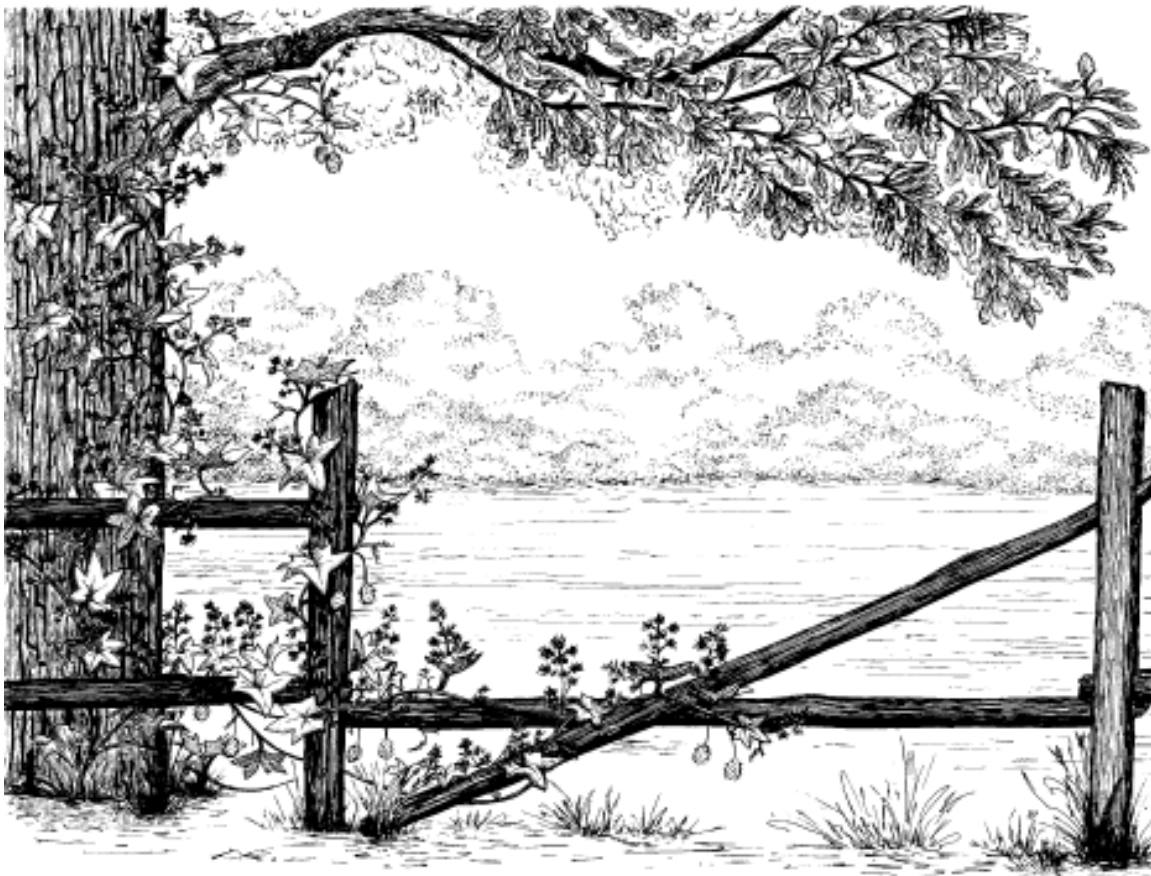


SNAPDRAGONS & FRIENDS

Revised 14 October 2015



LINDERNIACEAE

Lindernia

OROBANCHACEAE

Agalinis
Aureolaria
Castilleja
Conopholis
Dasistoma
Melampyrum
Orobanche
Pedicularis
Seymeria
Tomanthera

PLANTAGINACEAE

Besseya
Chelone

Collinsia
Gratiola
Linaria
Penstemon
Plantago
Veronica
Veronicastrum
Wulfenia

PHRYMACEAE

Mimulus
Phryma

SCROPHULARIACEAE

Scrophularia
Verbascum

Where have all the figworts gone?
Long time passing
Where have all the figworts gone?
Long time ago
Where have all the figworts gone?
Girls have picked them everyone.
When will they ever learn?
When will they ever learn?

With apologies to Pete Seeger, Where Have All The Flowers Gone ©1961

(Renewed) Fall River Music Inc.

Almost 20 years ago, the *Gerardias* vanished, & now the rest? The traditional *Scrophulariaceae* have been restructured with *Antirrhinanthaceae*, *Orobanchaceae*, *Callitrichaceae*, *Plantaginaceae*, *Buddlejaceae*, & *Phrymaceae* into the following:

Linderniaceae: *Lindernia*, *Hemianthus*, *Micranthemum*, *Torenia*.

Orobanchaceae: *Agalinis*, *Aureolaria*, *Buchnera*, *Castilleja*, *Conopholis*, *Dasistoma*, *Epifagus*, *Macranthera*, *Melampyrum*, *Orobanche*, *Pedicularis*, *Schwalbea*, *Seymeria*, *Striga*.

Plantaginaceae (*Veronicaceae*): *Amphianthus*, *Antirrhinum*, *Bacopa*, *Callitriche*, *Chaenorrhinum*, *Chelone*, *Collinsia*, *Cymbalaria*, *Digitalis*, *Gratiola*, *Kickxia*, *Leucospora*, *Limnophila*, *Limosella*, *Linaria*, *Mecardonia*, *Misopates*, *Nuttallanthus*, *Penstemon*, *Plantago*, *Scoparia*, *Veronica*, *Veronicastrum*.

Phrymaceae: *Glossostigma*, *Mazus*, *Mimulus*, *Phryma*.

Scrophulariaceae s.s.: *Buddleja*, *Scrophularia*, *Verbascum*.

After Weakley (2011)

This section contains the spp of the former, broadly-defined SNAPDRAGON FAMILY & the families to which many spp have been reassigned, a very artificial “GREATER SNAPDRAGON” group. Mohlenbrock (2014) maintains the traditional *Scrophulariaceae* family *sensu lato*.

Swink & Wilhelm (1994) plant spp associates have been added to all hemiparasites & holoparasites. Many are likely symbionts, &/or are potentially useful in developing northern Illinois restoration strategies for these various “codependent” spp. Herbaceous & woody associate plant spp are listed for those spp known to parasitize *Quercus*. Spp lists are in the order of each habitat listed by the authors, the lists are not consolidated, & the habitats are separated by a (1), (2), &c.

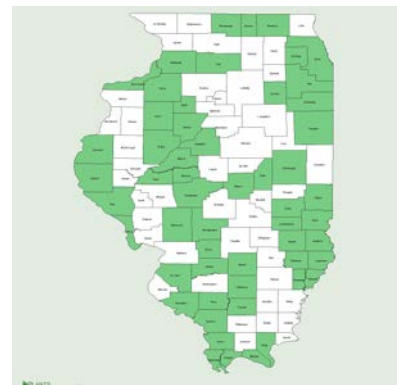
LINDERNIACEAE FALSE PIMPERNEL FAMILY A family of about 13 genera & 195 spp of pantropical & warm temperate regions.

LINDERNIA Allioni 1755 **FALSE-PIMPERNEL** *Linderniaceae* *Lindernia* honoring Franz Balthasar von Lindern (1682-1755). A genus of 80-100 (±50) spp or warm temperate & subtropical regions of both hemispheres. Placed by some in *Plantaginaceae*. The genus was formerly part of the broadly defined *Scrophulariaceae*, in which this genus is maintained by Mohlenbrock (2014).

Lindernia anagallidea (Michaux) Pennell (alternately *Lindernia dubia* (Linnaeus) Pennell var *anagallidea* (Michaux) Cooperrider) *MA, NH **SLENDER FALSE PIMPERNEL**, aka **FALSE PIMPERNEL**, (*anagallideus -a -um* like the genus *Anagallis*, pimpernel, or resembling pimpernel, from *αναγαλλις*, *anagallis*, a Greek name for pimpernel, & *-eus*, made from, -color, -like, or possibly related to Greek *-ίδιον*, *-idion*, diminutive suffix, meaning little pimpernel.)

“Apparently quite uncommon in our area we having found it only in a prairie slough at Alpine & Sandy Hollow roads east of Rockford” (ewf55). In the se USA, “wet sandy or muddy areas (w12). distribution/range: “Moist soil, sometimes in standing water; occasional throughout the state, except for the nw cos, where it is rare or absent (m14). Very widely distributed nearly throughout North America, Central America, & South America (w12).

①Average 1000 Seed Weight(g): 0.0020, (Baker Seed Herbarium, California), Seed; Seed mc not stated, but weight is likely to refer to air-dry seed



Annual/biennial; most leaves widely rounded at the base. key features: Leaves widely-rounded at the base (fh).

Possibly Extirpated in Maine. Endangered in New Hampshire.

VHFS: Some authors feel this is a variety or form of the following, *L dubia* (pugs14). “The extensive & essentially coincident ranges of the 2 varieties of *L dubia* suggests that they may be merely forms, as suggested by Voss (1996)” (w12).

“A few specimens from the southern counties of the Lower Peninsula are var *anagallidea* (Michx) Cooperr, with slender pedicels exceeding the short, broad somewhat clasping subtending leaves. Plants with pedicels shorter than the leaves, which are ± tapered to their bases, represent var *dubia*. The two have sometimes been regarded as distinct species, but intermediates seem numerous.” (rvw11)

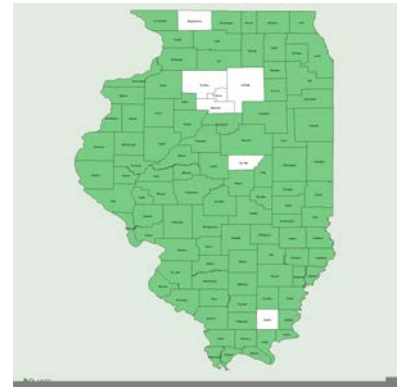
[*Gratiola anagallidea* Michx, *Ilysanthes anagallidea* (Michx) BL Rob, *I inequalis* (Walter) Pennell, *Lindernia anagallidea* (Michx) Pennell]

Both vars of *Lindernia dubia* are known from “nearly throughout North America, Central America, and South America” (w12). It is also known from China & Taiwan, as *BEI MEI MU CAO*, where it is cited as a North American native (Flora of China vol 18). Many European names exist including *FABREGA*, *LINDERNIE DOUTEUSE*, *MANJERICO*, *VANDELLIA DELLE RISAIE*, *VERWECHSELTES BUCHSENKRAUT* (http://luirig.altervista.org/photos/l/lindernia_dubia.htm).

Illinois map courtesy plants.usda.gov.

Lindernia dubia (Linnaeus) Pennell YELLOWSEED FALSE PIMPERNEL, aka FALSE PIMPERNEL, MOIST BANK PIMPERNEL, YELLOW-SEED FALSE PIMPERNEL, (*dubius -a -um* from Latin doubtful, dubious, uncertain.)

Habitat: “Common on muddy river banks especially Rock & Kishwaukee Rivers.” (ewf55) In Michigan, “an inconspicuous annual of bare mud or wet sand on shores, river banks, marsh & pond margins, interdunal flats, borrow pits, & old forest trails; thriving on exposure after lowering of water levels & seldom seen in times of high water. (The seeds are evidently dispersed or rejuvenated from seed banks by fluctuations in water level.)” (rvw11). “Wet soils along streams, ditches, ponds, lakes, & sloughs. Also in moist areas of fields & woods.” (missouriplants.com) In the se USA, “wet sandy or muddy areas.(w12). distribution/range: Very widely distributed nearly throughout North America, Central America, & South America (w12).



Culture: propagation: ①Average 1000 Seed Weight(g): 0.01; (RBG Kew, Wakehurst Place), Seed

Description: Native summer annual; flowers pale blue-purple to white; key features: “It can be identified by its small size, square stems, & small blue flowers. Another sp, *L anagallidea* (Michx) Pennell is similar but has lower pedicels, which are longer, than their subtending leaves. This latter sp is less common in Missouri & does not grow in as wet conditions as *L dubia*.” (mbg)

Comments: status: Possibly extirpated in Maine. Endangered in New Hampshire. phenology: Blooms

Associates:

ethnobotany:

VHFS: In Britton & Brown (1913), this is *Ilysanthes attenuata*.

The extensive & essentially coincident ranges of the two varieties of *L dubia* suggests that they may be merely forms, as suggested by Voss (1996)” (w11)

Illinois has 2 vars. Variety *dubia*; with all pedicels shorter than the subtending leaves; moist ground, sometimes in standing water; common throughout Illinois; blooms June-October. Variety *riparia* (Raf) Fern; with only the lowermost pedicles shorter than the subtending leaves; moist ground; common throughout Illinois; blooms June-October.

Synonyms for variety *dubia*. [*Gratiola attenuata* Spreng, *G dubia* L, *Ilysanthes attenuata* (Spreng) Small, *I dubia* (L) Barnhart, *L d* (L) Pennell var *riparia* (Raf) Fern, *L d* (L) Pennell var *typica* Pennell, *L procumbens* auct non (Krock) Philcox, *L pyxidaria* sensu Pennell, non L, *L pyxidaria* L var *major* Pursh, *I riparia* Raf, *L dubia* (L) Pennell var *major* (Pursh) Pennell]



Lindernia dubia

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2nd & 3rd line drawings Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS *Wetland flora: Field office illustrated guide to plant spp.* Not copyrighted image. 4th line drawing public domain from Hippolyte Coste - *Flore descriptive et illustrée de la France, de la Corse et des contrées limitrophes*, 1901-1906. Illinois map courtesy plants.usda.gov.

OROBANCHACEAE Ventenat 1799 **BROOMRAPE FAMILY** A family of about 96 genera & 2060 spp consisting of root-parasitic (holoparasitic) herbs lacking chlorophyll (*Orobanchaceae sensu strictu*) & chlorophyllose hemiparasitic herbs (formerly part of the *Scrophulariaceae*) from the subtropical & temperate regions of the Northern Hemisphere. As newly redefined, the familiar Midwestern hemiparasitic figworts are now in this family, including *Agalinis*, *Aureolaria*, *Dasistoma*, *Seymeria*, *Castilleja*, *Melampyrum*, & *Pedicularis*. Mohlenbrock (2014) maintains *Orobanchaceae sensu strictu*.

The hemiparasitic spp germinate independently of the host spp, differing from the holoparasitic *Orobanchaceae sensu strictu* that respond only to specific chemical signals from the host before germinating. Obligate hemiparasitic spp will not develop beyond the seedling stage without a host. Some of the former *Scrophs* may be parasitic & mycorrhizal or non-parasitic & mycorrhizal.

<http://www.parasiticplants.siu.edu>

Associates: Associated plant spp are *Allium cernuum*, *Andropogon scoparius*, *Bouteloua curtipendula*, *Comandra umbellata*, *Liatris cylindracea*, *Poa compressa*, *Polygala senega*, *Pteridium aquilinum latiusculum*, *Sorghastrum nutans*, & *Sporobolus heterolepis* (sw94).

ethnobotany:

VHFS: [*Gerardia aspera* Douglas ex Benth]



Agalinis aspera

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

Agalinis gattingeri (Small) Small * IA, MI, MN, OH, WI ROUND-STEM FOXGLOVE, aka GATTINGER'S FOXGLOVE, GATTINGER'S GERARDIA, ROUGH STEMMED FALSE FOXGLOVE, ROUND-STEMMED FALSE FOXGLOVE (*gattingeri* for Augustin Gattinger, 1825-1903.)

Habitat: In Illinois, "Sp is distributed along edges of glades" (Ilpin). Sterile wooded slopes & ridges, & Black Oak savanna (sw94). In Michigan, open sandy places, such as higher ground near marshes & in old borrow pits" (rvw11). In the se USA, barrens, glades, outcrops, & woodlands (w12).

distribution/range: "Dry, often rocky woods; uncommon throughout Illinois" (m14). Illinois is on the ne & e central edge of the range of this sp, with some outliers in Indiana, southern Michigan, & Ohio. Sp is uncommon to occasional in Illinois. Ontario to Minnesota, south to Ohio, & Alabama & east Texas, east Oklahoma, & east Kansas.

Culture: ☉ Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). Hemiparasite.

Description: Annual; flowers red to violet; key features: The stems may have low ridges, but they do not have sharp angles or wings (rvw11). Plant yellowish green, many erect branches; leaf yellowish green; solitary flower (fh) Stems are terete (Ilpin).

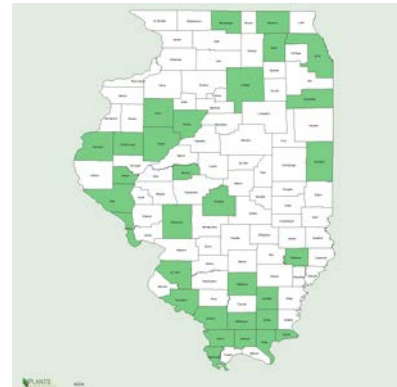
Comments: status: Threatened in Iowa & Wisconsin. Endangered in Michigan & Minnesota. Presumed extirpated in Ohio. phenology: Blooms 8-10. C3.

"This grows sparingly on a gravel hill prairie on Rock River west of Rockton." (ewf55 as *Gerardia gattingeri*)

Associates: Associated plant spp are *Antennaria plantaginifolia*, *Danthonia spicata*, *Lespedeza capitata*, *Polygala sanguinea*, *Potentilla simplex*, *Quercus alba*, *Quercus velutina*, *Ranunculus fascicularis*, & *Solidago ulmifolia* (sw94).

ethnobotany:

VHFS: [*Gerardia gattingeri* Small]





Agalinis gattingeri

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

Agalinis paupercula (A Gray) Britton *NY, OH, PA SMALL-FLOWERED FALSE FOXGLOVE, aka SMALL FLOWER FALSE FOXGLOVE, SMOOTH FALSE FOXGLOVE, (*pauperculus -a -um* little, poor, miserable, of poor appearance, diminutive of Latin *pauper, pauperis*.)

Habitat: Moist, sandy, or peaty soil, especially on calcareous pond shores (sw94). In Illinois, “sp is distributed in sandy or peaty soil, calcareous pond shores” (Ilpin). In the se USA, calcareous fens (w11). distribution/range: Illinois is at the south central-south west limit of this sp range.

Description: Annual; flowers red to violet. Plant 0.5-1.5’ tall; flower 0.5-0.75” long, hairy inside, upper lobes spreading backwards; sepal lobes from 40% to as long as the tube, stems in inflorescence less than 0.25” long (fh)

key features:

Comments: status: Threatened in New York. Endangered in Ohio & Pennsylvania. phenology: Blooms 8-10. C3.

“Similar to *G purpurea* & sometimes treated as a variety; the flowers are smaller & the plant is more often branched; it grows in the same places but is less common” (ewf55 as *G paupercula*).

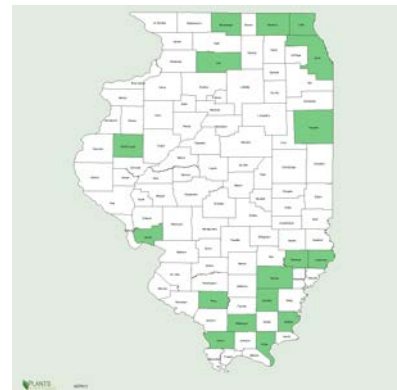
Associates: Associated plant spp are 1) *Cladium mariscoides*, *Cyperus rivularis*, *Juncus brachycephalus*, *Lobelia kalmii*, *Lycopus americanus*, *Rhynchospora capillacea*, & *Spiranthes cernua*; 2) *Cirsium muticum*, *Dryopteris thelypteris pubescens*, *Eupatorium maculatum*, *Eupatorium perfoliatum*, *Scutellaria epilobifolia*, *Solidago patula*, & *Solidago uliginosa* (sw94). Both varieties are larval hosts for *Euphydryas phaeton*, BALTIMORE CHECKERSPOT.

ethnobotany:

VHFS: Often seen as *Agalinis purpurea* (Linnaeus) Pennell variety *parviflora* (Benth) B Boivin.

Illinois has 2 vars. Variety *paupercula*; with the summit of flower 1.0-1.5 cm across; styles 8-10 mm long; moist soil, rare; scattered Illinois. Blooms August - September. [*Gerardia purpurea* L var *paupercula* A Gray, *G paupercula* (A Gray) Britt, *G p* (A Gray) Britt var *typica* Pennell]

Variety *borealis* (Pennell) Deam; with summit of flower 0.5-1.0 cm across; styles 6-8 mm long; moist soil; rare; confined to the n ¼ of Illinois. Blooms August - September. [*Agalinis purpurea* (L) Pennell var *parviflora* (Benth) B Boivin, *Gerardia purpurea* L var *parviflora* Benth, *G paupercula* (A Gray) Britton var *borealis* (Pennell) Deam, *G p* (A Gray) Britton ssp *borealis* (Pennell) Pennell]



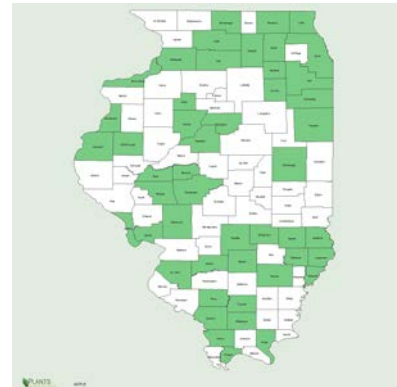


Agalinis paupercula

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

Agalinis purpurea (Linnaeus) Penell PURPLE FALSE FOX GLOVE, aka GERARDIA, PURPLE GERARDIA, SMOOTH AGALINIS, (*purpureus -a -um* (pur-PEWR-ree-us) purple, reddish-purple, from Latin *purpureus*, adjective, purple colored, dark red, dark brown, clad in purple, gleaming, bright, beautiful, for the purple flowers; alternately from Greek for purple.) facw

Habitat: Wet savannas, moist sandy or peaty areas, & mesic, wet mesic & wet prairies. “Locally common in moist sandy & peaty habitats, growing most characteristically on calcareous pond borders of interdunal sand flats... Also in artificially disturbed habitats where there is moist sand” (sw94). In Illinois, “Sp is distributed in sandy or peaty habitats, calcareous pond borders of interdunal sandflats” (llpin). “Common in the boggy places in Coon Creek bottom; quite uncommon in the Searle Tract & elsewhere in the Co.” (ewf55 as *Gerardia purpurea* L) In Michigan, “Sandy, gravelly, and rocky shores (of Great Lakes and inland lakes and ponds) and interdunal swales, especially after lowering of water levels; fens, sedge meadows, bogs; sand prairies and wet calcareous banks” (rvw11). In the se USA, woodlands, roadsides, & in a wide variety of open habitats 0w12). “Moist sandy fields, rocky shores, serpentine barrens” (lbj). distribution/range: “Moist soil, occasional to common throughout Illinois (m14). Sp is less common in southern 1/4 of Illinois.



Culture: ①Seeds germinate after about 60 days of cold, moist stratification (he99). ②Moist cold stratify or dormant seed, small seeds need light (Code C, D Ken Schaal). 8,107,143 (gnhj13), 8,800,000 seeds per pound.

bottom line: Sp is hemiparasitic & requires dormant seeding with seeds of or near an established known host sp. Rake the soil around the host plants briskly then scatter the seed. Gently firm soil. Germ 21%. Dorm 75%. Test 29 days.**

Description: Native, erect annual, 0.8-1.5' (3.0-6.0' in part of its range), lavender to pink (violet; purple to white; rose-purple; white, red, or purple) flowers; key features: “0.8-1.5' tall; flowers 0.75-1.5” long; sepal lobes only up to half as long as the tube; very similar to *A paupercula* but taller & with larger flowers” (fh).

Comments: status: phenology: Blooms 7-9(8-10). C3. In northern Illinois, collect seed Oct-Nov. Calcareous soils. Seed source wet prairie remnants, Green River Lowland, Lee Co, Amboy, Illinois & Dewey Twp, Starke Co & Lincoln Twp, St Joseph Co, Indiana.

Short recognized *G purpurea* and *G erecta* within this species, noting both as “other common plants, which presented themselves at different places on our route through the prairies.” *Agalinis purpurea* as *Gerardia erecta* JF Gmelin. (Short 1845).

See the discussion in Michigan Flora Online, <http://michiganflora.net/species.aspx?id=1851>

Associates: Studies have shown no host specificity for this sp. Associated plant spp are (1) *Aster dumosus*, *Aster ptarmicoides*, *Carex viridula*, *Cladium mariscoides*, *Eupatorium perfoliatum*, *Gentiana crinita*, *Hypericum kalmianum*, *Juncus balticus littoralis*, *Linum medium texanum*, *Lobelia kalmii*, *Lycopus americanus*, *Panicum virgatum*, *Parnassia glauca*, *Rhynchospora capillacea*, *Rudbeckia hirta*, *Scleria*

verticillata, *Solidago graminifolia nuttallii*, & *Spiranthes cernua*; (2) *Fragaria virginiana*, *Populus tremuloides*, & *Salix glaucophylloides*. (sw94).

VHFS: [*Agalinis purpurea* (L) Pennell fo *albiflora* House, *A p* (L) Pennell var *carteri* Pennell, *A p* (L) Pennell var *chiapasana* Pennell, *A p* (L) Pennell var *chiapensis* Pennell, *A p* (L) Pennell fo *kucyniakii* B Boivin, *A p* (L) Pennell var *neoscotia* (Greene) B Boivin, *A p* (L) Pennell subsp *parviflora* (Benth) Á&D Löve, *A p* (L) Pennell var *parviflora* (Benth) B Boivin, *A p* (L) Pennell var *purpurea*, *A p* (L) Pennell var *racemosula* (Pennell) B Boivin, *Gerardia purpurea* L, *G p* L subsp *parvula* Pennell, *G p* L var *carteri* (Pennell) Pennell, *G p* L var *grandiflora* Benth]. SW94 give considerable status to var *parviflora* (Benth) B Boivin.

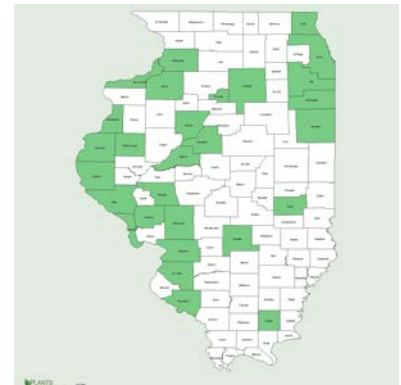


Agalinis purpurea

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. Second line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS *Wetland flora: Field office illustrated guide to plant spp.* Not copyrighted image. Illinois map courtesy plants.usda.gov.

Agalinis skinneriana (Alph Wood) Britton *IL, IN, IA, KY, MD, MI, OH, WI SKINNER'S FALSE FOXGLOVE, aka PALE FALSE FOXGLOVE, PALE GERARDIA, (*skinneriana* honoring Dr Albert Gallatin Skinner 1807-1891, on whose land AW Wood discovered *Gerardia skinneriana*, now *Agalinis skinneriana*. the epithet was originally capitalized.)

Habitat: "A rare plant of calcareous sandy prairies" (sw94). "Sp is distributed in calcareous areas" (Ilpin). In Michigan, "Usually considered a rare sp, & certainly so in the Great Lakes region. First collected from an open sandy depression in Algonac State Park, St Clair Co (*WW Brodowicz* in 1988, MICH)." (rvw11). "Dry to mesic prairies, open woods in shallow rocky soils, bluffs, barrens, pockets among dunes, sandy woods, and moist thickets. (Canne-Hilliker 1987, Trick 1995) **distribution/range:** "Dry prairies, rocky woods, calcareous fens; not common but scattered throughout Illinois (m14). Illinois is near the northeast limit of the sp distribution, with a few outlying populations in southeast Indiana, northwest & west central Ohio, southeast lower Michigan, & Ontario.



Culture: propagation:

cultivation: Dry soils, full sun.

Description: Native annual; flowers pink (red), $N 2n = 26$. **key features:** Plant yellowish-green; branches few, stiff, & erect; leaves yellowish-green; flower throat with purple spots & 2 yellow lines (fh). "Stems are angled; has ascending branches" (Ilpin).

See the discussion in Michigan Flora Online, <http://michiganflora.net/species.aspx?id=1852>

Comments: status: Threatened in Illinois. Endangered in Indiana, Iowa, Kentucky, Maryland, Michigan, Ohio, & Wisconsin. Considered extirpated in Alabama, Iowa, Nebraska, & Oklahoma. Sp is of special status in 8 of 12 states (historically 16) in which it occurs. **phenology:** Blooms 7-9. C3. Sp is threatened through loss of habitat through habitat conversion for agriculture & urban development, habitat degradation from invasive spp & inappropriately timed mowing, trampling and agricultural activity, encroachment of woody vegetation on prairie habitats due to fire suppression. The flowers are open 3-7 hours, & if not insect pollinated, they are capable of self-pollination.

Associates: Insect visitors include *Bombus pennsylvanicus* & *B. impatiens*, BUMBLEBEES, *Hymenoptera* sp SOLITARY BEES, *Colias eurytheme* SULPHUR BUTTERFLIES, & *Apis* sp, HONEYBEES. Associated plant spp include *Agalinis purpurea*, *Aletris farinosa*, *Andropogon gerardii*, *Aster ptarmicoides*, *Calopogon tuberosus*, *Liatris spicata*, *Linum medium texanum*, *Lobelia kalmii*, *Pycnanthemum virginianum*, *Rhynchospora capillacea*, *Solidago graminifolia nuttallii*, *Solidago ohioensis*, & *Tofieldia glutinosa* (sw94)

ethnobotany:

VHFS: [*Gerardia skinneriana* Alph Wood (basionym)]

http://www.centerforplantconservation.org/collection/CPC_ViewProfile.asp?CPCNum=6012

JM Canne-Hilliker, 1987. Status report on SKINNER'S PURPLE FALSE FOXGLOVE *Agalinis skinneriana* (Wood) Britton an endangered species in Canada. Guelph, Ontario, Canada: Dept. of Botany, Univ. of Guelph.

J Trick, 1995. Range-wide status assessment of the PALE FALSE-FOXGLOVE *Agalinis skinneriana* (Wood) Britton. Green Bay, WI: US Fish & Wildlife Service. p26.



Agalinis skinneriana

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

***Agalinis tenuifolia* (Vahl) Rafinesque** *RI SLENDER FALSE FOX GLOVE, aka SLENDER GERARDIA, SLENDER-LEAF FALSE FOXGLOVE, SLENDERLEAF FALSE FOXGLOVE, (*tenuifolius -a -um* slender-leaved, from Latin *tenuifolius*, slender-leaves, from *tenuis*, *tenu-*, thin, fine, slim, slender, *-i-*, & *folius*, *foli-*, *folium*, leaf.)

Habitat: Moist calcareous meadows & moist sand flats in areas relatively free from competition (sw94). In Illinois, wood borders; moist sandflats & meadows (Ilpin). Dry mesic, mesic, wet mesic prairies & savannahs. Calcareous soils; shores & meadows; in moist marly, peaty, or sandy soils (fh). In Michigan, "Moist open or even marshy ground: sandy ditches, borrow pits, shores, prairies, and meadows; fens, river banks" (rvw11). Note the varietal difference in habitats in w12. distribution/range: "Moist soil, calcareous fens, wet meadows; occasional to common throughout Illinois (m14).

Culture: ①60 days cold moist stratification. Seeds are very small or need light to naturally break dormancy & germinate. Hemiparasitic sp which needs a host plant. (pm09). ②Sow seeds immediately when ripe, or seeds germinate after about 60 days of cold, moist stratification (he99). ③(Code C, D Ken Schaal) ④Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). 2,304,568 (gnhm11), 8,407,407 (gnh13), 9,265,306 (gnam07), 9,860,8639 (gnh12), 12,500,000 (jfn04), 12,800,000 (pm02) seeds per pound.

bottom line: Species is hemiparasitic & requires dormant seeding with seeds of or near a host species. Rake the soil around the host plants briskly then scatter the seed. Gently firm soil. Consistently dormant. Germ 9.4, 7.0, na, sd 6.7, r 2-21 (19)%. Dorm 82.4, 83, na, sd 6.2, r74-90 (16)%. Test 34, 34, r27-44 days.**
Description: Native, erect annual, 0.5-2.0', flowers pink-rose (red). key features: "Axillary fascicles of leaves rarely present" (Ilpin). Flowers 0.33-0.50" long, smooth inside, upper lobe arched forward over the 4 stamens, inflorescence a raceme; with flowers on 0.33-1.0 long stalks; leaves to 0.25" wide (fh). "This is our second commonest species, with very slender elongate pedicels obviously different from *A. purpurea*. The length of the calyx lobes is quite variable." (rvw11).



Comments: status: Special Concern Rhode Island. phenology: Blooms August to October. C3. Collect seeds August to October. Seed source wet prairie remnants, Green River Lowland, Amboy Twp, Lee Co & Hume Twp, Whiteside.

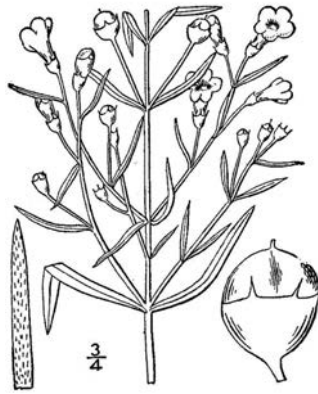
“More common than the two preceding (*A. papercula* & *A. purpurea*) & in the same places. Frequent in the sand area & not uncommon in Kent Creek bottom. Besides the two varieties, *parviflora* Nutt & *macrophylla* Benth, we have, growing at the edge of a wood on Cunningham road west of Rockford in a moist situation, plants that do not blacken upon drying & that otherwise differ materially from the above but which seem to be of this sp.” (ewf55)

Associates: Associated plant spp include *Asclepias incarnata*, *Aster novae-angliae*, *Aster simplex*, *Galium obtusum*, *Gentiana andrewsii*, *Iris virginica shrevei*, *Juncus torreyi*, *Lycopus americanus*, *Lythrum alatum*, *Spartina pectinata*, *Spiranthes cernua*, & *Verbena hastata*; *Agalinis purpurea*, *Lobelia kalmii*, *Parnassia glauca*, & *Solidago ohiensis* (sw94).

☞ Poisonous to sheep.

VHFS: Illinois has the sp & var *macrophylla* & *parviflora*. [*Agalinis besseyana* (Britt) Britt, *A tenuifolia* (Vahl) Raf var *macrophylla* (Benth) SF Blake, *A t* (Vahl) Raf var *parviflora* (Nutt) Pennell, *Gerardia besseyana* Britton, *G tenuifolia* Vahl, *G tenuifolia* Vahl subsp *macrophylla* (Benth) Pennell, *G t* Vahl subsp *parviflora* (Nutt) Pennell, *G t* Vahl var *humilis* Benth, *G t* Vahl var *macrophylla* Benth, *G t* Vahl var *parviflora* Nutt, *G t* Vahl var *typica* Pennell]





Agalinis tenuifolia 2nd line drawing var *macrophylla*,

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

AUREOLARIA Rafinesque 1836 **OAK-LEECH, FALSE-FOXGLOVE** *Orobanchaceae* *Aureolaria* golden from Latin *aureolus*, golden-yellow, golden colored, gilded, or made of gold, & the suffix *-arius -aria -arium*, indicating -belonging to, -having, connection to or possession, pertaining to, having the nature of, &c. A genus of approximately 10 spp of hemiparasitic herbs of eastern North America & Mexico. The genus was formerly part of the broadly defined *Scrophulariaceae*. Some spp have greater affinities for associating with either WHITE OAKS or BLACKS OAKS. Larval host of *Euphydryas phaeton* BALTIMORE BUTTERFLY.

All spp must be restored by successional restoration in intimate association with an appropriate host.

“The plants have long been known as hemiparasitic on oaks; *A flava* & *A virginica* are perennials & apparently are restricted to white oaks, while *A pedicularia*, an annual or winter-annual, occurs on black oaks. *Aureolaria pedicularia* has been found to parasitize also *Ericaceae* in the Southeast, & these species may be more widespread on woody plants than once thought.” (rvw11).

In listing various *Gerardia* spp, Short noted: “There are, indeed, comparatively speaking, but few plants, except the grasses, (which are gregarious every where and are intermixed in greater or less degree and variety among all the other plants of the prairie,) which may be considered as indigenes of the prairie region generally. ---Among these we may mention, as occurring most constantly, and under greater diversity of soil and situation that any others, ...” (Short 1845).

Aureolaria flava (Linnaeus) Farwell SMOOTH FALSE FOXGLOVE, aka FALSE FOXGLOVE, SMOOTH OAK LEACH, SMOOTH YELLOW FALSE FOXGLOVE, (*flavus -a -um* fla'vus (FLAY-vus) bright, almost pure yellow; pure, pale yellow, from Latin adjective *flavus -a um*, yellow, golden, gold colored; flaxen, blond; golden-haired.) UPL

Habitat: Woodland sp, often in sandy soil (sw94). Rocky woods, borders of glades (Ilpin). “Oak openings, sandy oak & oak-hickory savanna, with jack pine & aspen often present, forest borders & clearings” (rvw11). distribution/range:. “Rocky woods; occasional in the s ½ of Illinois, rare elsewhere” (m14). Sp is less common in the north ½ of Illinois.

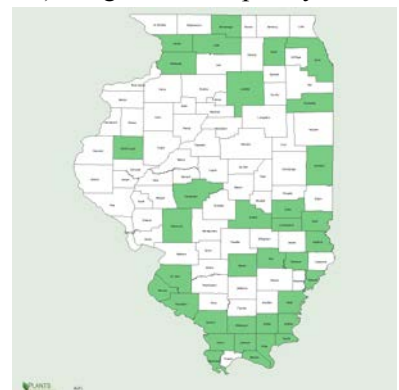
Description: Native perennial; flowers yellow; Variation of the length of perianth parts can occur on the same plant or even the same flower. key features: “Stems are glabrous & glaucous” (Ilpin).

“This, the sp without pubescens, is very definitely uncommon being found only occasionally in black oak woods in Sugar River sand area.” (ewf55)

Comments: status: phenology: Blooms 6-9. C3. Fruits September - October. Said to be hemiparasitic to the roots of *Quercus alba* with which it is associated. 112,000 (jfn04) seeds per pound.

Short (1845) recognized both *Gerardia flava* L and *Gerardia quercifolia* Pursh as species, both as “other common plants, which presented themselves at different places on our route through the prairies.”

Associates: In Michigan, *A flava* is restricted to WHITE OAKS as hosts (rvw11). Species may be parasitic on white oaks Ilpin). Associated plant spp include *Andropogon scoparius*, *Aristida purpurascens*, *Comandra umbellata*, *Danthonia spicata*, *Helianthemum canadense*, *Lespedeza hirta*, *Liatris aspera*, *Nyssa sylvatica*,



Panicum sphaerocarpon, *Panicum virgatum*, *Quercus velutina*, *Sorghastrum nutans*, & *Tephrosia virginiana* (sw94).

ethnobotany:

VHFS: In Britton & Brown (1913), this sp is called *Gerardia flava*.

Synonyms var *flava*. [*Agalinis flava* (L) B Boivin, *Aureolaria calycosa* (Mack & Bush) Pennell, *A flava* (L) Farw ssp *reticulata* (Raf) Pennell, *A f* (L) Farw var *reticulata* (Raf) Pennell, *A f* (L) Farw ssp *typica* Pennell, *Au reticulata* Raf, *Dasistoma calycosa* Mack & Bush, *D flava* (L) Alph Wood, *Gerardia calycosa* (Mack & Bush) Fern, *G flava* L, *G f* L var *calycosa* (Mack & Bush) Steyerm, *G f* L var *reticulata* (Raf) Cory]

Synonyms var *micrantha*. [*Agalinis flava* (L) B Boivin var *macrantha* (Pennell) B Boivin, *Aureolaria flava* (L) Farw ssp *macrantha* Pennell, *Gerardia flava* L var *macrantha* (Pennell) Fern]

Illinois has the sp & var *macrantha* Penell (pug14), but m14 lists only the latter. "The various named varieties or subsp need additional study; the variation seems to be too clinal to be practically recognized taxonomically" (w12). Hybrids with *A pedicularia* are known from Michigan (rvw11).



Aureolaria flava

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

***Aureolaria grandiflora* (Bentham) Pennell var *pulchra* Pennell** *IN YELLOW FALSE FOXGLOVE, aka ANNUAL FALSE FOXGLOVE, FALSE FOXGLOVE, LARGE-FLOWERED OAK-LEECH, LARGE-FLOWERED YELLOW FALSE-FOXGLOVE, LARGEFLOWER YELLOW FALSE-FOXGLOVE, (*grandiflorus -a -um* large-flowered, with flowers larger than normal, New Latin, from *grandis*, full-grown, great, large, tall, *-i-*, & *floreo*, I bloom, I flower; *pulcher -chra -chrum, pulcer -ra -rum* beautiful, pretty, handsome, fair from *pulcher*.) upl

Habitat: Occasional to frequent in oak woods (sw94). Dry oak savannahs; edge of glades & oak woods. He99 notes sandy soils, but we have seen this on loess & dolomitic till. distribution/range: "Woods, occasional in the n 2/3 of Illinois, rare elsewhere (m14).

Culture: Dormant seed in permanent location near an appropriate host, hand rake, & light cover. 800,000 (pm02) to 1,134,000 seeds per pound.

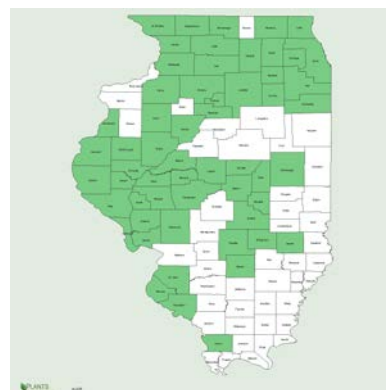
Description: Annual? 2.0-4.0', large showy yellow flowers. key features: Stem, outside of calyx, & fruit all glabrous. "Stems are densely pubescent" (Ilpin). Plants perennial; upper leaf sections becoming smaller toward the top; flowers axillary on short, stout, curved stalk abruptly turning upward (fh).

Comments: status: Extirpated in Indiana. phenology: Blooms 7,8,9. C3. Collect seeds in se Wisconsin in October (he99). Attractive dried seedheads, landscaping, hemiparasitic on oaks. An individual rosette in a colony does not live long.

"This is a pubescent perennial which is the most common of the three spp; black oak woods in Sugar River sand area & Kishwaukee River bluffs below Perryville (*Gerardia grandiflora* Benth var *pulchra* (Pennell) Fernald)" (ewf55)

Associates: Sp is said to be restricted to WHITE OAKS as hosts (Musselman 1969). Associated plant spp include *Antennaria plantaginifolia*, *Carya ovata*, *Cornus racemosa*, *Danthonia spicata*, *Hedeoma pulegioides*, *Ostrya virginiana*, *Quercus alba*, *Quercus rubra*, *Solidago ulmifolia*, & *Tilia americana* (sw94).

ethnobotany:



VHFS: A long time ago, in a galaxy far, far away, this plant was called *Gerardia grandiflora pulchra*. [*Aureolaria grandiflora* (Benth) Pennell subsp *pulchra* (Pennell) Pennell, *Gerardia grandiflora* Benth var *pulchra* (Pennell) Fern] The sp & 2 other vars are located south of Illinois.

LJ Musselman, 1969, Observations on the Life History of *Aureolaria grandiflora* & *Aureolaria pedicularia* (*Scrophulariaceae*) *American Midland Naturalist*, Vol 82, No 1 (Jul, 1969), pp 307-311



Aureolaria grandiflora

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

Aureolaria pedicularia (Linnaeus) Rafinesque *IA, ME, MN, NH, OH ANNUAL FALSE FOXGLOVE, aka ANNUAL OAK-LEECH, CLAMMY FALSE FOXGLOVE, FERNLEAF FALSE FOXGLOVE, FERNLEAF YELLOW FALSE FOXGLOVE, FERN-LEAVED FALSE FOXGLOVE, LOUSEWORT FOXGLOVE, WOODLAND FERN-LEAVED FALSE FOXGLOVE, (*pedicularius* -a -um louse, lousy, from *pedicularis*, lousewort, of or pertaining to the little feet (as the little feet of lice))

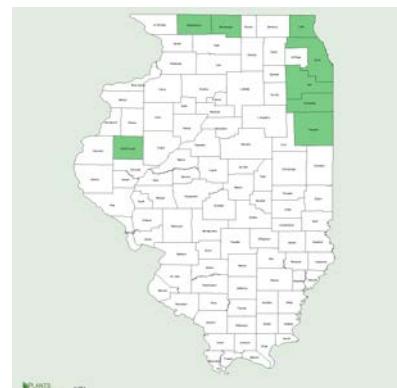
Habitat: “Locally common in sterile sandy soil, usually in thin woodland, where Penell (1935) noted it as parasitic on *Quercus palustris* & *Quercus velutina* (sw94). Dry, sandy oak savannas, hemiparasitic on black oaks in Michigan & probably northern Illinois. “Oak, oak-pine, & oak-hickory savanna, including old forested dunes; transition zones between savanna & marsh” (rvw011). In the se USA, Oak forests and woodlands (w12).

distribution/range: For var *ambigens* “sandy woods; occasional in the ne cos (m14).

Culture: Propagation: Successional restoration.

bottom line: Successional restoration.

Description: Native, erect, annual or winter annual forb; 1-3.0’; flowers yellow; key features: Stem, calyx, & fruit pubescent, pubescence, especially of calyx & pedicels, conspicuously gland-tipped; pedicels 8–25 (–30) mm long, ± curved; calyx lobes with prolonged toothed or pinnatifid tip. Sp annual, upper stem with obvious glands, yellow flower tinged with



brown, flower on long, thin, straight, upward-turning stalks, leaves mostly stalkless (fh). Stems are stalked-glandular throughout (Ilpin).

Comments: status: Endangered in Iowa. Special Concern in Maine. Threatened in Minnesota. Variety *intercedens* is Endangered in New Hampshire. Varieties *ambigens* & *pedicularia* are Endangered in Ohio. phenology: Blooms July (August) - September. C3. Collect seeds in se Wisconsin in October (he99). “This is an annual which grows with the **preceding but** which has capsules that are much less blunt, a character that distinguishes it very readily. It is only known in the black oak woods on the dune north of Yale bridge.” (ewf55)

Associates: Known to parasitize *Ericaceae* in the southeastern USA. Associated plant spp include *Andropogon scoparius*, *Aster azureus*, *Aster linariifolius*, *Carex pennsylvanica*, *Coreopsis tripteris*, *Hedeoma pulegioides*, *Ostrya virginiana*, *Quercus alba*, *Quercus rubra*, *Solidago ulmifolia*, & *Tilia americana* (sw94).

In Michigan, *A pedicularia* is restricted to BLACK OAKS as hosts. The sp appears to be more faithful to presence of BLACK OAKS than *A flava* is to presence of WHITE OAKS. (rvw11). Sp is said to be restricted BLACK OAKS as hosts (Musselman 1969).

ethnobotany:

VHFS: In Britton & Brown (1913), known as *Gerardia pedicularia*.

Mohlenbrock (2014) lists Illinois material as var *ambigens* (Fern) Farw. Pugs (2014) maps the typical variety in Illinois as well, but with no county map. Freckmann Herbarium lists the typical, var *ambigens*, & var *intercedens* Pennell for Wisconsin.

[*Agalinis pedicularia* (L) SF Blake, *A p* (L) SF Blake var *caesariensis* (Pennell) SF Blake, *A p* (L) Raf subsp *caesariensis* Pennell, *A p* (L) Raf subsp *carolinensis* Pennell, *A p* (L) Raf subsp *typica* Pennell, *A p* (L) Raf var *caesariensis* (Pennell) Pennell, *A p* (L) Raf var *carolinensis* (Pennell) Pennell, *A p* (L) Raf var *typica* (Pennell) Deam, *Dasistoma pedicularia* (L) Benth, *Gerardia pedicularia* L] “The various named varieties or subsp need additional study; the variation seems to be too clinal to be practically recognized taxonomically” (w11).

LJ Musselman, 1969, Observations on the Life History of *Aureolaria grandiflora* & *Aureolaria pedicularia* (*Scrophulariaceae*) *American Midland Naturalist*, Vol 82, No 1 (Jul, 1969), pp. 307-311



Aureolaria pedicularia

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

CASTILLEJA Mutis ex Linnaeus f 1782 **INDIAN PAINTBRUSH, PAINTED CUPS, PRAIRIE FIRE**
Orobanchaceae *Castilleja* for Professor Domingo *Castillejo*, 1744-1793, Spanish botanist & instructor of botany at Cadiz, Spain; alternately New Latin, irregular, from Juan *Castillo* y López, with the influence of Spanish *-eja*, diminutive suffix. The common name derives from the brightly colored bract tips that look as if they were dipped in paint. About 200 spp of hemiparasitic herbs, primarily of western North America, but with a few spp in eastern North America, Eurasia, Central America, & Andean South America. Habitats range from dry woodland & high prairie, sagebrush-grass desert, tundra, moist meadows damp forest glades, & streambanks. The genus was formerly part of the broadly defined *Scrophulariaceae*.

Some success by outdoor stratification, sometimes with the germination occurring second summer which may indicate some spp require multiple cycles. Some spp (not ours) may be grown without a host

(Huxley et al 1992 also note the *often hemiparasitic nature*). Code B (D?)
Seed matures summer to fall (4-6 weeks after flowers fade). (cu00)

Castilleja spp are difficult to establish beyond the seedling stage with out a suitable host. “They may be successfully cultivated when grown in a semi-natural manner on rocky slopes or in moist greenland in the company of other spp, carefully attempting to duplicate conditions and plant associations occurring in the wild.” (Huxley et al 1992). Grow most spp in full sun in a light sandy medium with added leafmould. Propagate from seed sown *in situ*. (Ibid) *Castilleja miniata*, sow at 18-22°C (64-71°F) for 2-4 wks, move to +2 to +4°C (34-39°F) for 4-6 wks, move to 5-12°C (41-53°F) for germination (tchn).

Photo C.A. Kutzleb - USDA-NRCS PLANTS Database - Not copyrighted image

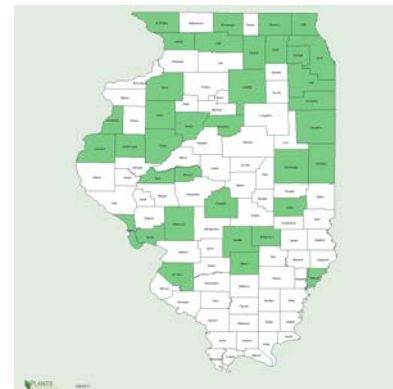


Castilleja coccinea (Linnaeus) Spreng *CT, KY, ME, MA, NY, RH INDIAN PAINTBRUSH, aka EASTERN INDIAN PAINTBRUSH, SCARLET INDIAN PAINTBRUSH, SCARLET PAINTED CUP, PAINTED CUP, SCHARLAKANSRÖD INDIANPENSEL (SW), SHOWY INDIAN PAINT-BRUSH, *Winabojó' noko'mis nízisun'*, Winabojó's grandmother's hair (*coccineus -a -um* Latin scarlet, red, deep red, deep carmine red, from Latin *coccineus*, scarlet.) fac

Habitat: Dry-mesic to wet-mesic prairies, sand prairies, & calcareous sand flats. A sp of prairies & sand prairies, the latter probably somewhat acid, & in calcareous sand flats (sw94). “Calcareous sandy or gravelly shores, including interdunal flats & conifer thickets; river & stream banks, swamps (especially cedar), occasionally fens; marshy ground, meadows, springy & marly places, crevices & shallow soil at limestone outcrops; moist jack pine & oak scrub” (rvw011). In se USA, “Woodlands, fens, barrens, rock outcrops, meadows, wet pastures, grassy openings, usually over mafic rocks” (w11). distribution/range: A sp of the Tall Grass Prairie & eastward.

Culture: ①60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. Hemiparasitic sp which needs a host plant. (pm09) ②Fall plant or cold stratify for up to 1 to 2 months for best results. Sow on the soil surface at 70°F & water. (ew11) 4,800,000 (pm02, ew11), 9,869,565 (gnhm12) seeds per pound.

“*Castilleja coccinea* Moist to dry prairie. Blooms late May. Harvest late June. I have established it only by scattering fresh seeds on established restored prairie. Annual or biennial.” (rs ma)



③Storage Behaviour: Orthodox. Storage Conditions: 80 % viability following drying to mc's in equilibrium with 15 % RH and freezing for 26 days at -20°C at RBG Kew, WP.

1000 Seed Weight. Average 1000 Seed Weight (g): 0.042. Details of Component Seed Weights: 0.035; (Stevens 1957), Seed; Weight refers to air-dry seeds. 0.048; (Stevens 1957), Seed; Weight refers to air-dry seeds.

Germination 80 % germination; pre-sowing treatments = imbibed on 1% agar for 6 weeks at 0°C, then imbibed on 1% agar for 4 weeks at 5°C; germination medium = 1% agar; germination conditions = 20°C, 8/16; (RBG Kew, Wakehurst Place.)

cultivation: Carefully space the imaginary potted or bare root plants on 0.75-1.0' centers. Do not over crowd. Full sun to partial shade, mesic soils.

Propagate from seeds sown *in situ* in a semi-natural manner, carefully attempting to duplicate conditions and plant associations occurring in the wild. Plants of *C coccinea* tend to be biennial in habit

producing a basal rosette in the first year and flowering, setting seed & dying in the second. (Huxley et al 1992)

bottom line: Species is hemiparasitic & requires dormant seeding with seeds of a host species. Or, in late fall, rake the soil around existing host plants briskly then scatter the seed. Gently firm with your left foot. Strongly dormant. Germ 22, 22, na, sd9.0, r13-31 (18)%. Dorm 64, 64, na, sd 11, r53-75 (22)%. Test 24 days. (#2).**

greenhouse & garden: Hemiparasitic, moist cold stratify, rake into or scatter on prairie sods in fall.

Description: Erect annual/perennial (annual/biennial?), 0.5-2.0', flowers (bracts) red - yellow, showy. key features: Bracts often scarlet, 3-5 lobed (fh). "Bracts are scarlet or orange; rosette leaves are obovate or oblong, entire (Ilpin).

Comments: status: Endangered in Connecticut, Kentucky, Maryland, & New York. Possibly Extirpated in Maine. Historical in Rhode Island. phenology: Blooms June - August. Collect seeds in se Wisconsin in September (he99). The sp is perennial monocarp, with each plant dying after setting seed. Semi-parasitic on grass.

Sp is photosynthetic but its roots penetrate the roots of its neighbors creating haustoria, interacting as a parasite. It does not progress beyond the seedling stage with out attachment to a host. *C coccinea* measurably lowers the dry weight of hosts, & phosphate, sulfate, & fructose move easily through the haustoria. What the plant actually takes from the host is not known. It infects a range of spp, including several from beyond its range. (Malcolm 1966)

"Not uncommon in low prairies & boggy places in Coon Creek bottom but not seen elsewhere. Our plants are all yellow bracted." (ewf55)

Associates: Attracts hummingbirds. Parasitizes *Penstemon*, *Sisyrinchium*, & *Schizachyrium* (mbg).

Associated plant spp include 1) *Andropogon scoparius*, *Comandra umbellata*, *Euphorbia corollata*, *Fragaria virginiana*, *Hypoxis hirsutus*, *Lithospermum canescens*, *Oxypolis rigidior*, *Phlox pilosa fulgida*, *Pycnanthemum virginianum*, *Sisyrinchium albidum*, & *Zizia aurea*; 2) *Aletris farinosa*, *Aster azureus*, *Coreopsis tripteris*, *Heuchera richardsonii*, *Houstonia caerulea*, *Krigia biflora*, *Pedicularis canadensis*, & *Salix humulis*; 3) *Agalinis purpurea*, *Aster ptarmicoides*, *Gentiana crinita*, *Hypericum kalmianum*, *Parnassia glauca*, *Potentilla fruticosa*, & *Sabatia angularis* (sw94). NOTE: In all 3 habitats & associate lists, this sp has a hemiparasitic associate.

ethnobotany: Used as medicinal plant by Ojibwa for rheumatism & diseases of women (den28).

VHFS: Mohlenbrock (2014) lists 2 forms in Illinois. Form *coccinea*, with bracts scarlet or orange, moist calcareous prairies, wet meadows, sandy woods, occasional in the n ¾ of Illinois, absent elsewhere; blooms April-July. Form *lutescens*, with bracts yellow; prairies, sandy woods; scattered in the n ¾ of Illinois; blooms April-July.

Form *lutescens* Farw with the calyx & bracts bright yellow may be found usually with the common form but occasionally by itself. Form *alba* Farw with white bracts is also known. [*Bartsia coccinea* L (basionym), *Castilleja ludoviciana* Pennell]

WM Malcolm 1966. Root Parasitism of *Castilleja Coccinea*. Ecology 47:179-186.

<http://dx.doi.org/10.2307/1933763>





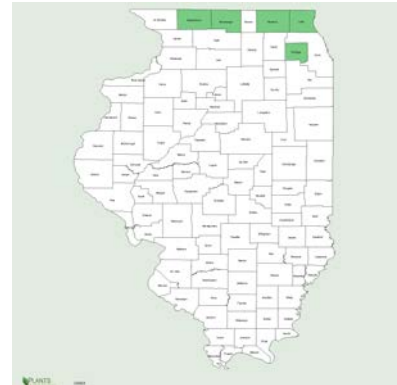
Castilleja coccinea

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

Castilleja sessiliflora Pursh *IL DOWNY PAINTED CUP, aka DOWNY PAINTBRUSH, DOWNY PAINTED-CUP, DOWNY PAINTEDCUP, GREAT PLAINS INDIAN PAINTBRUSH, INDIAN PAINTBRUSH, PLAINS PAINTBRUSH, SESSILE PAINTBRUSH, (*sessiliflorus -a us* with sessile flowers, or stalkless flowers)

Habitat: Calcareous hill prairies & sand prairies. In hill prairies & in sandy soil (sw94). **distribution/range:** “Prairies, rare; DuPage, Jo Daviess, Lake, Lee, McHenry, Rock Island, Stephenson, & Winnebago cos (m14). Northern Illinois is on the eastern edge of this sp range. The Lee & Ogle Co populations are often not mapped. Both are on knobs in Nachusa Grasslands.

Culture: ①Needs to be planted with the seeds of another plant, such as BLUE GRAMMA. Sow in fall or cold moist stratify 30-60 days & spring sow (pot00). ②60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. Hemiparasitic sp which needs a host plant. (pm09) ③Seeds germinate after about 60 days of cold moist stratification (he99). Scratching these seeds into an existing dry planting has given some success at our nursery. Chris Bronny moved this around Nachusa Grasslands many years ago, from Schaeffer’s Knob, Lee Co, to Doug’s Knob, Ogle Co. Chris was the first TNC onsite intern.



“*Castilleja sessiliflora* Dry sand prairie. Blooms June. Harvest August. Perennial. As with *C coccinea*, I have established it only by scattering fresh seed in our artificial sand barren.” (rs ma)

④Storage Behaviour: Orthodox. Storage Conditions: 90 % viability following drying to mc's in equilibrium with 15% RH and freezing for 27 days at -20°C at RBG Kew, WP

1000 Seed Weight. Average 1000 Seed Weight(g): 0.18

Details of Component Seed Weights: 0.1; (Stevens 1957), Seed; Weight refers to air-dry seeds. 0.17; (Stevens 1957), Seed; Weight refers to air-dry seeds. 0.26; (RBG Kew, Wakehurst Place), Seed

Germination. 90 % germination; pre-sowing treatments = imbibed on 1% agar for 4 weeks at 5°C; germination medium = 1% agar + 250 mg/l gibberellic acid (GA3), germination conditions = 5°C, 8/16; (RBG Kew, WP)

Description: Erect perennial, flowers creamy-yellow (ochroleucus perhaps?). Partial root parasite on grasses. **key features:** Stems clustered, very leafy; flowers yellow to whitish with a greenish bract (fh). Bracts green; flowers fragrant (Ilpin).

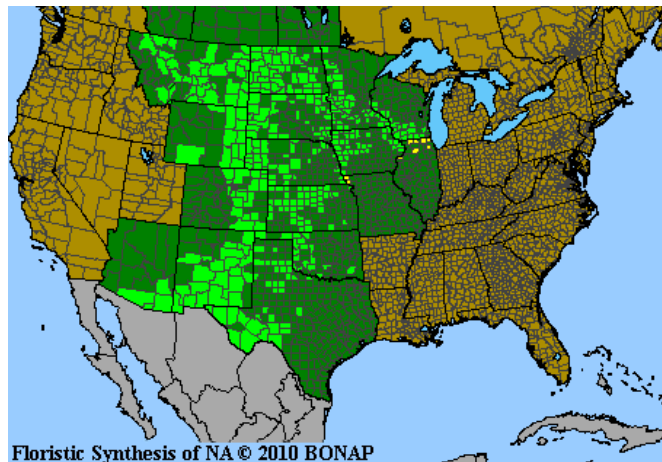
Comments: **status:** Endangered in Illinois. **phenology:** Blooms (May)June - July (August). C3. First hint of color showing April 29, 2010. 3,200,000 (pm01) seeds per pound. Calcareous soils. Ours grows next to a *Silphium laciniatum*, but seems to move a bit every year.

“A deep rooted, dry soil perennial that has several stems & is less than a foot tall. Known only on the gravel hills east of Ill Rt No 173 north of Loves Park.” (ewf55)

Associated plant spp include 1) *Amorpha canescens*, *Andropogon scoparius*, *Anemone patens* *wolfgangia*, *Arenaria stricta*, *Asclepias viridis*, *Aster sericeus*, *Bouteloua curtipendula*, *Euphorbia corollata*,

Kuhnia eupatorioides corymbulosa, *Lithospermum incisum*, *Petalostemum purpureum*, *Solidago nemoralis*, & *Sporobolus heterolepis*; 2) *Andropogon scoparius*, *Anemone cylindrica*, *Arabis lyrata*, *Arctostaphylos uva-ursi coactillis*, *Artemisia caudata*, *Aster ptarmicoides*, *Calamovilfa longifolia magna*, *Hypericum kalmianum*, *Koeleria cristata*, *Liatris aspera*, *Liatris cylindracea*, *Lithospermum croceum*, *Opuntia humifusa*, *Prunus pumila*, *Rosa carolina*, & *Solidago speciosa* (sw94).

VHFS: [*Castilleja sessiliflora* subsp *betheli* Cockerell, *C sessiliflora* fo *purpurina* Pennell, *C sessiliflora* fo *sessiliflora*]



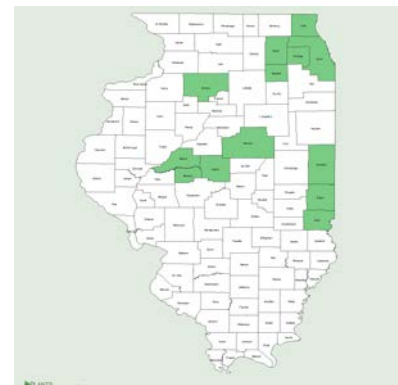
Castilleja sessiliflora

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010)

CONOPHOLIS Wallroth **SQUAWROOT, BEARCORN** *Orobanchaceae* *Conopholis* from Greek κώνος, *konos*, cone, & φολιδ-, φολίς, *pholid-*, *pholis*, scale. Genus of 3(2) herbs parasitic on *Quercus* of eastern North America & southwestern North America south to Central America.

Conopholis americana (Linnaeus) Wallroth *NH, NY, RI **SQUAWROOT**, aka **AMERICAN CANCER-ROOT**, **American Squawroot**, **BEARCORN**, **CANCER-ROOT**, *CONOPHOLIS D'AMÉRIQUE*, *CONOPHOLIS D'AMÚRIQUE*; **SQUAW-ROOT**, (*americanus -a -um* a-me-ri-KAH-nus of the New World, American.)

Habitat: “In our area, characteristically occurs as a parasite on the roots of oak trees” (sw94). In Michigan, “Often common locally in deciduous or mixed forests, wherever there is oak, including beech-maple, oak-hickory, or northern hardwoods stands, and even sometimes in rather swampy sites; occasionally no oak is evident in the immediate vicinity” (rvw11). In se USA, “rich, moist forests, under *Quercus* spp” (w11). distribution/range: “Wooded ravines; parasitic on oak roots; scattered in the n ½ of Illinois (m14). Widespread in eastern North America, disjunct in eastern Mexico.



Description: Native, erect perennial, non-chlorophyllous, pale brown to yellowish forb; holoparasitic; flowers 5-merous; key features: Lower lip of flowers 3-lobed (fh). “Plant is pale brown or yellowish; leaves reduced to scales (Ilpin).”

Comments: status: Threatened in New Hampshire. Exploitable Vulnerable in New York. Special Concern in Rhode Island. phenology: Blooms (March) May-June (July). CO₂ fixation none. The fresh inflorescence resembles a cream colored to yellowish brown pine cone, with brown tips on the bracts & leaves.

Associates: Parasitic on the BLACK/RED OAK group.

From Haynes (1971) in w12 “*Conopholis* apparently germinates near an oak root, forms a parasitic connection to the root, resulting in the formation of a gall consisting of both *Quercus* & *Conopholis* tissue. The gall can be up to 25 cm in diameter, & last for many years, repeatedly sending up flowering shoots. It is believed that the gall exists underground for some years prior to first flowering.” “The only known host is oak (*Quercus* spp, especially *Q. rubra* in Michigan). “A large woody gall is formed where the parasite’s root is attached to the oak root. After about 4 years of underground growth, *Conopholis* sends up thick annual flowering stems for several more years.” (rvw11)

Associated plant spp include *Acer saccharum*, *Allium tricoccum*, *Fraxinus americana*, *Geranium maculatum*, *Prunus serotina*, *Quercus alba*, *Quercus rubra*, *Thalictrum dioicum*, & *Trillium recurvatum* (sw94).

VHFS: [*Orobanche americana* L (basionym)]

RR Haynes, 1971. A monograph of the genus *Conopholis* (*Orobanchaceae*). Sida 4: 246-264.



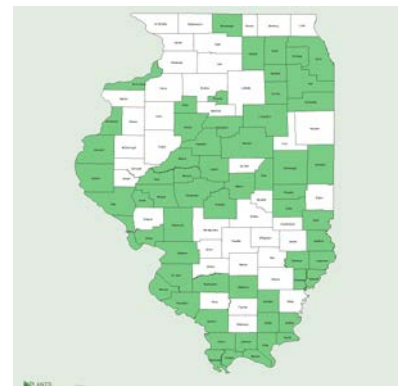
Conopholis americana

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed embryo image from Robert J Gibbons for Kirkbride, J.H., Jr., C.R. Gunn, & M.J. Dallwitz. 2006. Family Guide for Fruits and Seeds, vers. 1.0. URL: <http://nt.ars-grin.gov/sbmlweb/OnlineResources/frsdfam/Index.cfm>. Illinois map courtesy plants.usda.gov.

DASISTOMA Rafinesque **DASISTOMA, MULLEIN FOXGLOVE** *Orobanchaceae* *Dasistoma* from Greek δασυς, *dasys*, hairy or shaggy & στόμα, στόμοα, *stoma, stomoa*, a mouth. A monospecific genus, a hemiparasitic herb, endemic to southeast North America. The genus name is also spelled *Dasystema*. The genus was formerly part of the broadly defined *Scrophulariaceae*. Formerly placed in *Seymeria*.

Dasistoma macrophylla (Nuttall) Rafinesque *MI, WI MULLEIN FOXGLOVE, aka MULLEIN SEYMERIA, (*macrophyllus -a -um* with large leaves, having elongated leaves or leaflets, from Greek μακρος, *macros*, long; tall, high, deep, far, -o-, & φυλλον, *phyllon*, leaf, foliage, & -us, Latinizing suffix.)

Habitat: Mesic & dry savannas, recent clearings, rich woods, dry woods, rocky slopes, thickets. “Local in dry woods, & often where limestone is near the surface. ... MULLEIN FOXGLOVE can also be found in the tension zone of semi-shade between a wooded area & a recently made sunny clearing.” (sw94) Species is distributed on rocky slopes; where limestone is near the surface; & woodland borders (Ilpin). In Michigan, deciduous forests & forest openings, along larger rivers (rvw11). In the se USA, xeric to dry mesic woodlands & bluffs, over limestone or diabase (w07).
distribution/range: “Rich woods, rocky slopes, dry woods, thickets;



occasional throughout Illinois (m14).

Culture: Light, dormant seed in permanent location, hemiparasitic on oaks? We have had this flower but not persist under *Prunus serotina* at our farm. Genetic source Henckel, Lee Co. 648,000, 930,328 (gnhm15) seeds per pound.

bottom line: Dormant seed under an extant overstory with established hosts. Germ 1.0%. Dorm 68%. Test 21 days. (#1).

Description: Erect annual, (perennial?), partial-parasitic, native forb; roots minimum depth; stems 3.0-5.0(6.5)'; leaves opposite; lower widely oval, deeply bi-pinnately cut; upper lance-like, getting smaller & becoming entire; inflorescence an interrupted, leafy spike with flowers from the leaf axils; flowers yellow, 5-merous, 0.50" long, densely hairy inside, flaring lobes almost equal & widely spreading, tube longer than the lobes, 4 stamens; fruit is a roundish capsule, with papery seeds; N. key features: ① Flowers almost stalkless, densely hairy inside, lobes shorter than the tube (fh). ② "Upper leaves are reduced to lanceolate & entire" (Ilpin). ③ "In the absence of flowers, one might confuse the upper part of specimens with the similarly pubescent *Aureolaria virginica*, although the latter, besides its much larger flowers, usually has slightly longer pedicels and a larger capsule (over 1 cm long, compared to 1 cm or less in *D macrophylla*), and is a shorter plant; *Dasistoma* can be up to 2 m tall. Our other two species of *Aureolaria* are easily distinguished from *Dasistoma* by having the pubescence glandular (*A pedicularia*) or absent (*A flava*)."
(rvw11).

Comments: status: Threatened in Michigan. Special Concern in Wisconsin. phenology: Blooms (6)7,8,9. C3. "Usually considered an annual, but vegetative rosettes present at Michigan populations suggest it may sometimes be a biennial (or more likely monocarpic)" (rvw11). Native landscaping & restoration, adds to overall diversity. Attractive spike of seed pods used in dried arrangements.

"Quite uncommon being known to us only on Kishwaukee River; in Mulford woods at Perryville road, on the river bank opposite Camp Rotary & in the forest preserve in De Kalb Co on the south branch of the river." (ewf55)

Associated plant spp include 1) *Carya cordiformis*, *Celtis occidentalis*, *Cercis canadensis*, *Ostrya virginiana*, *Quercus alba*, *Quercus rubra*, *Rhus radicans*, *Solidago flexicaulis*, *Tilia americana*, & *Vitis riparia*; 2) *Asclepias verticillata*, *Aster nova-angliae*, *Aster pilosus*, *Aster sagittifolius drummondii*, *Carya cordiformis*, *Cornus racemosa*, *Crataegus punctata*, *Fraxinus americana*, *Gaura biennis pitcheri*, *Populus deltoides*, *Prunus serotina*, *Quercus rubra*, *Rhus glabra*, *Rhus radicans*, *Smilax ecirrhata*, *Solidago canadensis*, *Tilia americana*, & *Ulmus americana* (sw94).

VHFS: This plant was long known as *Seymeria macrophylla*. In Britton & Brown (1913) this sp is called *Afzelia macrophylla*. [*Afzelia macrophylla* (Nuttall) Kuntze, *Seymeria macrophylla* Nuttall; *Dasystema macrophylla* an orthographic variant]





Dasistoma macrophylla

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

MELAMPYRUM Linnaeus 1753 **COW WHEAT** *Orobanchaceae* *Melampyrum* black wheat, New Latin from ancient Greek μελαν-, μελανο-, *melan-*, *melano-*, black, & πυρος, *pyros*, wheat, in reference to the black seeds, which may also be golden brown aging to black. The seeds mimic both wheat grains & ant cocoons. The seeds have an eliasome (caruncle) & are dispersed by ants. The seeds of some spp were often harvested with wheat, but the contaminated flour would yield black bread, hence the genus name. Linnaeus stated ‘that when cows are fed in fields where the MEADOW COW-WHEAT is abundant, the butter yielded by their milk is peculiarly rich & of a brilliant yellow colour’, hence the common name ‘cow’-wheat. A genus of about 35 spp of hemiparasitic herbs of temperate North America & Eurasia. The genus was formerly part of the broadly defined *Scrophulariaceae*. *M cristatum* in Britain is said to be parasitic on grasses, clovers, & shrubs.

Melampyrum lineare Desrousseaux *IN, KY, OH COW WHEAT, aka AMERICAN COW-WHEAT, LINEAR COW-WHEAT, NARROWLEAF COW WHEAT,

Habitat: Bogs, marshes, & dunes, very rare. Local in acid shaded habitats, especially in the dunes region of Indiana, in somewhat boggy sites, & in drier habitats near Lake Michigan (sw94). “Wet & dry forests (deciduous or coniferous) & peatlands, favoring drier & only moderately shaded sites but ranging from bare rock cliffs to wet fens” (rvw11).

distribution/range: Bogs, marshes, dunes; very rare; Cook Co (m14).

①Average 1000 Seed Weight(g): 2.414 (Mazer 1989), Seed (RBG Kew, WP)

Comments: status: Rare in Indiana. Threatened in Kentucky & Ohio.

phenology: Blooms June-August. C3.

Associates: Associated plant spp include 1) *Acer rubrum*, *Agrostis perennans*, *Aralia nudicaulis*, *Aureolaria pedicularia ambigens*, *Bartonia virginica*, *Carex pensylvanica*, *Carex swanii*, *Euphorbia corollata*, *Gaultheria procumbens*, *Hamamelis virginiana*, *Hieracium canadense fasciculatum*, *Koeleria cristata*, *Maianthemum canadense interius*, *Mitchella repens*, *Pinus strobus*, *Pyrola elliptica*, *Quercus alba*, *Quercus velutinus*, *Smilacina stellata*, *Smilax rotundifolia*, & *Vaccinium pallidum*; 2) *Aletris farinosa*, *Medeola virginiana*, *Polygala cruciata aquilonia*, *Trientalis borealis*, & *Vaccinium corymbosum*; 3) *Pinus banksiana* (sw94).

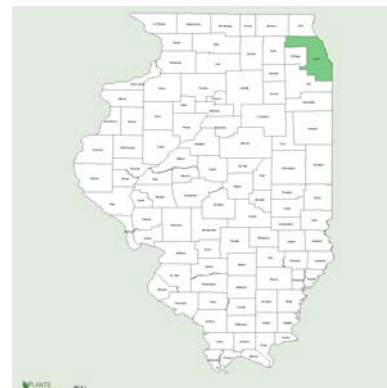
“This species has been documented in Michigan as parasitizing roots & rhizomes of many herbaceous & woody species (even perhaps on *Sphagnum*)” (rvw11).

Seed Dispersal. Animal; Diaspore is carried intentionally; Direct or experimental observation; (Gibson 1993), Ants.; Seed has an eliasome. (RBG Kew, WP)

ethnobotany: Used as medicinal plant by Ojibwa (sm32). Sp does not cause hayfever (Ilpin).

VHFS: This is *Melampyrum latifolium* in Britton & Brown (1913). Mohlenbrock has Illinois material as var *latifolium* Barton.

[*Melampyrum lineare* Lam, *M l* Desr, *M l* var *americanum* (Michx) Beauverd, *M l* subsp *latifolium* (Muhl ex Britt) Soó, *M l* var *latifolium* (Eaton & Wright) Farw, *M l* Desr var *latifolium* Bart, *M l* var *latifolium*

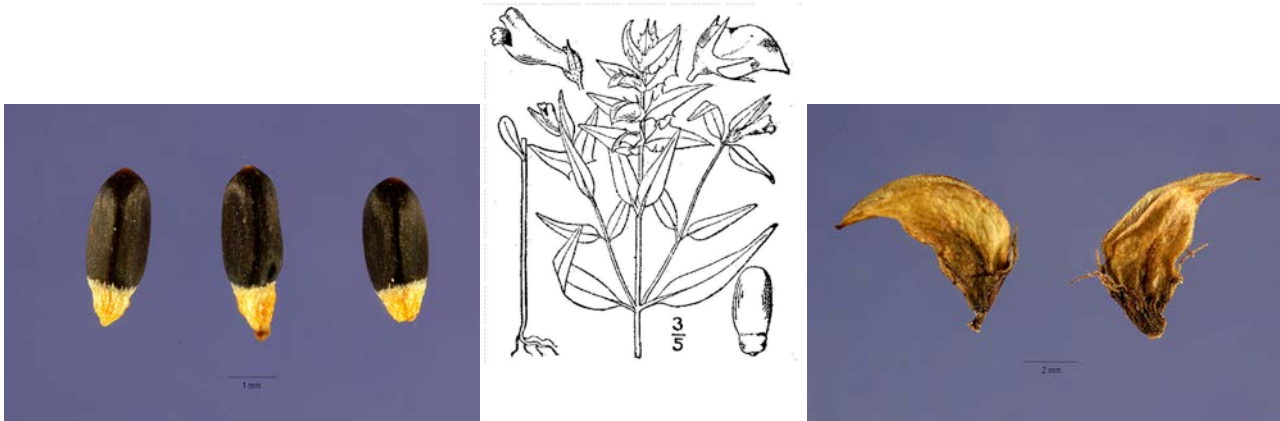


(Muhl ex Britt) Beauverd, *M l* var *lineare*, *M l* subsp *pectinatum* Pennell, *M l* var *pectinatum* (Pennell) Fern] 3 or 4 varieties are known in eastern North America.

Check old names Eaton 1829

S Mazer, 1989. Ecological, taxonomic, and life history correlates of seed mass among Indiana dunes Angiosperms. Supplement: species list, untransformed seed mass, seed mass class and ecological data associated with each species. Ecological Monographs, 59.

W Gibson, 1993. Selective advantages to hemi-parasitic annuals, genus *Melampyrum*, of a seed-dispersal mutualism involving ants: II. Seed-predator avoidance. *Oikos*, 67:345-350.



Melampyrum lineare

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed & husk photos Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov.

OROBANCHE Linnaeus **CANCER-ROOT, BROOMRAPE, HELLROOT** *Orobanchaceae* *Orobanche* broomrape, classical Latin *orobanchē*, a plant parasitic on vetch from ancient Greek ὀροβαγγη, *orobanche*, from ὀροβος, *orobos*, a kind of vetch, & ἄγγειν, *anchein*, to choke or strangle, in reference to the parasitic habit, in one source as from a Greek name of a kind of vetch. A genus of approximately 150 spp of parasitic herbs of mostly north temperate regions. *Orobanche* spp may be noxious & weedy or threatened & endangered in 10 states.

Orobanche fasciculata, sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn).

Orobanche ludoviciana Linnaeus *IL, IN, KY, OH, TN, WI NOX USA, AL, CA, FL, MA, MN, NC, OR, SC, VT BROOMRAPE, aka LOUISIANA BROOM-RAPE, LOUISIANA BROOMRAPE, MANYFLOWER BROOMRAPE, PRAIRIE BROOMRAPE,

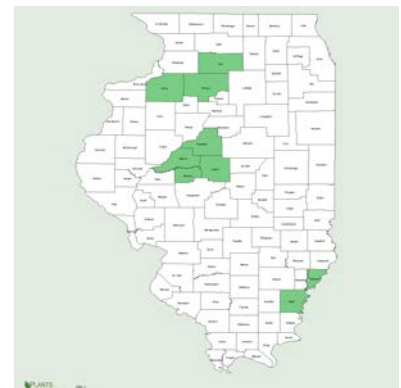
Habitat: “Also occurs in sandy alluvium along streams” (Ilpin). In the se USA, “pastures, upland areas, & glades, parasitic on perennial composites such as *Grindelia*, *Artemisia*, & *Heterotheca*” (w12). distribution/range: “Parasitic on roots of various members of the Asteraceae in dry soil; rare in the n ½ of Illinois; also Fayette, Wabash, & White cos (m14). One of the few rare plants mapped from the taxonomic black hole Bureau Co. Known but not mapped from Whiteside co.

①Average 1000 Seed Weight(g): 0.0060. Details of Component Seed Weights: 0.01; (Baker Seed Herbarium, California), Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. 0.0025; (Stevens 1957), Seed; Weight refers to air-dry seeds. (RBG Kew, WP)

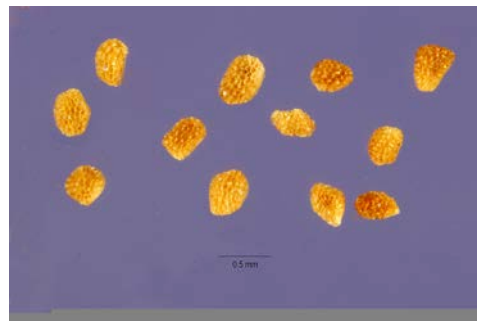
Description: Annual/perennial; flowers violet, 5-merous; fruit capsule; key features: ①Leaves reduced to scales (Ilpin). ②Upper lip of flower 1-lobed & almost straight, lower lip 4-lobed; inflorescence a many-flowered, dense spike (fh).

Comments: status: Threatened in Illinois & Indiana. Historical sp in Kentucky. Presumed extirpated in Ohio. Special Concern in Tennessee. Endangered in Wisconsin. In some areas, but not Illinois, this may be a weed of economic impact. phenology: Blooms August - September. CO2 fixation none.

Associates: Parasitic on roots of various members of *Asteraceae*, especially *Artemisia* & *Ambrosia* (Ilpin).



VHFS: [*Myzorrhiza multiflora* (Nutt) Rydb, *Orobanche ludoviciana* var *arenosa* (Suksd) Cronquist, *O l* subsp *ludoviciana*, *O l* var *multiflora* (Nutt) Beck, *O l* subsp *multiflora*, *O multiflora* Nutt, *O m* var *arenosa* (Suksd) Munz, *O m* var *pringlei* Munz] **check tropicos**

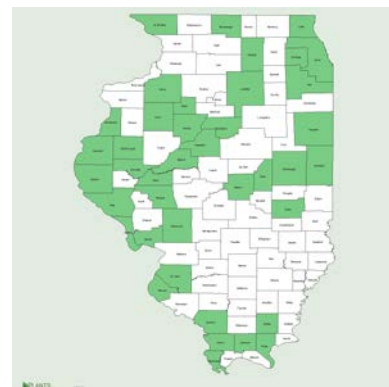


Orobanche ludoviciana

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Pod & seed photos Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov.

Orobanche uniflora Linnaeus *WI CANCER-ROOT, aka NAKED BROOM-RAPE, NAKED BROOMRAPE, ONE-FLOWERED BROOM-RAPE, (*uniflorus -a -um* single-flowered, with one flower.)

Habitat: Sporadic in woods & often parasitic on oaks, in a thicket of *Sassafras albidum*, in a prairie at Illinois Beach State Park, on the bluffs of Fox River, a shaded yard with some native plants, an upland forest in DeKalb Co, & a dry prairie east of Cary (sw94). “Known to us only on the high rocky bank of Kishwaukee River at the gorge below the Forest Preserve.” (ewf55) “Sp is distributed in rocky or open woods; above bluff escarpments, at base of bluffs” (Ilpin). Known from an open wooded lot, southwest area of Lake Calhoun subdivision, west of LaFayette, Illinois. In Michigan, “Local, at edges of conifer thickets along dunes; even more local inland, in both dry sandy open areas and rich forests” (rvw11). In the se USA, sandy streambanks & riverbanks, rich forests (w12).



distribution/range: “parasitic on the roots of various plants” scattered throughout Illinois (m14).

“Although this species has been reported throughout its range (covering most of the United States & southern Canada) from a diversity of hosts, *Symphyotrichum* & *Solidago* seem to be the only verified ones in Michigan” (rvw11).

Culture: ① Average 1000 Seed Weight(g): 0.01. Details of Component Seed Weights: 0.02; (RBG Kew, Wakehurst Place), Seed. 0.0030, (Baker Seed Herbarium, California), Seed; Seed mc not stated, but weight is likely to refer to air-dry seed. (RBG Kew, WP)

Description: Annual; inflorescence solitary; flowers violet or white, 5-merous; fruit a capsule; key features: “Species is caudex subterranean or only slightly above ground; leaves are reduced to scales” Ilpin). Flowers with 5 almost equal lobes, stalk longer than the flower & much longer than the stem, flowers solitary (fh).

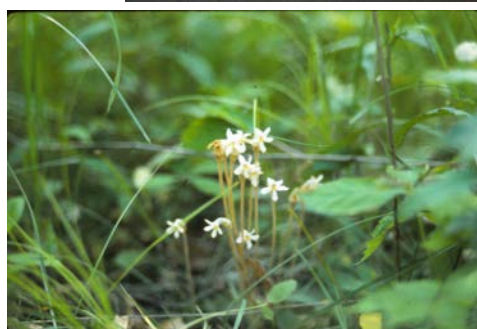
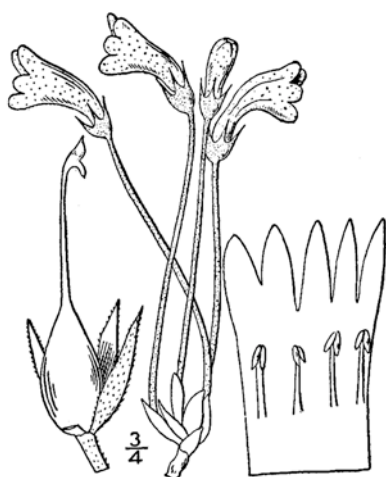
Comments: status: Special Concern in Wisconsin. Taxon is noxious or bad listed federally and in 8 states.

phenology: Blooms June - July. CO2 fixation none.

Associates: Sp is a parasite on many plant species, often on oaks (Ilpin)

VHFS: In Britton & Brown (1913), this is *Thalesia uniflora*. [*Anoplanthus uniflorus* (L) Endl, *Aphyllon minutum* Suksd, *A sedii* Suksd, *A uniflorum* (L) A Gray, *A u* (L) A Gray var *occidentale* Greene, *A u* (L) Torr & A Gray, *Orobanche porphyrantha* G Beck, *O purpurea* Jacq, *O sedii* (Suksd) Fech, *O terrae-novae* Fernald, *O uniflora* L ssp *occidentalis* (Greene) Abrams ex Ferris, *O u* L var *minuta* (Suksd) G Beck, *O u* L var *occidentalis* (Greene) Roy L Taylor & MacBryde, *O u* L var *purpurea* (A Heller) Achey, *O u* L var *sedii*

(Suksd) Achey, *O u L var terrae-novae* (Fernald) Munz, *O u L var typica* Achey, *Thalesia uniflora* (L) Britt] cf tropicos, fh



Orobanche uniflora

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo courtesy of National Plant Germplasm System, M. Cashman, USDA, ARS, GRIN. Illinois map courtesy plants.usda.gov.

PEDICULARIS Linnaeus **BETONY, LOUSEWORT, WOOD BETONY** *Orobanchaceae Pedicularis*
 Pedicular'is (ped-ik-yoo-LARE-is, or pe-dik-yoo-LAR-is) New Latin, from Latin (*herba pedicularis* lousewort, literally, of or pertaining to the little feet, from classical Latin *pēdiculus*, from *pes*, *pedis*, a foot (or *pedis*, *pedis*, a louse, possibly from the same Indo-European base as *pēdere* to break wind, & also Avestan *pazdu-* small harmful insect) & *-ulus -a -um*, Latin adjectival diminutive suffix meaning little, -tending to, -having somewhat, a name used for a plant in Columella, thought to be associated with lice, with *-aris*, from *-alis*, of or pertaining to; alternately Latin meaning LOUSEWORT, in reference to the old English belief that when cattle or sheep grazed on these plants, they became infested with lice; alternately from the plants ability to repel lice from livestock, or from the belief the plant bred lice, alternately the leaves appearing to be infested with lice. About 350 (500, ≈600) spp of hemiparasitic, erect, annual, biennial, or perennial herbs from temperate regions of central & eastern Asia, Europe, western North America, eastern North America, & Andean South America, mainly distributed in frigid, high latitude, & alpine belts in the north temperate zone. It is one of the larger genera of angiosperms in the northern hemisphere. About 65 spp in North America. Genus is well known for facultative hemiparasites, but Lee & Guan (2008) note only a few spp have been experimentally examined for their parasitic habit. Haustorial connections are produced upon contact with roots of surrounding host plants. It is said there is no known host specificity, but Huxley et al (1992) note some spp may not find correct hosts in cultivation. The genus was formerly part of the broadly defined *Scrophulariaceae*.

“There are, indeed, comparatively speaking, but few plants, except the grasses, (which are gregarious every where and are intermixed in greater or less degree and variety among all the other plants of the prairie,) which may be considered as indigenes of the prairie region generally. ---Among these we may mention, as occurring most constantly, and under greater diversity of soil and situation that any others, ... *Pedicularis* various species.” (Short 1845).

The seeds are dispersed as raindrops hit the tips of the ripe seed pods, known as rain ballism or ombrohydrochory. (<http://www.parasiticplants.siu.edu/Orobanchaceae/Hemipar.html>)

Partial parasite, moist cold stratify (30-60) or dormant seed, successional restoration. The 2 Illinois spp are obligate hemiparasites, incapable of completing their life cycle without a host. They will not develop beyond the seedling stage without a host. Several North American spp have physiological dormancy (<http://www.nativeplantnetwork.org/Network/Search.aspx?Keywords=pedicularis>).

The hemiparasitic *Pedicularis* germinate independently of the host spp, differing from the holoparasitic *Orobanchaceae* that respond only to specific chemical signals from the host. Wetland spp may be photoblastic & require light for the embryo to develop. Desert spp germinate in the dark. Scarification increases germination of some spp but GA3 had no positive benefit. (Li et al 2007) *Pedicularis procera*, sow at 20°C (68°F), germinates in less than two wks (tchn).

Ai-Rong Li & Kai-Yun Guan, 2008, Arbuscular mycorrhizal fungi may serve as another nutrient strategy for some hemiparasitic spp of *Pedicularis* (*Orobanchaceae*). Mycorrhiza (2008) 18:429–436. DOI 10.1007/s00572-008-0196-z

Ai-Rong Li, Kai-Yun Guan, & Robin JB Probert 2007, Effects of Light, Scarification, & Gibberillic Acid on Seed Germination of Eight *Pedicularis* Spp from Yunnan, China, HORTSCIENCE 42(5):1259–1262. 2007

Pedicularis canadensis Linnaeus WOOD BETONY, aka BEEFSTEAK PLANT, BETONY, CANADIAN LOUSEWORT, COMMON LOUSEWORT, EARLY LOUSEWORT, EASTERN LOUSEWORT, FOREST LOUSEWORT, HIGH HEALALL, LOUSEWORT, PRAIRIE BETONY, SNAFFLES, WOOD-BETONY, “ENTICER ROOT” Menomini (*canadensis -is -e* (kan-a-DEN-sis) of or from Canada or the north-east USA, of Canadian origin.) The seeds are said to resemble lice, & the scalloped leaves have the appearance of being infested with lice, hence LOUSEWORT. facu+

Habitat: Hill, sand, dry, & mesic prairies, mesic & dry savannas & open woods. Black soil mesic prairies. Sandy BLACK OAK woods. Frequent in prairie remnants, BLACK OAK savannas in the dune area, moister woodlands, & on clay slopes near Lake Michigan (sw94). “Dry forests & savanna (oak, pine, aspen, red maple), also rich hardwoods including beech-maple, especially in openings; less often in conifer swamps, meadows, & grasslands” (rvw11). In the southeastern USA, “Moist to dry forests & woodlands, streambanks” (w11). distribution/range: Known but not mapped from Bureau and Whiteside cos.

Culture: ①30 days cold moist stratification. Hemiparasitic sp which needs a host plant (pm09, 11). ②Seeds germinate after about 30 days of cold moist stratification. (he99) ③No pretreatment needed. Sow seeds on the soil surface at 70°F & water. (ew11) ④Sow at 20°C (68°F), germinates in less than two wks (tchn).

Amy Bartow (personal communication) notes *P groenlandica* requires warm moist then cold moist treatment for germination. *P canadensis* seeds are shed early summer, naturally going through a warm moist period then cold moist, & may also require multiple cycles.

Growth rate moderate. Seedling vigor low. Vegetative spread rate none (?). Seed spread rate slow. Difficult from seed & transplants (are they even possible?). 400,000 (usda), 400,800 (easy11), 528,000 (pm02), 547,200 (ew11), 576,000, 610,215 (gnhm11), 633,636 (gnam07), 785,467 (gnhm14), 1,248,000 (sh94) seeds per pound.

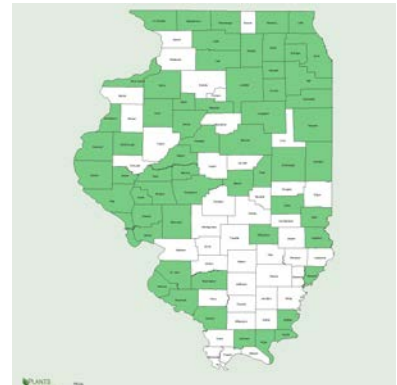
Storage Behaviour: Orthodox. Storage Conditions: 85% viability following drying to mc's in equilibrium with 15% RH & freezing for 4 weeks at -20C at RBG Kew. Material provided by Chicago Botanic Garden (CBG), Illinois, USA.

1000 Seed Weight. Average 1000 Seed Weight(g): 0.865 (524,767/lb). Details of Component Seed Weights: ①1.285 (353,248/lb), (Mazer 1989), Seed. ②0.445 (1,020,053/lb), (Stevens 1957), Seed; Weight refers to air-dry seeds.

Germination 85% germ; pre-sowing treatments = imbibed on 1% agar for 4 weeks at 25/10°C; germ medium = 1% agar + 250 mg/l gibberellic acid (GA3), germ conditions = 25/10°C, 8/16; (RBG Kew)

asexual propagation: Some suggest division of established plants in spring. If you attempt this, keep the host attached to all divisions.

cultivation: Space your imaginary potted plants on 0.5-1.0'. Tolerant of medium & fine textured soils. Anaerobic tolerance none. CaCO3 tolerance medium. Drought tolerance low. Fertility requirement medium. Salinity tolerance none. Shade tolerant. pH 4.0-7.0. Said to prefer slightly acidic soils. Zones 3-9.



bottom line: Fresh seed or dormant seed by successional restoration into established host spp with a healthy mycorrhizal population. Not a sp for *de novo* restorations in dead, urban, bulldozer smear soils. Germ 3.2, 2.0, 1.0, sd 2.3, r1.0-6.0 (5.0)%. Dorm 82.2, 80, 80, sd 5.2, r75-90 (15)%. Test 31, 32, na, r19-41 days. (#9)**

Description: Native, erect, perennial forb; minimum root depth 0.5'; stems 0.75-1.25', hollow, reddish; leaves alternate, petiolate, pinnatifid to bipinnatifid, larger leaves basal, upper reduced; inflorescence terminal spicate raceme, flowers sessile, flowers yellow (ranging from greenish yellow to purplish-red; rarely reddish brown), 5-merous, corolla bilabiate; interesting fern-like foliage; fruit is a capsule to +1.5 cm, beak minute, with tiny seeds; key features: Plants in clumps; upper lip of flower with 2 small teeth near the hooded tip, lower lip shorter, blooming April-June; dry habitat (fh). Stems usually villous (Ilpin).

Comments: status: phenology: Blooms 4-5 (6). C3. In northern Illinois & southeast Wisconsin, collect seeds in June, the ripe seeds are quickly shed. Can be used for cut flowers but because of the sp rare occurrence, the practice is not recommended. When viewed from directly above, the flowers are arranged in a spiral. Doug Wade pointed this out in 1981. Dried infructescences are attractive in dried arrangements, but shake out & scatter the seed first. Rock gardens.

“Common in two quite different situations, dry wooded streambanks & in boggy places & low prairies in Coon Creek bottom. Kishwaukee River bank at Camp Hillcrest, & the high bank of South Kinnikinnick Creek. We have not seen var *dobbsii* Fern.” (ewf55) Genetic source Clarion Twp, Bureau Co & Clyde Twp, Whiteside Co.

Associates: Hemiparasitic generalist, ‘attacks’ a wide range of spp, including other hemiparasites & members of its own sp, when seedlings are grown close together. It does not attack all spp it encounters, nor does it parasitize all hosts equally. It is said to be capable of normal growth & development without a suitable host plant. Individual plants may not be long-lived (4-5 years), & may lose vigor in the center, forming fairy rings (Henderson 2002). Plants may form small clones by means of short stoloniferous stems (Piehl 1963), or colonies may spread by self-sown seed (Henderson 2002). Piehl (1963) described the *Pedicularis* haustoria as nearly globose to broadly elliptic structures & noticed the presence of haustoria produced close together in a bead-like arrangement.

Henderson (2002) feels that *P canadensis* is a “keystone species” & the parasitism of the sp reduces the dominance of C4 grasses & allows greater diversity in native plantings. Henderson’s observations were from spp diversity patterns in remnant prairies & a successional seeded planting, not from *de novo* restorations. In Henderson’s experiment, grasses within reach of the wood betony had their flowering reduced by 90%, culm density reduced by 60%, & leaf height reduced by 50%.

Listed hosts include asters & native grasses.

Associated plant spp include 1) *Andropogon scoparius*, *Comandra umbellata*, *Euphorbia corollata*, *Heuchera richardsonii*, *Hypoxis hirsuta*, *Krigia biflora*, *Lespedeza capitata*, *Lithospermum canescens*, *Lobelia spicata*, *Petalostemum purpureum*, *Phlox pilosa fulgida*, *Rudbeckia hirta*, *Silphium integrifolium deamii*, *Silphium terebinthinaceum*, *Sisyrinchium albidum*, *Stipa spartea*, & *Zizia aurea*; 2) *Antennaria plantaginifolia*, *Helianthus divaricatus*, *Koeleria cristata*, *Liatris aspera*, *Prunus virginiana*, *Quercus velutina*, & *Tradescantia ohiensis*; 3) *Acer saccharum*, *geranium maculatum*, *Ostrya virginiana*, *Prenanthes alba*, *Quercus alba*, & *Thalictrum dioicum*; 4) *Aster laevis*, *Betula papyrifera*, *Gentiana quinquefolia occidentalis*, *Hamamelis virginiana*, *Lonicera dioica*, *Sanicula marilandica*, *Shepherdia canadensis*, & *Taenidia integerrima* (sw94).

Pollinated by bees (main pollinator), attracts hummingbirds..

ethnobotany: Greens used as a vegetable like spinach for food by Iroquois (Waugh 1916). Used as medicinal plant by Ojibwa (Gilmore 1933). Root used as an aphrodisiac & a love charm by Ojibwa (sm32), & by the Menomini as a love charm & to bring quarreling couples back together. Also used for treating snakebites, medicinal teas & poultices. Native Americans added it to oats to feed horses

VHFS: Mohlenbrock (2014) lists 2 vars for Illinois. Var *canadensis*, with flowering stems clustered; stolons absent; woods, prairies; occasional throughout the state; blooms April - June. Var *dobbsii* Fern, with flowering stems solitary; basal offshoots stoloniferous; woods, prairies, not common, scattered in Illinois; blooms April - June.

Weakly (2012) notes that variety *dobbsii* Fernald, with nearly solitary flowering stems & prolonged, stoloniform, often repent basal offsets, needs more study. This variety is named for its discoverer, Dr Raymond J Dobbs, of Geneseo, Illinois. Ironically, the type is from Tennessee (<http://www.florida.plantatlas.usf.edu/>) Sw94 note the varieties occurrence in the Chicago region, but most local authors do not recognize it. Named forms include *f canadensis*, corollas yellow, *f praeclara* AH Moore, corollas maroon, or *f bicolor* Farw] yellow on the

lower lip & maroon on the upper. All forms are known to occur together. (rvw11) Steyermark listed a rare, white flowered form, f *albescens* Steyererm.

[*Pedicularis canadensis* L (basionym), *P c* fo *albescens* Steyererm, *P c* fo *bicolor* Farw, *P c* fo *canadensis*, *P c* L fo *flava* Farw, *P c* subsp *canadensis*, *P* var *canadensis*, *P c* L subsp *canadensis* var *dobbsii* Fern, *P c* L var *dobbsii* Fernald, *P c* subsp *fluviatilis* (A Heller) WA Weber, *P c* var *fluviatilis* (A Heller) JF Macbr, *P c* L f *praeclara* AH Moore, *P c* fo *praeclara* AH Moore]

Amy Bartow, 2014, Native Nursery Network email, October 29, 2014

RA Henderson, 2002, Are there keystone plant spp driving diversity in Midwest prairies? in Stephanie Foré, Editor, 2002, Proceedings of the 18th North American Prairie Conference: Promoting Prairie, Truman State University Press, Kirksville, Missouri.

VK Lackney, 1981, The parasitism of *Pedicularis lanceolata* Michx, a root hemiparasite. Torrey Botanical Club Bulletin 108: 422-429.

MA Piehl, 1963, Mode of attachment, haustorium structure, & hosts of *Pedicularis canadensis*. Amer. J Bot., 50, 979-985.

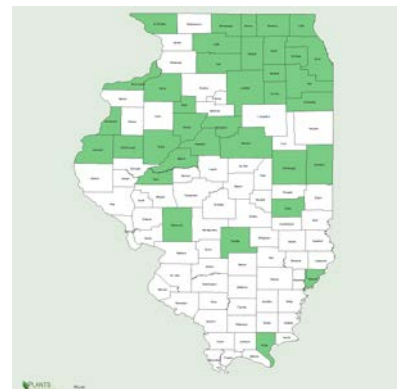


Pedicularis canadensis

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2nd line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS *Wetland flora: Field office illustrated guide to plant spp.* (Second line drawing is probably the next sp, but it is mis labeled on several websites.) Not copyrighted image. Last photo by Jock Ingels. Illinois map courtesy plants.usda.gov.

***Pedicularis lanceolata* Michaux** *CT, KY, MD, MA, NY, PA, TN SWAMP BETONY, aka FEN BETONY, SWAMP LOUSEWORT, SWAMP WOOD BETONY, (*lanceolatus -a -um* (lan-kee-o-LAH-tus) lanceolate, spear-shaped, lancelet-like in form, New Latin from *lancea*, lance or spear, *-olus- a- um-*, diminutive, & *-atus*, possessive of or likeness of, for the lanceolate leaves.) [obl]

Habitat: Fens, wet meadows, upland swamps, & wet woods. Calcareous fens (sw94). “Much more of a wetland sp than *P canadensis*: borders of marshes, swamps, ponds, & lakes; river banks, thickets, & springy slopes; fens (even in *Sphagnum*), meadows, & wet prairies” (rvw11). In the southeast USA, “Springheads & swampy areas, over calcareous, mafic, or ultramafic rocks” (w11). distribution/range: “Calcareous fens; wet meadows, bogs, swamps; occasional in the n ½ of Illinois, uncommon in the s ½ (m14). Known but not mapped from Bureau & Whiteside cos.



Culture: ①30 days cold moist stratification. Hemiparasitic sp which needs a host plant (pm09, 11). ②Seeds germinate after about 30 days of cold moist stratification (he99). ③No pretreatment needed. Sow seeds on the soil surface at 70°F & water. (ew11) ④“Seeds exhibit physiological dormancy. Seeds are placed in cold moist stratification. Germination occurs at 20°D/10°N C alternating temperature cycle. Germination was greater in light than dark.” (bb02) 520,000 (jfn04), 612,800 (ew11), 644,886 (gnh11), 697,840, 704,000 (pm02, aes10), 813,620 (gnam06), 890,196 (gnh13) seeds per pound.

SWAMP LOUSEWORT germinates readily, but seedlings require hosts for further development. Without hosts, seedlings remain stunted & chlorotic. *Triticum aestivum* WHEAT may be used as short-term host in greenhouse propagation. (Lackney 1981)

Cultivation: Space imaginary plants 1.0-1.5'. Full sun to partial shade, wet soils. Calcareous soils.

bottom line: Dormant seed by successional restoration with host spp. Germ 4.2, 2.0, 2.0, sd 4.0, r 1.0-12 (11)%. Dorm 74.8, 84, 88, sd 22, r31-88 (57)%. Test 30, 27, 27, r22-40 days. (#6).**

From seed in mature wetland restorations by successional method. More reliable than *P canadensis* from seed.

Description: Erect, herbaceous, perennial, native forb; stems 1.0-3.0'; flowers yellow; **key features:** Stems mostly solitary, upper flower lip entire, lower lip almost as long, blooms Aug-Sept; wet habitat (fh). “Leaves pinnately lobed less than half way to the midvein” (Ilpin). “The corolla is pale yellow or cream, not as variable as in *P canadensis*. Even more than in *P canadensis*, the margins of the leaf lobes are edged with hard white ceramic-like deposits” (rvw11).

Comments: **status:** Special Concern in Connecticut. Historical in Kentucky. Endangered in Maryland & Massachusetts, & Pennsylvania. Threatened in New York & Tennessee. **phenology:** Blooms 8,9. C3. In northern Illinois, collect seeds in September - early November. Collect seeds in se Wisconsin in October (he99). Attractive cut flowers, dried seed heads, landscaping, wetland restoration, rain gardens. Seed source DeKalb Co.

“Other common plants, which presented themselves at different places on our route through the prairies.” *Pedicularis lanceolata* as *P. pallida* Banks ex Pursh (Short 1845).

“Frequent in boggy places & sloughs. Coon Creek bottom, Kent Creek bottom at North Springfield avenue road.” (ewf55)

Associates: “Plant relies on a host for an increased supply of water & minerals but produces its own carbohydrates through photosynthesis (Lackney 1981, in Ilpin).

Associated plant spp include *Aster novae-angliae*, *Aster puniceus firmus*, *Aster umbellatus*, *Chelone glabra*, *Cirsium muticum*, *Dryopteris thelypteris pubescens*, *Eupatorium maculatum*, *Eupatorium perfoliatum*, *Impatiens capensis*, *Lobelia kalmii*, *Lycopus americanus*, *Lysimachia quadriflora*, *Lythrum alatum*, *Parnassia glauca*, *Solidago ohioensis*, *Solidago patula*, & *Solidago riddellii* (sw94).

VHFS: [*Pedicularis auriculata* Sm, *Pedicularis pallida* Nutt, *Pedicularis virginica* Poir]

CC Baskin & JM Baskin, 2002. Propagation protocol for production of container *Pedicularis lanceolata* Michx plants; University of Kentucky, Lexington, Kentucky. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 24 September 2013). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

VK Lackney, 1981. The parasitism of *Pedicularis lanceolata* Michx, a root hemiparasite. Torrey Botanical Club Bulletin 108: No 4 (Oct-Dec) 422-429.



Pedicularis lanceolata, Irene Cull's Fen

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

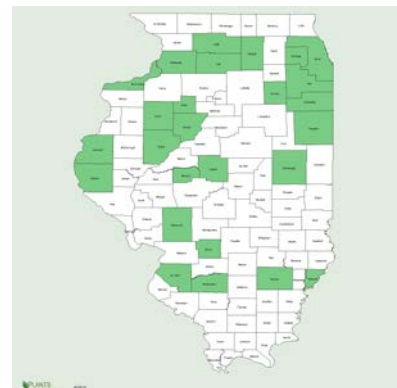
SEYMERIA Pursh **BLACKSENNA** *Scrophulariaceae* New Latin, from Henry *Seymer*, 19th century English naturalist & New Latin *-ia*. A genus of about 25 spp of annual hemiparasitic herbs of southern North America. *Seymeria cassioides* YAUPON BLACKSENNA is the most economically damaging root parasite of southern pine plantations. The genus was formerly part of the broadly defined *Scrophulariaceae*. *Dasistoma macrophylla* was formerly in this genus. Alas poor *macrophylla*, I knew it well.

TOMANTHERA Rafinesque **TOMANTHERA** *Orobanchaceae* *Tomanthera* One source relates this to the Latin base *toment-*, dense hair, stuffing, possibly for the hairy stems or calyx; the first root may be Greek *tom-*, cut, the reference unclear; the second root word is Greek *άνθηρα* f, *anthera*, in botany an anther, the pollen-bearing part of a flower's stamen. So, is the stamen cut or woolly? The name is from "Greek *τοωή*, *tooe*, section & *άνθηρα*, *anthera*, & was said to apply to the split anthers; Rafinesque described the two cells as unequal, whereas it rather seems to be that those of one pair of anthers are smaller". (*Note Rafinesque has been described as a few fries short of a Happy Meal, but he was usually proven correct.*) A small Nearctic genus of two annual plants. The genus was formerly part of the broadly defined *Scrophulariaceae* & is now part of the broadly defined *Agalinis* within *Orobanchaceae*. Once known as *Otophyllus* from Greek *ους*, *ous*, ear, & *φυλλον*, *phyllon*, for the auriculate leaf-blades; an old name for *Tomanthera*. Sp is visited by long-tongued bees.

move to *Agalinis auriculata* (Michx) SF Blake

***Tomanthera auriculata* (Michaux) Rafinesque (New nomenclature *Agalinis auriculata* (Michaux) SF Blake (w12, BONAP, pug14, rvw11)) *IL, IN, KY, MA, MI, MN, OH, PA, TN, WI** EARLEAF FOXGLOVE, aka AURICULATED FALSE FOXGLOVE, AURICLED GERARDIA, EARED FALSE FOXGLOVE, EARLEAVED FALSE FOXGLOVE, EARLEAF FOXGLOVE, EAR-LEAVED GERARDIA,

Habitat: Mesic to wet mesic tallgrass prairie. Local in moist prairies (sw94). In Michigan, "Apparently originally native from Ohio, southern Michigan, and southern Wisconsin southward and westward, but rare and local everywhere that it still grows. Collected in Michigan only by the First Survey in a sandy bur oak opening at White Pigeon, St. Joseph Co. (in 1837, MICH) and in dry openings near Edwardsburg, Cass Co. (in 1838, NY)." (rvw11) In the se USA, "glades, barrens, blackbelt prairies, & disturbed clearings over mafic rocks (such as diabase & gabbro) or calcareous rocks; rare" (w12). Tallgrass prairie, Blackland prairie, prairie-like glades, & openings. distribution/range: "*In pratis regionis Illinoensis.*" This sp was recorded by IDNR from west Bureau Co in the late 1970's, but it is not mapped from there. This is what happens when funding for geography is cut in favor of math, science, & "social studies". Are you one of the 60% that can find Iraq on a map? Don't know where the Pacific is?



Culture: Seeds are dormant when shed, & require 90 days cold moist stratification or dormant seeded, germinating the following March & April. Small seeds require light to germinate. Seed remains viable in the soil for 4 years.

Description: Erect annual, 12-32", stem simple or with a few branches. The plant becomes reddish brown as the seeds ripen. key features: Plant rough hairy, leaves with lobes at the base (fh).

Comments: status: Threatened in Illinois. Endangered in Indiana, Kentucky, Minnesota, Ohio, Pennsylvania, & Tennessee. Probably Extirpated in Michigan. Special Concern in Wisconsin. phenology: Blooms 8-9. Harvest seed September to October. A disturbance dependent hemiparasite.

"Other common plants, which presented themselves at different places on our route through the prairies." *Agalinis auriculata* (Michx) SF Blake from *Tomanthera auriculata* (Michx) Raf as *Gerardia auriculata* Michx (Short 1845).

Associates: A partial parasite on *Aster ericoides* & other *Asper spp*, but also capable of fully photosynthesizing. Other reported hosts include *Poa pratensis*, *Helianthus occidentalis*, & *Rudbeckia fulgida*. Often grows with *Fragaria virginiana*. Sp is visited by long-tongued bees. Bumblebees are the most important pollinators, also Miner bees & large Leaf-cutting bees.

Associated plant spp include 1) *Andropogon gerardii*, *Asclepias sullivantii*, *Aster ericoides*, *Aster laevis*, *Comandra umbellata*, *Elymus canadensis*, *Euphorbia corollata*, *Helianthus grosseserratus*, *Helianthus rigidus*, *Liatris spicata*, *Lysimachia quadriflora*, *Oxypolis rigidior*, *Parthenium integrifolium*, *Phlox pilosa*

fulgida, *Physostegia virginiana arenaria*, *Polygala verticillata isocycla*, *Ratibida pinnata*, *Silphium laciniatum*, *Silphium terebinthinaceum*, *Solidago nemoralis*, *Solidago rigida*, *Veronicastrum virginicum*, & *Zizia aurea*; 2) *Agalinis tenuifolia*, *Cuscuta glomerata*, *Gaura biennis*, *Gentiana andrewsii*, *Lysimachia quadriflora*, & *Solidago nemoralis* (sw94).

VHFS: In Britton & Brown (1913), this is *Otophylla auriculata*. [*Aureolaria auriculata* (Michx) Farw, *Dasistoma auriculatum* (Michx) Raf (basionym), *Gerardia auriculata* Michx, *Otophylla auriculata* (Michx) Small, *Seymeria auriculata* (Michx) Spreng, *Tomanthera auriculata* (Michx) Raf]



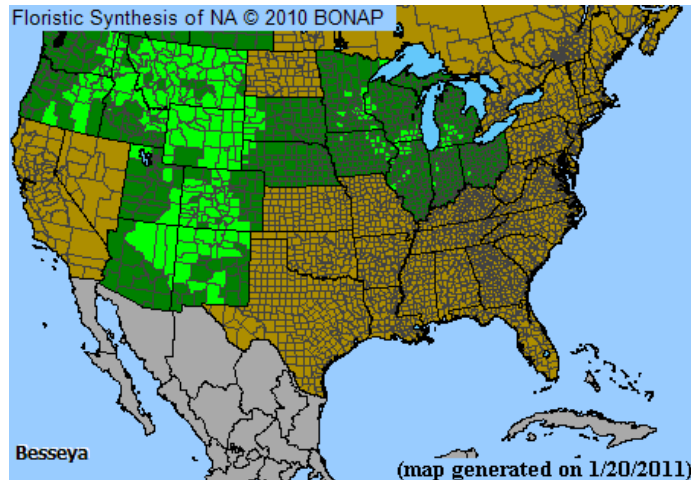
Tomanthera auriculata, Gold (Canal Borrow-Pit) Prairie, west Bureau County, down by the Green River,

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Fruit, seed, & seed with coat removed images from Robert J Gibbons for Kirkbride, J.H., Jr., C.R. Gunn, & M.J. Dallwitz. 2006. Family Guide for Fruits and Seeds, vers. 1.0. URL: <http://nt.ars-grin.gov/sbmlweb/OnlineResources/frsdfam/Index.cfm>. Illinois map courtesy plants.usda.gov.

PLANTAGINACEAE AL Jussieu 1789 **PLANTAIN FAMILY** Fruits are generally a capsule, septicidal, loculicidal, circumscissile, or dehiscent by terminal slits or pores. As recently recircumscribed, this family now includes many non-hemiparasitic figworts, including *Chelone*, *Collinsia*, *Penstemon*, *Antirrhinum*, *Chaenorrhinum*, *Linaria*, *Misopates*, *Nuttallanthus*, *Digitalis*, *Veronica*, & *Veronicastrum*. Mohlenbrock (2014) maintains *Plantaginaceae sensu strictu*.

BESSEYA see *Wulfenia*. **BESSEYA** *Plantaginaceae* Genus named in honor of professor Charles Edwin Bessey, American botanist (1845-1915), student of Asa Gray, botany professor at Iowa Agricultural College & the University of Nebraska, president of the AAAS, introduced the systematic study of plant morphology as the basis of modern plant taxonomy. Also wrote *The Geography of Iowa* (1876). GEOGRAPHERS OF THE WORLD UNITE! The genus was formerly part of the broadly defined *Scrophulariaceae*. Formerly *Synthyris* Benth or *Wulfenia*.

Besseyia bullii occurs near the margin of Wisconsinan glaciation & the Driftless Area in the upper Mississippi River Valley & the western part of the Great Lakes region, clearly disjunct from the rest of the genus. 6 (7) related purple-flowered (bracted) spp (either *Besseyia spp* or *Synthyris spp*) grow in the Rocky Mountains. Our sp may have migrated eastward in a periglacial arctic/alpine environment on then recent glacial moraines during a late Pleistocene glacial climate, perhaps then continuing into Michigan & Ohio, or moving east during the Altithermal. Or not.



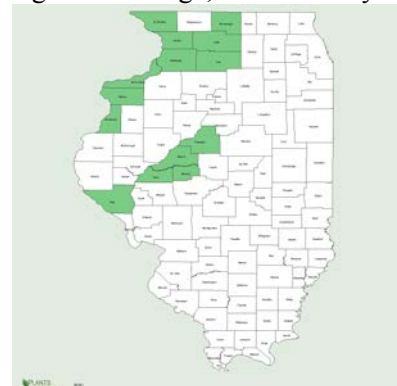
North America genus map courtesy of BONAP (2010)

Besseyia bullii (Eaton) Rydberg * IL, IN, IA, MI, MN, OH, WI KITTENTAILS, aka BESSEYA, BULL'S CORALDROPS, KITTEN TAILS, KITTEN-TAILS, NORTHERN KITTENTAIL, (*bullii* for George Bull, discoverer of the sp.)

Habitat: Dry prairies, woods, & barrens. Sandy grasslands, prairies, open oak woods, & savannas. In sandy or gravelly soils. In Michigan, it is found exclusively in oak savannas on steep hillsides, & sandy grasslands and hillsides with sparse oaks. **distribution/range:** Upper Midwest, uncommon throughout its range, rather locally from Michigan & southwest Ohio to Iowa & southeastern Minnesota (rvw11).

Sp is threatened or endangered in all the states it is known from. **Culture:** ① "Fall sow, or moist cold treatment 120 days. However, dry cold storage & shorter moist cold treatment have resulted in germination. Very light cover. (mfd93) ② Best planted outdoors in the fall, or 120 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. (pm09). ③ Seeds germinate after about 120 days of cold moist stratification, or sow seeds outdoors in fall (he99). ④ Sow at 20°C (68°F), if no germination in 3-4 wks, move to +2 to +4°C (34-39°F) for 6-12 wks, move to 5-12°C (41-53°F) for germination, do not cover (tchn).

Cultivation: Said to tolerate clay soils.



Description: Native, erect, small perennial forb, 8-12(16)”, easily overlooked except when in bloom; stems hairy; leaves basal rosette of ground hugging, oval, toothed leaves, 2-5” in length, cauline leaves smaller, alternate, sessile or clasping; inflorescence a 2.0-6.0”, dense, spike-like raceme of stalked flowers; flowers yellowish green, small, prominently 2 lipped, upper lip sharp, lower lip curved backwards with 3 irregular small lobes, 2 stamens, 5-merous, flowering progresses from the bottom of the spike upwards; N. key features: Fruit is a hairy 0.13-0.25” 2-celled capsule. “The inconspicuous yellow flowers are in a long spike-like inflorescence at the end of an unbranched stem bearing many small leaves” (rvw11)

Comments: status: Threatened in Illinois, Iowa, Michigan, Minnesota, & Wisconsin. Endangered in Indiana. Presumed extirpated in Ohio (a single record from Montgomery Co). phenology: Leaves begin growth late March to late April. Flower spikes form March to late April. Blooms April-May to June. Fruits May to June. In northern Illinois, collect seeds in late June- early July. Collect seeds in se Wisconsin in June - July (he99). KITTENTAIL is self-compatible (McKone et al 1995).

This sp is commonly threatened by habitat degradation & brush encroachment. Burn, baby, burn. It is best to seek this plant in late May to mid-June, when it is in bloom & most obvious. Some think it evokes the image of a tiny mullein plant.

“Uncommon on high prairies particularly in the gravel hills, also in thin oak woods in sandy areas. (*Wulfenia bullii* (Eaton) Barnh)” (ewf55 as *S bullii* (Eaton) Hell)

Associates: Pollinated by small bees of the family *Halictidae*, *Lasioglossum anomalus*, *Augochlorella striata* & *Dialictus spp*. We have had garden plantings destroyed from beneath by moles. Fall bare-root may be more successful. April 2012, when just out of flower, all seed stalks on a large plants outside my library were eaten by rabbits. Paybacks are hell. Bet they can’t outrun two Malamutes.

VHFS: Formerly known as *Wulfenia bullii* (Eaton) Barnhart. In Britton & Brown (1913), this is *Synthyris bullii*. [*Besseyia bullii* (Eat) Rydb, *Gymnandra bullii* Eaton, *Synthyris bullii* (Eat) Heller, *Wulfenia bullii* (Eat) Barnh]

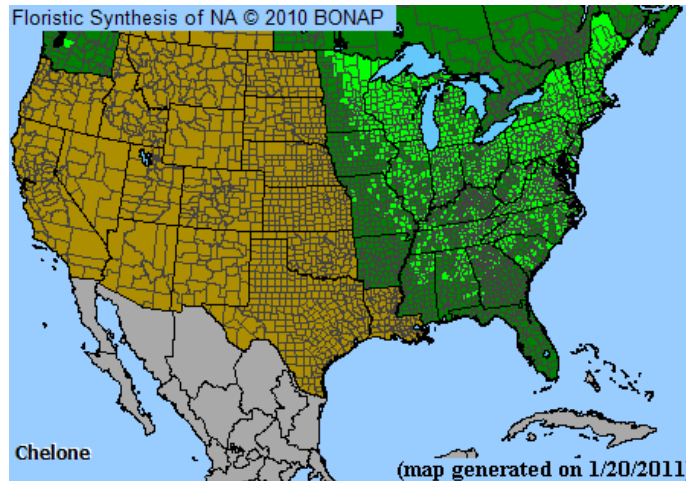


Besseyia bullii

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

CHELONE Linnaeus **TURTLEHEAD** *Plantaginaceae* *Chelone* (ke-LO-nay) New Latin from Greek χελώνη, *chelone*, tortoise, as the corolla is shaped like a turtle's head. A small genus of 4 spp of perennial herbs native of humid eastern North America, adventive in Washington state. The genus was formerly part of the broadly defined *Scrophulariaceae*.

Cold moist stratify at 90-120 days. Very light cover. Code B, H. (cu00)



North American genus map courtesy of BONAP (2010)

Chelone glabra Linnaeus *NY **TURTLEHEAD**, aka SNAKEHEAD, TURTLE-HEADS, WHITE TURTLEHEAD, (*glaber*, *-bra*, *-brum* (GLA-ber) glabrous, lacking hairs, smooth, bare, from *glaber*, *glabri*, Latin for bald.)
obl

Habitat: Wet meadows, fens, & marshes. Wet woods & swamps. In Michigan, “Moist ground along streams, rivers, ponds, and lakes; swamps (coniferous or hardwood), especially in openings and borders; fens, moist fields and meadows, wet shores, marshes, thickets” (rvw11).

distribution/range: Sp is the most widely distributed member of the genus.

Culture: ① “Moist cold treatment, or fall sow. Very light cover. Variable germination.” (mfd93) ② 120 days cold moist stratification. Best planted outdoors in the fall. (pm009). ③ Sow seeds outdoors in fall, or 120 days cold moist stratification (he99). ④ Fall plant or cold stratify for 2 to 3 months for best results. Sow on the soil surface at 70°F & water. (ew11) ⑤ Sow at 20°C (68°F), if no germination in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn). ⑥ “The papery capsule turns darker shades of brown when the seeds approach maturity. The seeds are usually ready for harvest at or near the first frost. Air-dry the capsules, separate the seeds & store in sealed, refrigerated containers. Moist-chill stored seeds six weeks prior to sowing. Plant seeds outside in fall or moist-chill & plant in spring. Seedlings germinate after one year & flower after two.”

(lbj) 1,008,000 (aes12), 1,053,364 (gnam04), 1,054,588 (gnam06), 1,261,111 (gnam11), 1,472,000 (pm02, ecs), 1,504,000 (ew11), 1,550,000 (jfn04) seeds per pound.

asexual propagation: Make stem cuttings in early summer. 2 node stem cuttings work well. Roots can be divided in early spring or late fall with the plant is dormant. Space divisions 18 in. apart.

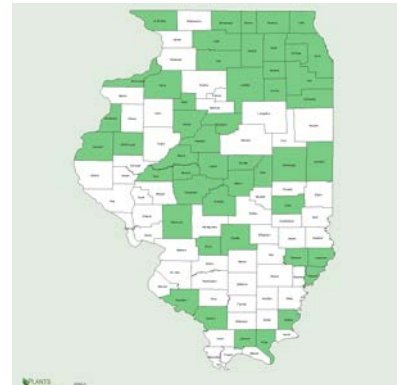
cultivation: Space plants 1.5-2.0'. Light, wet, rich soils, full sun. Prefers acidic soils, pH <6.8.

bottom line: Dormant seeding is best for field establishment, but essentially non-dormant lots are known. Flipflop species. Germ 21.7, 17, 17, sd 18.5, r8.0-64 (56)%. Dorm 62.4, 66, na, sd 27.9, r1.0-88 (87)%. Test 32, 34, 35, r21-39 days. (#17)**

greenhouse & garden: Dormant seed or moist cold stratify (90-120 days). Small seeds require light & shallow soil cover.

Description: Erect perennial, 2.0-4.0', narrowly pyramidal spike of white (cream; red, yellow, violet, white), deep-throated flowers, each resembling a turtle's or snake's head, diploid. key features: “leaves sessile or nearly so; flowers white throughout or greenish-yellow or tinged with pink or purple” (Ilpin).

Comments: status: Exploitably vulnerable in New York. phenology: Blooms 7,8,9. C3. Seed matures fall. In northern Illinois, collect seeds in mid-October - mid-November. In southeast Wisconsin, collect seeds in September - October. Attractive cut flowers & dried seed heads used in fall arrangements. Useful in landscaping, wetland restoration, & rich, moist rain gardens, with real infiltration of clean water into real soils



(not those BS, over-engineered, under-thunk, bogus, crapola “swales with the sub drainage of a gravel kame” horse shit). Seed sources nursery production, genetic source Chicago Botanic Garden & wet ditches south Whiteside Co.

“Other common plants, which presented themselves at different places on our route through the prairies” *Chelone glabra* L (Short 1845).

“Uncommon in slough marshes, bogs, & other wet places; sometimes in thickets. Coon Creek bottom, the Searle tract, & a low place on the C & NW Ry east of Winnebago.” (ewf55)

Associates: Attracts butterflies & hummingbirds. Pre- & post-hibernation host *Euphydryas phaeton*

BALTIMORE CHECKERSPOT BUTTERFLY. Browsed by wildlife.

VHFS: Including var *linifolia* Coleman & *f tomentosa*



Chelone glabra

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Second line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS *Wetland flora: Field office illustrated guide to plant spp.* Not copyrighted image. Illinois map courtesy plants.usda.gov.

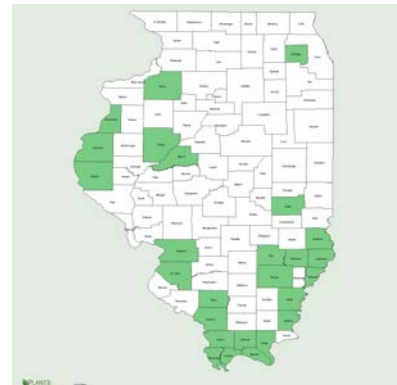
Chelone obliqua Linnaeus *AR, IA, KY, MA, MI PINK TURTLEHEAD, AKA PURPLE TURTLEHEAD, RED TURTLEHEAD, ROSE TURTLEHEAD, (*obliquus -a -um* (o-BLEE-kwus) oblique, slanting, sideways, awry, lopsided.) obl

Habitat: Seasonally inundated areas & wet meadows. In Michigan, thickets along the Huron River near Ann Arbor, very rare (rvw11).

distribution/range: Northern Illinois is near the northwest limit of the sp range. Known from but not mapped from the Mississippi River floodplain in Mercer Co.

Culture: propagation: ① Sow at 20°C (68°F), if no germination in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn). ② Easily grown from seed (Ilpin). Moist cold stratify or dormant seed.

Description: Native, erect, perennial forb; 2.0-5.0'; flowers pink (red, violet). key features: “Leaves are petioled; sepals fringed with short hairs”



(Ilpin).

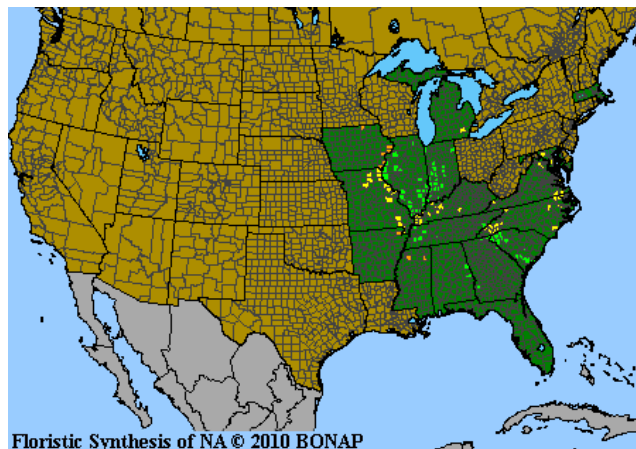
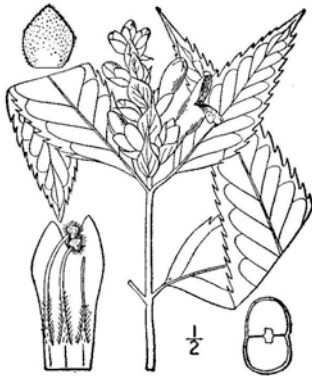
Comments: status: Variety *speciosa* is Endangered in Arkansas & Kentucky. Variety *obliqua* is Endangered in Kentucky. Threatened in Maryland. Endangered in Michigan. phenology: Blooms 8,9(10). C3. Seed matures fall, October-November). Wetland restoration. Adventive in northeast Illinois, but at home in the wetlands of the Mississippi in Illinois. At one time, this was considered a part of *C glabra* (Eaton 1829).

Associates:

ethnobotany:

VHFS:

“A tetraploid race is restricted to the southern Blue Ridge; plants in the remainder of the distribution are hexaploid (Nelson, Elisens, & Benish 1998)” (w11).

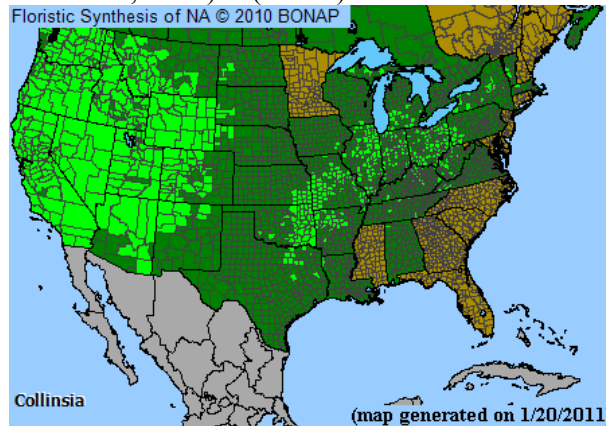


Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 1st Photo Robert H Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image. 2nd line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS *Wetland flora: Field office illustrated guide to plant spp.* Not copyrighted image. North America map courtesy of BONAP (2010). Illinois map courtesy plants.usda.gov.

COLLINSIA Nuttall **BLUE-EYED MARY, CHINESE HOUSES** *Plantaginaceae* *Collinsia* Collin'sia (kol-IN-see-a) New Latin, from Zaccheus *Collins* 1764-1831 American mineralogist & botanist, & New Latin *-ia*. Collins was a member of the Philadelphia Academy of Natural Sciences, an authority on lower plants, & corresponded with the cosmographer Von Humboldt, & Nuttall, Torrey, & Rafinesque. Mineralogists rock! x = 7?

A genus of 20 spp of herbs of North America, with the most diversity in western North America. Fruits septicidal & loculicidal (valves 2-lobed), seeds generally few, ± oblong, generally plump; inner surface ± concave. The genus was formerly part of the broadly defined *Scrophulariaceae*. *Collinsia verna* & *C violaceae* are the only common spp east of the Rocky Mountains, the latter is known from one Illinois Co & is endangered. The range of these 2 spp seems to form a continuum.

C parviflora has disjunct populations in northern Michigan. “A species disjunct in range from farther west. In crevices & gravelly soil on exposed rock outcrops, though collected in “weedy sand barrens” in Schoolcraft Co. (*WT Gillis* 2455 in 1958, MSC).” (rvw11).



North American genus map courtesy of BONAP (2010)

Collinsia verna Nuttall *NY, TN, WI **BLUE-EYED MARY**, aka **EASTERN BLUE-EYED MARY, SPRING BLUE EYED MARY**, (*vernus -a -um* ver'nus (VER-nus) vernal, of spring, by implication flowering in spring, from Latin *vernus -a -um*, pertaining to or of spring, from *vēr* spring.)

Habitat: Damp, open, woods. In Michigan, “Rich deciduous forests, especially in ravines and moist areas. This is one of our most attractive wildflowers, striking in its bicolored corolla, but relatively recent (post-1980) collections are few” (rvw11). In the se USA, “nutrient-rich, moist bottomlands & forested slopes; uncommon” (w11). distribution/range: West of Wyandot on the south side of the BN tracks west of Sand Hill Baptist Church Road about 1 mile.

Culture: propagation: Seeds are naturally shed in the summer & germinate in the fall. ①“Seeds exhibit physiological dormancy. Seeds are warm stratified & germinate at 15/6°C.” (bb02) ②Sp is easily grown from seed (Ilpin).

Cultivation: Moist soil, partial to full shade.

Description: Winter annual; weak stem; leaves opposite, mostly stalkless; flowers blue & white, 2-lipped, stemmed, axillary & terminal; key features: “Flowers are in whorls in upper axils” (Ilpin).

Comments: status: Endangered in New York & Tennessee. Extirpated in Wisconsin (Rock Co). phenology: Blooms April-June. C3.

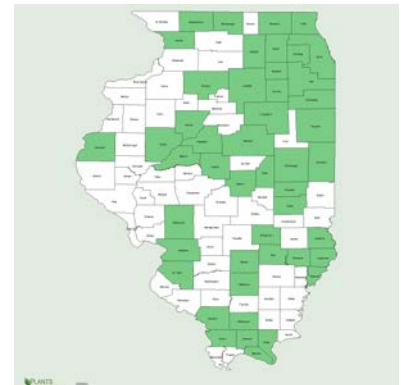
“Quite uncommon being known to us only in Page Forest but reliably reported in several places near Pecatonica.” (ewf55)

Associates: Sp is of special value to native bees.

ethnobotany:

VHFS:

CC Baskin & JM Baskin, 2002. Propagation protocol for production of container *Collinsia verna* Nutt plants; University of Kentucky, Lexington, Ky. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 30 September 2012). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.





Collinsia verna

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

GRATIOLA Linnaeus 1753 **GOLDEN-PERT, HEDGE-HYSSOP, MUD-HYSSOP** *Plantaginaceae Gratiola*
New Latin, diminutive of Latin *gratia* grace or favor; from its alleged healing qualities. A genus of about 20 (25) spp of herbs of temperate regions & tropical mountains of the North America, Europe, Asia, Australia, & South America. Fruits septicidal & loculicidal, 4-valved, 3–6 mm, ovoid to spheric, seeds many, 0.5–0.9 mm, coat net-like, ± brown. The genus was formerly part of the broadly defined *Scrophulariaceae*.

Gratiola officinalis, sow at 20°C (68°F), if no germination in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn).

Gratiola neglecta Torrey MUD-HYSSOP, AKA CLAMMY HEDGE-HYSSOP, CLAMMY HEDGEHYSSOP, DRUG HEDGEHYSSOP, HEDGEHYSSOP, NEGLECTED HEDGEHYSSOP, (*neglectus -a -um* neglected, disregard, overlooked, unobserved, insignificant.)

Habitat: Ditches, wet areas, & bottomlands. Streambanks & in muddy soils. In Michigan, “Muddy river banks, depressions in fields, and wet sandy disturbed places” (rvw11). distribution/range: The most widespread sp in the genus.

Culture: propagation:

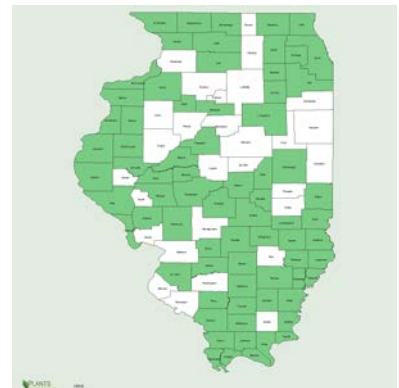
Description: Native, erect annual; N 2n = 18. key features: ①Plant annual, leaves widest near or above the middle (fh). ②“The elongate (especially in fruit) filiform pedicels tend to be a little more conspicuously glandular-pubescent than those of *G. virginiana*” (rvw11).

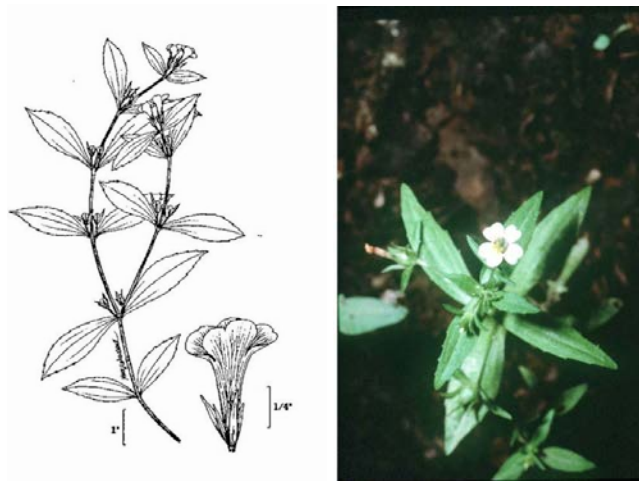
Comments: status: phenology: Blooms 4-10. “Common in the sandy slough area west of Shirland & in Coon Creek bottom but not seen elsewhere.” (ewf55)

Associates:

ethnobotany:

VHFS:





Gratiola neglecta

Line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS *Wetland flora: Field office illustrated guide to plant spp.* Not copyrighted image. Photo Robert H Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov.

LINARIA P Miller **TOADFLAX, YELLOW TOAD-FLAX** *Plantaginaceae* *Linaria* (leen-AH-ree-a) New Latin, from *lin-*, from Greek *linon*, flax, *Linum usitatissimum*, in reference to the flax-like leaves. About 150 (100±) spp of temperate Eurasian & North African annual & perennial herbs, many cultivated. American spp are often placed in *Nuttallanthus* DA Sutton, which see. The genus was formerly part of the broadly defined *Scrophulariaceae*.

Linaria aerugina, *alpina*, & *purpurea*, sow at 20°C (68°F), germinates in less than two wks. *L. genistifolia*, & *supina*, sow at 18-22°C (64-71°F) for 2-4 wks, move to +2 to +4°C (34-39°F) for 4-6 wks, move to 5-12°C (41-53°F) for germination. (tchn)

Linaria dalmatica (Linnaeus) P Miller *NOX DALMATIAN TOADFLAX, aka BROADLEAF TOADFLAX, BROADLEAF DALMATION TOADFLAX, *DALMANTINER LEINKRAUT*, DALMATION TOADFLAX, *LINAJOLA DI DALMAZIA*, *LINARIA-DALMÁTICA*, (*dalmaticus -a -um* Dalmatian, from Dalmatia in Austria-Hungary.)

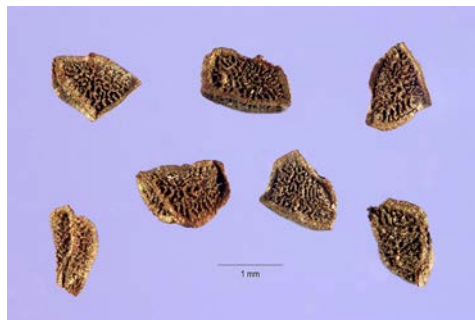
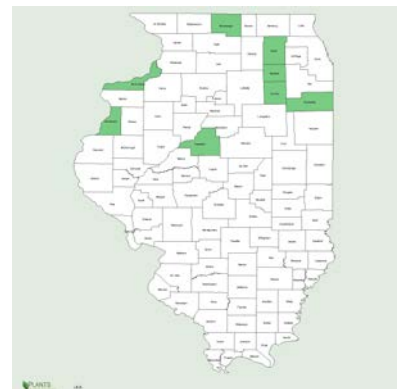
In Michigan, “first collected ... in 1945 in Kalamazoo Co & now locally established along roadsides & railroads, on sand dunes, at borders of forests, & in fields & disturbed places such as vacant lots” (rvw11). Native to the Mediterranean. Sp is very aggressive in the western USA

N 2n = 12.

See <http://michiganflora.net/species.aspx?id=1951> for a discussion of taxonomy.

Listed as a noxious weed in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Washington, & Wyoming.

“A garden escape which is inclined to persist as on the roadside east of New Milford.” (ewf55)



Linaria dalmatica

Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov.

Linaria maroccana Hooker f BABY SNAPDRAGON, aka BUNNY RABBITS, MOROCCAN TOADFLAX, SPURRED SNAPDRAGON, (*maroccanus -a -um* (ma-ro-KAH-na) of Morocco, from Marrakech, the capital; possibly from Tamazight (Berber) words *mur (n) akuch*, which means Land of God.)

Habitat: distribution/range: Native to the Mediterranean. Naturalized or escaped in 10 states.

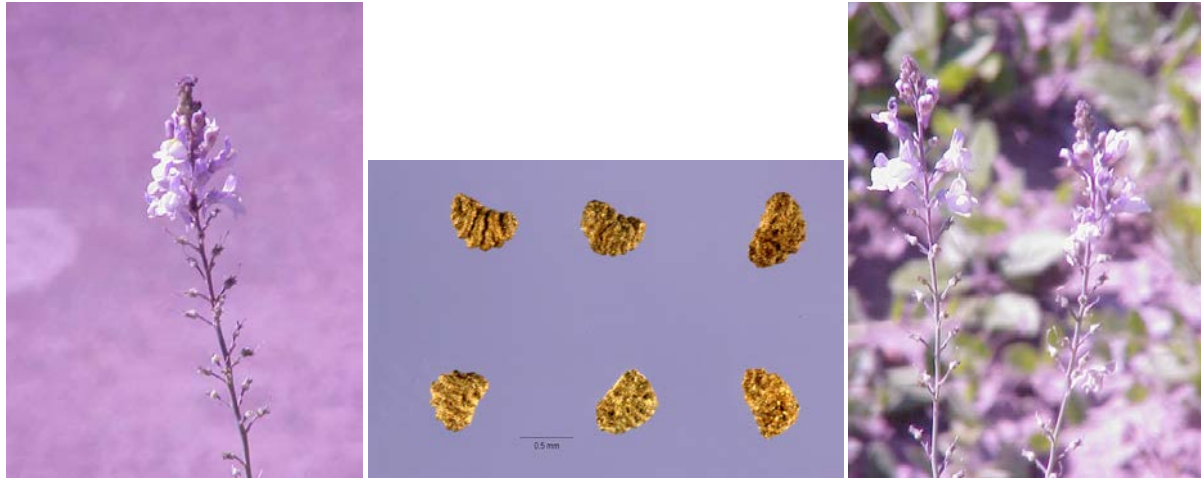
Culture: ☉No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) Easy to establish. 6,720,000 (ew11), 6,850,000 (gran) seeds per pound. Pure stand plant 0.5 lb per acre (gran).

Drought tolerant. Low to moderate moisture requirements. Full sun to partial shade. Widely adaptable. Coarse to moderately fine soils. Best in neutral soils, some base tolerance.

Description: Introduced annual, 18-24", N 2n = 12. Flowers with mixed colors bloom from spring to summer (spring thru fall).

Comments: status: phenology: Blooms Attractive cut flowers. Selections are often used as quick color with native seed mixes. In light of the aggressiveness of some *Linaria*, ***this sp should be planted with caution.***

The use of this species for quick color in native seedings has declined in recent years.



Linaria maroccana

Seed photo Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted image. Photos by permission granted to use under GFDL by Kurt Stueber. Source: www.biolib.de

Linaria minor (Linnaeus) Desfontaines

“Common on cinder piles & railroad ballast. Usually only 2 to 4 inches tall but occasionally growing to 15 to 18 inches. (*Chaenorhinum minus* (Linnaeus) Lange)” (ewf55)



738. *Linaria minor* Desf.
Lesser Toadflax; P.

Linaria vulgaris P Miller *NOX ID, MO, NV, NM, OR, SD, WA, WY BUTTER-& -EGGS, aka BUTTER & EGGS, BUTTERANDEGGS, COMMON TOADFLAX, FLAXWEED, *GEMEINES LEINKRAUT*, GREATER BUTTER-&-EGGS, JACOB’S LADDER, *LINAIRE VULGAIRE*, *LINAJOLA COMUNE*, *LINARIA COMÚNE*, PENYWORT, *RAMSTED*, WILD-SNAPDRAGON, YELLOW TOADFLAX, (*vulgaris -is -e* (vul-GHA-ris) common, vulgar, from Latin *vulgāris*, from *vulgus*, the common people.) BUTTER & EGGS refers to the yellow flowers with a bright orange spot.

In Michigan, “Long a familiar and attractive weed along roadsides and railroads; on shores; thriving in fields, vacant lots, gravel pits, and dry disturbed ground generally” (rvw11). Native of the Mediterranean. An aggressive, noxious weed in the western USA. Gravel road ditch west of Limerick.

① Sow at max 5°C (41°F), germination irregular, often several months (tchn).

“Common & variable. A monstrous form without spur is common.” (ewf55)

$N 2n = 12$. “The linear leaves, mostly 1.5–4 (–5) mm wide, are often rather densely crowded” (rvw11).

In Britton & Brown (1913), this is listed as the tautonym *Linaria linaria*. Where for art thou, *Linaria*?



Linaria vulgaris

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Photo by Leo Michels - Source: <http://www.imagines-plantarum.de/> Public domain image. Illinois map courtesy plants.usda.gov.

NUTTALLANTHUS DA Sutton 1988 **AMERICAN TOADFLAX** *Plantaginaceae* A genus of 4 spp of annual or biennial herbs of North & South America, fruit dehiscent by slits into chambers near tip, ± spheric; seeds many, prismatic, 4–7-angled, faces smooth or tubercled. The genus was formerly part of the broadly defined *Scrophulariaceae*. Formerly part of a broadly defined *Linaria*. The American spp are separated on the basis of "the corolla with the abaxial lip greatly exceeding the adaxial lip; the palate weakly developed & scarcely occluding the tube; the spur very slender or absent & the prismatic seeds with 4-7 longitudinal ridges." (Sutton 1988 in Weakley 2011).

DA Sutton, 1988. A revision of the tribe *Antirrhineae*. British Museum (Natural History), Oxford Univ Press, London.

Nuttallanthus canadensis (Linnaeus) DA Sutton *OH COMMON TOADFLAX, aka ANNUAL TOADFLAX, BLUE TOADFLAX, CANADA TOADFLAX, OLD FIELD TOAD FLAX, (*canadensis -is -e* (kan-a-DEN-sis) of or from Canada or the north-east USA, of Canadian origin.)

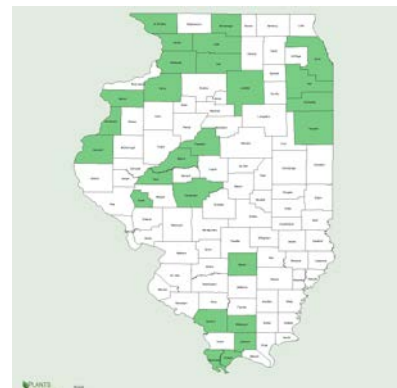
Habitat: Dry prairies, sandy soils, & sandy old fields. In Michigan, “dry, open, sandy or rocky ± barren ground; oak and sassafras savanna and jack pine plains; beds of dried lakes” (rvw11). In the se USA, “in a wide variety of natural & disturbed habitats, especially common & weedy in disturbed sites such as roadsides & fields, also common & apparently native in thin soil of rock outcrops; common” (w11). Open sandy areas where there is moisture in the spring. distribution/range:

Culture: ① Seeds germinate after about 60 days of cold moist stratification (he99).

Description: Erect annual/biennial, 1-2', violet-purple flowers. key

features: “Surprisingly frequently misidentified in herbaria as *Lobelia kalmii*, with which it shares narrow leaves and blue bilaterally symmetrical flowers, but not habitat, superior ovary, spurred corolla, absence of milky juice, or other characters” (rvw11).

Comments: status: Endangered in Ohio. Some authorities feel this sp is aggressive or invasive in some applications or in some parts of its range (SWSS 1998). phenology: Blooms 5-9. Collect seeds in se Wisconsin in September (he99). “Common in Sugar River sand area & occasional in sandy places elsewhere as below New Milford on Kishwaukee River.” (ewf55)



VHFS: Formerly *Linaria canadensis* (Linnaeus) Dumont. Originally published by Linnaeus as *Antirrhinum canadense*. (Collected by Kalm? near Philadelphia.) [*Antirrhinum canadense* L, *Nuttallanthus canadensis* (Linnaeus) DA Sutton]



Nuttallanthus canadensis

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

PENSTEMON Mitchell 1769 *or (Schmidel) **BEARD-TONGUE, PENSTEMON** *Plantaginaceae* *Penstemon* (pen-STAY-mon, commonly pen-STUH-mon) from Greek *pente*, *penta*, five & *stēmōn*, warp, thread, or a stamen, for the 5 stamens, or a reference to the fifth stamen, the staminode. Stamen is akin to Old Irish *sessam* act of standing, Sanskrit *sthāman* station, Greek *histanai* to cause to stand; basic meaning is standing upright. BEARDTONGUE is a reference to the sterile stamen having a tuft of hair. In Jepson eFlora, it is listed as Latin & Greek: **almost thread, from stamen-like staminode**. A genus of about 250 spp of perennial herbs & shrubs, of western North America, eastern north America, & one sp in Asia. Fruit is a capsule, septicidal & sometimes also loculicidal at tip, with many, tiny, irregularly angled seeds. This is the largest genus endemic to the United States. The genus was formerly part of the broadly defined *Scrophulariaceae*. Most spp readily self-sow. Cut flowers, dried flowers, & landscaping. Attracts hummingbirds. x = 8?

Culture: Light, moist cold stratify 30 days or dormant seed, cool soils, division. “Moist cold treatment, or fall sow. Germinates better on cooler soils. Sow early spring or late fall. Light cover, very good germination.” (mfd93)

Seeds mature midsummer to fall. Easy from cold moist stratified seed with shallow sand cover (light). The genus is notoriously polygamous, with hybrids common. Easy in containers. Code B, H. 2-4 node soft or semi-hard wood cuttings (not hollow) root easily. (cu00)

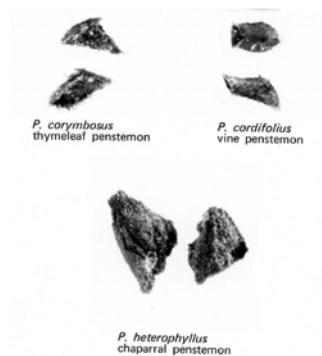


Photo USDA-NRCS PLANTS Database - Not copyrighted image.

Penstemon calycosus Small *MI CALICO BEARDTONGUE, aka EASTERN BEARDTONGUE, LONGSEPAL BEARDTONGUE, SMOOTH BEARDTONGUE, (*calycosus* -a -um with a large or remarkable calyx, from Latin *calyx*, Greek κάλυξ, *kalyx*, outer covering of a fruit, flower, or bud, & -osus -a -um, plentitude or notable development.) FACU

Habitat: Woodland slopes with sparse vegetation, woodland edges, advancing woodland fringes, woods, meadows, & rocky slopes. In Michigan, “Fields and openings, apparently very rare in Michigan” (rvw11). In the se USA, limestone ledges, other woodlands (w08). distribution/range: Northern Illinois is at the northwest limit of this sp range (plants.usda.gov maps it from Minnesota).

Culture: ①30 days cold moist stratification. Seeds germinate most successfully in cool soil. (pm09, 11, 15) ②Cold moist stratify 30 days (Wade nd). ③Fall plant or cold stratify at 40°F for 1 to 2 month for best results. Then sow just below soil surface at 50°F & water. (ew11) 1,440,000 (pm02, jfn04), 1,472,000 (ew11), 1,600,000 (aes10), 1,856,851 (gna04), 2,172,249 (gnhm13) seeds per pound.

cultivation: Space plants 1.0-1.5'. Full sun to woodlands.

bottom line: Field establish by dormant seeding only, dormancy typically 64-83%. Germ 12, 12, 12, sd 5.4, r4.0-21 (17)%. Dorm 72.8, 72, na, sd 7.1, r64-83 (19)%. Test 36, 34, 34, r26-49 days.**

Description: Erect perennial, to 4', flowers tinged with purple (pink) & anthers glabrous, flowers 5-merous.

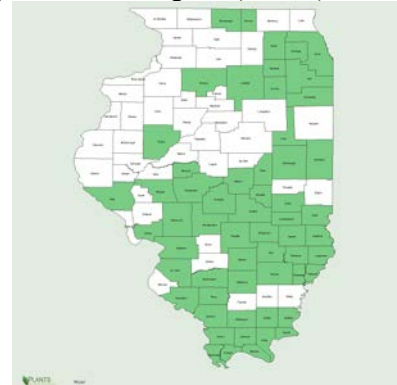
key features: “Anthers are without hairs on the backs.” (Ilpin) “The corolla tends more often to pink-violet in this species than in the normally white *P. digitalis*” (rvw11).

Comments: status: Threatened in Michigan. phenology: Blooms 5-7. C3. Attractive cut flowers & interesting dried seed heads. Useful in landscaping, specimen plantings, shade gardens, & rain gardens. Seed source nursery production, genetic source Shaw Station, Lee Co.

“This resembles *P. digitalis* in looks & in its weedy nature. The flower is purplish & its calyx lobes are attenuate. Uncommon in the low prairies in Coon Creek bottom east of Seward Bluff Forest Preserve.” (ewf55)

Associates: Attracts butterflies & hummingbirds. Larval host of *Poladryas minuta* DOTTED CHECKERSPOT, & attracts a variety of moths. Many beneficial insects are attracted to its nectar. Reported as deer resistant.

VHFS: *Penstemon digitalis* & *P. calycosus* are sometimes merged into the more southeastern *P. laevigatus* Aiton.



Penstemon calycosus

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

Penstemon cobaea Nuttall SHOWY BEARDTONGUE, aka COBEA BEARDTONGUE, FALSE FOXGLOVE, LARGE-FLOWERED BEARDTONGUE, LARGE-FLOWERWED PENSTEMON, PRAIRIE BEARDTONGUE, PRAIRIE PENSTEMON, RED BEARDTONGUE, WILD FOXGLOVE, (*cobaea* New Latin, irregular from Bernabé *Cobo*, died 1657, Spanish naturalist)

Habitat: Flat, dry meadows. Dry mesic & dry prairies & savannas. distribution/range: Known from Kane Co, native south & west of Illinois.

Culture: ①30 days cold moist stratification (pm09, 11). ②Germination best with cold moist stratification (lbjwc). ③No pretreatment needed. Sow seeds on the soil surface at 45°F & water. Slow to germinate. (ew11) 192,000 (pm02, ew11, aes10), 1,075,200 (wns01) seeds per pound.

cultivation: Space plants 1.25-1.5'. Calcareous or sandy loam; rocky, sandy, limestone-based, sandy loam, medium loam, clay loam, clay (lbj).

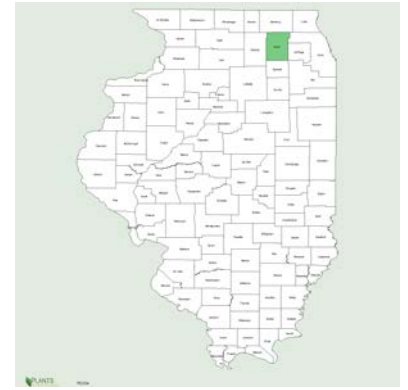
greenhouse & garden: Easily grown from seed. Blooms second year from seed.

Description: Erect perennial, 1.0-2.0', lower leaves dead by flowering, flowers white to pink (purple) with dark purple lines, showy tubular; **key features:**

Comments: **status:** **phenology:** Blooms 6. C3. Collect seed in summer when capsules are brown & seeds black. May go dormant during the summer.

Associates: Attracts a variety of moths & nectar insects. Attracts butterflies & hummingbirds. Larval host for *Poladryas minuta* DOTTED CHECKERSPOT. Reported as deer resistant.

VHFS:



Penstemon cobaea

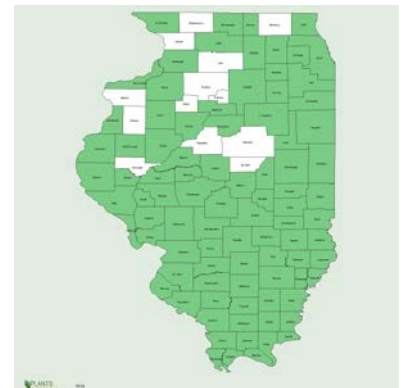
Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

Penstemon digitalis Nuttall ex Sims *RI FOXGLOVE BEARD TONGUE, aka FALSE FOXGLOVE, MISSISSIPPI PENSTEMON, TALL BEARD-TONGUE, TALL WHITE BEARDTONGUE, TALUS SLOPE PENSTEMON, WHITE BEARDTONGUE, (*digitalis -is -e* Latin *digitalis*, pertaining to a finger, or digit, from Latin *digitus*, for the shape of the corolla resembling the finger of a glove.) fac-

Habitat: Mesic & dry prairies, mesic savannas, & open woods, ecologically tolerant sand sp, sandy soils, mesophytic woods, mesic sand prairie, disturbed sand ground. Woodland borders, meadows & sparsely vegetated wooded slopes. In Michigan, "Fields, meadows, and prairie remnants; openings in dry savannas (oak, aspen), along roadsides and railroad beds. Perhaps only adventive northward." (rvw11) **distribution/range:** This sp may have originally been native to the Mississippi River basin. Apparently, this sp is invading Wisconsin from the south (*revenge of the flatlanders*). What global warming?

Culture: ①30 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. Seeds germinate most successfully in cool soil (pm09, 15). ②Seeds germinate after about 30 days of cold moist stratification. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (he99) ③"30 days moist stratification required for germination. Field sow fall." (pnnd) ④Germination is best with cold moist stratification & light (lbj). ⑤No pretreatment needed. Sow seeds on the soil surface at 45°F & water. Slow to germinate. (ew11) Growth rate moderate. Seedling vigor medium. Vegetative spread rate moderate. 400,000 (usda, ecs), 1,299,000 (wns01), 1,600,000 (pn02), 1,692,164 (gnh02), 1,714,000 (gn), 1,736,138 (gna06), 1,763,107 (gnh02), 1,840,000 (jfn04), 1,968,000 (ew11), 1,919,662 (gna04), 1,965,368 (gnasr06), 2,080,000 (pm01), 2,880,000 (aes10), (4,536,000?) seeds per pound. *P digitalis* "Husker Red" 1,299,200 (wns01) seeds per pound.

asexual propagation: Softwood cuttings & root division.



cultivation: Space plants 1.0-2.0'. Fertile, well drained loams, clay loams, & sandy soils. Tolerates clay soils. Anaerobic tolerance low, but tolerates periodic wet feet. CaCO₃ tolerance low. Drought tolerance high. Fertility requirement medium. Salinity tolerance medium. Shade tolerant, to medium shade. pH 5.5-7.0. Said to prefer acidic soils but will tolerate lime. Does best in rich, moist soils in light shade to full sun. Plant with *Echinacea pallida* & *purpurea*, *Heliopsis helianthoides*, *Liatris aspera*, *Liatris pycnostachya*, *Monarda fistulosa*, *Pycnanthemum virginianum*, & ...

bottom line: Field establishment by dormant seeding is best, seed is significantly to strongly dormant. Germ 16.8, 14, 14, sd 13.5, r3.0-50 (47)%. Dorm 64.6, 70.5, 71, sd 16, r33-83 (50)%. Test 40, 35, na, r27-52 days. (#19)**

greenhouse & garden: Easy by successional restoration method in winter on open soils. Light, dry storage (180 days), easy from seed or transplants.

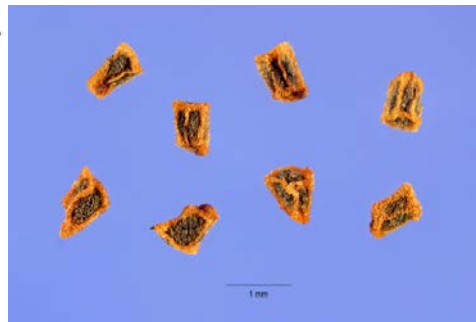
Description: Erect, herbaceous, perennial, native forb; 2.0-4.0'; basal foliage semi-evergreen; flowers white, (& anthers with stiff hairs on back), 5-merous; key features: Flowers white, throat open with a flat base (fh). "Stems are typically glabrous, often glaucous or purplish; corolla is usually marked with purple lines within." (Ilpin) "The corolla is white or creamy, usually ± lined or tinged with light pink-violet. The inflorescence is usually ± densely glandular-pubescent." (rvw11)

Comments: status: Special Concern in Rhode Island. phenology: Blooms 5,6,7. C3. In northern Illinois, collect seeds in late August through October. Collect seeds in se Wisconsin in September (he99). Flowers in pairs from upper leaf axils, & have purple bee 'guidelines' in the throat. This sp may be early successional & short lived in plantings. Landscaping, savanna gardens, pollinator gardens, rain gardens, & swales. Attractive cut flower & dried seed heads. The dried seed heads & seeds have the aroma of toe jam or aged belly button lint. Makes you want to give a nice dried arrangement to your mother-in-law or boss. Seed source, nursery production plots, genetic sources Shaw Station, Lee Co, Ogle, Bureau, & Peoria cos.

"Rather frequent on low prairies in Grove Creek bottom, the Searle Tract & in a thicket in Coon Creek bottom, in Rockton Township." (ewf55)

Associates: Pollinator friendly. Pollinated by bees (long-tongued bees), including honeybees, bumblebees, Miner bees, & Mason bees. Attracts bumblebees & hummingbirds. Butterfly nectar source. Reported as deer resistant.

VHFS: *Penstemon digitalis* & *P calycosus* are sometimes merged into the more southeastern *P laevigatus* Aiton. [*Penstemon laevigatus* Ait ssp *digitalis* (Nutt ex Sims) Bennett; *P l* Ait var *angulatus* Bennett]





Penstemon digitalis

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Second line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS Wetland flora: Field office illustrated guide to plant spp. Not copyrighted image. Illinois map courtesy plants.usda.gov.

Penstemon gracilis Nuttall *IA, MI SLENDER PENSTEMON, aka LILAC BEARDTONGUE, LILAC PENSTEMON, SLENDER BEARD-TONGUE, (*gracilis* -ie -e slender, gracefully slight in form.)

Habitat: Dry & dry mesic prairies. Sandy soils. Full to partial sun, dry soils, often sandy or gravelly; prairies, inland sands, & woods. In Michigan, “Rocky ledges and oak savanna along the Menominee River in Dickinson Co where collected by D Henson in 1989” (rvw11).

distribution/range: Known from Wisconsin & Indiana (2 cos). Known from one site in Kane Co, Illinois where it grows in an old cattle yard in cinders.

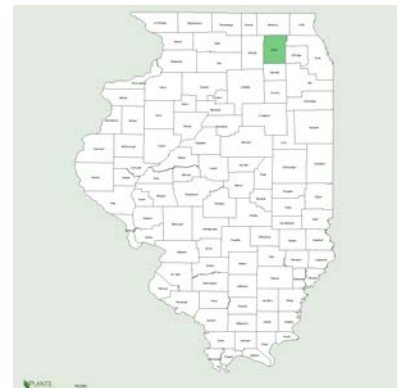
Culture: ①Seeds germinate after about 30 days of cold moist stratification. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (he99) ②“30 days moist stratification required for germination. Field sow fall.” (pnnd) ③Germination is best with cold moist stratification (lbj). 3,200,000 (pn02), 9,600,000 (pm02) seeds per pound.

Description: Erect perennial forb, 0.67-2.0’, leaves narrow, flowers lavender; key features: ①Flowers pale purple, throat open with a flat base (fh). ②“Sp has pubescent stems, corolla is open throated (llpin).

Comments: status: Threatened in Iowa. Endangered in Michigan. phenology: Blooms 6-7. C3. Collect seeds in se Wisconsin in August - September (he99).

Associates: Attracts hummingbirds.

VHFS: Illinois plants are variety *wisconsinensis* (Pennell) Fassett.





Penstemon gracilis

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

Penstemon grandiflorus *IL LARGE-FLOWERED BEARD TONGUE, aka CANTERBURY BELLS, LARGE BEARD TONGUE, LARGE-FLOWERED PENSTEMON, PINK BEARDTONGUE, SHELL-LEAF BEARDTONGUE, SHELL-LEAF PENSTEMON, SHOWY BEARDTONGUE, WILD FOXGLOVE, (*grandiflorus -a -um* large-flowered, with flowers larger than normal, New Latin, from *grandis*, full-grown, great, large, tall, *-i-*, & *floreo*, I bloom, I flower.) upl

Habitat: Open sand prairies. Sandy woodlands or plains. Dolomite prairie knob in Winnebago Co. distribution/range: In Illinois, Henderson, McHenry, Whiteside, & Winnebago cos. Northern Illinois is at the southeast limit of the sp range. Adventive in Michigan.

Culture: ①30 days cold moist stratification. Seeds germinate most successfully in cool soil (pm009). ②Seeds germinate after about 30 days of cold moist stratification. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (he99) ③“30 days moist stratification required for germination. Field sow fall.” (pnnd).

④Germination is best from cold-moist stratification (lbcwc). ⑤*P grandiflorus* seeds are best sown in the fall or spring in a greenhouse. The seeds should germinate within one to four months (Heuser 1997). ⑥No pretreatment needed. Sow seeds on the soil surface at 45°F & water. Slow to germinate. (ew11) ⑦Dry storage 70° 180 days (nd91). ⑧Sow in fall or cold stratify (pots). ⑨Seeds exhibit physiological dormancy. Seeds are placed in cold moist stratification for 105 days. Germination occurs at 33°C day/19°C night alternating temperature cycle. (bb02) 176,000 (sh94), 224,000 (pm20, ew11), 235,172 (gna11), 240,000 (aes10), 250,207 (gna06), 251,663 (gnh14), 273,000 (stocks), 292,055 (gna04), 550,000 (gran)! seeds per pound. Plant 4.5 oz per 1,000 ft sq (stocks). Pure stand plant 5 lb per acre. (gran).

asexual propagation: “Stem tip cuttings should be taken from the tips of healthy, non-flowering, semi-mature or mature shoots, between early summer & fall. Shoots can be cut into a number of usable sections at almost any time during the growing period.” (Heuser 1997)

cultivation: Space plants 1.0-2.0'. Moderate water requirements. Sp is drought tolerant, but fruits & seeds will abort in extended droughts (2012). Full sun to part shade. Likes well drained soils performing best in sandy soils. Moderately coarse to moderately fine soils. Neutral soils. According to the USDA Plant Guide, this sp prefers acid, neutral, & alkaline soils.

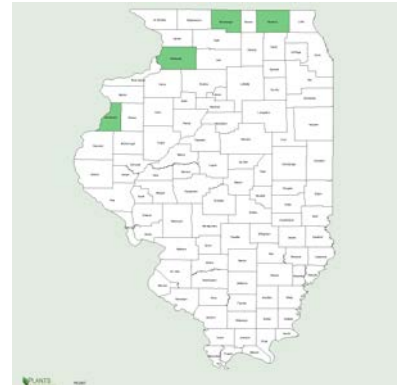
bottom line: Field establishment by dormant seeding is best, seed is significantly to strongly dormant, 35-84% dormant. Germ 19.9, 7.0, 21, sd 23.2, r1.0-72 (71)%. Dorm 63.6, 66, 66, sd 23.3, r25-91 (66)%. Test 37, 35, 35, r27-48 days. (#9).**

greenhouse & garden: Easily grown from seed.

Description: Native erect perennial, 2.0-4.0', with spectacular, showy, short-lived, lavender (purple) to pink tubular flowers, occasionally white, leaves prominent, opposite, gray-green, rounded, fleshy, with a waxy surface.

key features: ①Flowers pink, to 2" long, leaves waxy looking (fh). ②“Leaves clasping or perfoliate; glabrous” (Ilpin).

Comments: status: Endangered in Illinois. phenology: Blooms 5,6, late May to June. C3. In northern Illinois, collect seeds in August - September. Collect seeds in se Wisconsin in September - October (he99).



This is among the most impressive native flowers in northern Illinois. Very showy in large colonies, but the show is short lived, usually lasting about 1 week. A candle in the wind. Attractive cut flowers, but cut in early bloom. The large flowers are followed by attractive dried seed heads, often with curved stems, that are excellent in dried arrangements. The ripe seed heads crack open & most of the seeds will shake out. This sp forms buds near the soil surface, which are harmed by prairie fires, & growing new buds taxes the plant's resources. In its native habitat, fuel densities are often too low to carry a heavy fire. Short lived, but abundantly self sows in open, sandy ground. Seed source nursery production, genetic source Winnebago Co. Associates: Attracts butterflies & hummingbirds. Reported to be deer resistant.

ethnobotany:

CC Baskin & JM Baskin, 2002. Propagation protocol for production of container *Penstemon grandiflorus* Nutt plants; University of Ky, Lexington, Ky. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 29 March 2011). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

CW Heuser, 1997. *The complete book of plant propagation*. The Taunton Press, Newtown, Connecticut.



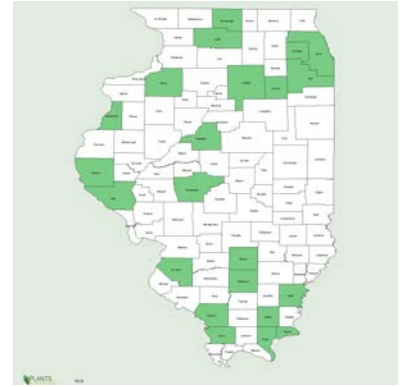
Penstemon grandiflorus

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov.

Penstemon hirsutus (Linnaeus) Willdenow *WI HAIRY BEARD TONGUE, aka, DWARF HAIRY PENSTEMON, NORTHEASTERN BEARDTONGUE, (*hirsutus* -a -um (hir-SOO-tus) hirsute, hairy, covered with hair, with straight hairs, having long distinct hairs, rough, stiffly hairy, from Latin for rough, shaggy, bristly, prickly, hirsute, or rude, unpolished.)

Habitat: Hill, dry, & sand or gravel prairies, dry savannas, & dry woodland openings. Wooded slopes near streams. Thin shallow soils over dolomite & dry wooded slopes. Dry woods, rocky fields, & bluffs; thin well-drained soils. In Michigan, “Sandy, barren, open, usually dry ground, including prairies, oak savanna and borders, fields, roadsides; stream and river banks, rocky ground” (rvw11). distribution/range:

Culture: ①60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. Seeds germinate most successfully in cool soil (pm09). ②Seeds germinate after about 30 days of cold moist stratification. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (he99) ③Germination best from cold-moist stratification (lbj). ④No pretreatment needed. Sow seeds just below the soil surface at 40°F & water. Slow to germinate. (ew11) ⑤Seeds exhibit physiological dormancy. Seeds are cold stratified & germinate at 20/10°C. (bb02) Cold moist stratify 30 days, cool soils. 800,000 (ew11), 2,000,000 (jfn04), 3,200,000 (aes10, shirley), 3,968,000 (pm11), 4,403,883 (gnhn13), 5,604,938 (gnh02), 6,013,245 (gnam11) seeds per pound.



cultivation: Space plants 1.25-1.5'. Full sun to partial shade, mesic to dry soils. Clay soil tolerant. Drought tolerant.

bottom line: 80% of lots require dormant seeding, ranging 56-88% dormant. Germ 23.7, 13, na, sd 17, r9.0-54 (45)%. Dorm 61.7, 62.5, na, sd 24, r20-88 (68)%. Test 38, 36, na, r27-51 days. (#5).**

Description: Erect perennial, 2(3)', stems conspicuously hairy, flowers violet-purple (blue/violet, red/pink), key features: Flowers purple, throat almost closed by the arching lower lobe (Freck). “Stems with glandular hairs; lower lip of flower nearly closing off the throat” (Ilpin).

Comments: status: Special Concern in Wisconsin. phenology: Blooms 6-7. C3. Collect seeds in se Wisconsin in August (he99). Landscaping, rock gardens, dry prairie gardens, dry pollinator gardens & xeriscaping. Seed source nursery remnants & plantings, genetic source Pine Rock Twp, Ogle Co.

“Not as common as *P pallidus*. Gravel hills south of Roscoe & west of Rockton; the high bluff of Killbuck Creek in the Forest preserve. Usually plentiful when found.” (ewf55)

Associates: Pollinator friendly. Butterfly nectar plant. Attracts butterflies, moths, & hummingbirds. Larval food source pre- & post-hibernation for *Euphydryas phaeton* BALTIMORE CHECKERSPOT BUTTERFLY.

Reported as deer resistant.

VHFS: A white-flowered form has been called *f albiflorus* Farw.

CC Baskin & JM Baskin, 2002. Propagation protocol for production of container *Penstemon hirsutus* (L) Willd. plants; University of Kentucky, Lexington, KY. In: Native Plant Network. URL:

<http://www.nativeplantnetwork.org> (accessed 29 March 2011). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.



Penstemon hirsutus

Penstemon pallidus Small *WI PALE BEARD TONGUE, aka EASTERN WHITE BEARD-TONGUE, (*pallidus* -a -um, green(?), pale, wane, pallid, somewhat pallid, somewhat pale, causing paleness, from Latin *pallidus*, from *pallere* to be pale, from Greek *polios* gray, cognate Sanskrit *palita* gray, hoary, Old Slavic *plavu*, white.) upl

Habitat: Hill, dry, & sand prairies, dry sandy savannas, & limestone barrens. Rocky open woods; dry woods & fields. "In Michigan, "Like most of our species in this genus, found in dry fields and along roadsides" (rvw11). distribution/range:

Culture: ①60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ②30 days cold moist stratification. Seeds germinate after a period of cold, moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (pm11) ③Seeds germinate after about 30 days of cold moist stratification. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (he99)

④Germination is best with cold moist stratification (lbj). ⑤Fall plant or cold stratify at 40°F for 1 to 2 month for best results. Then sow just below soil surface at 50°F & water. (ew11) 2,759,878 (gna06), 2,880,000 (pm02, ew11), 3,200,000 (sh94), 5,044,444 (gnhm11), seeds per pound.

Penstemon pallidus Dry calcareous prairie. Blooms late May, early June; WHITE. Harvest August-September. 14"; method #1, SEEDLING TRANSPLANT. Seed small, but plants do well, blooming 2nd year." (rs ma)

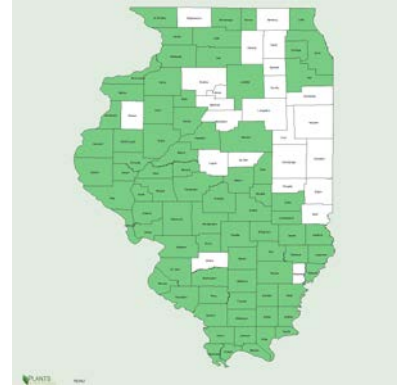
cultivation: Space plants 0.33-0.67'. Full sun to partial shade, dry soils. Needs soils with sharp internal drainage & short, well-behaved neighbors.

bottom line: Spring plant works most years, but one of 3 lots strongly dormant (>70%). Germ 38.5, 35.5, na, sd 14.6, r6.0-82, (76)%. Dorm 36.5, 35.5, na, sd 30.3, r4.0-79 (75)%. Test 37, 35, 31, r31-47 days.**

Description: Erect perennial, 0.75-1.25(2.0)', leaves very narrow, flowers white, or cream to light blue with fine purple "(bee)lines in the throat, 5-merous. key features: Plant hairy throughout; flower throat open & flat; dry habitat (fh). "Stems with short hairs; throat of corolla flattened (Ilpin).

Comments: status: Special Concern in Wisconsin. phenology: Blooms 5,6. C3. In northern Illinois, collect seeds in July - early October. Collect seeds in se Wisconsin in August - September (he99). "Common on prairies, railroads & in sandy places. C & NW Ry east of Rockford & Sandy Hollow road south of Rockford." (ewf55)

Associates: Attracts butterflies & hummingbirds. Pollinated by bees. Reported as deer resistant.





Penstemon pallidus

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

Penstemon tenuiflorus Pennell EASTERN WHITE BEARDTONGUE, aka EASTERN WHITEFLOWER BEARDTONGUE, (*tenuiflorus*-a -um with slender flowers, from Latin *tenuis*, thin, slender, or narrow, & *flos*, flower.) distribution/range: Native south of Illinois. ☉30 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09).

Penstemon tubaeformis Nuttall *IN, OH, TN TUBE BEARDTONGUE, aka BEARDTONGUE, SMALL-FLOWERED BEARDTONGUE, TUBE PENSTEMON, WESTERN BEAD TONGUE, WHITE WAND BEARDTONGUE, (*tubaeformis* -a -um with trumpet-like flowers.)

Habitat: Remnant prairies. Dry prairies, limestone glades.

distribution/range: Rare in the north ½ Illinois. Considered introduced in Wisconsin.

Culture: ☉30 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09, 11, 15). 1,280,000 (aes10) seeds per pound.

cultivation: Space plants 1.0-1.5'. Full sun to partial shade, mesic to dry soils.

Description: Erect perennial; 1.0-3.5'; stem smooth below the inflorescence; flower white, 0.5-1.0" long, tubular, 5-merous; key

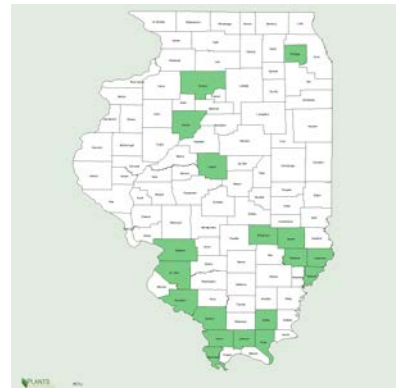
features: Flower lips similar (fh). "The throat of corolla is internally covered with minute glandular hairs" (Ilpin).

Comments: status: Extirpated in Indiana. Presumed Extirpated in Ohio. Special Concern in Tennessee.

phenology: Blooms 5-6. C3. Useful in landscaping, massed plantings, formal beds.

Associates: Attracts butterflies & hummingbirds. Reported as deer resistant.

VHFS: Also seen as *P tubiflorus*.



Penstemon tubiflorus

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

PLANTAGO Linnaeus 1753 **Plantain** *Plantaginaceae* *Plantago* New Latin *plantago*, *plantaginis*, from Latin, *planta*, *plantae*, cutting, heel, young shoot detached for propagation; seedling, young plant; alternately sole (of foot), (esp. as placed on ground in standing or treading), foot; feminine termination of *planta*, from classical Latin *platinem*, for the way the leaves of some spp lie flat on the ground, cognate (?) with French *plantain*. A genus of about 250 (270) spp of herbaceous annuals & perennials worldwide, fruit is a capsule, circumscissile ± at or below the middle, with 2-many seeds, gelatinous when wet.

“The native or introduced status of many of our spp is uncertain or controversial.” (w08)

All PLANTAIN species are noxious in Alaska, Connecticut, Mississippi, & the state of Washington.

Plantago aristata Michaux *NOX AK BRACTED PLANTAIN, aka BOTTLEBRUSH INDIANWHEAT, BUCK-HORN, BUCKHORN, BUCKHORN PLANTAIN, LARGE BRACT PLANTAIN, LARGE BRACTED PLANTAIN, MANG BAO CHE QIAN, *TRANCHAGEM-BRACTEADA*, *TRANSAGEM-BRACTEADA*, (*aristatus -a -um* aristate, awned (like heads of wheat), bearded, a long bristlelike tip, with bearded awns like the ear of Barley, from Latin *arista*, noun, the beard of an ear of grain, corn silk; ear of grain or corn, & *-atus*, adjective, possessive of or likeness of something; corn refers wheat or other small cereals.)

Habitat: In Michigan, “Sandy fields, hillsides, and dunes; disturbed ground including railroads, roadsides, and gravel pits” (rvw11). distribution/range: “Though sometimes occurring in dry prairie remnants, perhaps not native quite as far east as Michigan; the first Michigan collections are from 1885 (Ingham Co.), 1892 (St. Clair Co.), and 1896 (Kent Co.)” (rvw11)

Culture: propagation:

Description: flowers white/green; $N 2n = 20$. key features: “Very depauperate plants with shorter bracts than usual may be confused with *P patagonica* and *P virginica*, but the bracts are still more prolonged and the pubescence is not densely silky (unlike *P patagonica*), the corolla lobes are spreading (unlike *P virginica*)” (rvw11).

Comments: status: Noxious weed in Arkansas. Sp is considered weedy or aggressive in parts of its range or in certain applications (Assorted authors. 200_. State noxious weed lists for 46 states, SWSS 1998).

phenology: Blooms 4-10.

“Other common plants, which presented themselves at different places on our route through the prairies.” *Plantago aristata* Michx. (Short 1845).

“Common in waste places & on roads & railroads.” (ewf55)

Associates: Sp is of minor food value to large mammals & terrestrial birds.

ethnobotany:

VHFS:



Plantago aristata

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov.

Plantago cordata Lam. “Other common plants, which presented themselves at different places on our route through the prairies” (Short 1845).

Plantago lanceolata Linnaeus BUCKHORN PLANTAIN, aka BUCKHORN, ENGLISH PLANTAIN, LANCELEAF INDIANWHEAT, LANCELEAF PLANTAIN, *LÍNGUA-DE-OVELHA*, *LINGUA DI CANE*, *LLANTÉN*, *LLANTÉN MENOR*, *PLANTAIN MINORE*, NARROWLEAF PLANTAIN, PETIT PLANTAIN, *PLANTAGGINE LANCIUOLA*, RIB-GRASS, RIBWORT, (*lanceolatus -a -um* (lan-kee-o-LAH-tus) lanceolate, spear-shaped, lancelet-like in form, New Latin from *lancea*, lance or spear, *-ola-*, *-olus-*, diminutive, & *-atus*, possessive of or likeness of, for the lanceolate leaves.)

Weed of waste places, lawns, & roadsides. In Michigan, “disturbed ground everywhere: roadsides, railroads, parking lots, gravel pits, farmyards, filled land; lawns and fields; borders and clearings in forests and pine plantations; shores and river banks” (rvw11). Native of Europe (Eurasia).

①Sow at 20°C (68°F), if no germ in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn).

Perennial short hairy; from a stout caudex, taprooted; N 2n = 12, 24, 96.

Note the description in <http://michiganflora.net/species.aspx?id=1965>

“Common in yards & pastures & on roadsides.” (ewf55)

Plantago major Linnaeus PLANTAIN, aka *BREITWEGERICH*, BROADLEAF PLANTAIN, BUCKHORN PLANTAIN, *CINQUENERVIA*, COMMON PLANTAIN, GRAND PLANTAIN, GREAT PLANTAIN, GREATER PLANTAIN, *GROßER WEGERICH*, *LANTANA-MAIOR*, *LLANTEN MAYOR*, *LANTÉN*, *LLANTÉN COMÚN*, WHITEMAN’S FOOT, *Gine’biwuck*, snake-like Ojibwa medicine for inflammation also called *O’mukiki’bug*, frog leaf used as charm, & noted for Omaha-Ponca use for an application to draw out splinter, Densmore (1928) (*major* classically spelled *maior*, greater, larger, larger than the type sp, from Latin *major*, comparative of *magnus*, large, great, high, extensive.) In Michigan. “Disturbed ground, including roadsides and railroads, parking lots, gravel pits and filled land, dumps; moist shores, forests, river banks, floodplains; spreading to mixed forests (including pine, aspen, birch), especially along trails and old roads” (rvw11). Native to Eurasia, now a thoroughly naturalized weed throughout much of the world.

①Sow at 20°C (68°F), if no germ in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn).

Native, erect perennial (in California perennial, rarely annual), generally glabrous except the peduncule; caudex short with fibrous roots; N 2n = 6, 12, 24. key features: “A variable species in habit, size, and foliage. The leaves are usually pubescent on one or both surfaces (more so than in *P rugelii*). The sepals are often broadly rounded and the fruit also shorter than in *P rugelii*, as well as more rotund.” (rvw11).

Blooms April - September. “Much less common than *P rugelii*.” (ewf55)

f rosea (Decne) Prah, with 2–3 leaves on the scape just below the spike. (rvw11).

Plantago patagonica Jacquin *OH WOOLLY PLANTAIN, aka SALT & PEPPER PLANT, WOOLLY (WOOLY) INDIAN WHEAT, upl

Habitat: Disturbed open sands & blowouts. In Michigan, “Sandy roadsides, fields, and open ground; also pine barrens & river banks in oak forests” (rvw11). distribution/range: Native of the eastern USA & Europe. Known from 40 of the lower 48 states. BONAP maps this as adventive in Illinois, Iowa, & Wisconsin. “Like *P aristata*, probably not native quite this far east in North America” (rvw11). Adventive in se USA.

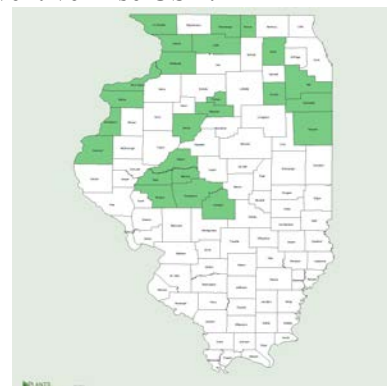
Culture: ①Moist cold stratify. 30 days cold moist stratification (pm09). Native annuals are best dormant seeded!

Description: Native, erect annual (in California perennial, rarely annual), densely hairy; 0.25-1.0’, green flowers; N 2n = 20. key features:

Comments: status: Endangered in Ohio. Sp is considered weedy or aggressive in parts of its range or in certain applications (Stubbendieck et al 1994, Whitson et al 1996). phenology: Blooms 5,6,7. Sp is early successional.

“Rather frequent in Sugar River sand area, on the sandy prairies about Camp Grant & to a less extent on high prairies.” (ewf55) “The silvery white (to tawny) hairs are usually so dense and long as to conceal the surface, and they give the plant a decidedly silky appearance” (rvw11).

VHFS: In Britton & Brown (1913), listed as *Plantago purshii*. [*P purshii* Roem & Schultes]





Plantago patagonica

Inflorescence & seed photo Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted image. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. <http://seedsofsuccess.smugmug.com>. Illinois map courtesy plants.usda.gov.

Plantago rugelii Descaisne PLANTAIN, aka AMERICAN PLANTAIN, BLACK-SEEDED PLANTAIN, BLACKSEED PLANTAIN, BROAD-LEAVED PLANTAIN, PALE PLANTAIN, RED-STALKED PLANTAIN, RUGEL'S PLANTAIN, *TANCHAGEM-AMERICANO*, *TRANSAGEM-AMERICANA*, (*rugelii* for Ferdinand Ignatius Xavier Rugel, 1806–1878, German born botanist and pharmacist.)

Habitat: Disturbed areas & lawns. In Michigan, “Besides the usual disturbed ground (vacant lots, roadsides, parking lots, fields and gardens, lawns, etc.), *P rugelii* inhabits moist shores, floodplains, river banks, forests (especially along trails and in clearings)” (rvw11). distribution/range: Ubiquitous in Illinois. North America east of the Rockies.

Culture: propagation:

Description: Native, erect, perennial forb, 0.25-1.0' tall; roots fibrous; leaves 3-veined, elliptical to oval, stalk base reddish; inflorescence a 0.13-



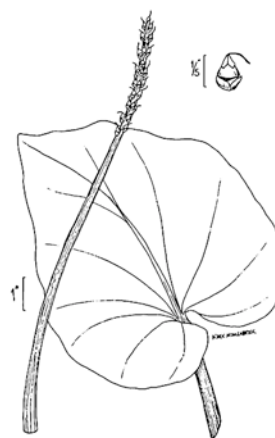
1.0' long, tapering spike less than 0.33" thick; flowers green to white, 4-merous, .0.6" long, leaflike; key features: ①Leaves elliptical to oval, stalk base reddish; floral bracts lance-like to triangular; inflorescence a tapering spike less than 0.33" thick (fh). ②“This species is almost as variable as *P. major* and grows in much the same places except the driest and hardest packed soil. It can usually be reliably distinguished even before the fruit is ripe by the narrow acute bracts and nearly linear sepals, giving the flower a more elongate, streamlined appearance than the chubby ones of *P. major*. (Furthermore, the spikes of robust plants may be as long as 65 cm.) The petioles are nearly always pink to deep red-purple at the base, while in *P. major* they are green or at most a pale pink. The leaves are usually glabrous, sometimes sparsely puberulent, and usually have a few small marginal teeth (though *P. major* may occasionally have teeth and more often a somewhat undulate margin).” (rvw11).

Comments: status: Sp is considered weedy or aggressive in parts of its range or in certain applications (Stubbenieck et al 1994, SWSS 1998). phenology: Blooms June to August. “Our most common sp.” (ewf55)

Associates: **Add larval hosts.**

ethnobotany: Used as medicinal plant by Menominee (sm23). Roots & leaves are alterative, diuretic, & antiseptic (den28).

VHFS: [*Plantago rugelii* Decne var *alterniflora* Farw, *P r* Decne var *aspera* Farw]



Plantago rugelii

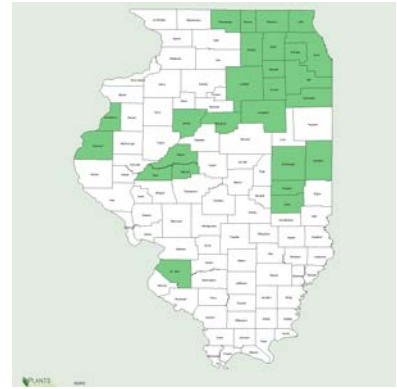
Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Second line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS Wetland flora: Field office illustrated guide to plant spp. Not copyrighted image. Illinois map courtesy plants.usda.gov.

VERONICA Linnaeus 1753 **SPEEDWELL, BIRD'S EYE, GYPSYWEED** *Plantaginaceae* *Veronica* Veron'ica (ver-ON-i-ka) New Latin, probably modification (influenced by the feminine name Veronica) of Late Greek *berenikion*, a plant, from Greek (or Macedonian) Βερενίκη, *Berenikē*, *Pherenikē*, *Berenice*, Latinized to Veronica, after Saint Veronica, who traditionally gave Jesus her veil to wipe his face while on the way to Calvary, in reference to the markings of some spp supposed resemblance to the image of the face of Christ left on the sacred cloth. *Berenike* is said to mean bearer of victory (which is uncertain here, a preserved transcriptional reference to Greek *nike*, victory perhaps), from the folk etymology of Latin *vera*, truth, & Greek εικόνα, *eikona*, image; or Latin *vera icon*, true image. As currently conceived, it is a genus of 180 spp of herbs, nearly cosmopolitan, most diverse in Europe, paraphyletic. The genus was formerly part of the broadly defined *Scrophulariaceae*.

Veronica anagallis-aquatica L *IN, MA, NJ, TN WATER SPEEDWELL, aka BLUE SPEEDWELL, BROOK-PIMPERNEL, GREATER WATER SPEEDWELL, LONG-LEAVED WATER SPEEDWELL, PINK WATER SPEEDWELL, SESSILE WATER-SPEEDWELL, VERONICA, WATER SPEEDWELL, (*anagallis-aquatica* anagal'lis-aqua'tica (an-a-GAL-is -- a-KWA-ti-ka) water-*Anagallis* (Pimpernel, a *Veronica* species), New Latin from *Anagallis* and *aquatica*.)

Habitat: Seeps, springs, muddy borders of ponds, temporary pools of water, & ditches (Hilty) “Occasional on streambanks & in sloughs. Kent Creek bank near the ICRR station in Rockford, slough west of Yale bridge.” (ewf55 as *V connata*) In Michigan, “Wet sandy or muddy shores and ditches, especially in springy places; in

flowing water of streams and rivers as well as on their banks; rarely on floating mats in peatlands” (rvw11). In the se USA, “Bogs, marshes, streamsides, ditches. May-September; July-October. Circumboreal, south in North America to c peninsular FL, TX, and CA; some occurrences probably represent introductions of European material. Some authors interpret *V. anagallis-aquatica* as being non-native in North America. distribution/range: Circumboreal, in most of the USA & southern Canada, except Louisiana, Mississippi, New Hampshire, South Carolina, & maritime Canada. Occasional in ne Illinois, uncommon in central Illinois. “Shallow spring-water, very rare; Bureau & Kane cos” (m14). Known from, but not mapped from Whiteside Co. Some local populations may be introduced Eurasian plants. Sp is also native of Europe & north Asia. BONAP (2010) maps this sp as exotic in North America.



Culture: Propagation: Commercial availability is unknown, it is not seen in the plant trade. Synonymy may confound availability.

cultivation: Full to partial sun, wet to constantly moist, muddy to gravelly soils. Wild plants seem quite vigorous (Little Shop of Horrors, Audrey II, feed me!), sp not for the meek & timid. Sp appears to be cyclical in local drainage ditches. Unicyclic?

bottom line:

Description: biennial/perennial; inflorescence axial racemes; flowers blue, lavender, or violet with purple lines near the base & 2 small protruding stamens; key features: “Mature flower stalks curving backward, lobes longer than the tube; flowers only from upper leaf axils; leaves 1.5-3 times as long as wide, stalkless, mostly clasping (fh).

Comments: status: Threatened in Indiana. Endangered in Massachusetts, New Jersey, & Tennessee.

phenology: Blooms late spring to late summer, June-August. Reproduces vegetatively & sexually.

“Weed” in native plant greenhouse wet beds, starting about 2010. In 2012, this plant appeared in large numbers in our drainage ditch, which is almost one half a mile from the greenhouse.

Associates: Small bees & flower flies seek nectar. Larval host for *Junonia coenia* Buckeye.

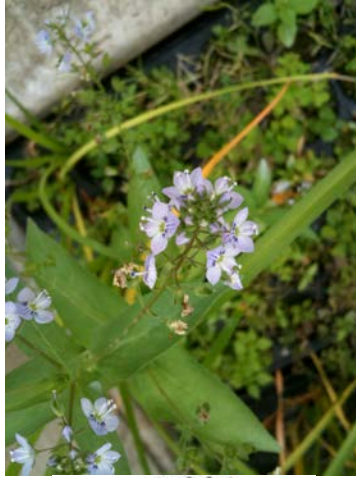
ethnobotany:

VHFS: American plants were formerly segregated as *Veronica catenata* Pennell, with *V anagallis-aquatica* Linnaeus as the European species. As currently defined, our plants are part of a variable, circumboreal species, with native and European elements. Mohlenbrock (2014), mapping only 2 northern Illinois cos, shows a very different species concept is used by some authors. Cf <http://michiganflora.net/species.aspx?id=1971> .

[*Veronica anagallis* L, *V anagallis-aquatica* L var *glandulosa* Farw, *V catenata* Pennell, *V catenata* Pennell var *catenata*, *V c* Pennell var *glandulosa* (Farw) Pennell, *V comosa* auct non K Richt, *V c* K Richt var *glaberrima* (Pennell) B Boivin, *V c* K Richt var *glandulosa* (Farw) B Boivin, *V connata* auct non Raf, *V c* Raf subsp *glaberrima* Pennell, *V c* Raf var *glaberrima* (Pennell) Fassett, *V c* Raf var *typica* Pennell, *V glandifera* Pennell, *V salina* auct non Schur, *V X lackschewitzii* J Keller]

http://www.illinoiswildflowers.info/wetland/plants/wt_speedwell.htm





Veronica anagallis-aquatica, greenhouse weed

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed & capsule photo Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted image. Second line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS Wetland flora: Field office illustrated guide to plant spp. Not copyrighted image. Illinois map courtesy plants.usda.gov.

Veronica arvensis Linnaeus CORN-SPEEDWELL, aka COMMON SPEEDWELL, *FELD-EHRENPREIS*, ROCK SPEEDWELL, *TACHI-INUNOFUGYRI*, *VERONICA ARVENSE*, *VERONICA DEI CAMPI*, *VERÓNICA-VULGAR*, *VERÓNICA-DO-CAMPO*, *VÉRONIQUE DES CHAMPS*, WALL SPEEDWELL, *ZHI LI PO PO NA*, (*arvensis* -is -e (ar-VEN-sis, ar-VEN-see) growing in fields, of cultivated or planted fields, of farmland, from Latin *arvum*, noun, field, cultivated land, plowed land, & *-ensis*, adjective suffix for nouns denoting country or place of origin or habitat.)

“Common & more likely to be in dry sterile or gravelly places.” (ewf55) In Michigan. “along roads and trails, disturbed areas in forests, on shores and rock ledges; in moist fields and gardens; and disturbed ground generally, such as parking lots, vacant lots, roadsides” (rvw11). Native of Eurasia.

Blooms March-June.



Veronica arvensis

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

Veronica chamaedrys Linnaeus GERMANDER SPEEDWELL, AKA BIRD-EYE, *SHI CAN YE PO PO NA*, SPEEDWELL, *VERONICA COMUNE*, (*Chamaedrys* ground oak, Theophrastus' name *χαμαίδρυς*, *khamaidrys*, for a small oak-leaved plant, lit. ground oak, from *χαμαί*, *khamai*, on the ground, & *δρῦς*, *drys*, oak.)

Golf courses & lawns. In Michigan, "Lawns, roadsides, hillside banks, disturbed ground, trails, invading coniferous and deciduous forests" (rvw11). Native of Eurasia.

key features: This species has a more open raceme than *V austriaca*, with the flowers more widely spaced (rvw11).

"An occasional escape which commonly persists as on Kinnikinnick road east at Roscoe at the edge of a woods.' (ewf55)



Veronica chamaedrys

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society.

Veronica connata Rafinesque (revised nomenclature ***Veronica catenata*** Penell (w12)) (*connatus -a -um* born at the same time, united, joined; connate, twin, united congenitally or subsequently, united in pairs at the base, from Latin *connāt-us* born together, twin, past participle of *connāscī*, to be born together, from *con-* together, & *nāscī* to be born.)

Streams & wetlands. distribution/range:

In part synonymous with *Veronica anagallis-aquatica* L Weakley (2011) maintains this as a sp, noting "Circumboreal, the southern limits obscure because of taxonomic confusion, misidentifications, & misattributions."

VHFS: [*V anagallis-aquatica* Linnaeus, *V comosa* Richter, *V salina* Schur, *V connata* Rafinesque var *typica*, *V glandifera* Pennell, *V catenata* Pennell]

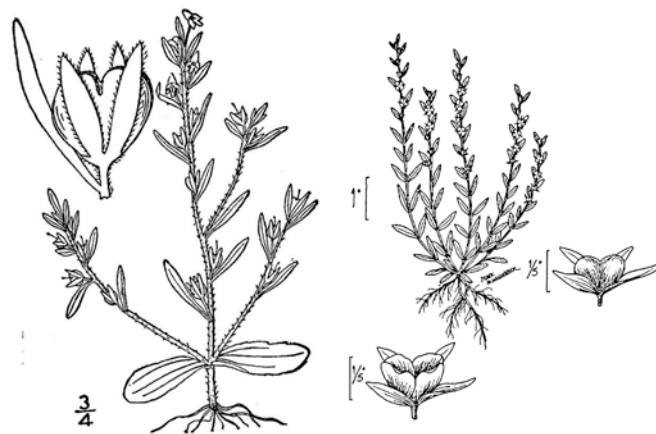
Veronica perigrina Linnaeus COMMON PURSLANE SPEEDWELL, aka AMERICAN SPEEDWELL, *AMERIKANISCHER EHRENPREIS*, *MUSHIKUSA*, NECKLACEWEED, NECKWEED, NECKWEEK, *PILGRIMSVERONIKA*,

PURSLANE SPEEDWELL, SPEEDWELL, *VERONICA PELLIGRINA*, *VERONICA PEREGRINA*, *VERÓNICA*, *VÉRONIQUE ÉTRANGÈRE*, WANDERING SPEEDWELL, *WEN MU CAO*, (*peregrinus -a -um peregrinus* (pe-re-GREE-nus or per-eh-GRY-nus) foreign, exotic, strange; pilgrim. From classical Latin *peregrinus*, adjective, coming from foreign parts, foreign, alien, exotic, concerned with foreigners or aliens; as a noun, foreigner, free resident having no rights of citizenship, in post-classical Latin on a pilgrimage.)

“Common in lawns, gardens & fields, more likely to be in damp places.” (ewf55) In Michigan, “It grows in cultivated fields, flower beds, lawns; moist disturbed ground such as logging trails, gravel pits, shores; on limestone pavements, outcrops, and gravels; open moist swales and streamsides; and disturbed ground” (rvw11). Native to North & South America.

key features: “Frequently confused with *V serpyllifolia* by those not familiar with both. Besides the characters in the key, *V peregrina* usually has nearly linear leaves, somewhat succulent in aspect, in contrast to the broadly rounded, sometimes even orbicular, blades that are usual in *V serpyllifolia*. Furthermore, the latter is perennial. Scattered throughout the state are populations with short gland-tipped hairs on the stem (especially above) and in the inflorescence; these are var *xalapensis* (Kunth) Penne.” (rvw11)

Illinois has the sp & subsp *xalapensis* (Kunth) Pennell, HAIRY PURSLANE SPEEDWELL, *VERONICA-DE-XALAPA*, WESTERN PURSLANE SPEEDWELL.



Veronica peregrina

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Second line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS *Wetland flora: Field office illustrated guide to plant spp.* Not copyrighted image

Veronica serpyllifolia Linnaeus THYMELEAF SPEEDWELL, aka BRIGHTBLUE SPEEDWELL, *MAJVERONIKA*, *KO-TENGU-KUWAGATA*, *QUENDEL-EHRENPREIS*, *TENGU-KUWAGATA*, THYME LEAVED SPEEDWELL, THYME SPEEDWELL, THYME-LEAF SPEEDWELL, *VERONICA A FOGLIE DI SERPILLO*, *VERÓNICA-MIMOSA*, *VÉRONIQUE À FEUILLES DE SERPOLET*, *XIAO PO PO NA*, (*serpyllifolius -a -um* thyme-leaved, with leaves like Wild Thyme, serpyllum-leaved, from Latin *serpyllum*, wild thyme, & *folium*, from Greek σερπυλλος, *serpyllos*.)

“Uncommon in low places usually in grass. Hall Creek bottom, Lovesee place east of Roscoe, Pecatonica River Bottom on the Boswell place east of Shirland, Elmlawn Sanitarium north of Rockford.” (ewf55) In Michigan, “A widespread Eurasian weed, well established in forests (especially along borders, trails, old logging roads, openings, and clearings), meadows, pastures, farmyards, roadsides, and other disturbed ground; fields, lawns, gardens; banks of rivers and streams” (rvw11). Eurasian species, with widespread introduced element, and a rare boreal and western variety *humifusa* (Dickson) Vahl, or separate sp. See Michigan Flora Online for a discussion of the vars. <http://michiganflora.net/species.aspx?id=1985>



Veronica serpyllifolia

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed & capsule photo Jose Hernandez USDA-NRCS PLANTS Database. - Not copyrighted image. Second line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS *Wetland flora: Field office illustrated guide to plant spp.* Not copyrighted image.

VERONICASTRUM Heister ex Fabricius **CULVER'S-ROOT** *Plantaginaceae* tribe *Veroniceae*
Veronicastrum an inferior or wild *Veronica*, New Latin after the genus *Veronica*, which see, named for St. Veronica & *-aster*, *astrum*, denoting an incomplete resemblance, an inferior sort, or wild type; meaning a plant somewhat like *Veronica* or an inferior sort or wild type of *Veronica*. Alternately from *Veronica-ad-instar*. With some spp, *-astrum* occasionally means a star. A genus of 2 (or 20, hmm!) spp, relictually distributed in eastern North America & eastern Asia, tall herbs resembling SPEEDWELLS. The genus was formerly part of the broadly defined *Scrophulariaceae*. C3. Formerly *Leptandra* Nuttall or included in *Veronica* L.

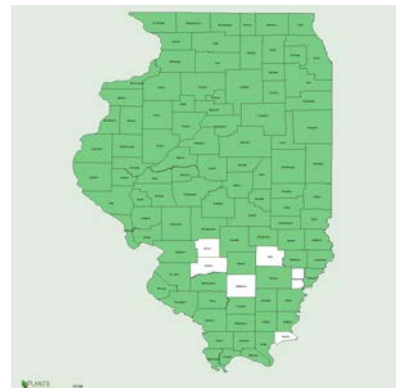
Veronicastrum sibiricum & *virginicum*, sow at 20°C (68°F) in light, if no germination in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks. Do not cover. (tchn)

Veronicastrum virginicum (Linnaeus) Farw *MA, NY, VT **CULVER'S PHYSIC**, aka **BLACKROOT**, **BEAUMONT ROOT**, **BOWMAN'S ROOT**, **BOURMAN'S ROOT**, **CULVER'S ROOT**, *KRANSVERONIKA*, **PHYSIC ROOT**, **OXADADDY**, **TALL SPEEDWELL**, **TALL VERONICA**, **VIRGINIA CULVER'S-ROOT**, *Wi'sugidji'bik*, bitter root (Ojibwa), (*virginicus -a -um* of or from Virginia, USA, Virginian.) The common name is said to be from a Dr. Coulvart, an American physician of the late 17th & early 18th centuries, or a colonial Dr. Culver. fac

Habitat: Wet, mesic, dry, & sand prairies, mesic & dry savanna, woods, & prairies. In Michigan, "Prairie remnants, fens, and meadows; river banks; deciduous savannas (especially with oaks), and adjacent roadsides" (rvw11). In the se USA, "streambanks, bogs, wet meadows, dryish soils in areas with prairie affinities; uncommon (rare in Coastal Plain)" (w12).
distribution/range: Occasional to common through Illinois. In Michigan, "the Isle Royale (Keweenaw Co) occurrence seems likely to be an escape" (rvw11). Beware the wild OXADADDY! Native in North America from the Tallgrass Prairie eastward.

Culture: ①Seeds ripen late summer as the small woody capsules brown. Do not overly dry the pods; dry & clean in a timely fashion. Crush the capsules & clean with a fine screen. *Cullina (2000) notes the seeds are hydrophilic, so store cleaned seed in ziplocks in the refrigerator.* 3-4 weeks cold moist stratification improves germination. Seeds require light. Code B, H*. (cu00)

②No pre-treatment necessary other than cold, dry stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ③No pre-treatment needed. Sowing outdoors in the spring is the easiest method. Seeds need light to break dormancy & germinate. Plant on top of growing media & do not cover. (he99) ④"No pre-treatment needed. Sow seeds on soil surface at 70°F & water. Slow to germinate." (ew12) 4,544,000 (sh94 based on hulls perhaps?, aes10), 7,761,000 (ecs), 11,493,670 (gna04), 11,792,207 (gna07), 12,000,000 (pn02, jfn04), 12,400,000 (ew12), 12,800,000 (pm01), 13,969,230 (gna05), 16,214,285 (gnh03), 16,509,090 (gna04) seeds per pound.



“*Veronicastrum virginicum* Moist to mesic prairie. Blooms early July to early August; WHITE. Harvest October. 3 1/2'; seed tiny, but easy by method #1; SEEDLING TRANSPLANT; reliable in field, but not healthy in nursery. Seeds tiny, but plants grow well, with flowers 2nd year. Attractive.” (rs ma)

asexual propagation: Division of mature clumps in spring. 2-3 node tip cuttings root well in spring
cultivation: Space plants 1.25-1.5' centers. Mesic soils, full sun to partial shade. Clay soil tolerant.

bottom line: Fall seeding is best. Genesis seed tests show 2/3 of all lots tested are significantly to strongly dormant. Ca 10% of lots perform with nondormant seeding. Flipflop species. Germ 17.4, 8.0, 8.0, sd 21.8, r1.0-77 (76)%. Dorm 45.3, 47, 0.0, sd 29.8, r0.0-88 (88)%. Test 37, 37, 29, r23-50 days. (#19).**

greenhouse & garden: The seeds are small & may be difficult to germinate. Once established self-sows.

Description: Erect, herbaceous, perennial, native forb; stems 2.0-6.0'; leaves whorled; flowers white, rarely pinkish; fruits are capsules with tiny seeds; key features: “The stamens and style are strongly exerted and the corolla is usually white, though sometimes pink. “The stamens and style are strongly exerted and the corolla is usually white, though sometimes pink” (rvw11).

Comments: status: Threatened in Massachusetts & New York. Endangered in Vermont. phenology: Blooms 6,7,8. C3. In northern Illinois, collect seeds in September - October. Collect seeds in se Wisconsin in October (he99). Cut flowers & attractive dried seed heads. Landscaping, formal beds, specimen plants, savanna restorations, rain gardens, & shade gardens; very interesting texture. Very impressive in massed, naturalized colonies, with hundreds of white flowery spikes fluidly moving in the wind. The flowers bloom sequentially, from the bottom up, new flowers are being produced at the top while there are flowers in full bloom in the middle, & fertilized flowers at the bottom. Pinkish-white flowered plants are known from a cemetery prairie north of Peoria. 2011 on the farm, some stems are purplish green. Seed source nursery production genetic sources mesic railroad remnants Squaw Grove Twp, DeKalb Co & Gold Twp, west Bureau Co, down by the Green River, where Paradise lay, & a grow out from Chicago Botanic Garden, Cook Co. Weakley (2011) notes in the se USA, “Populations seem to be of somewhat sporadic or irregular appearance from year to year.”

“Other common plants, which presented themselves at different places on our route through the prairies.”

Veronicastrum virginicum as *Leptandra Virginia* (L.) Nutt. (Short 1845).

“Common in wet places particularly low prairies.” (ewf55)

Associates: Pollinator friendly. Pollinated by bees & other *Hymenoptera*. Attracts butterflies, game birds, & ants. Beetles on the flowers 2011.

ethnobotany: Root used as medicinal plant by Ojibwa & Menominee (den28, sm23) Ojibwa physic & medicine for nosebleed & scrofula (den28). Densmore lists as both *Veronica* & *Leptandra*. Rhizome & roots alterative, cholagogue, & cathartic (den28). Herbalists say to dig the root in the fall & store a year before using, the fresh root being too powerful. I say give one of those 28 lbs of seed per acre prairie consultants a fresh chunk of CULVER'S ROOT, & they can use a matchbox for a coffin.

VHFS: Formerly *Leptandra virginica* (Linnaeus) Nutt (Britton & Brown 1913) or *Veronica virginica* Linnaeus. Several other synonyms exist, including *Callistachya* (*Callistachia*) & *Eustachya*. Includes *f villosum* (Raf) Pennell. Eaton (1829) lists a purple flowered variety. Some Asian spp are in the ornamental trade (by most taxonomies, there should only be one Asian sp?).

“*L virginica*, (common also to Japan, or more probably a distinct sp of the same genus. A variety of this plant mentioned by Mr Pursh, Vol 1 p 10 with purple flowers, may perhaps prove distinct. There is another sp called *Veronica Sibirica*, inhabiting Dauria, in which the stamina & the pistillim are double the length of the corolla.” (Nuttall 1818 v1)



Veronicastrum virginicum

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Second line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS *Wetland flora: Field office illustrated guide to plant spp.* Not copyrighted image. Illinois map courtesy plants.usda.gov.

WULFENIA Jacq [**Besseyia** Rydb] **KITTENTAIL** *Wulfenia* honoring Rev Francis Xavier (Xaver) von *Wulfen*, (Baron Franz Xaver von *Wulfen*), Austrian botanist, author, mineralogist, alpinist, mathematics & physics instructor, & Jesuit priest, (1728-1805) (04 in one source). Nicholas Joseph von Jacquin named *Wulfenia* in his honor in 1781. Except for sw94, this is placed in the genus *Besseyia*, which see. The genus was formerly part of the broadly defined *Scrophulariaceae*. Formerly *Synthyris* Benth.

PHRYMACAEA Schauer 1847 **LOPSEED FAMILY** Some recent authors place *Mimulus* Linnaeus in this family.

MIMULUS Linnaeus 1753 **MIMULUS, MONKEY-FLOWER** *Phrymaceae* *Mimulus* (MEE-mew-lus) New Latin, from Late Latin, comic actor, from diminutive of Latin *mimus* an actor, mime, mimic, & *-ulus*, diminutive, from Greek *mimos*, imitator; probably from the flower bud mimicking a mask or monkey's face, or

for the flowers resemblance to one of the grinning masks worn by classical actors; New Latin, from Latin *mimus* mime, from Greek *mimos*, a reference to the flowers are supposedly mimicking to grinning faces by extension, a monkey or an ape; alternately from Greek *mimo*, an ape, for the resemblance of the markings on the seed to the face of a monkey. About 150 spp of American, southern African, & Asian perennial herbs & shrubs having a tubular 5-angled calyx & an irregular 2-lipped corolla. The greatest diversity is in western North America, with only 4 spp east of the Mississippi. The genus was formerly part of the broadly defined *Scrophulariaceae*, where it is maintained by Mohlenbrock (2014).

Seeds ripen mid- to late summer. Seeds germinate very easily. Code A, H. Cuttings & layerings are possible. (cu00)

Mimulus alatus Aiton *CT, IA, MA, MI, NY WINGED MONKEY FLOWER, aka SHARPWING MONKEYFLOWER, WING-STEMMED MONKEY-FLOWER, (*alatus -a -um* winged, or wing-like, from Latin *alatus*, adjective, furnished with wings, winged.)

I'll get you my pretty, & your little dog too!



Habitat: In Michigan, a wetland species more southern in range, not collected in Michigan since 1916 but still extant in adjacent Ontario (rvw11). In the se USA, marshes, bottomlands, & ditches (w12). distribution/range: "Wet ground; common in the s ½ of Illinois, becoming less common in the n ½ (m14).

Culture: propagation: ①(Code C, D Ken Schaal). 19,200,000 (gni) seeds per pound.

②Storage Behaviour: Orthodox. Storage Conditions: 100 % viability following drying to mc's in equilibrium with 15 % RH and freezing for 40 days at -20C at RBG Kew, WP

Germination 100 % germination; ; germination medium = 1% agar; germination conditions = 35/20°C, 8/16;

Material provided by Chicago Botanic Garden (CBG), Illinois, USA. (RBG Kew, WP)

Description: key features:

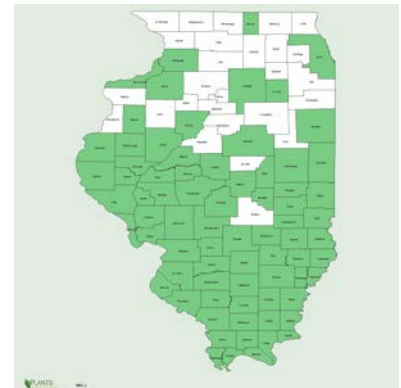
Comments: status: Special Concern in Connecticut. Threatened in Iowa. Endangered in Massachusetts. Probably Extirpated in Michigan. Rare in New York. phenology: Blooms June-September.

Associates:

ethnobotany:

VHFS: An unnamed hybrid with *M ringens* has been collected in Cass Co, Illinois (m14).

[*Mimulus alatus* Aiton, *M a fo alatus*, *M a fo albiflora* House, *M a var chandleri* Farw, *M alatus x ringens*]





Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Second line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS Wetland flora: Field office illustrated guide to plant spp. Not copyrighted image. Photo Robert H Mohlenbrock USDA-NRCS PLANTS Database. - Not copyrighted image. 2nd photo courtesy WD & Dolphia Bransford, Wildflower Center Slide Library. Unrestricted image. Illinois map courtesy plants.usda.gov.

Mimulus glabratus Humboldt, Bonpland, & Kunth (or (Benth) Grant) (Alternate nomenclature **Mimulus glabratus** HBK var **fremontii** (Benth) AL Grant (m14)) *F, IL, IA, MI MONKEY FLOWER, aka JAMES' MONKEY-FLOWER, ROUNDEAF MONKEYFLOWER, YELLOW MONKEYFLOWER, (*glabratus* -a -um somewhat or almost glabrous (destitute of pubescence, hairless (questionable?)).

Wetlands, cool shallow water, spring ponds, in limy soil. In Michigan, "This is a calciphile, growing along marly springs, in cold streams through cedar swamps, on calcareous shores, and in associated ditches" (rvw11).

distribution/range: "Around streams, springs, & fens, rare; confined to the n ½ of Illinois (m14). Rare in the north ½ of Illinois, Jo Daviess, Kane, Kendall, McHenry, Mason, Ogle, Peoria, Putnam, Tazewell, & Winnebago cos.

ⓄStorage Behaviour: Orthodox. Storage Conditions: Long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection 14 years; germination change 100 to 85%, 13 years, 1 collection

1000 Seed Weight. Average 1000 Seed Weight(g): 0.013

Details of Component Seed Weights: 0.013 (34,917,208 /lb), (Mazer, 1989), Seed

Germination (all at RBG Kew, Wakehurst Place)

100 % germination; ; germination medium = 1% agar; germination conditions = 10°C, 8/16;

100 % germination; ; germination medium = 1% agar; germination conditions = 10°C, 8/16;

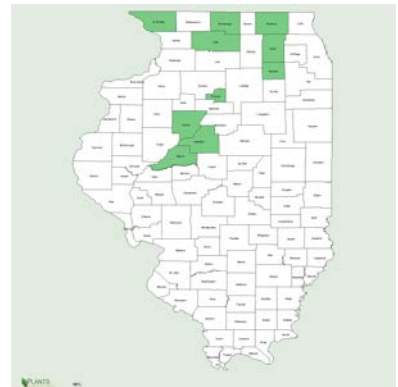
100 % germination; ; germination medium = 1% agar; germination conditions = 15°C, 8/16;

100 % germination; ; germination medium = 1% agar; germination conditions = 15°C, 8/16;

75 % germination; ; germination medium = 1% agar; germination conditions = 20°C, 8/16;

100 % germination; ; germination medium = 1% agar; germination conditions = 21°C, 12/12;

100 % germination; ; germination medium = 1% agar; germination conditions = 21°C, 12/12;



Description: Native, erect to drooping, aquatic, perennial; 0.08-1.75' tall, stems weak, mostly smooth; leaves opposite, palmately veined; inflorescence single axial flowers with long stalks; flowers yellow, often with reddish dots, 5-merous, 0.33-1.0" long, throat open, lower lip bearded, sepals connected into a tube, stamens 4; fruit a cylindrical capsule; key features: Aquatic, flowers yellow (fh). Stems weak, rooting at the lower nodes (Ipin).

Comments: status: Endangered in Illinois & Threatened in Iowa. Variety *michiganensis* is Federally Endangered & Endangered in Michigan. phenology: Blooms (May) June - August. C3.

"This was reported from the co many years ago but we have been unable to find it." (ewf55 as *M geyeri*).

Associates: ethnobotany: Used as medicinal plant by Pottawatomie (sm33).

VHFS: In Britton & Brown (1913) this was *Mimulus geyeri*. [*Mimulus geyeri* Torr, *M glabratus* Kunth var *fremontii* (Benth) AL Grant, *M inamoenus* Greene, *M jamesii* Torr & A Gray ex Benth, *M jamesii* Torr & A

Gray ex Benth var *fremontii* Benth, *M reniformis* Engelm ex Benth] Illinois plants are mapped as var *jamesii* (pug14). Michigan plants are var *jamesii* (Benth) A Gray (rvw11).



Mimulus glabratus jamesii, JAMES' MONKEYFLOWER

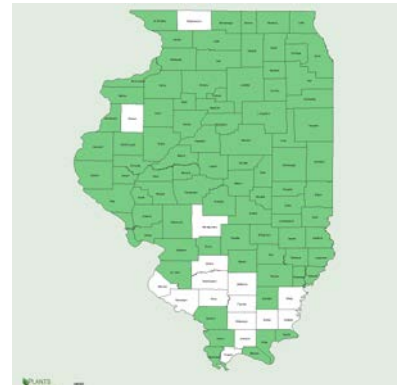
Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

Mimulus geyeri Torreyi (*geyeri* after Charles A Geyer, a German botanist who collected in the 1840's in Washington, Idaho, Minnesota, & Iowa.) See *M glabratus*.

Mimulus ringens Linnaeus MONKEY FLOWER, aka ALLEGHENY MONKEY FLOWER, ALLEGHENY MONKEYFLOWER, ALLEGHENY MONKEY-FLOWER, *BLÅ GYCKELBLOMMA* (SW), RINGENS MONKEYFLOWER, SESSILE MONKEY-FLOWER, SQUARE STEMMED MONKEY FLOWER, (*ringens* gaping, referring to a hole, open-mouthed, wide open, as in some labiate flowers, from Latin *ringens* (?), from verb *ringor*, *ringi*, to show the teeth, to snarl, be angry, or to open the mouth wide, for the gapping corolla.) obl

Habitat: Seasonally inundated areas. Wet to wet mesic prairies, wet meadows, upland swamps, & shorelines. Clean-water drainage ditches. "Species is distributed on muddy shores, ditches, wet meadows" (Ilpin). In Michigan, "wet, usually ± open places: marshes, swales and ditches, swamps, shores, fens; borders of lakes, ponds, rivers, and streams; does well in disturbed wetlands" (rvw11). in the se USA, marshes, bogs, wet meadows, bottomlands (w12). **distribution/range:** See vars.

Culture: ① "Moist cold treatment, or fall sow. Very light to no cover. Good germination." (mfd93) ② 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm11, 15). ③ Seeds germinate after about 60 days of cold moist stratification (he99). ④ No pretreatment needed. Sow seeds on the soil surface at 40°F & water. Slow to germinate. (ew11) ⑤ Surface sow at max 5°C (41°F), germination irregular, often several months (tchn). 4,536,000 (jfn04), 18,144,000, 22,900,000 (ecs), 24,000,000 (aes10), 32,000,000 (ew11), 32,438,571 (gnh13), 36,800,000 (pm01), 41,272,727 (gnhe02), 50,444,443 (gna05), 53,411,760 (gna07) seeds per pound.



©Storage Behaviour: Orthodox. Storage Conditions: 79% viability following drying to mc's in equilibrium with 15 % RH and freezing for 20 days at -20°C at RBG Kew, WP.

1000 Seed Weight. Average 1000 Seed Weight(g): 0.03. Details of Component Seed Weights: 0.03; (RBG Kew, Wakehurst Place), Seed. 0.01; (Stevens 1932), Seed; Weight refers to air-dry seed. 0.0070, (Mazer 1989), Seed. 0.1; (Shiple & Parent 1991), Seed; Dry weight. 0.0070, (Mazer 1989), Diaspore; seed plus associated protective structure. 0.01; (Tilman 1997), Seed

Germination 79 % germination; pre-sowing treatments = imbibed on 1% agar for 8 weeks at 5°C; germination medium = 1% agar; germination conditions = 25/10°C, 8/16; (RBG Kew, Wakehurst Place.)

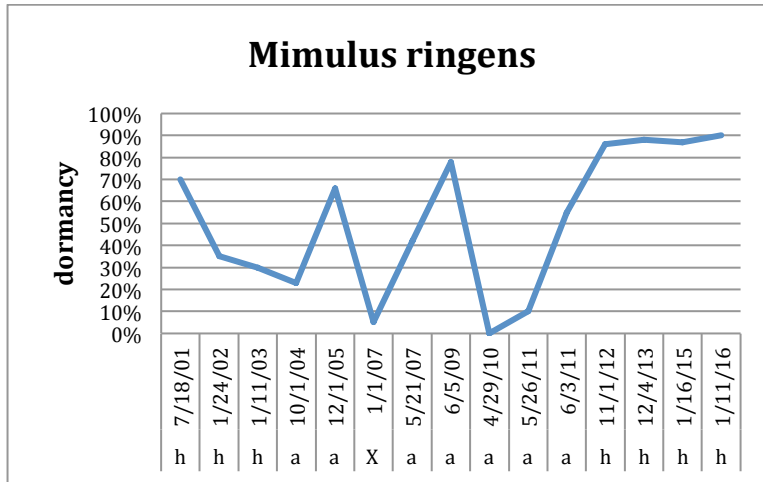
asexual propagation: Stem cuttings.

cultivation: Space plants 1.0-1.5'. Full sun to partial shade, wet to wet mesic soil. Clay soil tolerant.

bottom line: Dormant seeding is most efficient, with over 80% of lots with a significant to strong requirement for dormant seeding, but the extreme seed count gives even slight % germination the delusion of a

good crop. Flipflop, but dormant of late. Germ 22, 8.0, 8.0, sd 24, r2.0-81 (79)%. Dorm 51, 55, na, sd 31.3, r0.0-90 (90)%. Test 34, 36, na, r21-49 days. (#15:8)**

greenhouse & garden: Light, GA3 helps, dormant seed.



Description: Erect, herbaceous, perennial, native forb; short rhizomes; stems 1.0-3.0', square; leaves opposite, snap-dragon-like flowers pale purple (pink) to light blue (blue/violet) on long peduncles. key features: Stems 4-angled with narrow wings; flower pink to blue, lower lip arching (fh).

Comments: status: phenology: Blooms 7,8,9. C3. In northern Illinois, collect seeds in late September - October. Collect seeds in se Wisconsin in September - October (he99). Landscaping, wetter rain gardens & swales, water gardens, bog gardens, water margins, & wetland restoration. Seed source nursery production from genetic sources drainage ditches, Green River Lowland, Hamilton Twp, Lee Co & Chicago Botanic Garden, Cook Co.

“Our only sp. Common in wet places.” (ewf55)

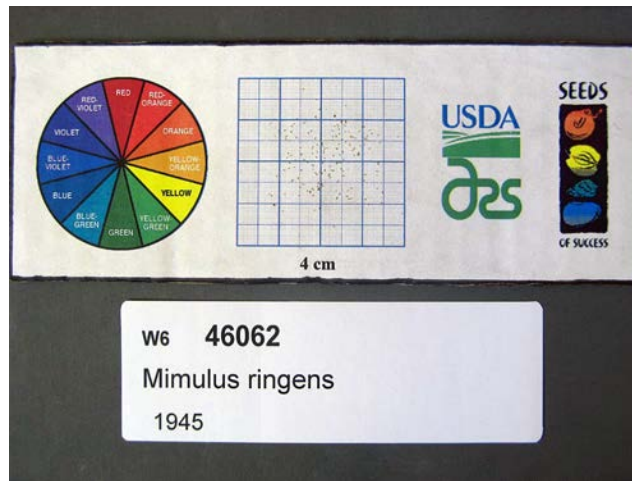
Associates: Attracts hummingbirds. Reported to be deer resistant.

VHFS: Var *colpophilus* Fern, ESTUARY MONKEYFLOWER, is special concern in Maine. Illinois is mapped as the widespread variety *ringens* (pug14).

Mohlenbrock (2014) notes 2 vars in Illinois. Var *ringens*, with most or all the cauline leaves rounded or clasping at base; wet ground; occasional in the n ¾ of Illinois; rare elsewhere; blooms June - September. Var *minthodes* (Greene) AL Grant, with most or all the cauline leaves tapering to base; wet ground; occasional in the westernmost cos of Illinois; blooms June - September.

[*Mimulus ringens* L, *M r fo albiflorus* Moldenke, *M r var albiflorus* House, *M r var colpophilus* Fernald, *M r var congesta* Farw, *M r var minthodes* (Greene) AL Grant, *M r fo peckii* House, *M r fo ringens*, *M r var ringens*, *M r var roseus* Fassett]





Mimulus ringens

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo courtesy of National Plant Germplasm System, M. Cashman, USDA, ARS, GRIN. Illinois map courtesy plants.usda.gov.

PHRYMA Linnaeus 1753 *Phrymaceae* *Phryma* from Linnaeus, the origin of the genus name is lost. A genus of 1-2 spp of eastern North America & Asia (Japan, Nepal, India, & Pakistan). Fruit is an achene.

“The disjunct populations in e. North America and e. Asia have been variously treated as species, varieties, or races; following the analysis of Nie et al (2006), I opt to recognize the continentally disjunct populations as being morphologically and genetically different enough (and with a long enough time since separation) to warrant specific status” (w12). (Note! Nie et al (2006) is missing from w12 Nov bibliography.)

“Remark. In a note at p 50, I suggested that the supposed capsule of some authors was the calyx closed upon the seed. Dr Darlington has since corrected me. On a review of the subject, I feel authorized to say (as of the genus *Verbena*, p 49,) that the supposed capsule is an extra tegument, or aril. It does not appear to me to present the analogies of a capsule.” (Eaton 1829)

Phryma leptostachya Linnaeus LOPSEED, aka AMERICAN LOPSEED, (*leptostachyus -a -um* with thin or slender spikes, from Greek *leptos*, adjective, thin, slender, delicate, narrow, *-o-* connective vowel in botanical Latin, & *σταχυς*, *stachys*, spike; ear of grain or corn in the Old World sense.) As the fruit approaches maturity, it lops down against the rachis, hence the common name. upl

Habitat: Mesic savannas, dry woods, & woodlands, hedgerows. “Common in woods” (ewf55). In Michigan, “Usually in rich deciduous forests, especially moist areas in beech-maple forest, but also in drier forests with oak and sometimes with conifers” (rvw11). In se USA, variety *leptostachya* grows in places primarily underlain with coquina limestone (marl)” (w08).

distribution/range: The spp has a relictual disjunct distribution with variety *leptostachya* in eastern North America & variety *asiatica* Hara in east Asia.

Culture: ①60 days cold moist stratification (pm09, 15). 61,920 (gnhm07), 64,000 (aes10), 70,783 (gnhm13) seeds per pound.

bottom line: Dormant seed only. Test data indicate lots are strongly dormant, >90%. Germ 1.5-5.0%. Dorm 90-93%. Test 28-32 days. (#4).**

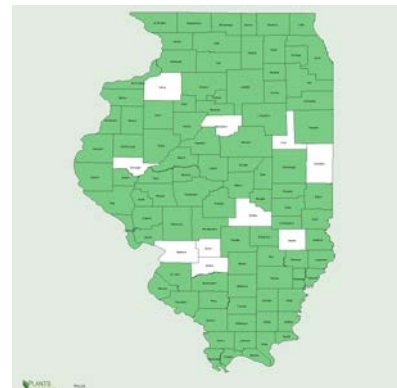
greenhouse & garden: Moist cold stratify or dormant seed.

Description: Native, erect perennial forb, 1.0-2.5'; leaves ovate, coarsely serrate, petioled; spikes terminal, slender; flowers small, opposite pink (lavender), snap-dragon-like; key features: “The fruits "lopped down" against the stem are unmistakable” (w08). “This species is easily recognized by the distant paired flowers, reflexed fruit, and broad, opposite, petioled leaves. The corolla appears pinkish, being basically white inside with pink tinge at least outside. Hooked tips on the bristle-like mature upper sepal lobes suggest animal dispersal. The reflexed fruit, unlike that of *Persicaria virginiana*, is not under tension.” (rvw11)

Comments: status: phenology: Blooms 6,7,8,9. Genetic source Kane Co.

Associates: ethnobotany: Used as medicinal plant by Ojibwa for sore throat (den28).

VHFS: *Phryma leptostachia*.





Phryma leptostachya

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

SCROPHULARIACEA AL de Jussieu 1789 **SNAPDRAGON OR FIGWORT FAMILY**

The *Scrophulariaceae* have been reduced to 3 genera, the introduced ornamental *Buddleja*, the weedy *Verbascum*, & the native *Scrophularia*.

“The herbalist John Gerard (no feminist, evidently) gave the reason antirrhinums were called *snapdragons*: ‘The flowers [are] fashioned like a dragons mouth; from whence the women have taken the name Snapdragon.’ *Herbal* 1597. The term was also used from the early 18th century for a party game which involved picking raisins out of a burning bowl of brandy & eating them while they were still alight -- the allusion being of course to the dragons’ fire-breathing habits.” (Ayto 1990) The fruits of *Antirrhinum* are foraminicidal capsules.

SCROPHULARIA Linnaeus **FIGWORT** *Scrophulariaceae* *Scrophularia* New Latin, from Medieval Latin *scrōfula*, *scrōfulae*, *scrophula* (also *schrof-*, *scrufula*) & New Latin *-aria*; from the supposed efficacy of such plants in the treatment of scrofula. Scrofula is tuberculosis of lymph glands, especially those of the neck [Medieval Latin, from Late Latin *scrofulae* (plural) swellings of the lymph glands of the neck, literally, little sows, plural of *scrofula*, diminutive of Latin *scrōfa* breeding sow, cf Greek χοιράδες, *khoirades*, plural of χοίρας, *khoiras* like a hog’s back. The Greek makes more a little more sense if *khoirades* is a very old Greek epichoric variant χ pronounced *ks*, hence *ksoirades*.] About 200 spp of temperate & tropical areas of the east & west hemispheres. In North America, only 2 spp are native east of the Rocky Mountains.

Scrophularia grandiflora, sow at 20°C (68°F), germination slow. *S nodosa*, sow at max 5°C (41°F), germ irregular, often several months. (tchn).

Cauline leaves all or mostly opposite on fertile stems; corolla brownish, clearly bilaterally symmetrical and ± 2-lipped.

Sterile filament (staminodium) (hidden under the upper corolla lip) yellowish-green, often distinctly wider than long; mature capsules (5–) 6–9(-10) mm long; larger leaf blades truncate to rounded at base, never cordate, leaf serrations coarse, often > 3 mm long; flowering May-early July..... *S lanceolata*

Sterile filament (staminodium) dark purple or brownish (very rarely green), often longer than wide; mature capsules 4–6 (-7) mm long; larger leaf blades often cordate, leaf serrations fairly fine, < 3 mm long; flowering mid July-October..... *S marilandica*

After w12 & rvw11.

Scrophularia lanceolata Pursh *RI EARLY FIGWORT, aka AMERICAN FIGWORT, HARE FIGWORT, LANCE LEAF FIGWORT, LANCE-LEAF FIGWORT, LANCELEAF FIGWORT, (*lanceolatus -a -um* (lan-kee-o-LAH-tus) lanceolate, spear-shaped, lancelet-like in form, New Latin from *lancea*, lance or spear, *-olus- a- um-*, diminutive, & *-atus*, possessive of or likeness of, for the lanceolate leaves.)

Habitat: Dry & dry-mesic prairies & open woods, woodland edges, rocky soils. Woodlands & forests (w11). In Michigan, “very conspicuous along roadsides & railroads; often in forests, especially clearings, openings, edges, & old roads; fields, fencerows, & thickets; shores & swamp borders; often thrives after some disturbance” (rvw11). distribution/range: Central Illinois is the southern limit of this sp Midwestern Range.

Culture: ①60 days cold moist stratification. ? Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09).

②Germination method unknown (he99). 2,368,000 (ew12), 3,661,2960 (gnh15), 3,978,947 (gnhm14) seeds per pound.

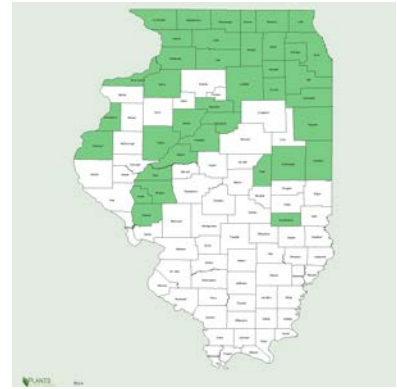
bottom line: Preliminary test data indicate dormant seeding is necessary. Germ 9.0-44%. Dorm 52-87%. Test 24-45 days. (#4).**

greenhouse & garden: 60 days cold moist stratification works well with ne Illinois material.

Description: Erect perennial; stems 2-6', stems square, sides of stem flat or slightly grooved, flowers red-brown, 5-merous; key features: “Sterile filament (or staminode) (hidden under the upper corolla lip) yellowish-green, often wider than long; leaf serrations coarse, often > 3 mm long; flowering May-early July; capsule 6-10 mm long” (w11, 12). “The width of the free part of the staminodium is variable, but usually broader than in *S. marilandica* (in which it seldom exceeds 1 mm). Both species bear a large number of flowers over a long blooming season (some flowers open while others have formed mature fruit). Hence, it may be difficult to determine that *S. lanceolata* is an earlier-blooming plant, the first flowers appearing in May or June, while in *S. marilandica* they usually appear in July or August.” (rvw11)

Comments: status: phenology: Blooms 6-8. Collect seeds in se Wisconsin in August - September (Heon et al 1999). “Common on roadsides, in fencerows & the edge of woods.” (ewf55)

VHFS: [*Scrophularia leporella* Bick, *S. occidentalis* (Rydb) Bickn, *S. pectinata* Raf]



Scrophularia lanceolata

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

Scrophularia marilandica Linnaeus LATE FIGWORT, aka CARPENTER’S SQUARE, EASTERN FIGWORT, facu-
Habitat: Sand prairies, mesic, dry, & sand savannas. Forests. In Michigan, “Less common than *S. lanceolata* but in similar habitats: river bank thickets & floodplains; forests (especially at borders & in clearings), roadsides” (rvw11). In the se USA, “moist to dry, nutrient-rich woodlands & forests, especially over mafic or calcareous rocks” (w11).

distribution/range:

Culture ①60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ②No pre-treatment needed. Sow seeds on soil surface at 70F & water. (ew12) 2,000,000 (jfn04), 2,368,000 (ew12), 2,720,000 (pm11, aes10), 3,721,311 (gnh15), 4,067,067 (gnhm14) seeds per pound. Only seed is available.

cultivation: Space plants 1.5-2.0'. Mesic to well-drained soils, full sun to partial shade. Prefers shady sites or sand prairies.

bottom line: Genesis test data indicate good crops can be grown without dormant seeding, but germination will be enhanced (10-15%) with



it. For field planting, this seed should be sown on top of the ground in early winter or spring. Flipflop species. Germ 41.8, 49, na, sd 19.9, r9.0-60 (51)%. Dorm 43.8, 35.5, na, sd 27.8, r16-88 (72)%. Test 34, 35, na, r29-36 days.**

greenhouse & garden: Moist cold stratify or dormant seed.

Description: Native, erect, perennial forb; stems 3.0-6.0'; flowers green/red-brown, inconspicuous; N = ? key features: “Sterile filament (or staminode) dark purple or brownish, often longer than wide; leaf serrations fairly fine, < 3 mm long; flowering mid July-October; capsule 4-7 mm long” (w11, 12). “Not always easily distinguished from *S lanceolata*, though frequently taller & more branched. The sides of the stem in *S marilandica* are usually ± grooved or channeled, while in the other spp the sides are usually flat or slightly convex, & the leaves of the latter are often more irregularly toothed (even somewhat incised toward the base)” (rvw11).

Comments: status: phenology: Blooms 7,8,9,10. In northern Illinois, harvest seeds in late October-early November. The snapdragon that only its mother could love. The inconspicuous flowers are far more interesting than showy. Dried seed heads are attractive in fall arrangements. Landscaping, adds diversity & texture to native plantings, great addition in pollinator gardens, shade gardens, minimalist gardens, & naturalizing.

“More common than the above & more likely to be in woods rather than in the open.” (ewf55).

Associates: Pollinator friendly. Highly rated for pollinators. Attracts hummingbirds. Walnut tolerant.

ethnobotany:



Scrophularia marilandica

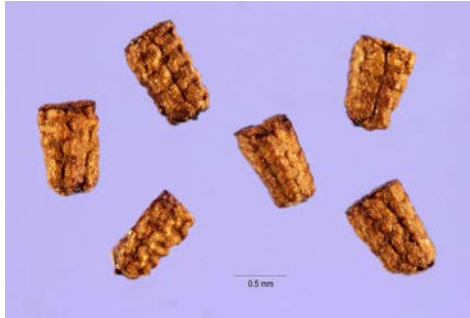
Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

VERBASCUM Linnaeus **MULLEIN** *Scrophulariaceae* *Verbascum* New Latin, from Latin, mullein, probably a corruption of *Barbascum*, is an ancient Latin name used by Pliny for some member of this genus. 360 (250) spp of annual, biennial, & perennial herbs & shrubs, native to Eurasia & northeast Africa. All species are adventive or escapes from cultivation. Sometimes placed in Family: *Plantaginaceae* tribe: *Veroniceae*.

Verbascum blattaria Linnaeus MOTH MULLEIN, (*blattarius -a -um* Latin name *blatta*, a moth, or a cockroach, or an ancient name in Pliny meaning cockroach-like, from *blatta, blattaræ*.)

distribution/range: Native of Eurasia.

“Not very common in stream bottoms & low pastures.” (ewf55) Sp is known from the east side of McCune Sand Prairie, west Bureau Co.



Verbascum blattaria

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image.

Verbascum thapsus Linnaeus *NOX CO, HI COMMON MULLEIN, aka AARON’S-ROD, *BARBASCO*, BIG TAPER, *BIRODŌ-MŌZUIKA*, BLANKETWEED, *BOUILION BLANC*, CANDLEWICK, FLANNEL MULLEIN, FLANNEL PLANT, FLANNELLEAF, FLANNELPLANT, GIANT MULLEIN, *GORDOLOBO COMÚN*, GREAT MULLEIN, GREY MULLEIN, *GUARDALOBO*, HAG TAPER, *KOROVÁK OBYKNOVENNYJ*, *KUNGLJUS*, *MAO RUI HUA*, *MOLÈNE*, MULLEIN, TORCHES, VELVET DOCK, VELVET PLANT, *VERBASCO*, WILD TOBACCO, WOOLLY MULLEIN, (*thapsus* from Thapsos, the former name of a town in Sicily, also referenced as a town in Greece, as Sicily was part of *Magna Graecia*, Latin for Greater (or simply Great) Greece, or Μεγάλη Ἑλλάς, *Megalê Hellas*. Thapsos is a Middle Bronze Age site near Syracuse, Sicily. Also referenced as Thapsus in ancient Africa, now Tunisia. From the island of Thapsos, an old generic name θαψος, *thapsos*, for *Cotinus coggygia*, Thapsus(os) was a North African town & the site of a victory by Caesar. *Ave Caesar, morituro te salutamus*.)

distribution/range: Native of Europe. Found in all 50 states & subarctic Canada. In all Illinois cos.

Ⓞif one so desires, sow at 20°C (68°F), germinates in less than two wks cover thin ((tchn).

“A common pasture plant.” (ewf55) I formerly considered this to be of little consequence but it is increasing in abundance & appears to be undergoing ecological release in some areas. Noxious weed in Colorado & Hawaii.



Verbascum thaspus

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image.

Thus ends the Snapdragon Section, not with a bang, but with a whimper.



Endnotes & abbreviations. The following math functions violate Abbey's 1st Law, which see.

++ The listed numbers are seed count mean, seed count median, seed count mode, seed count standard deviation, seed count max, seed count min, seed count range.

** The listed numbers are Germ mean, germ median, germ mode, germ standard deviation, germ range (range); Dorm mean, dorm median, dorm mode, dorm standard deviation, dorm range (range); Test mean, test median, test mode, test range. (#germ test : tz etc)

Reference abbreviations May 04 2014

- CEPPC California Exotic Pest Plant Council
- CIPC California Invasive Plant Council
- SEPPC Southeast Exotic Pest Plant Council
- SWSS Southern Weed Science Society
- RBG Kew RBG Kew, Wakehurst Place
- aes10 (AES 2010)
- afvp (Atlas of Florida Vascular Plants)
- anef (Angelo & Boufford: Atlas of New England flora)
- apl (Applewood)
- asfg (Audubon Society Field Guide)
- wade (Alan Wade, nd, various years, 95, &c)
- bsh (Baker Seed Herbarium, California)
- bb02 (Baskin & Baskin 2002, 2001, &c.)
- nlb05 Britton 1905
- cb03 (CC Baskin 2003, 2001, &c.)

crfg California Rare Fruit Growers
csvd (Currah, Smreciu, & Van Dyk 1983)
tchn tomclothier.hort.net (-4°C 24°F stratification being corrected)
cu00 (or cu02, &c, Cullina 2000, 2002, 2008)
nd91 (Norm Deno, 1991, 1993)
den28 (Densmore 1928)
do63 (Dobbs 1963)
mfd93 (Mary Fisher Dunham 1993)
dh87 (Dirr & Heusser 1987)
drwfp (Directory of Resources on Wildflower Propagation)
ecs (Ernst Conservation Seeds catalog)
ew12 (Everwilde 2012) also ew11
ewf55 (Egbert W Fell 1955)
ewf59 (Egbert W Fell 1959)
fh (Robert W Freckmann Herbarium)
fna (Flora of North America project)
foc (Flora of China online)
fop (Flora of Pakistan online)
gni (Genesis Nursery, Inc)
gc63 (Gleason & Cronquist 1963, 1991)
gran (Granite Seeds)
he99 (Heon et al 1999)
hk83 (Hartman & Kester 1983)
hpi (Hill Prairies of Illinois
(Hilty website)
Ilpin (Illinois Plant Information network)
jf55 (Jones & Fuller 1955)
jlh (JL Hudson, Seedsman, (if the phone doesn't ring its me))
kpw (Kansas Prairie Wildflowers)
krr (Kenneth R Robertson)
lbj (Lady Bird Johnson Wildflower Center Native Plant Information Network)
m14 (Mohlenbrock 2014) also m86, m99, m02, m05, m06, &c
mbg (Missouri Botanic Garden)
msue (Michigan State University Extension)
nae Native American Ethnobotany (Moerman, University of Michigan Dearborn)
now36 (Nowosad et al 1936)
nyfa (New York Flora Atlas)
orghp (Ontario Rock Garden Hardy Plant Society)
ppc (Philips Petroleum Company)
pots (Plants of the Southwest 2000)
pm09 (Prairie Moon 2009) also pm02, pm11, &c
pnnd (Prairie Nursery no date)
pph (Prairie Propagation Handbook)
ppi (Prairie Plants of Illinois)
psdg (Plants of South Dakota Grasslands)
pug13 (plants.usda.gov accessed 2013, 2014)
oed Oxford English Dictionary online
rain (Ranier Seeds)
rn97 (Reeseville Ridge Nursery 1997)
rvw11 (Reznicek et al 2011)
rs ma (Ray Schulenburg Morton Arboretum)
rhs Royal Horticultural Society
sh94 (Shirley Shirley 1994) & don't call me Shirley
sk08 (Stuppy & Kessler 2008)
sm23 (Smith 1923) also sm32, sm33, sm28, &c.
sw79 (Swink & Wilhelm 1979)

sw94 (Swink & Wilhelm 1994)
t1p (Time Life Perennials)
tlw (Time Life Wildflowers)
tpg The Prairie Garden
uconn (UConn Plant Database)
us97 (USDA 1997)
w12b (Weakley Nov 2012) also w07-12
wfatp (Vance & Vance 1979)
wfn (Wildflowers of Nebraska)
wfnp Wildflowers northern prairies)
ws92 (Wilhelm & Swink 1992)
w73 (Alphonso Wood 1873)
ry64 (Richard Yarnell 1964)
yy92 (Young & Young 1992)
Reliquum etiam non scriptum est.