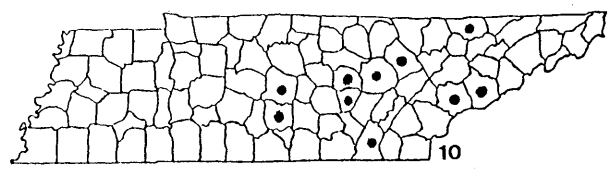

8. *V. rostrata* Pursh

This violet's habitat and distribution are similar to that of the preceeding species with which it sometimes occurs sympatrically. The elongated spur of the basal flower petal easily differentiates this species.




9. *V. striata* Ait.

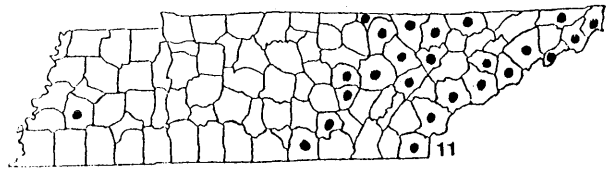
As suggested by Russell (1965), this violet is quite similar both genetically and morphologically to the two preceeding species although its flowers are white. All three have identical chromosome numbers ($2N = 20$) while *V. canadensis* has a chromosome number of $2N = 24$ (Gershoy, 1934). This species occurs in deciduous forests from the Western Highland Rim eastward and appears to adapt very well if its habitat is disturbed.




10. *V. walteri* House

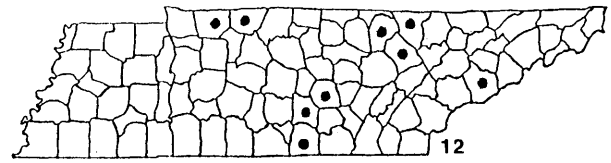
*Viola walteri* occurs infrequently in upland deciduous forests from the Central Basin eastward. It is a beautiful violet producing dense mats of prostrate, stoloniferous plants.

**Acaulescent White Violets**



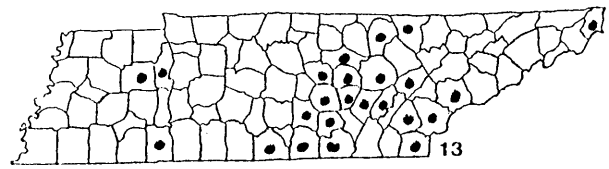

11. *V. blanda* Willd.

This species occurs in deciduous forests throughout the eastern portion of the state. It is low growing, stoloniferous, and exhibits considerable variation in both floral and vegetative morphology. Two similar taxa, *V. incognita* Brainerd and *V. macloskeyi* Lloyd ssp. *pallens* (Banks) M.S. Baker, although recorded from Tennessee (Russell, 1958), have not been verified by either field or herbarium studies. *Viola blanda* likely represents a large complex of similar taxa where differentiation has not occurred throughout its entire range. Many have alluded to the close relationship both morphologically and genetically between *V. blanda* and *V. incognita* Brainerd (1921), Gershoy (1934), Anderson (1954), and Russell (1956, 1965). On the other hand, while *V. macloskeyi* ssp. *pallens* is morphologically quite similar, it reportedly differs with respect to chromosome number ($2N = 24$), whereas chromosome numbers for both *V. blanda* and *V. incognita* are $2N = 44$ Clausen (1929), Gershoy (1934). Kartesz and Kartesz (1980), while recognizing *V. incognita*, placed *V. blanda* as a synonym under *V. macloskeyi* ssp. *pallens*. I find no justification for such a nomenclatural change now. Further study may be necessary for a proper resolution.




12. *V. lanceolata* L.

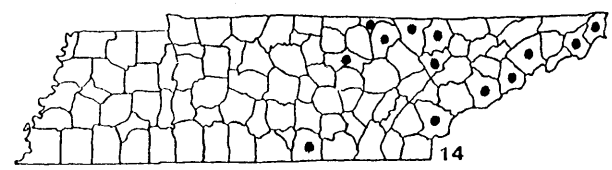
This violet occurs in open, moist habitats from the Western Highland Rim eastward although appearing to be absent from the Central Basin. As our only lanceolate–leaved white violet, it is quite distinctive.




13. *V. primulifolia* L.

The habitat and distribution of this violet is quite similar to that of the preceeding species. It may be distinguished by its elongated–ovate leaf blades and acute to cuneate leaf base.

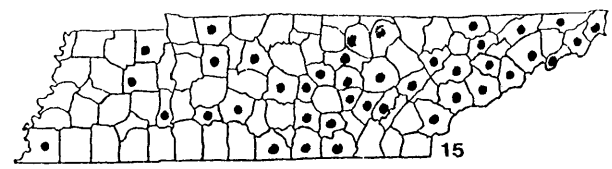
**Acaulescent Yellow Violets**




14. *V. rotundifolia* Michx.

Our only stemless yellow violet is confined to the eastern portion of the state and occurs in rich deciduous forests. Material lacking flowers might possibly be confused with *V. blanda*. However, its leaves are more rounded and less heart–shaped and appear as a much darker and deeper green.

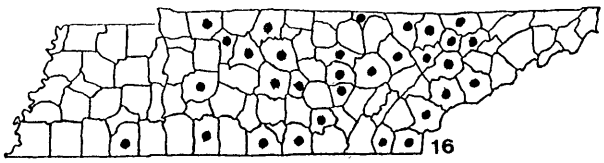
**Acaulescent Blue Violets**




15. *V. cucullata* Ait.

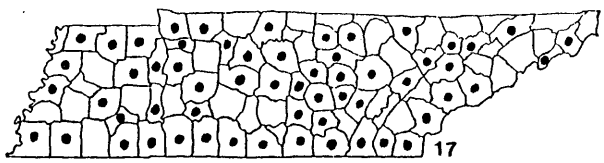
This species occurs in moist habitats infrequently

throughout the state. It may be distinguished by the erect nature of its chasmogamous and cleistogamous peduncles and by the very prominent and elongated sepal auricles of the cleistogamous flowers and capsules.



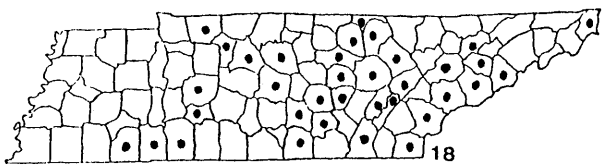

16. *V. hirsutula* Brainerd

Although appearing to be absent from extreme West Tennessee, this species occurs infrequently throughout the rest of the state. It inhabits deciduous forests and may be distinguished by its relatively small, prostrate appearance and the silvery mottling of the upper leaf surface.



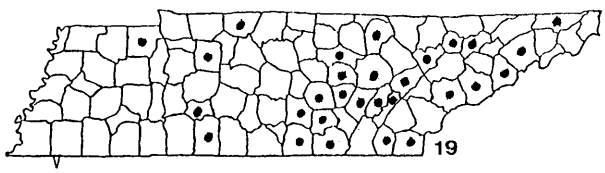

17. *V. palmata* L.

As one of our more common species, this violet occurs in forests and thickets throughout the state. This is a heterophyllous violet with leaves either uncut or cleft or parted into three primary segments. Two forms are recognized. The first, f. *palmata*, represents the basic trilobed appearance while f. *dilatata* presents three to five segments appearing somewhat petiolate at their base. Both are present in Tennessee. Several reported taxa for this state which are synonymous with this species are; *V. esculenta* Ell., *V. lovelliana* Brainerd, *V. stoneana* House, and *V. triloba Schwein.*



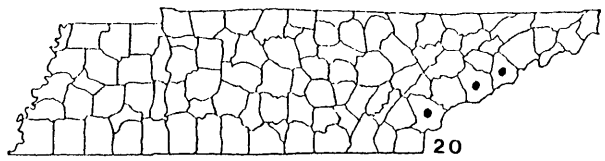

18. *V. pedata* L.

This species occurs throughout the state in open, sandy, wooded areas and occasionally in disturbed sites. It is quite distinct from other species with its flowers flattened and pansy-like, having conspicuously protruding stamens and no petal beards. It is strictly chasmogamous.



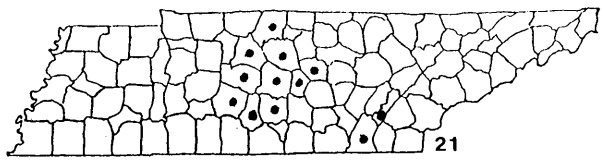

19. *V. sagittata* Ait. var. *sagittata*

This variety occurs sporadically throughout much of the state except for the Central Basin. Its leaf blades are narrowly triangular, narrowly elliptic, to ovate in outline with a sagittate/hastate base. *Viola emarginata* (Nutt.) LeConte as applied to Tennessee records is synonymous.



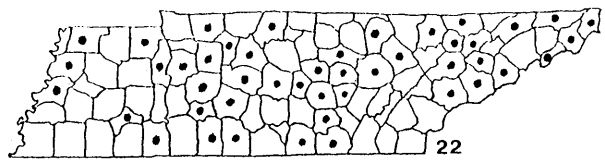

20. *V. sagittata* Ait. var. *fimbriatula* J.E. Smith

This variety occurs sporadically within the southern Appalachian portion of East Tennessee. Its leaf blades are elliptic to ovate in outline with a truncate, attenuate, or slightly sagittate/hastate base. It is generally more pubescent than its preceeding relative.



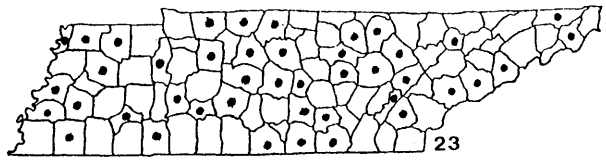

21. *V. septemloba* LeConte var. *egglestonii* Brainerd

As an endemic to cedar glades or glade–like areas, this violet is limited in distribution to the Central Basin and several sporadic occurrences in the Ridge and Valley province (Hamilton and Meigs Counties). This is a heterophyllous violet with its earliest leaves uncut and later leaves divided into five to nine spatulate to almost falcate segments.



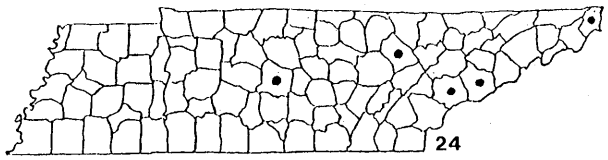

22. *V. sororia* Willd. var. *sororia*

This is by far our most abundant and weediest species and is found in wooded areas and disturbed ground throughout the state. Leaves are cordiform, reniform, to very widely ovate in outline. It may be glabrous or very heavily pubescent or somewhere in between. Two taxa reported from the state and synonymous with this species are *V. papilionacea* Pursh and *V. septentrionalis* Greene.




23. *V. sororia* Willd. var. *missouriensis* Greene

This variety occurs in alluvial woods throughout the state. Its leaves are triangular or deltate in outline, light green, and usually glabrous.




24. *V. subsinuata* Greene

This species inhabits mesic woodlands from the Central Basin eastward and is rather infrequent. Its leaf blades are homophyllous, triangular to widely ovate and cleft or parted into five to nine (occasionally as many as sixteen) segments. Each segment is somewhat elliptic, triangular, lanceolate, or falcate and separated by broad sinuses which generally decrease in both width and depth toward the widening base. Since Brainerd (1921), this violet is what many of us came to know as *V. palmata* L., however, this violet does not conform to the Linnaean type. Greene's description and type specimen of *V. subsinuata* conforms very well to this violet and sets it apart from the heterophyllous *V. palmata.*

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