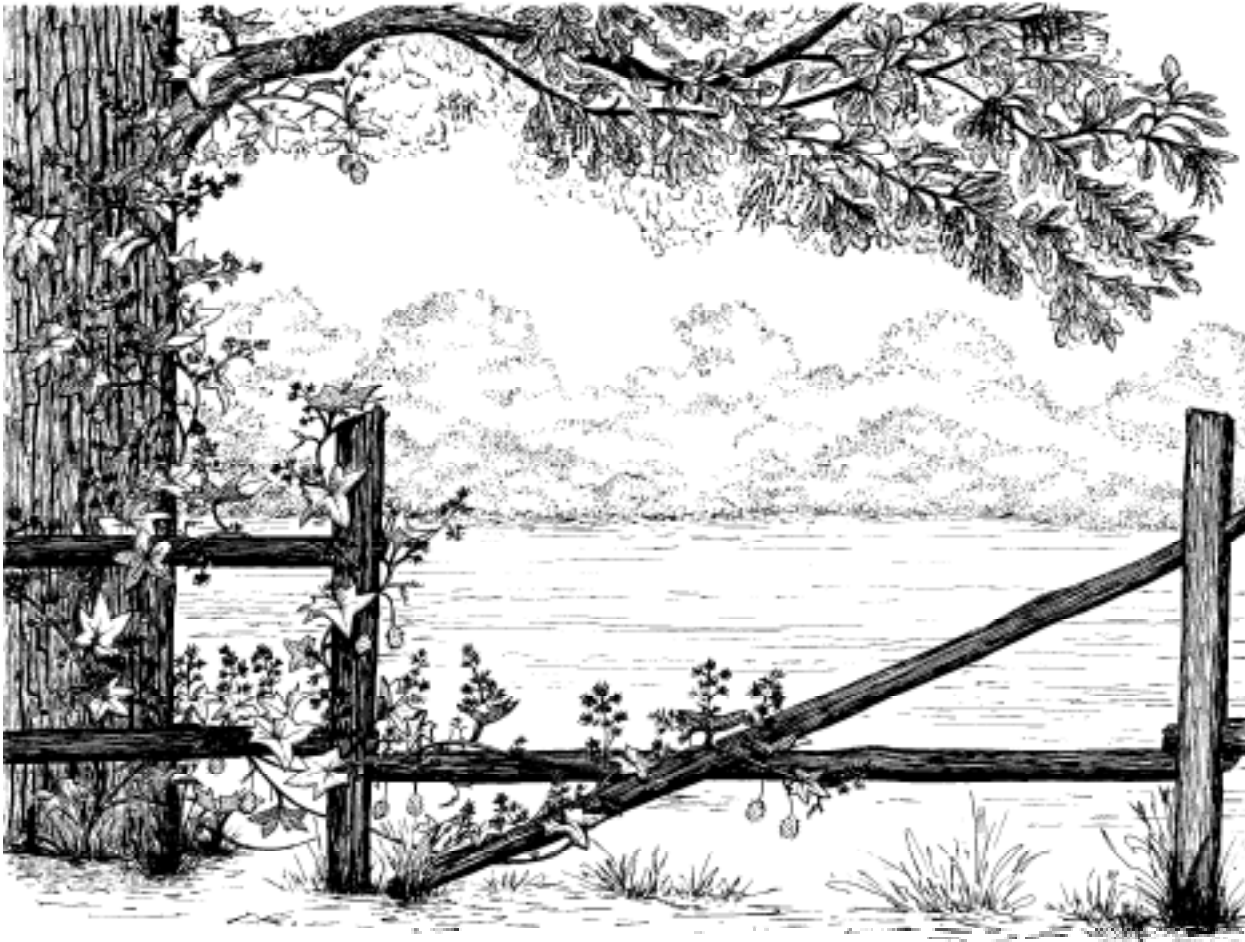


# COMPOSITAE

## PART ONE

*Achillea* to *Eutrochium*

Working Draft Friday June 13<sup>th</sup>, 2015



### ALPHABETICAL LIST OF PLANT MATERIALS

*Asteraceae* Martinov formerly *Compositae* Adanson  
*Asteraceae* Dumortier 1822 or *Compositae* Giseke 1792

“As is the case, I believe, with the American Flora throughout the United States, & indeed, the whole continent, the autumnal botany of the prairies exhibits a large preponderance of the *Compositae*. Besides those already mentioned, we may enumerate, as of frequent occurrence, *Chrysopsis mariana*, *Helenium autumnale*, *Boltonia glastifolia* & *B asteroides*, *Bidens frondosa* & *B chrysanthemoides*, *Eupatorium serotinum*, *E aromaticum*, *E ageratoides*, *E purpureum*, &c, *Cnicus glutinosus*, *C Virginianus*, *C muticus*, *C altissimus*, &c, *Silphium laciniatum*, *S integrifolium*, *S terebinthinaceum*, &c, *Prenanthes aspera*, *P virgata*, *P racemosa*, *P*

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*serpentaria*, &c, *Vernonia fasciculata*, *V corymbosa*, & one or two other species.” (Short 1845, Observations on the Botany of Illinois, more especially in reference to the Autumnal Flora of the Prairies.)

SUNFLOWER FAMILY 1 COMPOSITAE

Achillea  
Actinomeris  
Ageratina  
Agoseris  
Ambrosia  
Anaphalis  
Antennaria  
Arctium  
Arnoglossum  
Artemisia  
Aster  
Bidens  
Boltonia  
Brickellia  
Cacalia  
Centaurea  
Chrysanthemum  
Chrysopsis

Cichorium  
Cirsium  
Conoclinium  
Conyza  
Coreopsis  
Cosmos  
Dimorphotheca  
Dracopsis  
Dyssodia  
Doellingeria  
Echinacea  
Erechtites  
Erigeron  
Eupatorium  
Eurybia  
Euthamia  
Eutrochium

**ASTERWORTS**

Every aster in my hand  
Goes home with a thought  
Emerson

“A very large family of herbs, shrubs, & trees, 1500-1600 genera & 20,000-25,000 spp (formerly order *Campanulales*, now *Asterales*) considered to constitute the most highly evolved plants & characterized by florets arranged in dense heads that resemble single flowers, each floret having a gamopetalous, ligulate, or tubular corolla & a calyx modified into a pappus (as in the dandelion, sunflower, aster, & ragweed). In some classifications a superfamilial group that is coextensive with the family *Compositae* & is divided into the families *Carduaceae*, *Cichoriaceae*, & *Ambrosiaceae*.” <http://unabridged.merriam-webster.com> (accessed starting August 2006).

Historically the seeds have been called achenes (variously *achaene*, *achænium*, *achenium*, *achenia*, *akene* in some older works). Achenes are hard dry, single-seeded fruits that develop from unicarpellate, superior ovaries. Technically, they are *cypsela*, achenes developed from an inferior bicarpellary ovary fused with the calyx tube (*cypsela*, New Latin, from Greek *kypselē*, hollow vessel, chest, box; akin to Greek *kyphos* bent, crooked). *Cypsela* was coined by C de Mirbel in 1815. Achenes & *cypsela* are not unique to the *Compositae*. Achenes have been called the fruit of composites, but some authors consider the fruit is the head of achenes, & the achene is a seed. Achene (& *apparently all other terms*) for the fruits of carices was rejected by Egorova who felt the term should be reserved for the ‘unique’ fruits of the *Asteraceae*.

Ovaries 1-celled, with 1 erect ovule, style single with 2 stigmas at summit; fruit a cypsela, dry, indehiscent, 1-seeded, often crowned with a pappus (Wood 1873).

Many composites are self-sterile. Softwood cuttings of many spp root fairly well but may not overwinter well. (cu00)

*Lizzie Borden took an axe  
And gave her Asteraceae forty whacks.  
And when she saw what she had done,  
She gave her Rosaceae forty-one.*

The SUNFLOWER family nomenclature is going through many changes. The following 4 sections present as many of the changes of which we are aware. Most of these “new” names are based on classifications that were made over 100 years ago that are being substantiated by modern chemical & chromosome studies.

Composites are the largest vascular plant family. Food members include *Lactuca* lettuce, *Carthamus tinctorius* safflower, *Cichorium* endive, escarole, & chicory, *Cynara* globe artichoke, *Tragopogon* salsify, & *Helianthus* sunflowers & Jerusalem Artichoke. Ornamentals include *Aster*, *Chrysanthemum*, cineraria, cosmos, dahlia, daisies, edelweiss, strawflowers, marigolds, globe thistle, & zinnia. Composite weeds include ragweed, thistles, *Conyza* horse weed, galinsoga, fleabane, goldenrod, beggarticks, sowthistle, & dandelion. A number of species are poisonous such as *Arctium* spp, *Eupatorium rugosum* (*Ageratina altissima*), *Helenium autumnale*, *Tanacetum vulgare*, & *Xanthium* spp.

**ACHILLEA** Linnaeus **YARROW, MILLEFOIL, SNEEZEWORD, ACHILLÉE** *Achillea* (classically a-kil-LEE-a or a-KILL-ee-a) New Latin, from Latin *achillea*, *achilleos*, a plant, from Greek *achilleios*, a plant supposed to have been used medicinally by Achilles, from *achilleios* of Achilles, from *Achilleus*, Achilles who is said to have discovered it's healing power, & used plants of this genus to staunch the wounds of his soldiers at the battle for Troy. Achilles learned medicine from Chiron the centaur. A genus of about 115 spp of north temperate & arctic herbs (4 in northern North America) having divided leaves, small heads of tubular & ray flowers, followed by flattened achenes.  $x = 9$ .

“Centers of diversity for *Achillea* are in Europe & Asia. *Achillea ageratum*, *A distans*, & *A ligustica* have been reported as occurring in North America. Labels on herbarium specimens examined indicated that those reports were based on cultivated plants; there is no evidence that any of the three has become established in our flora. *Achillea filipendulina* may be persistent or established in California (F Hrusa et al 2002) & in Michigan (EG Voss 1972–1996, vol. 3).

*Achillea* includes aromatic herbs with diverse vegetative morphologies. Floral characters show much less variation. Some spp are widely cultivated both in Eurasia & North America. Interspecific hybridization has made identifications difficult & has evidently contributed to long lists of synonyms for some spp.” (Trock in fna)

YARROWS have been used medicinally for thousands of years everywhere the plant naturally grew. There are dark, sordid, little corners of the Internet where the name Wolowizard is whispered in hushed tones & where some consider YARROW as a plant medicinal to the landscape, thriving in ‘sick’ disturbed soils & ruderal, early successional communities. YARROW contains many chemicals that it contributes to the soil &, ultimately, to nearby plants. These chemicals are said to help heal ‘terminally ill’ soils, plus the top growth & especially the roots, add to the overall soil organic matter, water absorption capabilities, & health of the soil. Planting *may or may not* be justified locally on bio-remediation sites.

Perennials for full sun, cut flowers & dried flowers. Started in the green house, plants will flower the same season. Germination best at 70°F in 5-15 days.

***Achillea filipendula*** GOLD YARROW, aka CLOTH OF GOLD, CLOTH-OF-GOLD ACHILLEA, CLOTH OF GOLD ACHILLEA, CLOTH-OF-GOLD YARROW, CLOTH OF GOLD YARROW, FERN-LEAVED ACHILLEA, FERN-LEAVED YARROW, FERN LEAVED YARROW, FERN-LEAFED ACHILLEA, FERN-LEAFED YARROW, FERN LEAFED YARROW, FERN-LEAF ACHILLEA, FERN-LEAF YARROW, FERN LEAF YARROW, FERNLEAF YARROW, YARROW, ORTHOGRAPHIC VARIANTS *AD NAUSEUM*, (*filipendulus -a -um* New Latin thread-drooping, hanging by a thread, joined by a thread.)

Habitat: Grows in most soils & climates. Low to moderate moisture requirements. Coarse to moderately fine soils. Best in neutral soils. distribution/range: Introduced in California, Michigan, New York, Utah, Vermont, & Ontario. FNA notes California as persistent or established.

Culture: propagation: ① No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) ② “Sow at 20°C (68°F), germinates in less than two wks, thin cover, needs light, grow on at 10°C (50°F) (tchn). 2,000,000 (stock), 2,770,000 (gran), 2,790,000 (apl), 2,800,000 (ew11) seeds per pound. For pure stand, plant 1 lb pls per acre (gran). Plant 0.4 oz per 1,000 sq ft (stocks).

Description: Introduced, herbaceous perennial forb, 3-4', with golden yellow flat-topped clusters of flowers.

Comments: status: phenology: Blooming summer to fall. Attractive cut & dried flower. Taller than most yarrows, can become aggressive. Use in borders & in mixes.

Associates: Deer resistant.

***Achillea millefolium*** Linnaeus \*ME COMMON YARROW, aka *ACHILLÉE MILLEFEUILLE*, BLOODWORT, CARPENTER'S WEED, DEVIL'S NETTLE, *GEWÖHNLICHE SCHAFFGARBE*, *GORDALDO*, *HIERBA DE LAS CORTADURAS*, *HERBE-À-DINDE*, *MILEFÓLIO*, *MILENRAMA*, MILFOIL, *MILLE-FEUILLE*, *MILLEFOGLIO*, NOSEBLEED PLANT, OLD MAN'S PEPPER, *PLUMAJILLO*, *RÖLLIKA*, SANGUINARY, *SCHAFFGARBE*, *SEOYANGTOBPUL*, SNEEZEWORD, SOLDIER'S FRIEND, SOLDIER'S WOUNDWORT, STENCHGRASS, *TAUSENDBLATT*, THOUSANDLEAF, THOUSAND-SEAL, *TYSÁČELISTNIK OBYKNOVENNYJ*, *WIESEN-SCHAFFGARBE*, *YANG SHI CAO*,

Habitat: "Pastures, meadows, roadsides, stream sides, woodlands, waste grounds, dry or sandy soils, also in damp, clayey, & salty soils; 0–3600 m" (Trock in fna). distribution/range: Native of temperate & tropical Asia, Europe, Northern America, & Mesoamerica, naturalized in Asia, Africa, Australasia, Pacific islands, & South America. Taxon is known from all Illinois cos.

Culture: propagation: ①No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) ③"Sow at 20°C (68°F), germinates in less than two wks, thin cover, needs light, grow on at 10°C (50°F) (tchn). ③Sow @ 20°C. Seed germinates within 3 months (orghp). 2,670,588 (gni06), 2,790,000 (apl), 2,864,353 (gn02), 3,200,000 (ew11) seeds per pound.



cultivation: Full sun, moderate moisture to wet soils, roadsides & disturbed areas.

Description: Erect perennial 8" to 40" tall, aromatic forb; head just under a 0.25" wide with 4-6 (usually 5) short, white to pinkish rays each with 3 teeth, disks white; inflorescence with many heads in a round, flat, dense cluster (corymb-like), seeds without a fluffy pappus; leaves finely-feathery cut, lance-shaped in outline, upper stalkless;  $N 2n = 18, 27, 36, 45, 54, 63, \& 72$  (including counts from Europe).

Comments: status: Variety *borealis* is Special Concern in Maine. phenology: Blooms June - September. Species is looked down upon in Illinois, but it is used in native seed mixes in Michigan and Minnesota.

Associates: Attracts birds, bees, & butterflies. Species has shown antimicrobial properties, particularly against *Salmonella typhimurium* (Frey & Meyers 2010).

VHFS: [*Achillea millefolium* L var *millefolium*]

The treatment of this sp varies widely. Flora of North America recognizes a single sp.

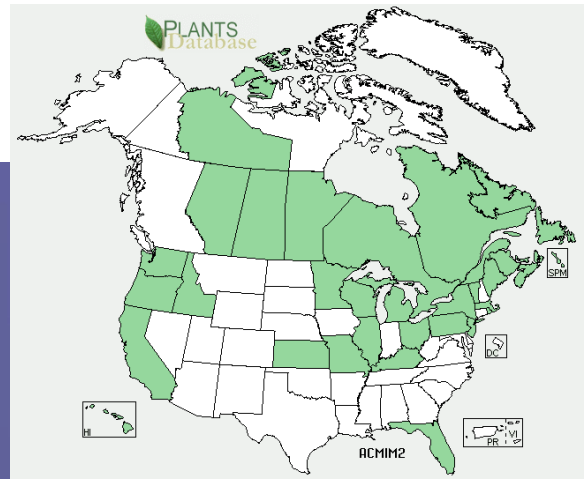
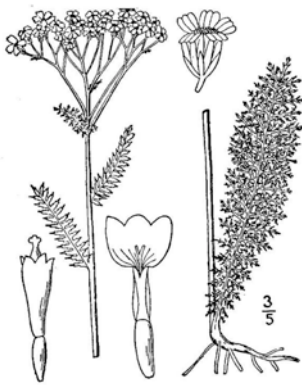
"*Achillea millefolium* is morphologically variable & has been treated as either a single sp with varieties or as multiple distinct spp. At least 58 names have been used for North American specimens. Some early workers (eg, J Clausen et al 1948) thought the native North American plants were taxonomically distinguishable from introduced, Old World plants. Other workers (eg, R J Tyrl 1975) have treated *A millefolium* as a cosmopolitan, Northern Hemisphere polyploid complex of native & introduced plants that have hybridized, forming diploid, tetraploid, pentaploid, hexaploid, septaploid, & octoploid plants &/or populations constituting a single, variable sp.

Morphologic characters that have been used to segregate these populations into spp &/or varieties include: (1) degree & persistence of tomentum; (2) phyllaries with greenish, light brown, or dark brown margins; (3) shapes of capitulescences (rounded or flat-topped), & (4) degrees of leaf dissection & shapes of lobes." (Trock in fna)

The USDA in plants.usda.gov, recognizes 1 introduced Eurasian variety & 11 native varieties. Others call the varieties ssp. Illinois has varieties *millefolium* & *occidentalis*.

[*Achillea millefolium* L var *alpicola* (Rydb) Garrett, *A m L* var *arenicola* (A Heller) Nobs, *A m L* var *borealis* (Bong) Farw, *A m L* var *californica* (Pollard) Jeps, *A m L* var *gigantea* (Pollard) Nobs, *A m L* var *litoralis* Ehrend ex Nobs, *A m L* var *megacephala* (Raup) B Boivin, *A m L* var *millefolium* (Eurasian), *A m L* var *nigrescens* E Mey, *A m L* var *occidentalis* DC, *A m L* var *pacifica* (Rydb) GN Jones, *A m L* var *puberula* (Rydb) Nobs]

FM Frey & R Meyers, 2010, Antibacterial activity of traditional medicinal plants used by Haudenosaunee peoples of New York State, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2989932>

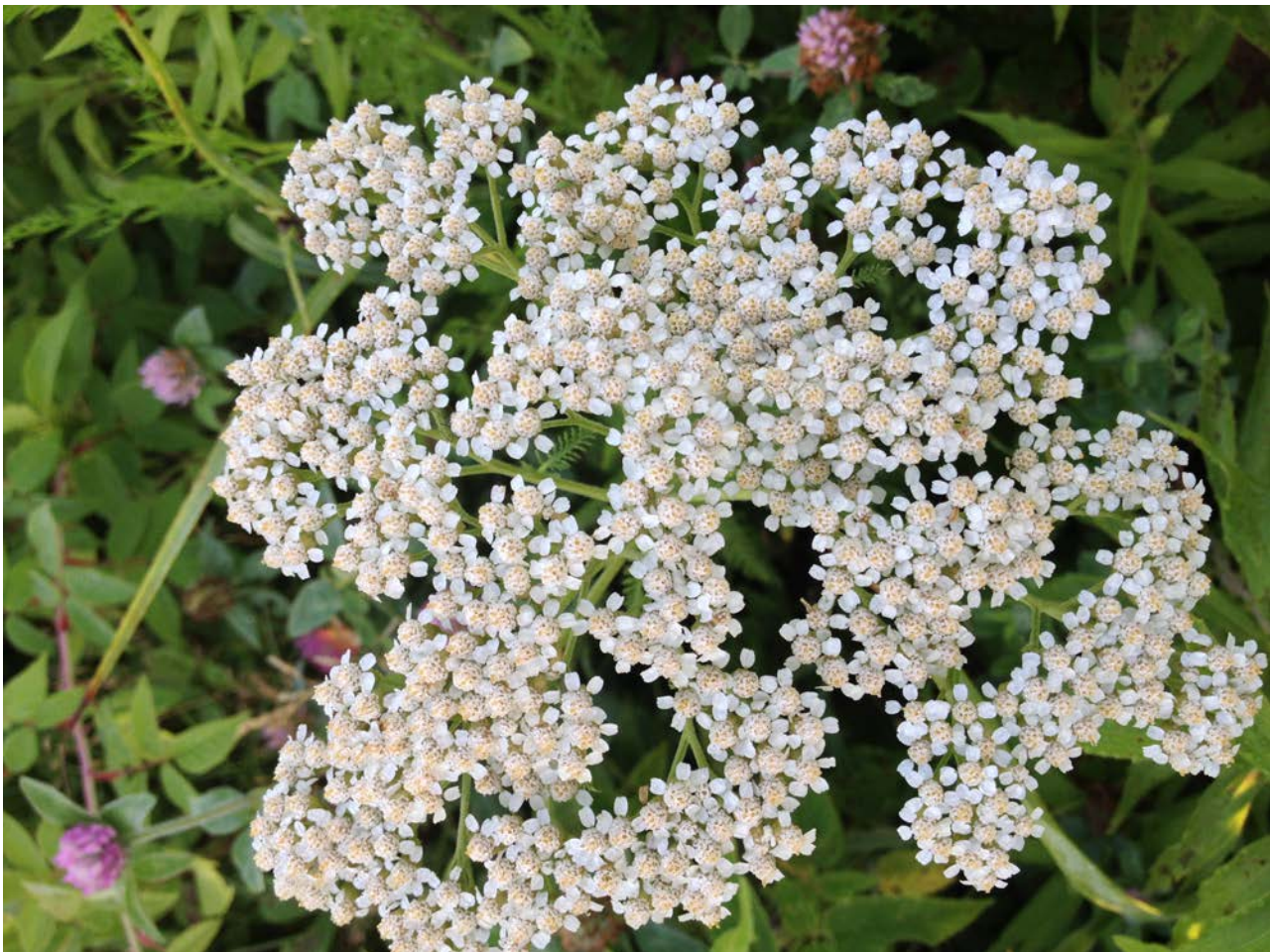


Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov. North American map courtesy plants.usda.gov.

**Discuss *Achillea borealis* Bongard AMERICAN YARROW, AMERICAN THOUSANDLEAF here. (w15)**  
<http://www.ramseylab.org/Ramsey/Publications.html>

introduced taxon taller, aggressive vigor, weediness, later flowering & seed maturation; leaves smooth or only sparsely hairy; leaf segments longer, more rounded, lance-shaped; introduced races mostly hexaploid.

widespread native taxon 10-36" tall; leaves densely hairy, lacey & fernlike, divisions not over 0.04" (1mm) wide; inflorescence somewhat rounded, cream to white, blooms May to September; native races originating in the western US (except the Pacific coast) are mostly tetraploid.

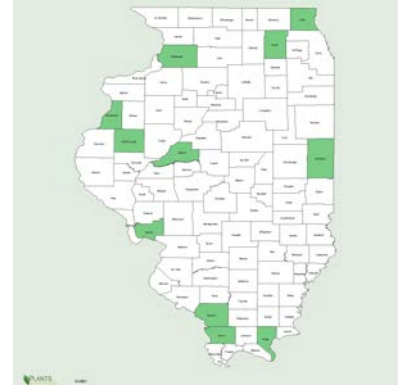


**Achillea millefolium** Linnaeus subsp **lanulosa** (Nuttall) Piper or **Achillea lanulosa** Nuttall [the revised nomenclature will be *Achillea millefolium* L var *occidentalis* DC ] WESTERN YARROW, aka MILFOIL, THOUSANDLEAF, WHITE YARROW, WOOLY YARROW, *A'djidamo 'wano*, squirrel tail (Ojibwa), (*millefolium -a -um* thousand leafed, from classical Latin *millefolium*, from *mille* thousand, & *folium, foli(i)*, leaf, after Hellenistic Greek μυριόφυλλον, *myriophyllum*, *Myriophyllum*, for the many, finely divided leaves.) (*lanulosus -a -um* woolly, lanulose, or minutely woolly, from the Latin root *lanula*, a tiny lock of wool, the diminutive form of *lanata* or *lanosa*.) Facultative

Habitat: distribution/range: Circumboreal. Taxon is known through out northern North America.

Culture: propagation: ①Very light soil cover, light helps, sow anytime.

Cultivars germinate best at 70°F. D70 germinator. Drill or broadcast ¼" deep when moisture is adequate. ②“Sow at 20°C (68°F), germinates in less than two wks, thin cover, needs light, grow on at 10°C (50°F) (tchn). Growth rate moderate. Seedling vigor high. Vegetative spread rate rapid. Seed spread rate moderate. 2,648,256 (wns01), 2,750,000 (cci), 2,770,000 (gran), 3,411,818 (usda), 4,400,000 (usda) seeds per pound. 2, 670,588 (gna06), 2,864,353 (gnhss02) for *A millefolium*. Seed longevity is at least 5 years when stored at moderate temperatures & low humidity (USDA NRCS 2004). Pure stand plant 1 lb pls per acre (gran) or 0.25-0.5 lb/ac (0.3-0.6 kb/ha) pls (usda). Plant 1.0-3.0 lb pls per acre (more when broadcasting, or so sayeth the heretics), or reduce rates & use in mixes.



cultivation: 4,800-19,000 plants per acre. Moist to dry soils, prefers sandy, well-drained soils & full sun. Drought tolerant, full to partial sunlight. Will grow in most moisture regimes. Best in neutral soils, acid & base tolerant. Tolerant of coarse to medium textured soils. Anaerobic tolerance none. CaCO3 tolerance medium. Drought tolerance medium. Fertility requirement low. Fire tolerance high & no resprout. Salinity tolerance low. Shade tolerance intermediate. pH 6.0-8.0. Hardiness Zone ?. Chemical control of WESTERN YARROW is achieved through herbicide application mixtures of dicamba & dichlorprop (Robocker 1977). Late spring burning reduces WESTERN YARROW (Anderson et al 1970) as does heavy fires. In certain environments YARROW populations tend to temporarily increase after less intense fires (Bartos & Mueggler 1981).

bottom line: This seed is nondormant & can be seeded spring or dormant. Consistently nondormant. Germ 87.8, 93, 93, sd 9.9, r70-97.8 (27.8)%. Dorm 1.25, 0.0, 0.0, sd 2.2, r0-5.0 (5.0)%. Test 13, 12.5, na, r12-13 day.\*\*

Description: Aggressive native, erect, perennial forb, 1.0-3.0', with flat clusters of white or cream colored flowers, some with a 'reddish tint', with gray-green, hairy, feathery, fern-like, aromatic leaves around tough central stem,

Comments: status: Freckmann Herbarium notes this taxon as native but potentially invasive in Wisconsin. This taxon is considered weedy or invasive in some parts of its range or under certain applications (Haragan 1991, Uva et al 1997, Stubbendieck et al 1994, SWSS 1998, Whitson et al 1996). phenology: Blooms 4-5 or 5-9(-11). Semi-evergreen when dormant. Attractive fresh or dried flowers. Aggressive, early successional, pioneering sp used for erosion control, bioremediation, & landscaping.

Associates: Self compatible, insect pollinated. Beneficial & pollinating insect visitors include *Orius sp.* Minute Pirate Bug, *Geocoris* Big-Eyed Bug, *Syrphidae* Hoverflies, & several tachnid flies *Archytas apicifer*, *Gymnosoma*, *Tricopoda pennipes*, & *Cylindromia*. Insect pests include common leaf bugs & flea beetles. Plant is of low palatability but browsed by small mammals, deer, & sheep, but rarely palatable to cattle. Plant increases with overgrazing. Food source for bighorn sheep, pronghorn antelope, & deer. Root rot & mildew occur in poorly drained soils.

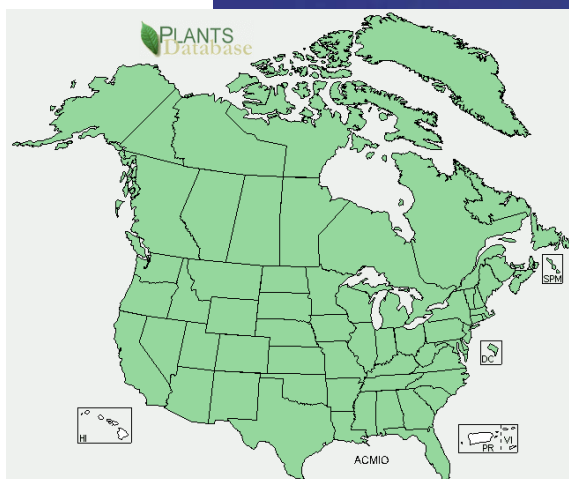
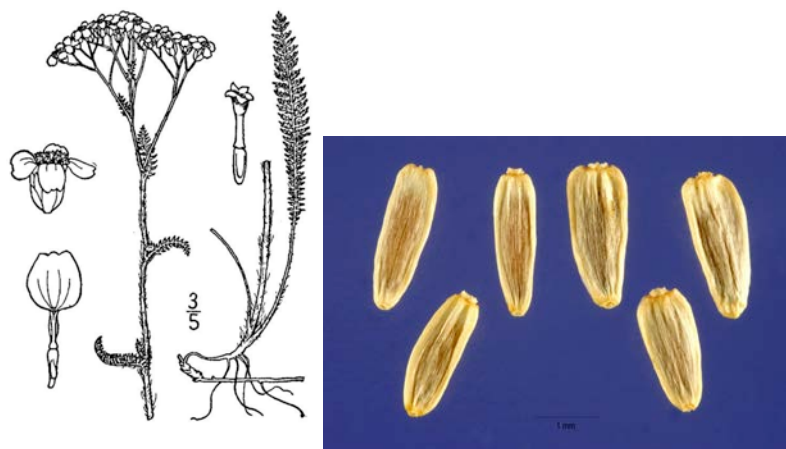
ethnobotany: The stem, leaves, & flowers contain volatile oils, alkaloids, & glycosides that are considered toxic. Used as a headache medicine by Ojibwa (den28). Used as medicinal plant by Ojibwa (sm32). Flowers smoked ceremonially by Ojibwa (sm32). Can be a headache in restorations & old fields. Plant is slightly astringent & has been used for alterative, diuretic, & as stimulant tonic.

VHFS: This taxon is listed in Britton & Brown (1913) as *Achillea lanulosa*. [*Achillea angustissima* Rydb, *A asplenifolia* auct non Vent, *A eradiata* Piper, *A gracilis* Raf, *A lanulosa* Nutt, *A lanulosa* Nutt f *peroutkyi* FC Seymour, *A l* Nutt f *rubicunda* Farw, *A l* Nutt subsp *typica* DD Keck, *A l* Nutt var *arachnoidea* Lunell, *A l* Nutt var *eradiata* (Piper) M Peck, *A laxiflora* Pollard & Cockerell, *A millefolium* L subsp *lanulosa* (Nutt) Piper f *rubicunda* Farw, *A m* L subsp. *occidentalis* (DC) Hyl, *A m* L subsp. *pallidotegula* B Boivin, *A m* L var

*aspleniifolia* (Vent.) Farw, *A m L* var *gracilis* Raf ex DC, *A m L* var *lanulosa* (Nutt) Piper, *A m L* var *occidentalis* DC, *A m L* var *rosea* (Desf) Torr & A Gray, *A m L* var *russeolata* B Boivin, *A occidentalis* (DC) Raf ex Rydb, *A rosea* Desf, *A tomentosa* Pursh, non L]

Robocker, WC 1977 Germination of seeds of common yarrow (*Achillea millefolium*) & its herbicidal control. Weed Science 25(5):456-459.

USDA NRCS 2004 Release notice for selected class of Great Northern Germplasm western yarrow. Bridger, MT



*Achillea millefolium occidentale*

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 American map courtesy plants.usda.gov.

***Achillea millefolium rubra*** ROSY RED YARROW, aka RED YARROW, (*rubra*, *rube*, *rubens* referring to the color red.)

Habitat: Tolerates wide range of soils & climates. distribution/range:

Culture: propagation: ①No pretreatment needed. Sow seeds just below the soil surface at 70°F. & water. (ew11) 2,790,000 (apl), 2,800,000 (stock), 2,800,000 (ew11) seeds per pound. Planted alone sow 0.4 oz per 1,000 sq ft.

cultivation: Plants on 12-15" centers.

Description: Perennial, 1-2', similar to WHITE YARROW, but reddish-pink flower clusters, blooming all summer. Does well planted with other yarrows or in mixes. Can be aggressive if sown too heavily. You will go to restoration hedoubletoothpicks. Drought resistant.

***Achillea ptarmica*** Linnaeus SNEEZEWEED, aka *ACHILLÉE PTARMIQUE*, *HERBE-À-ÉTERNUER*, *NYSÖRT*, SNEEZEWORD, *SUMPF-SCHAFGARBE*, *TYSYACHELISTNIK PTARMICA*, (*ptarmicus* -s -um from Greek *ptario* to sneeze)

Roadsides, disturbed sites, open fields & pastures, in sandy or gravelly soils or in moist to drying silty soils; 0–2400 m" (Trock in fna). distribution/range: Native of Eurasia, introduced & escaped in North America. Also naturalized in Australasia & South America. Established northwest, north, & east of our area.

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①“Sow at 20°C (68°F), germinates in less than two wks, thin cover, needs light, grow on at 10°C (50°F) (tchn). Leaf edges not finely cut; N 2n = 18. Blooms late June to mid September. Double flowered plants originated in cultivation, but persist in naturalized stands.



*Achillea ptarmica*

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

**ACTINOMERIS** Nuttall **WINGSTEM** ray parts, partially radiate, from Greek ακτις, ἀκτίς, *aktis, aktin*, a ray & μέρος, *meris*, a part, for the irregular rays. Leaves often decurrent. Achenes are compressed, flat, obovate, mostly winged, 2-awned. This genus is currently commonly included in *Verbesina* Linnaeus, section *Actinomeris*, which see. Mohlenbrock (2014) places *Actinomeris alternifolia* (L) Benth & *A helianthoides* (Michx) Nutt here.

**AGERATINA** Spach 1847 **MILK-POISON, WHITE SNAKEROOT** *Ageratina* Agerati'na (aj-er-a-TIE-na) a small *Ageratum*, from the generic name *Ageratum* & Latin *-ina*, feminine diminutive suffix. A large genus of about 250 spp of North America, Mexico, Central America, & Andean South America. This was formerly part of the broadly defined genus *Eupatorium*. x = 17.

**Ageratina altissima** (Linnaeus) King & HE Robins var **altissima** ☠ **WHITE SNAKEROOT**, aka **COMMON WHITE SNAKEROOT**, **COMMON MILK-POISON**, *EUPATOIRE RUGUEUSE*, **MILK POISON**, **RICHWEED**, **SNAKEROOT**, (*altissimus -a -um* altis'simus (al-TI-si-mus, or al-TIS-i-mus) highest, very high, very tall, tallest, the superlative of the Latin adjective *altus -a -um*, tall, high, or deep, with *-issimus -a -um*, the superlative suffix, meaning most so, to the greatest degree; most-, -est, such as largest, prettiest, whitest; formerly *rugosus -a -um* (roo-GO-sus) rugose, wrinkled, rough; covered with wrinkles, or thrown into wrinkles, from Latin *rugosus*, adjective, full of wrinkles, folds, or creases, from *ruga*, wrinkle, for the wrinkled leaves.) upl

**Habitat:** Most woodlands & savannas, dry-mesic to wet-mesic, including floodplains & other disturbed woodlands. Moist calcareous shaded places, rocky woods. **distribution/range:** Ubiquitous in Illinois.

**Culture:** ①“Excellent germination. Moist cold treatment, or fall sow. Light cover. Fair to good germination.” (mfd93) ②60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ③Seeds germinate after about 60 days of cold, moist stratification. Seeds need light to break dormancy & germinate. Plant on top of growing media & do not cover. (he99) ④Sow at 20°C (68°F), germination slow (tchn). 672,000; 756,000; 2,400,000 (pm02, jfn04, aes12), 2,910,256 (gnhm14), 2,945,454 (gnh12), 3,439,394 (gnmh11), 3,452,471 (gna03), 3,721,311 (gna04) seeds per pound. ++Mean 3,144,814. median 3,192,424, sd 440,320; max 3,721,311, min 2,400,000, r1,321,311 seeds per pound

**cultivation:** AES (2010) reports some salt tolerance.





bottom line: Seed spring or dormant, test data show little or no dormancy in 89% of lots, (66% dorm). Small seeds need light to germinate, surface sow or very shallow cover. Flipflop species & probable crossover species. Germ 68.4, 82, 84, sd 26.1, r12-91 (79)%. Dorm 20.4, 2.0, 0.0, sd 30.4, r0.0-85 (85)%. Test 26, 26, 25, r23-31 days. (#10).\*\*

Description: Native, erect perennial, 18-36", flowers white, opposite stalked leaves.

Comments: status: This sp is considered invasive or weedy in parts of its range or in certain applications (Haragan 1991, Stubbendieck et al 1994.) phenology: Blooms July to October. In northern Illinois, collect seeds in October. Collect seeds in se Wisconsin in November (he99). On 10/20/11, *E rugosum* in the woods behind our house is dead ripe! 15 feet away, there are several plants just off the bluestone & planting beds that are in the shadow of the house for a significant part of the day. These plants are in full bloom as opposed to the full-sun plants with dead ripe seeds. Such is the value of phenology & microclimates.

Calcareous, weedy, self-sows aggressively. Seed source nursery plantings genetic source savanna cemetery remnant, north of Mendota, LaSalle Co, & savanna remnant near Sheffield, Bureau Co.

Short (1845) recognized both *E ageratoides* L f and *E aromaticum* sensu Short (1845), &c, non L (1753) within this species, both "of frequent occurrence."

"Common & variable, growing in woods, thickest, fence-rows, yards, &c." (ewf55)

Associates: Attracts butterflies.

ethnobotany: This sp causes milk sickness, containing a toxin that is transmissible to humans through cow milk.

VHFS: For many years known as *Eupatorium rugosum* Houttuyn. Linnaeus called this *Ageratum altissimum*, in a distinct genus from *Eupatorium altissimum*. The varieties & synonyms are lengthy & confusing. [*E ageratoides* ??] Synonyms for the sp or var "altissima" [*Ageratum altissimum* L, non *E altissimum* L, *E rugosum* Houtt, *E r* Houtt var *chlorolepis* Fern, *E r* Houtt var *tomentellum* (BL Robins) Blake, *E r* Houtt var *villicaule* (Fern) Blake, *E urticifolium* Reichard var *tomentellum* BL Robins. Also seen as *E urticaefolium*.]

Also in Illinois is var *angustata* (Gray) Blake, ranging from Illinois to Texas & Louisiana [*Ageratina altissima* (L) King & HE Robins. var *angustata* (Gray) Clewell & Woot, or *E rugosum* Houtt var *angustata* (Gray) Blake].

Variety *roanensis* is south & east of our area [aka *A altissima* (L) King & HE Robins. var *roanensis* (Small) Clewell & Woot, *E roanense* Small, *E rugosum* Houtt var *roanense* (Small) Fern, *E urticifolium* Reichard].

Sw94 note that most Chicago area specimens can be referred to var *tomentellum* (B L Rob) S F Blake, having stems & petioles pubescent instead of glabrous.





*Ageratina altissima*

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

**AGOSERIS PRAIRIE FALSE DANDELION** *Agoseris* Ago'seris (a-GO-ser-is, or a-go-SER-is) from Greek *αγος*, *agos*, leader, chief, pollution, guilt, & *seris*, endive, chicory, succory, a pot-herb; allusion unclear. Western North America & South America. Alternately placed in *Microseris* or *Nothocalais*. See the latter. x = 9.

**AMBROSIA** Linnaeus 1753 **RAGWEED, HORSEWEED** *Ambrosia* (am-BRO-see-a) elixir of the gods, Greek, Dioscorides' name *ἀμβροσία*, *ambrosia*, food of the gods, divine, immortal, for *Ambrosia maritima* (divine food, food of the gods, immortality), with the fragrance of ambrosia, Latin, from Greek, literally, immortality, from *ambroto*, immortal, from *a-*, & Greek *mbrotos*, mortal, whence Greek *brotos*, *mortos*, mortal, & *-ia*, the food of the Greek & Roman gods, or the ointment or perfume of the gods. How ragweed relates to the food of the gods is strangely unclear. A genus of about 43 (40+) spp of annual & perennial herbs & shrubs, 22 spp in northern North America, originally native of the New World, now cosmopolitan. Formerly *Franseria* Cavanilles or *Hymenoclea* Torrey & A Gray. Wind pollinated, pollen is allergenic. *Ambrosia trifida* & *A artemisiifolia* are C3 plants (Ilpin).

**Ambrosia artemisiifolia** Linnaeus \*NOX IL, MI, OR COMMON RAGWEED, aka ANNUAL BUR-SAGE, ANNUAL RAGWEED, *ALTAMISA* (SP), *AMBRÓSIA* (PB), *AMBROISIE ANNUELLE* (F), *AMBROSIA DE HOJAS DE AJENJO* (SP), *ARTEMISIA* (PB), *ARTEMISIA DE TERRA* (SP), *BEIFUßAMBROSIE* (G), *BEIFUßBLÄTTRIGES TRAUBENKRAUT* (G), BITTERWEED, *BUTA-KUSA* (J), *CRAVORANA* (PB), HOGWEED, LOW RAGWEED, *LOSNA-SELVAGEM* (PB), *PETIT HERBE À POUX* (FC), RAGWEED, ROMAN WORMWOOD, *RÖMISCHER WERMUT* (G), SHORT RAGWEED, SMALL RAGWEED, *TRAUBENKRAUT* (G), *TUN CAO* (CH), WORMWOOD, (*artemisiifolius -a -um* (ar-tem-is-i-FO-lee-us) with leaves like WORMWOOD, SOUTHERNWOOD, *Artemisia*, from Latin *artemisia*, mugwort, & *folium, foli(i)*, n, noun, a leaf.) Thoreau called this plant ROMAN WORMWOOD.

distribution/range: Ubiquitous. Native of North & South America (exact native range obscure). Naturalized in Africa, temperate & tropical Asia, Australasia, N 2n = 34, 36. Europe, Hawaii. Species is known from every Illinois Co.

key features: "leaves twice-pinnatifid, nearly smooth; petioles ciliate; raceme terminal, paniced, stems virgate" (Wood).

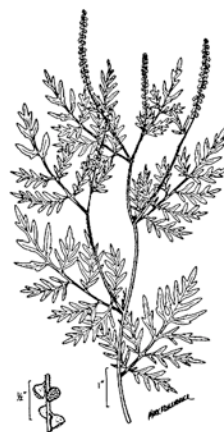
Comments: status: Noxious weed in Illinois, Michigan, & Oregon. This taxon is considered weedy or invasive in some parts of its range or under certain applications (Assorted authors. 200\_. State noxious weed lists for 46 states, Haragan 1991, Uva et al 1997, Stubbendieck et al 1994, SWSS 1998, Whitson et al 1996). C3. "Far more worthy of its English name, *Hogweed*, than its Latin name."

Associates: Provides food & cover for terrestrial birds. Fruits eaten by wild turkeys. Species is of low food value for large mammals.

VHFS: Illinois has variety *artemisiifolia* & the widespread variety *elatior*. *Ambrosia artemisiifolia* X *A psilostachya* [*A ×intergradiens* W H Wagner].



In Britton & Brown (1913), this is *Artemisia elatior*.

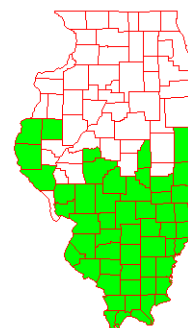


*Ambrosia artemisiifolia*

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

### ***Ambrosia bidentata* Michaux LANCELEAF RAGWEED**

“In the neighborhood of Springfield, again, & especially in the out-lots of that town, we found the ground covered, to the exclusion of every other vegetation, with a small sp of *Ambrosia* (*A bidentata*) which, at the season in which we saw it, being out of flower, & the ripening of its dark-colored seed, gave to the common an aspect as dreary as “the bleak & blasted heath where Macbeth met the witches” (Short 1845).



*Ambrosia bidentata*



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 of ILPIN.

***Ambrosia psilostachya* AP de Candolle WESTERN RAGWEED, aka CUMAN RAGWEED, *Herbe à poux vivace* (F), PERENNIAL RAGWEED, (*psilostachyus -a -um* psilostach'yus (sy-lo-STAY-kee-us) bare spike, from Greek ψιλός-, *psilos-*, bare, naked, empty, stripped of hair, smooth, & *stakhys*, a spike, or Greek *psiloo*, strip bare, become bare)**

**Habitat:** Prairies, plains, & uncultivated areas. Disturbed sand prairies & sandy old fields. **distribution/range:** Native of most of the USA & southern Canada.

**Culture: propagation:**

**Description:** N 2n = 18, 27, 36, 45, 54, 63, 72, 100-104, 108, 144. **key features:** “Similar in appearance to *Ambrosia artemisiifolia*, but with a creeping rhizome, & thicker, short-petiolate to such sessile leaves. (sic)”

(Ilpin) “Whitish with appressed woolly hairs; fruits hairy” (Wood).  
 Creeping, fibrous roots; leaves once pinnate; inflorescence 6.0” spikes  
 (Freckmann).

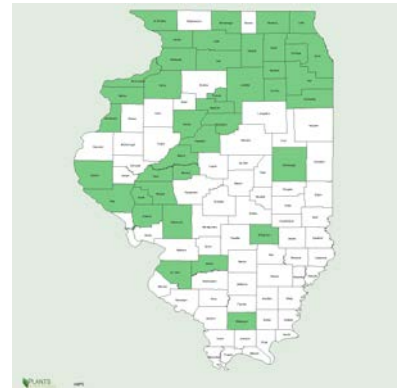
Comments: status: This taxon is considered weedy or invasive in some parts of its range or under certain applications (Stubbenieck et al 1994).  
phenology: Blooms C4 plant (Risser et al 1981, page 158).

“A perennial that is much less common than *A. elatior*. It is found on some of the dunes in Sugar River sand area, on the prairies west of Rockton & on the sandy prairies about Camp Grant. (*A. psilostachya* DC var *coronopifolia* (T & G) Farw)” (Ewf55 as *A. coronopifolia* T & G)  
 Reproduces by seed & rhizomes.

Associates: Species is of low to minor food value to large mammals & terrestrial birds. WESTERN RAGWEED may have beneficial allelopathic influence on some native prairie spp.

ethnobotany:

VHFS: [*Ambrosia californica* Rydb, *A. coronopifolia* T&G, *A. cumanensis* auct non Kunth, *A. psilostachya* DC var *californica* (Rydb) SF Blake, *A. psilostachya* DC var *coronopifolia* (T&G) Farw, *A. psilostachya* DC var *lindheimeriana* (Scheele) Blank, *A. rugelii* Rydb]



*Ambrosia psilostachya*

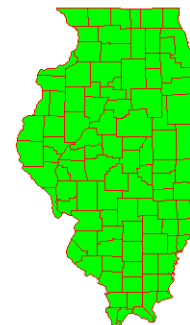
Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov.

**Ambrosia trifida** Linnaeus GIANT RAGWEED, aka BUFFALO WEED, GREAT RAGWEED, HORSE-CANE, HORSEWEED, (*trifidus -a -um* divided or cleft into three, with three parts, the division extending at least half way.) The plant is said to be greedily eaten by horses, hence the common name HORSEWEED.

distribution/range:

key features: “Sterile heads, short pedunculate, leaves palmately 3 to 5 lobed or undivided. Typical variety has petioles of at least upper leaves wing-margined, larger fruits, & ribs of fruit ending in short spines.” (Ilpin) “Leaves 3-lobed, fruits with 6 ribs ending below the conical summit” (Wood). C3.

“Particularly robust & abundant in rich prairie soil & in stream bottoms, much less common in the sand areas.” (ewf55)



*Ambrosia trifida*



*Ambrosia trifida*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy of ILPIN.

**ANAPHALIS** Augustine de Candolle **PEARLY-EVERLASTING** *Anaphalis* (a-NA-fa-lis) *Anaphalis* New Latin from an ancient Greek name for a similar plant, an *immortelle* (a composite with papery texture that dries well), or possibly, derived from generic name *Gnaphalium*. Herbs of north temperate regions having canescent foliage & small discoid heads of dioecious flower. Woolly perennials used for dried flowers. In the past, it was used medicinally for its reported anti-aphrodisiac properties. Give full sun & good drainage. Can be divided in spring.

***Anaphalis margaritacea*** (Linnaeus) Benth & Hook f or *A margaritacea* (Linnaeus) C B Clarke **PEARLY EVERLASTING**, aka **LARGE-FLOWERED LIFE-EVERLASTING**, **WESTERN PEARLY EVERLASTING**, *Wabigun*, flowers (Ojibwa), (*margaritaceus -a -um* pearly, pearl-like, the flower heads, from *Margarita*, a pearl.) upl

Habitat: Sunny oldfields to dry woods & dry forests. distribution/range:

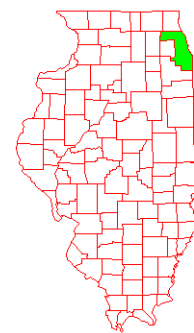
Culture: propagation: ① Germination pretreatments not sure? (pm) No pretreatment needed. Sow seeds just below the soil surface at 65°F & water. (ew11) ② Surface sow at 20°C (68°F), germinates in about two wks or so (tchn). 1,120,000 (wns2001), 3,522,000 (ew11) seeds per pound.

cultivation: Space plants 18-24".

Description: Hardy perennial to 3', an everlasting having floccose-woolly herbage & small corymbose heads with pearly white scarious involucre.

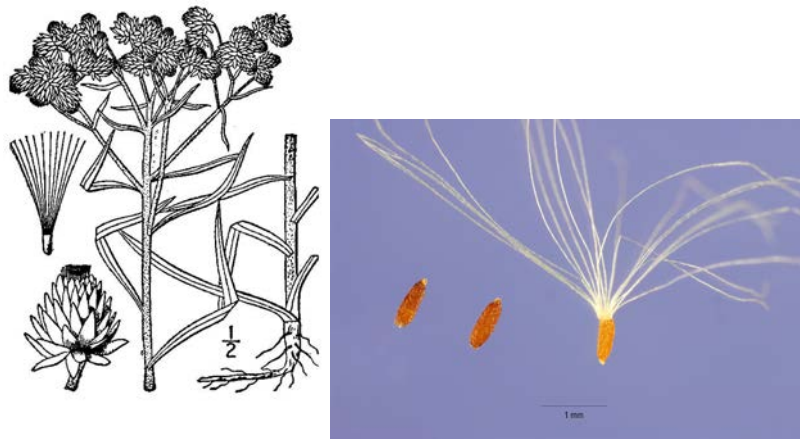
Comments: status: phenology: Blooms 7-9. White woolly, excellent ever-lasting, often dried colors. Very similar to *Gnaphalium obtusifolium*, which smells strongly like maple syrup. *A margaritacea* has no odor to speak of, participle dangling. Seed source southern Wisconsin. Attractive cut or dried flowers.

Associates: Food source for Painted Lady butterflies.



*Anaphalis margaritacea*

**ethnobotany:** Used as medicinal plant by Ojibwa for paralysis (sm32). Flowers smoked by Pottawatomie to drive away evil spirits that cause sickness (sm33). Used in 1600's by New England fishermen as tobacco substitute (jlh)



*Anaphalis margaritacea*

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 of ILPIN.

**ANTENNARIA** Gaertner 1791 **PUSSY-TOES, EVERLASTING, LADIES TOBACCO, ANTENNAIRE** *Antennaria* (an-ten-NAY-ree-e or an-ten-AH-ree-a) feeler, New Latin from Medieval Latin *antenna*, *antennae*, & New Latin *-aria*, connection to or possession of, for the resemblance of the clavate pappus hairs of the staminate plants to insect antennae, literally projecting like a boat's yard-arm the hairs of the pappus. The common name is from the resemblance of the inflorescence to the paws of a cat. About 70 spp of woolly or hoary herbs forming semi-evergreen mats that are natives mostly of temperate regions & have small whitish discoid flower heads & a pappus formed of a single row of club-shaped bristles. Dioecious, some members of the genus are parthenogenetic or apogamous. Apomixis has led to the formation of many races & ssp. *Antennaria* is a larval food of *Vanessa virginiensis* AMERICAN LADY BUTTERFLY. *A. parviflora*, direct sow in spring (pots). x = 14.

Dry seed should be placed in a ziplock & refrigerated until sown. Code A or Code B. Easy by division, in spring or summer after new rosettes have begun rooting. (cu00)

**Antennaria neglecta** Greene **CAT'S FOOT**, aka *ANTENNAIRE NEGLIGEE*, **FIELD PUSSEYTOES, PRAIRIE PUSSEYTOES**, (*neglectus -a -um* Latin neglected, disregard, overlooked, unobserved, insignificant.) upl

Habitat: Plains, grasslands, pastures, & open woodlands. distribution/range:

Culture: propagation: ①Seeds germinate after about 60 days of cold, moist stratification (he99). Sow at max 5°C (41°F), germination irregular, often several months (tchn).

3,360,000 (pm), 6,600,000 (usda), 12,800,000 (sh94) seeds per pound.

asexual propagation: Division of mature clones.

bottom line: Recalcitrant. Seed should be minimally dried (1 week), cleaned & immediately sown or stored in ziplock bag in a refrigerator. Seeds die quickly in conventional dry storage. Germ 2.0%. Dorm 95%. Test 39 days.\*\*

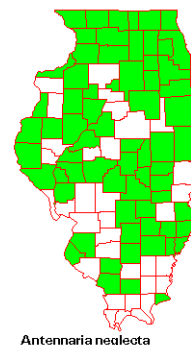
greenhouse & garden: Moist cold stratify or fall plant properly stored seed.

Description: N 2n = 28, a sexual diploid.

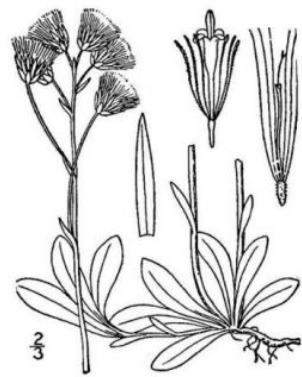
“*Antennaria neglecta* is a sexual progenitor of both the *A. howellii* & *A. parvifolia* polyploid complexes & has one of the more widespread ranges among the amphimictic spp in the genus in North America. Amphimicts generally have small ranges compared to those of the polyploid agamic complexes derived from them. Characteristic features of *A. neglecta* are its lashlike stolons that bear reduced leaves (except at the ends), flags on the distal cauline leaves, & basal leaves that are green-glabrescent with age (RJ Bayer & GL Stebbins 1982).” (fna)

Comments: status: phenology: Blooms 4. Seeds mature late spring. Collect seed June (he99). Ground cover, stoloniferous forms patches, excluding other sp, allelopathic. Genetic source Greenville Twp, Bureau Co, & Tampico Twp, Whiteside Co.

Uncopyrighted Draft



*Antennaria neglecta*



*Antennaria neglecta*

Line drawings Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy of ILPIN.

**Antennaria neodioica** Greene. LESSER CAT'S FOOT, aka *ANTENNAIRE NÉODIOÏQUE*, FIELD PUSSY-TOES, HOWELL'S PUSSY-TOES,

Habitat: "Pastures, dry fields, openings in woodlands & forests, & rock barrens & dry lake shores"(fna)

distribution/range: North ½ of the United States & southern Canada.

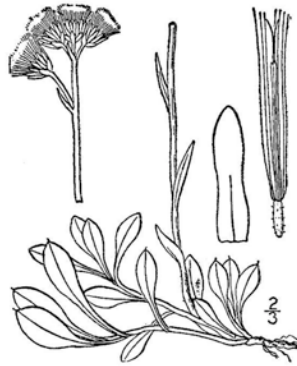
Culture: propagation:

Description:  $N 2n = 56$ . key features:

Comments: status: phenology: Blooms mid-spring to early summer.

Associates: ethnobotany: Used as medicinal plant by Ojibwa (sm32).

VHFS: Usually included with *A neglecta* as var *neodioica* (Greene) Cronquist "a local variant that has short, merely decumbent leafy stolons, as opposed to the long, remotely-leafed procumbent stolons of *A neglecta* (sw94). Alternately *Antennaria howellii* Greene ssp *neodioica* (Greene) Bayer.



*Antennaria howellii* ssp. *neodioica*

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

**Antennaria parlinii** PARLIN'S PUSSEYTOES

Habitat: Forests. distribution/range: Ontario.

Culture: propagation:

Description: flowers white, key features:

Comments: status: phenology: Blooms early spring, one of the first plants to bloom. Shady ground cover. "*A parlinii* is of multiple hybrid origin, includes sexual & asexual populations, & is derived from *A plantaginifolia*, *A solitaria*, & *A racemosa*" (w11).

Associates: Host of PAINTED LADY BUTTERFLY.

ethnobotany:

VHFS:

**Antennaria plantaginifolia** (Linnaeus) Richardson PUSSY TOES, aka EVERLASTING, MOUSE-EAR, PLANTAIN PUSSYTOES, PLANTAIN-LEAVED PUSSY-TOES, WOMAN'S TOBACCO, (*plantaginifolius -a -um* New Latin plantain-leaved, from Latin *Plantago*, plantain, & *folium, foli(i)*, n., a leaf.) upl

Habitat: In most prairies & open woods. distribution/range:

Culture: propagation: ①Moist cold stratify or fall plant. 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. (pm09) ②Fall plant or cold stratify at 40°F for 2 weeks. Sow just below the soil surface at 45°F & water. Slow. Moderately difficult. (ew11) ③Sow at max 5°C (41°F), germination irregular, often several months (tchn). 4,440,000 (pm02, ew11, aes12), 4,536,000 seeds per pound.

asexual propagation: Division of mature clones.

cultivation: Space plants 1.0-1.5' or greater. Mesic to dry soils, full sun to partial shade.

bottom line: Recalcitrant. Seed should be minimally dried (1 week), cleaned & immediately sown or stored in ziplock bag in a refrigerator. Seeds die quickly in conventional dry storage. Total viability after 1 year dry storage was 11%. Germ 18%. Dorm 78%. Test 35 days. (\*1:3)\*\*

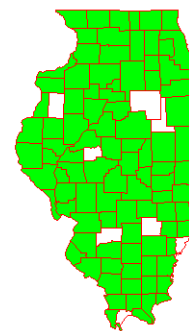
Description: Erect perennial, 4.0-8.0", rhizomatous, leaves fuzzy on top, 3-5(7) prominent veins, flowers white, dioecious.  $N 2n =$  , a sexual diploid.

Comments: status: phenology: Blooms 4,5,6. Seeds mature late spring, early summer. A most righteous native ground cover, but keep away from major grasses, also good in rock gardens. Genetic source Whiteside Co.

Associates: Larval host *Vanessa virginiensis* AMERICAN LADY BUTTERFLY. Walnut tolerant.

ethnobotany:

VHFS: Sw94 notes local variants var *parlini* (Fern) Cronquist & var *ambigens* (Greene) Cronquist (includes *A munda* & *A fallax* of Fernald (1950))



*Antennaria plantaginifolia*





*Antennaria plantaginifolia*

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

*Anthemis arvensis* L. MAYWEED

*Anthemis cotula* L. DOG-FENNEL, aka STINKING CHAMOMILE

“At some places between Peoria and Springfield the road-sides and even the beaten path, were so completely covered with little *Boebera chrysanthemoides* (*Dyssodia papposa* (Vent.) Hitchc.), that, trodden under our horses’ feet, it exhaled a strong and nauseating odor. In many such localities, this noisome weed seems to take the place of the *Anthemis cotula* and *A. arvensis* (Mayweed and Dog-fennel,) in the more settled portions of the Western States.” (Short 1845)



*Anthemis cotula*

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

**ARCTIUM** Linnaeus 1753 **BURDOCK, COCKLEBUR, COCKLEBURR** *Arctium* (ARK-tee-um) New Latin, from Greek *arktios*, a plant, probably from Greek *αρκτος*, *arktos*, bear, because it is a real bear to eradicate from natural areas. More likely from the rough involucre. The common name cocklebur is generally reserved for *Xanthium*. Old World coarse biennial (& perennial?) herbs distinguished by the bristly receptacle of the flower heads & by the hooked involucre bracts. Some spp have been used as food or medicine, some escaped & became weeds of waste places. Purple to white flowers, burr seed coats. Formerly *Lappa*.

*Arctium lappa* Linnaeus GREAT BURDOCK (*lappa* a bur, New Latin, from Latin name for a burr, or rough.) UPL  
Habitat: Waste ground. distribution/range: Native of Eurasia.

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

Comments: status: phenology: Blooms 7,8,9.

*Arctium minus* Schkuhr COMMON BURDOCK, [including *A minus laciniatum*] (*minus* Latin smaller, lesser.) upl

Habitat: Introduced from Eurasia, locally abundant in abused pastures, dumps, barnyards, high nitrogen soils  
Comments: status: phenology: Blooms 7,8,9. C3. COMMON BURDOCK can be difficult to eliminate from rich soils in partial shade.

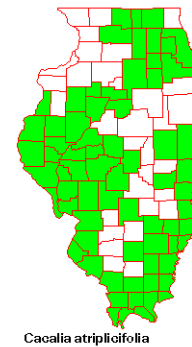
**ARNOGLOSSUM** Rafinesque 1817 INDIAN PLANTAIN *Arnoglossum* from Greek for *apvoç*, *arnos*, a lamb, & *γλωσσος*, *glóssos*, tongue, an ancient name for some sp of *Plantago*, HARE'S-FOOT PLANTAIN. A genus of about 8 spp of herbs of eastern North America. *Arnoglossum* is a good example of the genera proposed by Rafinesque that were then abandoned but subsequently reconsidered & reinstated. Formerly part of the broadly defined *Cacalia* Linnaeus. At various times placed in *Conophora* (de Candolle) Nieuwland or *Mesadenia* Rafinesque.

**Arnoglossum atriplicifolium** (Linnaeus) HE Robinson PALE INDIAN PLANTAIN, aka ORACH CARAWAY (*atriplicifolius -a -um* (locally a-tri-plic-si-FO-lee-us, properly a-tri-plic-ki-FO-lee-us,) with leaves of *Atriplex*, orache, from Latin *Atriplex* & *folium, foli(i)*, n., noun, a leaf.) Upland

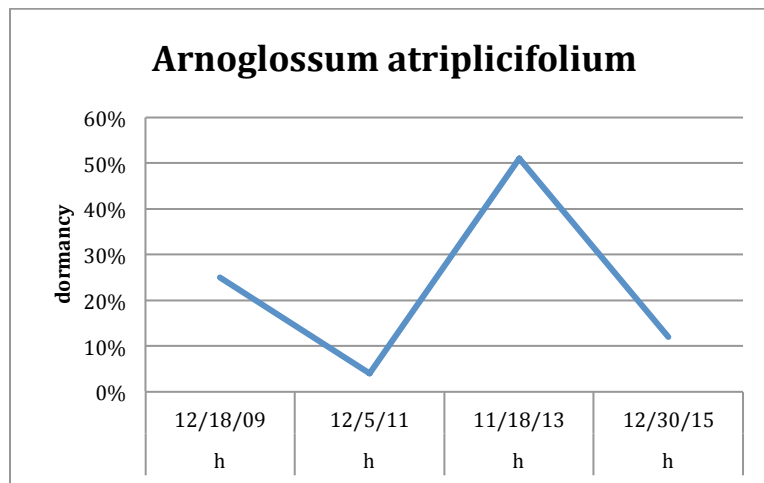
Habitat: Dry to dry-mesic prairies & savannas. In the se USA, “mesic forests, woodland edges, clearings, common” (w11). distribution/range:

Culture: ①60 days cold moist stratification (pm09). ②Seeds germinate after about 60 days of cold moist stratification (he99). ③Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). ④30 days moist stratification improves greenhouse germination, but not necessary. Field sow fall, early spring. (pnnd). 96,000 (pm02), 97,175 (gnh13), 104,000 (pn02, jfn04), 112,655 (gnha12), 193,350 (gnhml) seeds per pound. ++mean 120,739, median 104,000, sd 36,838, max 193,350, min 96,000, range 97,350 seeds per pound.

bottom line: Limited test data indicate dormant seeding will significantly increase germination in 1/4 of lots. Germ 68, 77, na, sd 25.3, r26-92 (66)%. Dorm 23, 18.5, na, sd 17.8, r4.0-51 (47)%. Test 22, 16, na, r11-40 days. (#4:5)\*\*



*Cacalia atriplicifolia*



Description: Erect perennial, 3.0-6.0', leaves whitish beneath, white buds & flowers, N 2n = 50, 52, 56.

Comments: status: phenology: Blooms 7,8,9. In northern Illinois, collect seeds in October - early November. Landscaping, aggressive, self sows. Collect seeds in se Wisconsin in September - October (he99). Genetic source LaSalle Twp, LaSalle Co.

VHFS: For many years known as *Cacalia atriplicifolia* Linnaeus. In Britton & Brown (1913), this plant is called *Mesadenia atriplicifolia*. [*Arnoglossum atriplicifolium* (L) H Rob, *Cacalia atriplicifolia* L, *C paniculata* Raf, *Conophora atriplicifolia* (L) Nieuwl, *C similis* (Small) Nieuwl, *Mesadenia atriplicifolia* (L) Raf, *M pulverulenta* Raf, *M rotundifolia* Raf, *M similis* Small, *Senecio atriplicifolius* (L) Hooker]



*Arnoglossum atriplicifolium*

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

**Arnoglossum plantagineum** Rafinesque \*MI, MN, WI, TN PRAIRIE INDIAN PLANTAIN, aka FEN INDIAN-PLANTAIN, GROOVESTEM INDIAN-PLANTAIN, GROOVESTEM INDIAN PRAIRIE PLANTAIN, TUBEROUS INDIAN PLANTAIN, (*plantagineus -a -um* plantain-like, like *Plantago*, from *Plantago* & *-ineus -a -um*, denoting a close resemblance, for the plantain-like leaves.) Facultative

Habitat: Hill prairies & wet meadows. Mesic & wet-mesic prairies. Full sun, medium soils. Glades, rocky open woods, thickets, & roadsides. Apparently known to grow in fens, as indicated by a common name. “Wet prairies & pastures, usually in boggy areas in north, 0–600 m” (Anderson in fna). distribution/range: Known from but not mapped in Bureau County.

Culture: ① “Sow in flats in fall & over winter, or fall sow. Moist cold treatment is recommended but in my experience, fall sowing is better. Light cover. Unreliable & low germination.” (mfd93). ② 60 days cold moist stratification. (pm09) ③ Fall plant or cold stratify for up to 2 to 3 months for best results. Sow just below the soil surface at 70°F & water. (ew11) ④ Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). ⑤ Moist cold stratify 3-4 month @ 34-36°F (Horvath et al 2001). 75,200 (pm02), 84,800 (ew11), 95,008 (jfn04), 102,400 (aes12), 103,088, 108,808 (gnam04), 111,262 (gnam04), 126,315 (gnhm11), 148,429 (gnhm14) seeds per pound. ++mean 105,739, median 102,400, sd 20,610, max 148,429, min 75,200, range 73,229 seeds per pound.

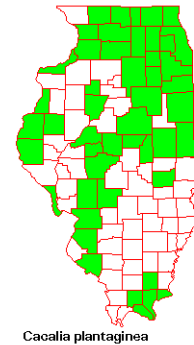
“*Cacalia tuberosa* Moist to mesic prairie. Blooms late June, early July, WHITE. Harvest late July. 2', method #1, but germination low. Successful by SEEDLING TRANSPLANT, with flowers 2nd year. A quality plant, most attractive while in bud.” (rs ma)

asexual propagation: Thrives with division of mature clumps.

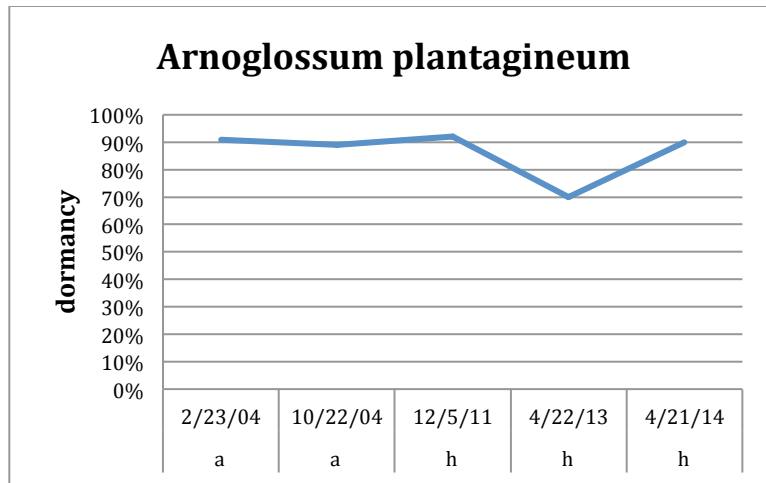
cultivation: Space plants 1.5-2.0' on center. Plants must be divided every few years. Calcareous soils.

bottom line: Dormant seeding is required. Some lots may be of low viability. Consistently strongly dormant. Germ 5.0, 4.0, na, sd 3.9, r1.0-12 (11)%. Dorm 86.4, 90, na, sd 8.3, r70-92 (22)%. Test 43, 36, 34, r28-83 days.\*\*

greenhouse & garden: Moist cold stratify or fall plant.



*Cacalia plantaginea*



**Description:** Native, erect, herbaceous, perennial forb, from tubers, stems 3.0-4.0', branched near the inflorescence, leaves broadly ovate, thick, 'waxy', parallel veins, white buds & flowers.  $N 2n = 54$ .

**Comments:** Special concern in Michigan (?). Threatened in Minnesota & Wisconsin. Special Concern Tennessee. **phenology:** Blooms 6,7,8. In northern Illinois, collect seeds in late August - September. Collect seeds in se Wisconsin in September - October (he99). Landscaping, produces numerous offsets.

Our original plants were salvaged by NRCS District Conservationist Don Presztch (a USDA plant materials specialist & co District Conservationist) from a south facing hill prairie/oak woodland on the moraine in Greenville Twp, Bureau Co (a co record). SIDE OATS GRAMMA was growing with the plantain. Go figure. Very attractive cut flower when cut in the bud.

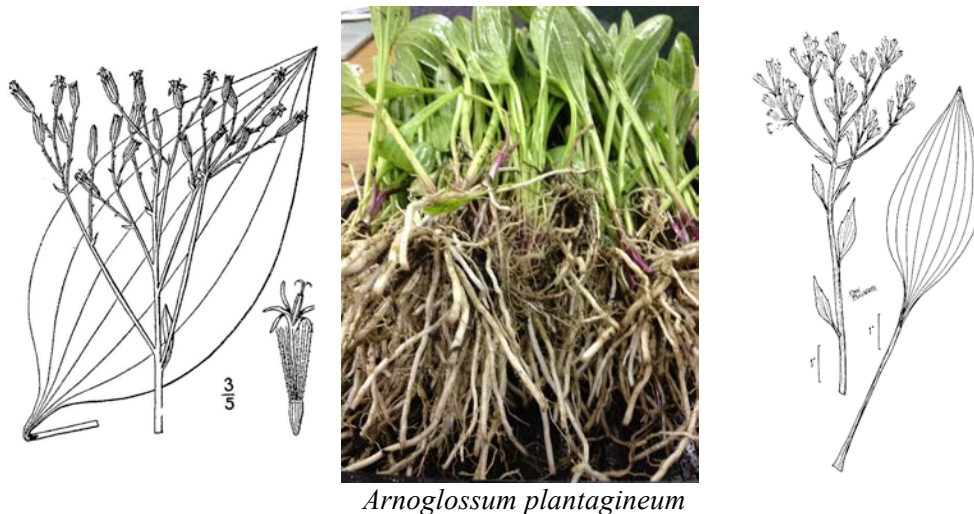
**Associates:** Flowers attract birds, bees, butterflies, moths, & wasps. Flowers are visited by bees, *Sphecodes dichroa*, Parasitic Halictid Bee sp, wasps, *Myzinum quinquecincta* Five-Banded Tiphid Wasp, butterflies, *Lycaena hyllus* BRONZE COPPER BUTTERFLY, moths, *Cisseps fulvicollis* YELLOW-COLLARED SCAPE MOTH, & plant bugs, *Lygaeus turcicus* LYGAEIS BUG sp. Sp is finicky about pollinators & seed set. It sets abundant seed on one farm, but very little in another farm.

Individual clumps may decline & be short lived without division. Someone or something must have disturbed or eaten these tubers, keeping them in a "semi-cultivated" state. Bears do this with tuberous native spp out west. With our genetic material, each plant consists of a multi-stem 'clump' made of several tubers, each tuber having a bud. After a season's growth, a bud develops on opposite ends of each tuber, the center deteriorates, and 2 new tubers are formed. At the end of the second year's growth, there are 4 tubers where there was one at the start of the first year, next year 8, &c. The tubers become numerous, smaller, & crowded, while the flowering culms become fewer. In a few years, tubers may struggle to produce a stunted leaf & no flowers.

**VHFS:** For many years known as *Cacalia tuberosa* Nuttall, then as *Cacalia plantaginea* (Raf) Shinnery. In Britton & Brown (1913), this plant is called *Mesadenia tuberosa*. [*Arnoglossum plantagineum* Raf, *Cacalia paniculata* Raf, *C pteranthes* Raf, *C tuberosa* Nuttall, *Mesadenia tuberosa* (Nutt) Britt]

[http://www.illinoiswildflowers.info/prairie/plantx/pr\\_ind\\_plantainx.htm](http://www.illinoiswildflowers.info/prairie/plantx/pr_ind_plantainx.htm)





*Arnoglossum plantagineum*

Note the tuberless stage of bare root transplants.

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Illinois map courtesy of ILPIN

**Arnoglossum reniforme** (Hooker) HE Robinson GREAT INDIAN-PLANTAIN, aka MÜHLENBERG'S CACALIA, (*reniformis* -is -e renifor'mis (ren-i-FOR-mis) renifor'me (ren-i-FOR-mee) New Latin kidney-shaped, with the form of a kidney, from Latin *ren*, *renis*, m., a kidney., & *-formis* -is -e, New Latin, -shaped, from the verb *formo*, *formare*, *formavi*, *formatus*, form, shape, fashion, model; specific epithet formerly *muhlenbergii* New Latin, from Gotthilf Heinrich Ernst *Muhlenberg* (1753-1815), American German Lutheran minister & pioneer botanist, born in Trappe, Pennsylvania & educated in Halle, Germany, who studied botany & other natural sciences in his spare time, & New Latin *-ia*. He was the first president of Franklin College, published a flora of Lancaster, Pennsylvania, & posthumously, a manuscript on grasses. The accepted spelling for *Carex muehlenbergii* & *Quercus muehlenbergii*, named for the same individual, has changed. His second name is sometimes seen as Henry.)

Habitat: Mesic to wet mesic savannas & woods. In the se USA, “cove forests, other mesic forests” (w11). distribution/range:

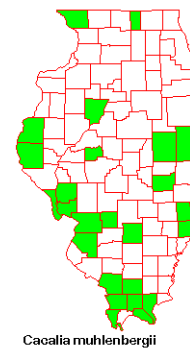
Culture: ①Cold moist stratify for 60 days (Wade). ②Seeds germinate after about 60 days of cold moist stratification (he99). 64,000 (pm02), 86,417 (gn13), 120,000 (jfn04) seeds per pound.

Bottom line: Initial datum indicates dormant seeding is not always needed. Germ 66%. Dorm 13%. Test 34 days.\*\*

Description: Erect perennial, 3-9', leaves not whitish beneath, flowers white,  $n 2n = 50$ .

Endangered in New Jersey. Blooms June - September. In northern Illinois, collect seeds in October - early November. Collect seeds in se Wisconsin in October (he99).

VHFS: For many years known as *Cacalia muhlenbergii* (Schultz 'Bipontinus') Fern. In Britton & Brown (1913), this plant is called *Mesadenia reniformis*. [*Arnoglossum reniforme* (Hooker) HE Robinson, *A muhlenbergii* (Sch Bip) H Rob, *Cacalia reniformis* Muhl ex Willd, non Lam, *Mesadenia reniformis* (Hook) Raf, *M muhlenbergii* (Sch Bip) Rydb, *Senecio atriplicifolius* Hook var *reniformis* Hook, *S muhlenbergii* Sch Bip]



*Cacalia muhlenbergii*



*Arnoglossum reniforme*

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

**ARTEMISIA** Linnaeus 1753 **WORMWOOD, MUGWORT, SAGE** *Artemisia* Artemi'sia (ar-tem-EE-see-a, ar-te-MIS-ee-a, ar-te-MIZ-ee-uh, or ar-tay-MIS-ee-a) New Latin *Artemisia*, from Latin *artemisia*, mugwort, from Greek, *Artemisia*, ἀρτεμισία, ἀρτεμισία, mugwort, probably irregular from *Artemid-*, *Artemis* & *-ia* after the Greek Moon goddess & goddess of the hunt, *Artemisia*, often portrayed as a virgin huntress. *Artemisia* was one of the names of the goddess Diana. Alternately, *Artemisia*, queen of Anatolia. Gledhill cites this as Dioscorides name for *Artemis*, (Diana) wife of Mausolus, of Caria, Asia Minor. *Artemisia dranunculus* is tarragon, Arabic *tarkhun*.

Vermouth is a fortified wine flavored with *Artemisia*, and other herbs, roots, bark, seeds, & spices. In fact, Vermouth is a corruption of WORMWOOD, or Vorm Vood, with a Bela LaGosi accent. The common name MUGWORT is a reference to WORMWOOD'S use in flavoring beer before hops were used.

Shrubs & herbs widely distributed in temperate & cool regions & having strongly scented foliage & small rayless flower heads. Fruits are achenes with a small disk, pappus 0. The Native Americans had in the plants that grew around them, a wide variety of technological, medicinal, culinary, & ceremonial tools. In the Midwest, four sacred plants were used in worship as incense & are still used today. They are sweet grass, sage, cedar, & tobacco. As some Indians adopted Christianity, these plants were incorporated into Christian worship.

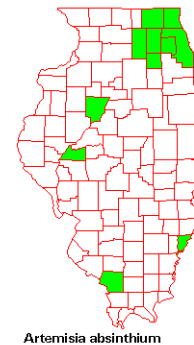
Seeds are very small & ripen late fall. Seeds need dry storage to after ripen, store in an envelop in the refrigerator until sowing in spring. Surface sow. Code A seeds will germinate within 4 weeks sown at 70°F, and H seeds require light to germinate. Cuttings will root, but stems and leaves rot under mist and heavy media. (cu02)

***Artemisia absinthium*** Linnaeus is listed by Densmore (1928) **WORMWOOD**, *Muse'odji'bik*, meaning worm root. (from classical Latin *absinthium*, *-i*, n wormwood, absinth(e), from Lucretius.) The common name ABSINTH has also been applied many North American *Artemisia* spp, especially *A tridentata*, COMMON SAGEBRUSH.

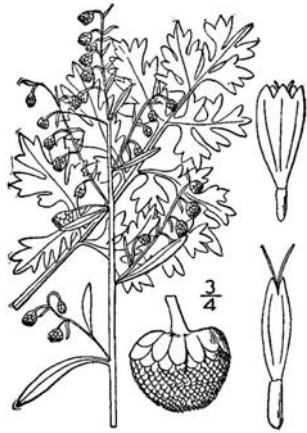
distribution/range:

Ⓞ Sow at 20°C (68°F), germinates in less than two wks (tchn).

Associates: ethnobotany: Used as medicine for sprains. Leaves & flowering tops are tonic, stomachic, stimulant, febrifuge, & anthelmintic, also noted for its intensely bitter taste. Absinthe is a highly alcoholic, bitter, anise-seed flavored spirit, usually greenish, distilled from wine, & flavored with *Artemisia absinthium* & other herbs, served mixed with sugar water. WORMWOOD contains small amounts of the neurotoxin thujone, which is also in sage & tansy. (oed)



*Artemisia absinthium*

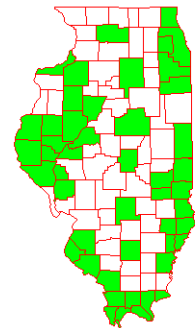


Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image.

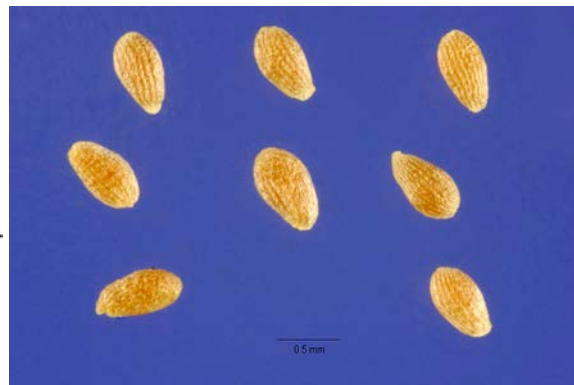
**Artemisia annua** Linnaeus SWEET ANNIE, aka ANNUAL MUGWORT, SWEET WORMWOOD, (*annuus -a -um* Latin a year, year-old, yearly, annual, lasting a year, within a year.) facu Annual, distribution/range:

An early introduction from Europe,

No treatment, medicinal (anti-malarial), grown for fragrance, used in potpourris, & used as a filler in dried floral arrangements.



Artemisia annua



*Artemisia annua*

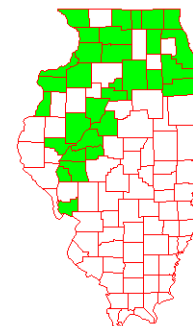
Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Illinois map courtesy of ILPIN.

**Artemisia campestris** Linnaeus subsp **caudata** (Michaux) HM Hall & Clem. BEACH or TALL WORMWOOD, aka FIELD SAGE-WORT, FIELD WORMWOOD, THREADLEAF SAGEWORT, WESTERN SAGEBRUSH, WILD WORMWOOD, (*caudatus -a -um* (kaw-DAY-tus) caudate, tailed, with a tail, from the long tipped panicle, from *cauda* (*coda*, *codae*) f, the tail of an animal.) upl

Habitat: Open, sterile, dry sandy prairies with low grass densities. distribution/range:

Culture: propagation: ①No treatment. Germination pretreatments not sure? (pm)?

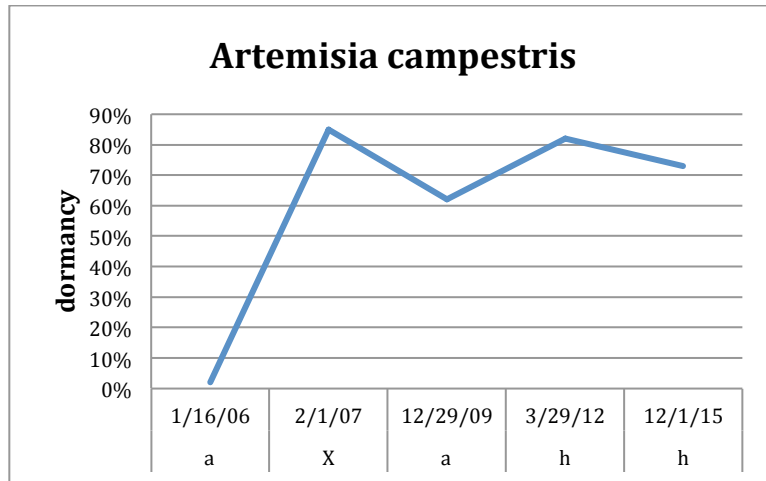
②No pre-treatment needed. Sowing outdoors in the spring is the easiest method. Seeds need light to break dormancy & germinate. Plant on top of growing media & do not cover. (he99 as *Artemisia campestre*) No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) ③No pre-treatment needed. Sowing outdoors in the spring is the easiest method, or seeds germinate after about 60 days of cold, moist stratification (he99 as *Artemisia caudata*). 4,000,000 (pm02 & ew11), 5,531,707 (gnh11), 5,570,552 (gn05) seeds per pound.



Artemisia campestris

cultivation: Space plants 24-36(?).

bottom line: Genesis test data indicate 80% of lots require dormant seeding. All tests since 2007 show dormancy 62-85%. Germ 19.6, 19, na, sd 11.9, r8.0-41 (33)%. Dorm 60.8, 73, na, sd 30.5, r2.0-85 (83)%. Test 34, 36, na, r26-38 days. (#6).\*\*



Description: Erect biennial/perennial, plant grayish, slightly aromatic, 1-4' tall, flowers yellow-green,

Comments: status: phenology: Blooms July - October. Collect seed October. Sometimes host of *Orobranche fasciculata*. In our area, *Orobranche* host is *Chrysopsis*. Biennial, rarely perennial, first year growth is a silvery-blue-green mound of finely divided leaves. Species adds a strong structural & textural element in dry sandy prairies, with lacey, silver-green tufts in spring & light green vertical accents turning brownish gold in the fall. First year growth is highly ornamental. Pioneering sp, abundantly self sows on open sands to the point of being aggressive. Seed source nursery production, genetic source Shaw Station, Lee Co.

“Other common plants, which presented themselves at different places on our route through the prairies.” *Artemisia campestris* L subsp *caudata* (Michx) HM Hall & Clem. as *Artemisia caudata* Michx. (Short 1845).

VHFS: For many years this was known as *Artemisia caudata* Michx, which is maintained by Mohlenbrock (2014).



*Artemisia campestris*

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

***Artemisia canadensis*** Michx CANADA WORMWOOD, (*canadensis* -is -e (kan-a-DEN-sis) of or from Canada or the north-east USA, of Canadian origin.)

Habitat: Gravels, sands, & on calcareous rocks & cliffs. distribution/range:



**Artemisia dracunculus** Linnaeus \*IL FALSE TARRAGON, aka DRAGON SAGEWORT, DRAGON WORMWOOD, ESTRAGON, FRENCH TARRAGON, WILD TARAGON, (*dracunculus -a -um* (dra-KUN-kew-lus) from Latin (Greek?) *dracunculus*, a small dragon, the words tarragon & dragon have the same derivation) upl

The unscented, culinary RUSSIAN TARRAGON is sometimes called variety *inodorus* (in-o-DO-rus) meaning unscented. Also called MUGWORT. This was an important plant to the Ojibwa. They gave it the following names: *Bu'giso'win*, swimming (bath), *Ba'sunukuk*, no translation, *Jin'gwakwan'dug*, pine, *I'ckode'bug*, fire leaf, *Ba'sibuguk*, small leaf, *O'gima'wuck*, chief medicine.

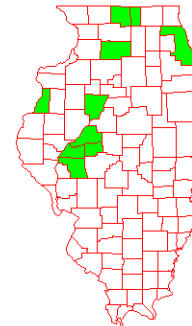
distribution/range:

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

Associates: ethnobotany: Not native to the Pottawatomie but planted by them. Used as medicinal plant by Ojibwa & Pottawatomie (den28, sm33) Ojibwa for dysentery, &c. (den28)

Used as topical irritant & diaphoretic. Adventive in Illinois, but a plant that the Pottawatomie are known to have moved & planted near their habitations elsewhere. Generally considered a western sp, *but*, it was known from New Amsterdam in the 1630's. Culinary herbs & wild plants! Medicinal & edible.

VHFS: [*A dracunculoides* Pursh, *A glauca*]



Artemisia dracunculus



Artemisia dracunculus

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 of ILPIN

### Artemisia dracunculus sativa

“*Draco dormiens nunquam titillandus*”

**Artemisia frigida** Willdenow \*WI PRAIRIE SAGEWORT, aka PRAIRIE SAGE, PRAIRIE SAGEBRUSH, PRAIRIE SAGEWORT, FRINGED SAGEBRUSH, FRINGED SAGEWORT, FRINGED WORMWOOD, NORTHERN WORMWOOD, PASTURE OR PRAIRIE SAGE, SILKY WORMWOOD, SWEET SAGE, *Bi'jikiwin'guck*, cattle herb (Ojibwa), (*frigida -a -um* (FRI-gi-dus) cold, of cold regions, growing in cold places, frosty, stiff.)

Habitat: Thin dry soils, full sun. distribution/range: Adventive along a railroad in in Cook Co. Native to western North America & Siberia.

Culture: ☉ No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) 3,600,000 (appl & ew11) seeds per pound.

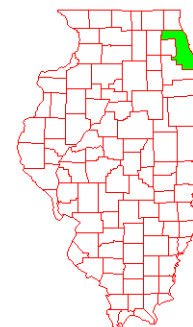
cultivation: Space plants 12-18”.

Description: Attractive, rhizomatous, mat-forming, sub-shrub, to 1.0' tall, foliage gray green velvety;

Comments: status: Special Concern in Wisconsin. phenology: Blooms Useful in landscaping.

Associates: Fair palatability to livestock & good for wildlife.

Uncopyrighted Draft



Artemisia frigida

**ethnobotany:** Not native to Pottawatomie territory but planted by them. Used as medicinal plant by Ojibwa & Pottawatomie (den28, sm33). Used by Ojibwa for convulsions, hemorrhage, tonic & “antidote” & noted for its used as tonic, & for headache, general medicine, & indigestion among the Chippewa, Sioux, Missouri river tribes, & Tewa respectively (den28).



*Artemisia frigida*

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 of ILPIN.

**Artemisia glauca** Pall. SMOOTH SAGE, (*glaucus -a -um* gray, bluish-green or gray, covered with ‘bloom’, from Latin *glaucus -a -um* bluish- or greenish-gray, from Greek γλαυκός, *glaukos*.)

**distribution/range:** See *A. dranunculus*.

**Associates:** **ethnobotany:** Used as medicinal plant by Ojibwa (den28).

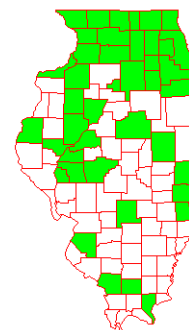
**Artemisia gnaphalodes** Nuttall WHITE MUGWORT, *Nokwe'jigun*, something soft (Ojibwa), (*gnaphalodes* gnaphalium-like).

“This variety with leaves more often entire, densely and permanently tomentose above and below. Most characteristic sage of true prairies. Roadsides and along railroads. Somewhat drier and more open sites than *A. ludoviciana* typical variety.” (Ilpin)

**Associates:** **ethnobotany** Used as medicinal plant by Ojibwa as antidote (den28). Noted for stomach trouble. Also used as a charm. Allergenic.

**VHFS:** Aka *Artemisia ludoviciana gnaphalodes*. [*A. ludoviciana* subspecies *albula*. (Wooton) D. Keck.] Included in the following.

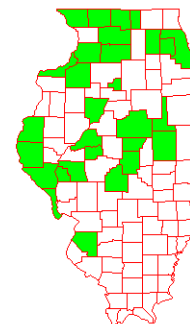
Illinois map courtesy of ILPIN.



*Artemisia ludoviciana gnaphalodes*

**Artemisia ludoviciana** Nuttall PRAIRIE SAGE, aka *ARMOISE DE L'OUEST*, DUSTY MILLER, LOUISIANA SAGEBRUSH, LOUISIANA SAGEWORT, NATIVE WORMWOOD, SILVER SAGE, SILVER WORMWOOD, WESTERN MUGWORT, WHITE SAGE, WHITE SAGEBRUSH, (*ludovicianus -a -um* (classically loo-do-wik-ee-AH-nus, or loo-do-vik-ee-AH-nus) of Louisiana, or St. Louis, the western USA at that time, a reference to King Louis XIV (named by La Salle), & by extension, to the Louisiana Territory (or Louisiana Purchase) or a reference to the State of Louisiana, also named after King Louis. French *Louis* becomes *Ludwig* in German, & *Ludovic* in Latin, said to mean famous warrior, or famous fighter.) upl

**Habitat:** In northwest Illinois, WHITE SAGE grows in sand & dry prairies, & sandy savannas, primarily near major rivers, presumably where it was introduced by Native Americans. Even many of the roadsides & railroad prairies where we have seen it growing are near major waterways & potentially near Native American habitation sites. We have noted several locations along the Rock River, such as Green Rock, Joslin, Nelson, & Spring Hill, or on a high dune complex with scenic overviews of a



*Artemisia ludoviciana*

drained peat bog in the Winnebago (Hochunk) Swamp at Normandy, on the bluff of Franklin Creek at Nachusa Grasslands, & on prairie bluffs of the Illinois River near Ottawa. We have not seen it in other settings. It does not have conservative native associates. Adapted to a variety of soils. Not a native plant but a native prehistoric introduction. distribution/range:

Culture: ①Seed needs no treatment, light. 30 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. (pm09) ②No pretreatment needed. Sow seeds on the soil surface at 70°F & water. (ew11) ③Sow at 20°C (68°F), germinates in less than two wks (tchn). Behaves as a pioneer, establishing easily, even on harsh sites. 3,632,000 (sh94), 4,000,000 (pm02, ew11), 4,203,704 (gnam11), 4,390,400 (wns01) seeds per pound. ++mean 4,056,526, median 4,101,852, sd 281,314, max 4,390,400, min 3,632,000, range 758,400 seeds per pound.

asexual propagation: Division of mature plants in spring, stem cuttings.

cultivation: Space plants 15-18" or more.

bottom line: Genesis test data indicate some lots are only slightly dormant. Germ 86.5, 86.5, na, r84-89 (5)%. Dorm 6.5, 6.5, na, r4.0-9.0 (5.0)%. Test 20 days.\*\*

Description: Herbaceous, rhizomatous, "native" half-shrub, 2.0-4.0' (Granite seed lists it at 1-2' tall, & we have a form that is 6-10 inches tall.) 2n = 18, 36, 54.

Comments: status: phenology: Blooms 7,8,9. Collect seed October. Attractive woolly-white foliage. Aromatic, may be aggressively rhizomatous forming solid clones, or may grow as an interstitial plant, a stem here, & a stem there. Fair forage for livestock & wildlife. Genetic source Whiteside Co. Commercial varieties of seed are also available!

This is certainly not a plant for de novo restoration of mesic prairies in Chicago, as can be seen in some catalogs. This is a Midwest native plant established by Native Americans centuries ago, but it is not a prairie plant in northern Illinois. As of 2009, Illinois Pheasants Forever was putting this sp in their Illinois mixes. A bunch of dumb asses bought a bill of goods from somebody. Blatant ignorance of biogeography must be blissful!

**Discuss appearance of non-local plants in CRP & IaDOT seedings.**

The Native Americans had, in the plants that grew around them, a wide variety of technological, medicinal, culinary, & ceremonial tools. In the Midwest, four sacred plants were used in worship as incense & are still used today. They are sweet grass, sage, cedar, & tobacco. As some Indians adopted Christianity, these plants were incorporated into Christian worship.

WHITE SAGE was smudged to drive away evil influences or malevolent powers. Ceremonies were begun by using sage as protection from evil. Sage was also used as a bed for sacred pipes, purification, brooms, love charm, hunting charm, & medicine for various ailments including dysentery, convulsions, hemorrhages, headaches, indigestion, & as a tonic. Used as medicinal plant & as a charm by Ojibwa (den28). Other spp of sage have been used medicinally in Europe since the time of Hippocrates, Pliny, & Dioscorides.

VHFS: **Add varieties.**





*Artemisia ludoviciana* dwarf plants

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

***Artemisia serrata*** Nuttall SAWTOOTH WORMWOOD, aka SAW-LEAF MUGWORT, SAW-TOOTHED SAGEBRUSH, SERRATE-LEAVED SAGE, SERRATE-LEAVED MUGWORT, TOOTHED SAGE, (*serratus -a -um* (sair-AY-tus) serrated, saw-toothed, beset with saw teeth, Latin *serrātus -a -um*, from *serra* saw.)

Habitat: Grasslands & barren areas. Moist ground (m14). distribution/range: Illinois, Iowa, Minnesota, North Dakota, Wisconsin, & naturalized in New York. Occasional in the north ½ of Illinois (m14). Known from Whiteside Co .

Culture: propagation: ① Sow at 20°C (68°F), germinates in less than two wks (tchn).

Description: Erect, perennial, native forb, pleasantly aromatic, from relatively short, horizontal rhizomes with fibrous roots, stems 3-6', mostly hairless below the inflorescence, leaves alternate, many, lance-like, undivided with sharp, even teeth, upper side green, lower side silvery, inflorescence racemiform, large leafy, flower heads yellowish, fruit elliptical, dry, ca 1 mm, glabrous,  $N 2n = 36$ . key features: Leaves alternate, many, lance-like, undivided with sharp, even teeth, upper side green, lower side silvery. “*Artemisia serrata* is closely related to *A ludoviciana* & *A longifolia*, it is distinguished by its prominent, serrated leaf margins.” (fna) “This sp is unusual among mid-western *Artemisia* spp in having truly simple leaves with little or no dissection, occasionally with two, basal, stipule-like lobes. It may get quite tall, to ten feet.” (Ilpin)

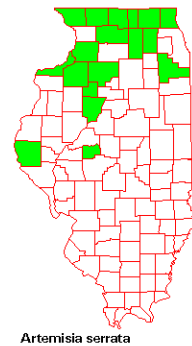
Comments: status: phenology: Blooms 8-9 (IL), 8-10 (WI). Seed source Whiteside Co.

Florets are all fertile. Outer florets are pistillate.

Associates:

ethnobotany: Wind pollinated, pollen may be allergenic. Species is an important cause of late-summer hay fever in the Mississippi Valley. (Ilpin) Species is a severe allergen.

VHFS: [*Artemisia vulgaris* L subsp *serrata* (Nutt) H M Hall & Clements]



*Artemisia serrata*



*Artemisia serrata*

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

**ASTER** Linnaeus **STARWORT, WILD ASTER, MICHAELMAS DAISY, FROST-FLOWER** *Aster* (A-ster, ASS-ter) New Latin, from Latin, *aster*, from Greek *aster-*, *astron*, star, aster, for the radiated flower heads resembling little stars. Chiefly fall-blooming, leafy-stemmed, herbaceous plants native to temperate regions & having discoid & usually daisy like radiate heads, a multiseriate involucre, & a pappus of a single series of capillary bristles. The disc flowers of many spp are yellow when first opened & turn red or purple when they have been pollinated. The ray flowers are blue, purple, or white, but never yellow (cyanic, never xanthic). Fruits are achenes, usually compressed, properly called cypselae, with pappus, simple, capillary, & scabrous. Most members of the “genus” attract butterflies, gamebirds, & songbirds. Asters are known to chemically inhibit sugar maple, red pine, tulip poplar, & black cherry. (Chick & Kielbaso 1998)

Traditionally *Aster* has been a genus of about 250 spp of Eurasia & North America. North American ‘asters’ are now divided into 13 (15) genera. The new genera in Illinois will include *Doellingeria* Nees, *Eurybia* (Cass) SF Gray, *Ionactis* Greene, *Oligoneuron* Greene, & *Symphyotrichum* Nees. Many of these names are not new, but were in use in the 1800’s & early 1900’s, & will include also include *Ampelaster*, *Oclemena*, & *Sericarpus*.

“The treatment of asters in Semple et al (1996) was an attempt at an acknowledged compromise between the old & new classifications & as such is inconsistent with the most recent data. Most significant is that the molecular evidence strongly shows that there are **no true asters in North America** (members of the genus *Aster*) with one exception the arctic-alpine *Aster culminis* & that the majority of spp placed in the genus by North American botanists belong in *Eurybia* Nees & *Symphyotrichum* Nees.”

(<http://www.jcsemple.uwaterloo.ca/asters.htm>, accessed February 2007)

Several spp appear to be self-incompatible, including *Aster concolor*, *A oblongifolius*, *A ericoides*, & *A vimineus* (many composites are self incompatible). Most asters will germinate with no treatment, outdoor seeding works well also. Code A or B. Seeds mature late summer to late fall. Asters are easy to transplant in spring or fall. In the garden, most benefit from division every four years. Subject to leaf spots, rusts, & mildews. (cu00).

Many Asters are hosts for butterfly larvae, especially Crescents & Checkerspots.

“*Aster* L Besides our 27 spp there are a few more that are usually considered to be varieties. All are perennial & have a long flowering, closing the summer season & extending through the fall. We have seen *Aster cordifolius* in bloom on June 24<sup>th</sup>, but the first to flower regularly is the flat-topped marsh aster (*A umbellatus*) which begins in late July. *Aster pilosus* has the longest blooming time, starting the middle of August & continuing through much of November. Asters grow in a variety of situations. Most of them are abundant, a few rare. A number of the showy asters are cultivated but asters do not often make good border material because of a tendency to run wild. This tendency to spread in disturbed soil is so marked in *A pilosus* that nearly pure stands are common in fallow fields. Our garden was originally a Rock River bluff prairie which was invaded by oaks & later by a mixture of boxelder, elm, hackberry, ash, mulberry, locust, grape vines, & Virginia creeper. A few years of gardening with much clearing & planting of perennials & native plants was followed by a period of neglect after three years of which we found the following 7 asters growing spontaneously, *cordifolius*, *azureus*, *lateriflorus*, *ontarionis*, *oblongifolius*, *exiguus*, & *pilosus*.

There is such a variation of characters in some of the groups as to cause marked difficulties in identification of spp. Crossing is the cause of some of this but this hybridization in asters is seldom as apparent as in such genera as verbena, violet, & willow. It seems that merging of spp results in mingling of characters which is the more important factor in causing confusion.” (ewf55)

**Aster X amethystinus** see *Symphyotrichum X amethystinum*

**Aster anomalus** see *Symphyotrichum anomalum*

**Aster azureus** see *Symphyotrichum oolentangiense*

**Aster borealis** see *Symphyotrichum boreale*

**Aster brachyactis** see *Symphyotrichum ciliatum* or *Brachyactis ciliata*

**Aster ciliolatus** see *Symphyotrichum ciliolatum*

**Aster conspicuus** see *Eurybia conspicua*

**Aster cordifolius** see *Symphyotrichum cordifolium*

**Aster divaricatus** see *Eurybia divaricata*

**Aster drummondii** see *Symphyotrichum drummondii*

**Aster dumosus** see *Symphyotrichum dumosus*  
**Aster ericoides** see *Symphyotrichum ericoides*  
**Aster falcatus** see *Symphyotrichum falcatum*  
**Aster fragilis** see *Symphyotrichum racemosum*  
**Aster furcatus** see *Eurybia furcata*  
**Aster laevis** see *Symphyotrichum laeve*  
**Aster lanceolatus** see *Symphyotrichum lanceolatus*  
**Aster lateriflorus** see *Symphyotrichum lateriflorum*  
**Aster linariifolius** see *Ionactis linariifolius*  
**Aster macrophyllus** see *Eurybia macrophylla*  
**Aster nemoralis** see *Oclemena nemoralis*  
**Aster novae-angliae** see *Symphyotrichum novae-angliae*  
**Aster novi-belgii** see *Symphyotrichum novi-belgii*  
**Aster oblongifolius** see *Symphyotrichum oblongifolium*  
**Aster ontarionis** see *Symphyotrichum ontarionis*  
**Aster parviceps** see *Symphyotrichum parviceps*  
**Aster patens** see *Symphyotrichum patens*  
**Aster pilosus** see *Symphyotrichum pilosum*  
**Aster praealtus** see *Symphyotrichum praealtum*  
**Aster ptarmicoides** see *Oligoneuron album*  
**Aster puniceus** see *Symphyotrichum puniceum*  
**Aster sagittifolius** see *Symphyotrichum urophyllum*  
**Aster sagittifolius drummondii** see *Symphyotrichum drummondii*  
**Aster schreberi** see *Eurybia schreberi*  
**Aster sericeus** see *Symphyotrichum sericeum*  
**Aster shortii** see *Symphyotrichum shortii*  
**Aster simplex** see *Symphyotrichum lanceolatum*  
**Aster spectabilis** see *Eurybia spectabilis*

**Aster tartaricus** Linnaeus f TARTARIAN ASTER, (*tartaricus -a -um* of Tartary (Tatary), a vast historical region in Asia & eastern Europe roughly extending from the Sea of Japan to the Dnieper river.) subgenus *Aster* Section *Macrocephali*

Habitat: Rare escape from cultivation (m14). distribution/range: Native to Asia, scattered in the c cos of Illinois.

Culture: Limited availability as an ornamental.

Description::

Comments: status: phenology: Blooms This handsome introduced sp, is, by some authorities, the only true *Aster* to grow in Illinois, all the other spp being placed in other genera.

VHFS:

**Aster turbinellus** see *Symphyotrichum turbinellum*  
**Aster umbellatus** see *Doellingeria umbellata*  
**Aster undulatus** see *Symphyotrichum undulatum*  
**Aster urophyllum** see *Symphyotrichum urophyllum*  
**Aster vimineus** see *Symphyotrichum lateriflorum lateriflorum*

**BIDENS** Linnaeus 1753 **BEGGARS-TICK, BUR-MARIGOLD, BIDENT, FOURCHETTE** *Bidens* (BYE-denz) New Latin, from Latin, *bis, bi-* bi-, two, & *dens, dent-*, tooth, two teeth, for the two barb-toothed pappi of the original sp. There is some question of the gender of the name *Bidens*, masculine & feminine specific epithets are seen. The common name BEGGARS-TICK is from the 2-horned achenes, which adhere to every passerby. A genus of about 240 spp of herbs native to the warmer & temperate parts of both hemispheres that have divided or compound leaves & yellow flowers, usually flattened achenes that are typically armed with barbed awns. Closely related to *Coreopsis*. Reseeding annuals in disturbed wetlands, early successional, can be persistent on disturbed wetlands. Seeds require light, those buried too deeply do not germinate. Fruit is an achene, obcompressed, obscurely

quadrangular, pappus 2-4 awns, rough backwards. *Bidens* provide food & cover for wildlife & waterfowl. Provides nectar for the *Danaus plexippus* MONARCH BUTTERFLY. x = 13. Formerly *Megalodonta* Greene.

In some parts of the United States, especially when thinking with the plow & cow (& mutton) mentality, several spp are considered invasive.

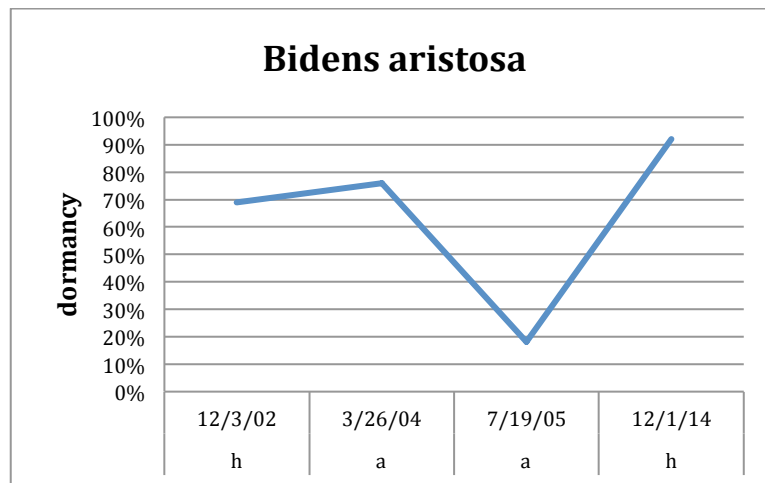
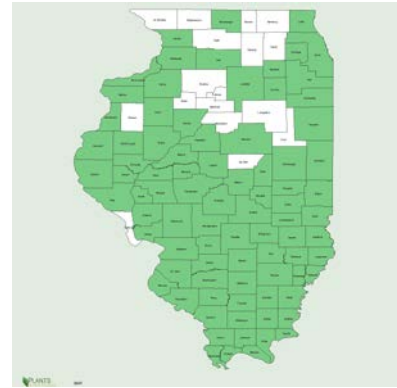
***Bidens aristosa*** (Michaux) Britton SWAMP MARIGOLD, aka BEARDED BEGGARTICKS, LONG-BRACTED BEGGARS-TICK, MIDWESTERN TICKSEEDED SUNFLOWER, TICKSEED SUNFLOWER, (*aristosus -a -um* bearded, with bearded awns like the ear of Barley, furnished with awns, bristly, from Latin *aristosus*, *aristos-*, with many beards, similar to those on the seed heads of some grasses, or New Latin, irregular from Latin *arista* beard of grain.) FACW

Habitat: Low ground. distribution/range:

Culture: ①60 days cold moist stratification (pm09). ②No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) Growth rate rapid. Seedling vigor high. Vegetative spread rate none. 81,165 (gnae04), 137,600 (ew11), 163,810 (gna05), 188,650 (gnha02), 228,571 (gn), 245,761 (gnh14) seeds per pound. ++mean 175,234, median 181,165, sd 51,294, max 245,671, min 81,165, range 164,506 seeds per pound.

cultivation: Space plants 18-24". Full sun to part shade, wet to mesic soils. Anaerobic tolerance medium. CaCO3 tolerance medium. Drought tolerance low. Fertility requirement medium. Salinity tolerance none. Shade tolerance intermediate. pH 5.0-7.0.

bottom line: Requires stratification & should be sown on top of the ground November to March for germination the following spring. *Bidens* may be photodormant, sow on top of soil. Flipflop species? Germ 24.5, 17, na, sd 23, r2.0-62 (60)%. Dorm 63.8, 72.5, na, sd 27.7, r18-92 (74)%. Test 32, 33, 39, r25-39 days. (#4:2)\*\*



Description: Native, erect, annual forb, from a taproot, 8" minimum depth, culms 1-5', flowers bright yellow, 1-2" diameter, N 2n = ? key feature: "Typical variety with outer involucral bracts 8-10, entire, merely finely ciliate" (Ilpin).

Comments: status: This plant is considered invasive in some areas (Haragan 1991). phenology: Blooms 8-9(10). Disk florets perfect & fertile, ray florets sterile or rarely pistillate. Attractive cut flowers. Seed source Erie, Whiteside Co.

VHFS: The typical variety has upwardly barbed awns, variety *fritcheyi* Fern has retrorsely barbed awns, & variety *mutica* A Gray is awnless. All are in our area.



*Bidens aristosa*

1<sup>st</sup> & 2<sup>nd</sup> line drawings Britton & Brown (1913) courtesy of Kentucky Native Plant Society. (2<sup>nd</sup> drawing B involucrata) 3<sup>rd</sup> & 4<sup>th</sup> line drawings Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image.

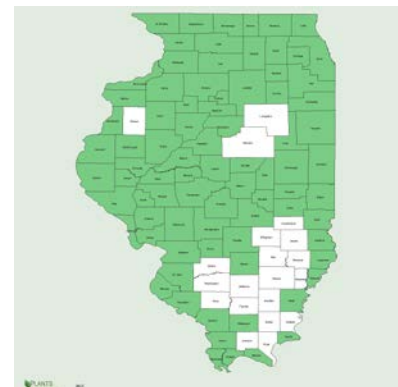
Seed photos Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov.

**Bidens cernua** Linnaeus BUR MARIGOLD, aka *BIDENT PENCHÉ*, DEVIL'S PITCHFORK, NODDING BEGGARS-TICKS, NODDING BUR MARIGOLD, STICKTIGHT, WATER BEGGAR'S TICK, (*cernuus -a -um* (locally SIR-nyew-us, but Latin c is properly pronounced hard as a k) drooping, nodding, down turned, like the flowers of *Narcissus*, from Latin, *cernuum*, nodding, from *cernuus -a -um*, inclining the head, stooping.) Also seen as *B cernuus*. Obligate.

**Habitat:** Seasonally inundated areas, wet meadows, upland swamps, wet shores, & drainage ditches. Full sun, wet soils. Saturated soils, tolerates seasonally flooded conditions for short durations. **distribution/range:**

**Culture:** ①60 days cold moist stratification (pm09). ②Seeds germinate after about 60 days of cold, moist stratification, or no pre-treatment needed, sowing outdoors in the spring is the easiest method. (he99) ③No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) In mixes seed up to 0.5 lb pls per acre (us97), but that is considered too expensive. Growth rate rapid. Seedling vigor high. Vegetative spread rate none. 130,000 (usda, ecs), 226,800 (jfn04), 227,200 (aes12), 281,600 (ew11), 305,660 (gnmh11), 328,000 (gn), 329,942 (gna07), 331,520 (wns01), 336,000 (pm02, agrecol), 349,634 (gna05), 477,141 (gnae04) seeds per pound. ++ mean 302,206, median 328,767, sd 84,062, max 477,141, min 130,000, range 347,141 seeds per pound. Seeds are available commercially, & plants are to a limited extent. As this is an annual, potted plants in restorations are not cost effective! Plugs should be limited to late spring early summer planting.

**cultivation:** Space plants 15-18". Nutrient load tolerance moderate. Siltation tolerance moderate to high. Anaerobic tolerance medium. CaCO<sub>3</sub> tolerance medium. Drought tolerance low. Fertility requirement medium. Salinity tolerance none or low to moderate, but AES reports some salt tolerance. Shade tolerant intermediate, partial to full sun. pH 5.1-7.0. Some project designer recommended that seeds are to be broadcast on wet mudflats or shorelines & raked into soil. That consultant is an idiot & deserves eternity in Hell raking mud flats. Better to dormant seed after a late fall draw down to allow natural stratification during winter. Drawdown the following



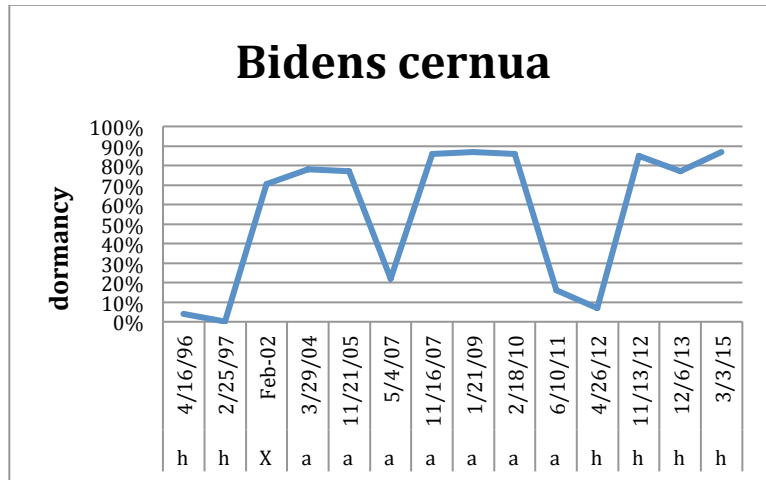


summer produces good response. Once populations are established, early summer shallow flooding followed by drawdown is said to give best seed production.

bottom line: Test data shows a significant percentage of dormant seed requiring late fall seeding.

*Bidens* may be photodormant, sow on top of soil. Flipflop species. Germ 31.5, 9.0, 7.0, sd 34.4, r3.0-90 (87)%. Dorm 55.9, 77, 77, sd 35, r0.0-87 (87)%. Test 32, 30, 29, r23-48 days. (#14:9).\*\*

greenhouse & garden: Said to require moist cold stratification @ 34-36°F for several months for optimum germination. Seeds require light.



Description: Annual emergent herb, 0.25-3.3', 8" minimum root depth, flowers yellow, nodding with age, followed by three-pronged sticktight. 2n = 24, 48.

Comments: status: In some parts of the United States this plant is considered invasive. phenology: Blooms July to October. In northern Illinois, collect seeds in October. Collect seeds in se Wisconsin in September - October (he99). Wetland restoration, good pioneering sp in upper shoreline zones & vegetated swales. Annual, sticktight. Seed source drainage ditches, Green River Lowland, Whiteside Co.

Of frequent occurrence *Bidens cernua* L. *B. chrysanthemoides sensu* Short (1845), &c,—non Michx.?" (Short 1845).

Associates: Provides wildlife cover. Waterfowl, shorebirds, songbirds, & small mammals eat seeds, including mallard duck, purple finch, & common redpoll.

ethnobotany: Edible, sticks to your ribs. Medicinal.

VHFS: *Bidens cernua* L var *cernua* L [superfluous autonym], *B cernua* L var *dentata* (Nutt) Boivin, *B cernua* L var *elliptica* Wieg, *B cernua* L var *integra* Wieg, *B cernua* L var *minima* (Huds) Pursh, *B cernua* L var *oligodonta* Fern & St John, *B cernua* L var *radiata* DC, *B glaucescens* Greene]

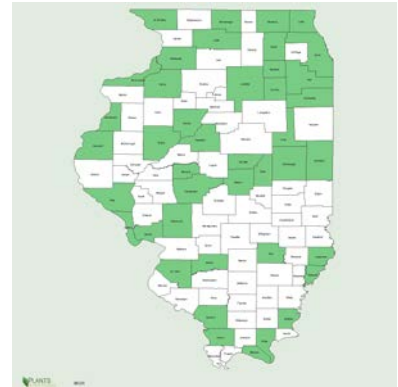


*Bidens cernua*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species.* USDA Natural Resources Conservation

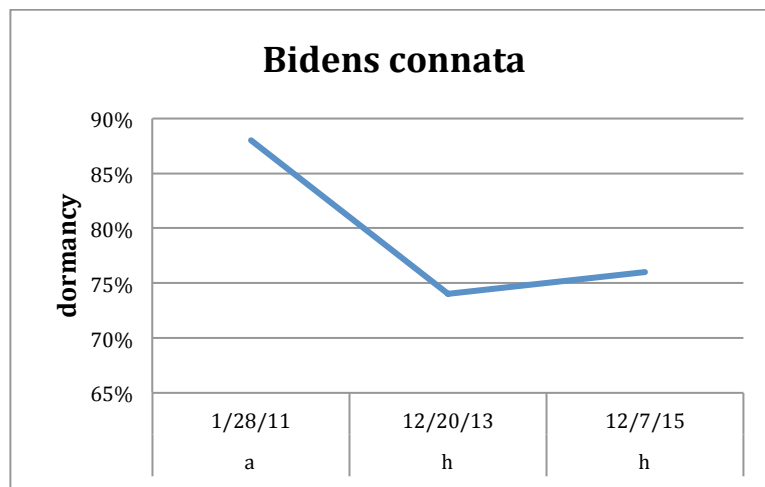
Service. Not copyrighted image. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov.

**Bidens connata** Muhl ex Willd PURPLE-STEMMED TICKSEED, aka *BIDENT CONNÉ*, PURPLE-STEMMED TICKSEED, (*connatus -a -um* born at the same time, united, joined; connate, twin, united congenitally or subsequently, united in pairs at the base, from Latin *connātus*, *connāti*, born together, twin, from the past participle of *connascor*, *connāscī*, to be born together, from *con-* together, & *nāscī* to be born.) distribution/range: Known but not mapped from Whiteside Co.



Culture: ① Cold moist stratify 60 days or direct sow in fall when soil temperature is below 54 degrees (Wade) 160,000 (pm2002), 226,773 (gnh13) seeds per pound.

bottom line: Test data shows a high percentage of dormant seed requiring late fall seeding. *Bidens* may be photodormant, sow on top of bare soil late fall. Germ 12.3, 12, na, sd 6.9, r4.0-21 (17)%. Dorm 79.3, 76, na, sd 6.2, r74-88 (14)%. Test 32, 29, na, r25-42 days. (#4).\*\*  
N 2n = 48.



*Bidens connata*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image.

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

**Bidens frondosa** Linnaeus COMMON or DEVIL’S BEGGARS TICK, aka BUR MARIGOLD, BURR MARYGOLD, DEVILS BOOTJACK, PITCHFORK WEED, STICKTIGHTS, TICKSEED SUNFLOWER, (*frondosus -a -um* leafy, by usage leaf-like, leaf-bearing, covered with foliage, for the outer involucre.) Facultative Wet

Habitat: Seasonally inundated areas, wet meadows. Prefers moist soil, 75-90% moisture content, but it is weedy enough to occur in drier areas.

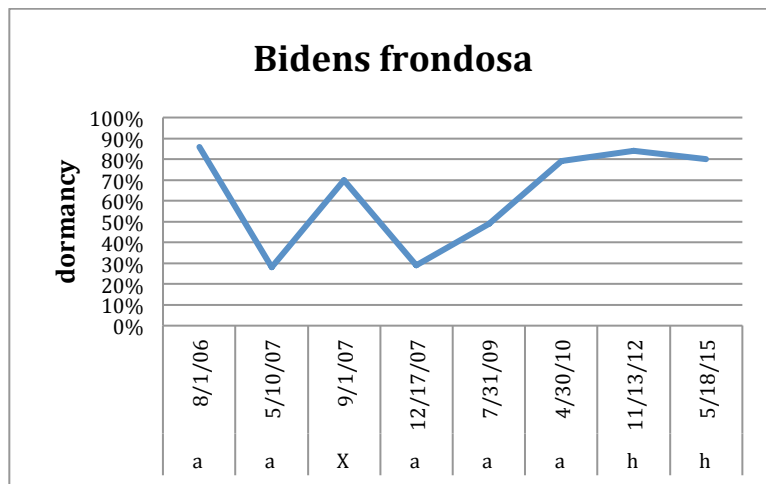
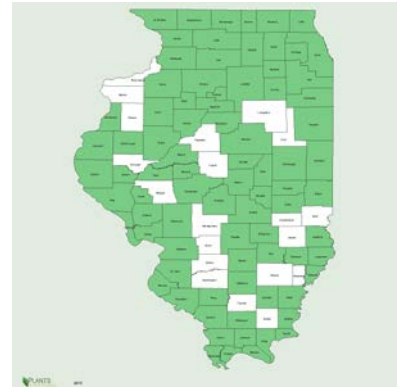
distribution/range:

Culture: 60 days cold moist stratification (pm09). Light. 80,000 (pm01, ecs), 84,000 (jfn04), 104,452 (gnaecs04), 125,034 (gna07), 129,714 (usda), 194,511 (gnhg12), 448,000 (aes12) seeds per pound. In mixes sow up to 0.125 lb pls per acre (us97). ++ mean 166,530, median 125,034, sd 120,260, max 448,000, min 80,000, range 368,000 seeds per pound. Seeds are somewhat commercially available, but not widely so.

cultivation: Nutrient load tolerance moderate. Siltation tolerance high. Anaerobic tolerance medium. CaCO3 tolerance medium. Drought tolerance low. Fertility requirement medium. Salinity tolerance variously none (plants.nrcs.usda.gov) or moderate to high. Shade tolerance intermediate. partial to full sun. Wide pH range, 5.2-7.2 Young plants have little tolerance for flooding & are killed by inundation of 1-2” for 2-3 days. Mature plants are more tolerant of some flooding. Mid to late season (May to July) drawdown in constructed wetlands mimics natural water level fluctuations & stimulates seed production.

bottom line: Test data shows a high percentage of dormant seed requiring late fall seeding. *Bidens* may be photodormant so sow on top of soil late fall. Germ 26.4, 19, na, sd 18.5, r6.0-53 (47)%. Dorm 63.1, 74.5, na, sd 22.8, r28-86 (58)%. Test 31, 29, 29, r21-45 days. (#9)\*\*

greenhouse & garden: In stewardship work, it has been said that germination is better after several months moist cold stratification @ 32-34° & then spring planted, but moist cold stratified seed is not recommended in commercial restoration work. Fresh or dry-stored seed may be late fall or early winter planted (dormant seeded) & lightly raked into the soil for germination the following spring. Photoblastic?



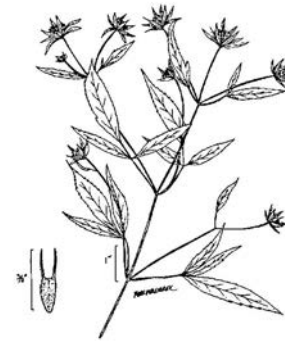
Description: Annual; minimum root depth 8”; 2.0-3.0(4.0)’; flowers yellow; followed by two-pronged stick-tights. N 2n = 24, 48, 72.

Comments: status: In some parts of the United States this plant is considered invasive. phenology: Blooms 6-10. Wetland restoration, used in upper shoreline zones, upland slope buffer, & vegetated swales. Seeds are stick-tights. Nursery production & drainage ditches, Green River Lowland, Lee & Rock River backwaters, Erie, Whiteside Cos.

“Of frequent occurrence” (Short 1845).

Associates: Provides food & cover for wildlife. Seeds are eaten by mallard ducks & ruffed grouse. Plants eaten by muskrats, upland gamebirds & songbirds

VHFS: [*Bidens frondosa* L var *anomala* Porter ex Fern, *B frondosa* L var *caudata* Sherff, *B frondosa* L var *pallida* Wieg, *B frondosa* L var *stenodonta* Fern & St John]



*Bidens frondosa*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy plants.usda.gov.

***Bidens polylepis*** SF Blake BUR MARIGOLD, aka LONG-BRACTED TICKSEED SUNFLOWER, OZARK TICKSEED-SUNFLOWER, (*polylepis* -is -e with many scales, from Greek πολυ-, *poly*-, many, much, & Greek λειπίς, *lepidō*-, *lepis*, *lepidō*-, scale.) facw

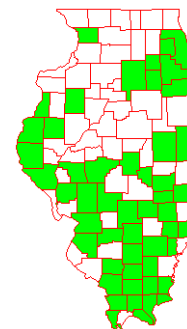
**Habitat:** Seasonally inundated areas. Wetlands & moist prairies, disturbed areas. Marshes, swamps, wet ditches (m14). “Marshes, bogs, flood plains, disturbed sites; 10–1500 m” (Strother & Weedon in fna). **distribution/range:** Occasional to common throughout Illinois (m14).

**Culture:** ①Moist cold stratify or fall plant. 137,600 (pm11), 228,571 (gni) seeds per pound.

**Description:** Erect annual (or biennial), culms 3.0-4.0', flowers yellow; achene has 2 tiny, barely visible awns; N 2n = 24. **key features:** “This variety with outer involucral bracts 12-20, coarsely ciliate, appearing almost serrulate” (Ilpin).

**Comments:** Blooms 8(9)-10. Wetland restoration. Compared to other *Bidens*, this sp is user friendly. Disk florets perfect & fertile; ray florets sterile or rarely pistillate. Seed source nursery production.

**VHFS:** This sp is sometimes considered synonymous with *Bidens aristosa*, or a variety there of, *B aristosa* (Michx) Britt *retrorsa* (Sherf) Wunderlin.



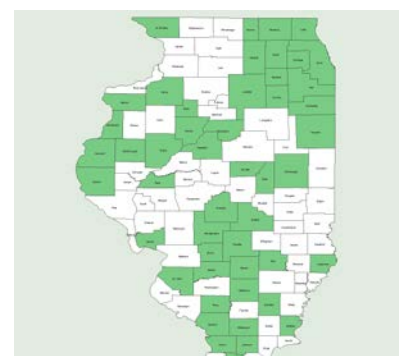
*Bidens aristosa retrorsa*



*Bidens polylepis*

***Bidens trichosperma*** (Michaux) Britton \*RI TICK-SEED SUNFLOWER, aka CROWNED BEGGARTICKS, NORTHERN TICKSEED-SUNFLOWER, TALL SWAMP MARIGOLD, (*coronatus* -a -um crowned or wreathed, having a corona or crown, from Latin *corōnātus*, past participle of *corōnāre*, to crown.)

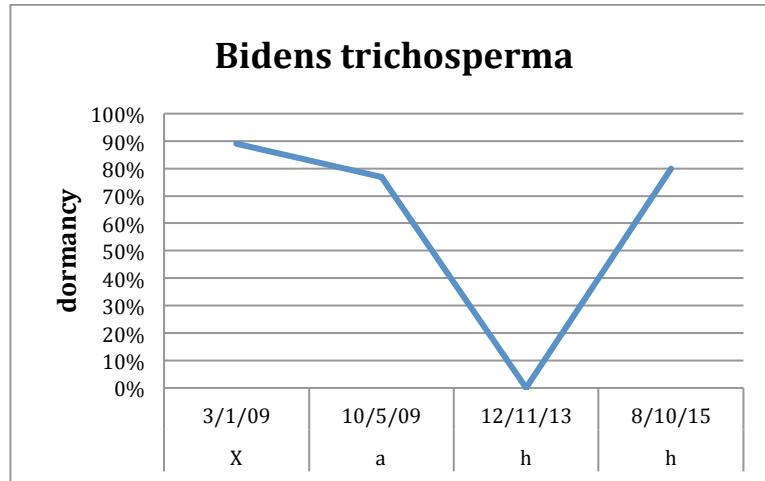
**Habitat:** Full sun, wet soils. **distribution/range:** Known but not mapped from Whiteside Co.



Culture: ①Cold moist stratify 60 days or direct sow in fall when soil temperature is below 54 degrees (Wade)  
 ②Seeds germinate after about 60 days of cold, moist stratification, or no pre-treatment needed, sowing outdoors in the spring is the easiest method. (he99) ③No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) 108,800 (ew11), 142,800 (jfn04), 240,000 (pm02), 331,871 (gnh13) 453,600 seeds per pound.

cultivation: Space plants 18-24”.

bottom line: Test data shows a high percentage of seed requiring dormant seeding 3 out of 4 years. A nondormant lot is known. Flipflop species. *Bidens* may also be photodormant, sow on top of bare soil late fall. Germ 28.6, 6.8, na, sd 39.5, r4.0-97 (93)%. Dorm 61.5, 78.5, na, sd 35.8, r0.0-89, (89)%. Test 37, 34, na, r28-49 days. (#5)\*\*



Description: Erect annual or biennial, 2-5', flowers yellow. 2n = 24.

Comments: status: Special Concern in Rhode Island. phenology: Blooms August - October. Collect seeds in se Wisconsin in October - November (he99). Seed source drainage ditches, Green River Lowland, Montmorency Twp, Whiteside Co.

“In other situations, where a depressed or flattened surface and clayey soil favor a continuance of moisture, a few species of yellow flowered *Coreopsis* occur in such profuse abundance as to tinge the entire surface with a golden burnish. The species of this genus more commonly met with in in such situations, were *Coreopsis trichosperma*, *C senifolia*, *C tripteris*, *C palmata*, &c, &c.” *Bidens coronata* as *Coreopsis trichosperma* Michx. (Short 1845)

VHFS: Formerly known as *Bidens coronata* (L) Britton (or Britton ex Sherff).





*Bidens trichosperma*

1<sup>st</sup> & 2<sup>nd</sup> line drawings Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 3rd line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. Illinois map courtesy plants.usda.gov.

**BOLTONIA** L'Héritier 1789 **DOLL'S DAISY, FALSE ASTER** *Boltonia* (bol-TO-nee-a) in honor of James B Bolton, fl. 1750s-1799, 18th century English botanist & artist, author of "Ferns of Great Britain", &c., 1788 Five (6-7) spp in eastern & central North America. Seeds are small achenes with small tufts of hair (awns). Attractive cut flowers, attracts butterflies, & reported as deer resistant. x = 9.

Largely self-incompatible. Cold moist stratify. Code B. (cu00)

*Boltonia asteroides*, sow on the surface at 20°C (68°F) in light, germinates in less than two wks, *B. latisquama*, 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). Hmmm.

***Boltonia asteroides*** (Linnaeus) L'Héritier var **recognita** (Fernald & Griscom) Cronquist \*MI FALSE ASTER, aka ASTERLIKE BOLTONIA, FALSE STARWORT, WHITE DOLL'S-DAISY, (epithet formerly *latisquamus -a -um* with broad scales, from Latin *latus*, adjective, broad, wide, & *squama -ae f*, noun, a scale; scale armor; a fish; *recognitus -a -um* restudied, reconsidered; acknowledged, from classical Latin *recognitiō, recognitiōn-*, formal examination, inspection, review.) (*asteroides* (as-tir-OY-deez) aster-like, from Latin *aster*, from Greek *αστηρ, aster*, a star; an aster type plant, taken by Linnaeus to be *Aster amellus*, & *-οειδης, -ooides*, adjective suffix for nouns meaning like, resemble.) [obl]

Habitat: Seasonally inundated areas, upland swamps, mesic prairies, gravelly shores, streams, & agricultural wetlands, roadside ditches. distribution/range:

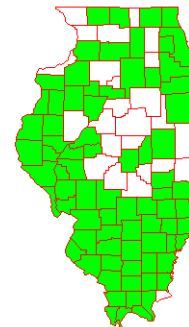
Culture: ① "Moist cold treatment, or fall sow. Light cover. Good germinator." (mfd93) ② 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. (pm09) 1,600,000 (gn98), 2,268,000 (jfn04), 2,560,000 (pm02), 3,301,818 (gnam06), 4,203,704 (gna06), 4,450,980 (gna03&07), 4,536,000; 4,544,000 (aes12), 5,072,626 (gna04).

asexual propagation: Division of mature clumps.

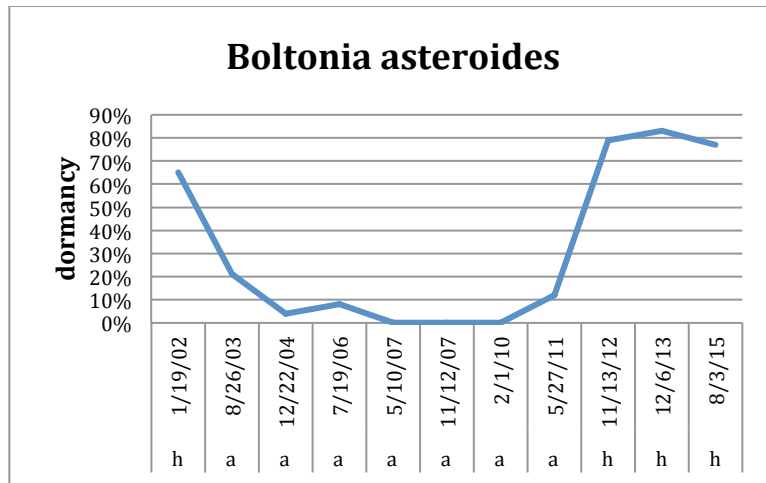
bottom line: Species may be successfully spring seeded 2 out of 3 years.

Some lots are non dormant while others are strongly improved by dormant seeding. Flipflop species. Germ 52.6, 72, na, sd 32.5, r6.0-86 (80)%. Dorm 31.7, 12, 0.0, sd 34.2, r0.0-83 (83)%. Test 33, 31, 39, r25-39 days. (#14)\*\*

greenhouse & garden: Cold moist stratify or dormant sow, small seeds need light.



*Boltonia asteroides*



Description: Erect perennial, 3.0-5.0, flowers white,  $N 2n = 36$ . Medium large, light-airy plant with small daisy like blooms. Southern Michigan specimens are pink rayed (rvw11).

Comments: status: phenology: Blooms 8,9,10. Seeds mature fall. In northern Illinois, collect seeds in October - early November. Collect seeds in se Wisconsin in late October (he99). Landscaping, wetland restoration. Seed source nursery production, genetic source wet railroad sidings, & farmed wetlands, Whiteside & Lee cos, Green River Lowlands.

Short recognized both *Boltonia asteroides sensu* Short (1845), &c —non (L) L’Her and *B. glastifolia sensu* Michaux (1803) &c--non (Hill) L’Her (1788), in the same sentence, noting they’re “of frequent occurrence”. *Boltonia asteroides* (Linnaeus) L’Héritier.

“*Boltonia asteroides* (L) L’Hér. This grows sparingly on a slough bank west of Shirland. We have found it in no other place in the co but it is not uncommon in Pecatonica River bottom north of Riddott in Stephenson Co.” (ewf55)

Associates: Pollinated by long-tongued bees, short-tongued bees, other *Hymenoptera*, *Diptera*, *Lepidoptera*. Attracts butterflies, gamebirds, songbirds, & small mammals.

VHFS: Formerly *Boltonia latisquama* A Gray *recognita* Fernald & Griscom. Several ornamental selections are known. **Add varieties.**

*Boltonia glastifolia* is listed in some old Midwest botanies. According to Nuttall (1817 v2), “the leaves when bruised smell something like FENNEL.” It is now included in *B. asteroides*.

*MICHIGAN FLORA ONLINE*. AA Reznicek, EG Voss, & BS Walters. February 2011. University of Michigan. Web. August 31, 2012. <http://michiganflora.net/species.aspx?id=260>.





*Boltonia asteroides*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Illinois map courtesy of ILPIN.

***Boltonia decurrens*** (Torrey & A Gray) Wood \*US, IL, MO DECURRENT FALSE ASTER, aka CLASPING-LEAF DOLL'S DAISY, DECURRENT ASTER, WINGED FALSE ASTER, (*decurrens* decurrent, literally running downwards, or running down the stem, running towards, usually meaning that the leaf runs down, or extends down the stem as two ridges, as in *Boltonia decurrens* or *Helenium autumnale*.) facw

Habitat: Disturbed alluvial habitats, open soil in wet prairies & wet savannas disturbed wet lakeshores. "Moist soil, usually along the Illinois River, rare" (m14). distribution/range: Illinois, Iowa, & Missouri. Not mapped from Iowa by fna. Called by some an Illinois endemic?, native to the Illinois River floodplain & Mississippi River floodplain in Missouri, although Dobbs collected it in Henry Co, Illinois.

Culture: ①60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. (pm09) ②No pretreatment needed. Sow seeds on the soil surface at 70°F & water. (ew11) Cold moist stratify, light. 2,400,000 (pm02, ew11), 4,536,000 seeds per pound.

asexual propagation: Division of mature clumps. Produces basal offsets.

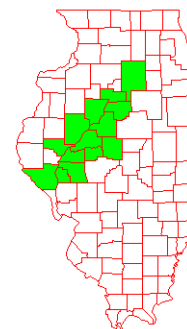
cultivation: Full sun wet soils.

Description: Erect, herbaceous, perennial, native forb; rhizomes & stolons absent; stems 3.0-6.0'; base of cauline leaves decurrent; flowers white, occasionally pink. N 2n = 18.

Comments: status: Federally threatened. Threatened in Illinois. Endangered in Missouri. phenology: Blooms 7,8,9. Seeds mature fall. Landscaping, attractive cut flowers, occasionally marketed as an ornamental.

Associates: Attracts butterflies.

VHFS: [*Boltonia glastifolia* Michx [not (Hill) L'Héritier] var *decurrens* Torr & A Gray, *Boltonia asteroides* (L) L'Hér var *decurrens* (Torr & Gray) Engelm, *B latisquama* Gray var *decurrens* (Torr & Gray) Fern & Grisc] Some "improved" selections are available.



*Boltonia decurrens*





*Boltonia decurrens*, near Peoria.

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

**BRICKELLIA** Elliott 1823 See *Kuhnia* **FALSE BONESET** New Latin, from John *Brickell*, fl1730 (1748-1809), Irish-American physician & naturalist who settled in Savanna, Georgia, & New Latin suffix *-ia*. Not John Brickell (1710?-1745), Irish naturalist who visited North Carolina ca 1729-1731 & published on the natural history of North Carolina in 1737. A genus of about 100 spp of annuals, perennials, subshrubs, or shrubs of the warmer regions of America having greenish or yellowish white flowers with a pappus of slender bristles (32 spp in North America north of Mexico). Fruit 10-striate, contracted above; pappus setaceous, in one series. Tribe *Eupatoriaceae*.  $x = 9$ .

**Brickellia eupatorioides** (Linnaeus) Shinnery var **corymbulosa** (Torrey & Gray)

Shinnery \*MI **FALSE BONESET**, (*eupatorioides* eupatorium-like; *corymbulosus* -a -um arranged in small corymbs or in small clusters.) upl

Habitat: Dry, dry mesic, & sand prairies, & dry savannas. distribution/range:

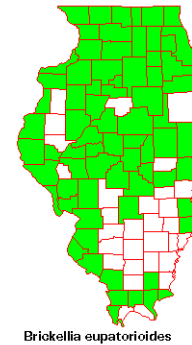
Culture: ①No pre-treatment necessary other than cold, dry stratification (pm09).

②“30 days moist stratification improves germination, but not needed for good greenhouse crop. Field sow fall, spring, early summer” (pnnd) ③No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ④Fall plant or cold stratify for up to 2 to 3 months for best results. Sow just below the soil surface at 70°F & water. (ew11) ⑤Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). No treatment. 373,970 (gnh11), 384,000 (pn02), 416,000 (aes10), 472,000 (jfn04), 492,800 (ew11), 511,261 (gnh13), 512,000 (pm02) seeds per pound.

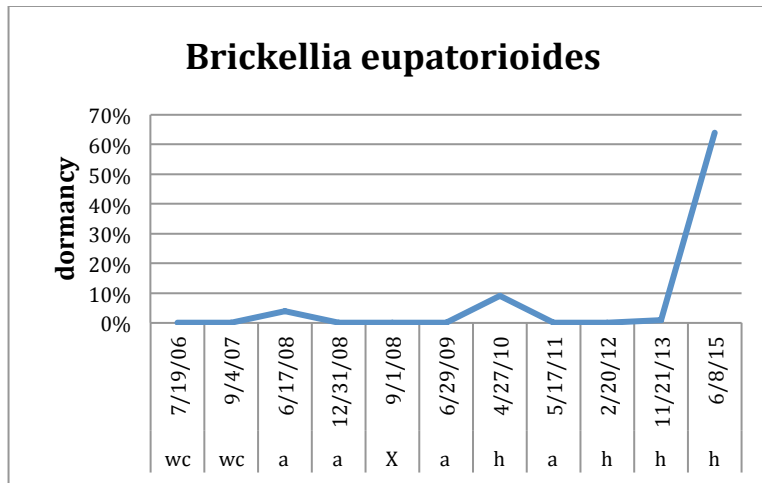
“*Kuhnia eupatorioides corymbulosa* Dry prairie. Blooms late August through September; CREAM. Harvest October. 2'; methods #1 & #3; SEEDLING TRANSPLANT, SPRING BROADCAST, FALL BROADCAST, NISBET DRILL. Too coarse for rich garden soil; good in field with competition. Flowers 2nd year; slightly weedy farther west.” (rs ma)

cultivation: Space plants 2.0-3.0'. Full sun to partial shade, dry soils.

bottom line: Formerly considered field sow spring or dormant. Seed test data historically indicated little or no dormancy (0-9%). Strong dormancy (64%) in 2014 crop. Flipflop? Germ 75.8, 84, 84, sd 21.4, r21-97 (76)%. Dorm 7.1, 0.0, 0.0, sd 18.2, r0.0-64 (64)%. Test 27, 26, 21, r20-44 days. (#11:1)\*\*



*Brickellia eupatorioides*



**Description:** Erect perennial, 2.0-3.0', flowers creamy-white, thistle-like in a flat cluster; pappus plumose, white or tawny.  $2n = 18$ . **key features:** Flowers are rayless, pappus is bright-white, fluffy, underside of leaves dotted with glands (Freck).

**Comments:** **status:** Special concern in Michigan. **phenology:** Blooms 8,9,10. In northern Illinois, collect seeds in mid-September - mid-November. Collect seeds in se Wisconsin in October (he99). Landscaping, aggressive. Seed source nursery remnants, Tampico Twp, Whiteside Co.

“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 than any others, ...” *Brickellia eupatorioides* (L.) Shinnars as *Kuhnia critonia* Willd. (Short 1845)

“A common, variable, dry soil weed that looks like a boneset. Dry prairies, sandy roadsides & railroads.” (ewf55)

**Associates:** Attracts butterflies. Reported as deer resistant.

**VHFS:** For many years known as *Kuhnia eupatorioides* (Linnaeus) *corymbulosa* (Torrey & Gray) Shinnars. The sp & six varieties are recognized in FNA, but all are  $2n = 18$ . [*Brickellia eupatorioides* (L) Shinnars var *corymbulosa* (Torrey & Gray) Shinnars] Check here!

“Var *corymbulosa* (Torrey & Gray) Shinnars ranges as far east as IN, IL, MO, & AR (& allegedly to KY) & has larger heads than var *eupatorioides* (9-15 mm high, with mostly 15-35 florets, vs. 7-11 mm high, with mostly 6-15 florets)” (w08). **Add var texana.**





*Brickellia eupatorioides corymbulosa*

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 of ILPIN.

**CACALIA** Linnaeus **CACALIA, WILD CARAWAY, TASSEL FLOWER** *Cacalia* (ka-KAY-lee-a) New Latin, from Latin, a very old Greek name for a plant, used by Dioscorides, *κακο-λιαν*, *kako-lian*, very-hurtful; or from Greek *kakalia*, *kakkalia*, the colt's foot, *Mercuralia tomentosa*. Tall smooth herbs with alternate, often-petioled leaves & large heads in flat corymbs. Pappus setaceous, capillary, scabrous, in one series. This genus is more attractive in bud than in bloom. Sometimes New World spp have been placed in the genera *Arnoglossum* or *Hasteola*, or formerly in *Mesadenia*.

**CENTAUREA** Linnaeus 1753 **STAR-THISTLE, KNAPWEED, BACHELOR'S BUTTON, BLUE-BOTTLE, CORNFLOWER, CENTAURÉE, HARDHEADS, HORSE-KNOPS**, *Centaurea* (kent-OW-ree-a, or locally sen-TAW-ree-a) New Latin, genus name, *Centaurea* from Medieval Latin, from Greek, *kentaurieon*, *kentaur*, a centaur, half-man, half-horse, an ancient plant name associated with Chiron (*Kheiron*), a centaur famous for his knowledge of medicinal plants. Chiron is said to have discovered the medicinal uses of plants, & was the tutor of Achilles (*Akhilleus*), Asclepius, Hercules, Dionysus, & others. Chiron is also said to have used this plant to heal his foot when wounded by Hercules. Where native, some *Centaurea* spp have a long history of medicinal use. A large genus (500 spp, 20 in North America) of composite herbs native to Eurasia & North Africa, including several cultivated for their showy heads of tubular florets. Fruits are achenes; pappus filiform, scabrous bristles in several series. x = 8, 9, 10, 11, 12, 13, 15.

A genus of generally weedy, persistent plants, with several aggressive, weedy, often invasive, spp.

***Centaurea cyanus*** Linnaeus **BACHELOR'S BUTTON**, aka **BACHELOR'S BUTTON, BLUEBOTTLE, CORN BLUE-BOTTLE, CORNFLOWER, GARDEN CORNFLOWER**, (*cyanus -a -um* dark blue, (or clear, bright blue in one source), from Latin *cyanus*, blue colored from *cyaneus*, blue steel, azure, dark blue for the flowers. Epithet formerly capitalized.)

Habitat: Drought tolerant, full sun to partial shade. distribution/range:

Culture: ☉Sow @ 70°F in the dark , 7-14d (tchn). Easily established in wildflower mixes. Sow in fall for flowers the following spring. Can be seeded later for fall blooms. Reseeds. 89,000; 96,000 (stock, ecs) seeds per pound. Seeded alone plant 1.6 oz, per 1,000 ft sq (stock).

Description: Annual, 1-3', with small, bright blue flowers in spring to summer.

Comments: status: This plant is considered invasive by several authorities (SWSS 1998, SEPPC 1996; Whitson 1996) phenology: Blooms work well as fresh cut or dried flowers. Seed source commercial.

***Centaurea biebersteinii*** DC **NOX SPOTTED KNAPWEED**, aka **BACHELOR'S BUTTON, BLUE BOTTLE, BORN FLOWER, CENTAURÉE MACULÉE OU TACHETÉE, GEFLECKTE FLOCKENBLUME, GEWÖHNLICHE RISPEN-FLOCKENBLUME, HARD HEAD, SPOTTED CENTAUREA, STAR THISTLE**, (*biebersteinii* for Baron Friedrich August Marschall von *Bieberstein*, 19th century German explorer in southern Russia.)

Habitat: Disturbed sites, dry prairies, calcareous. distribution/range: Probably more common than mapped. Native to southeastern Europe.

Culture: Rude & uncultured. Invasive.

Description: Erect biennial or perennial; stems 1-4'; leaves pinnately-divided into narrow lobes; inflorescence a solitary head at the ends of the many branches; flowering heads 1" wide with pink to purple disk flowers, starry, loosely thistle-like, phyllaries fringed with black;  $N 2n = 36$ . (polycarpic, perennial tetraploid) key features: bracts or phyllaries fringed with dark brown or black 'eyelashes', leaves pinnate with narrow lobes

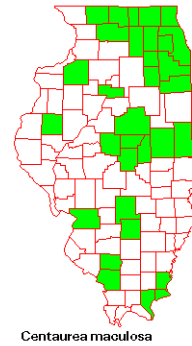
Comments: status: Introduced, naturalized, invasive. A listed noxious sp in 16 states.

phenology: Blooms June to October. C3. SPOTTED KNAPWEED was introduced to both coasts in alfalfa seed in the late 1800's.

Associates: Plants produce a chemical that kills nearby plants. Not only is this an aggressive, invasive sp in natural areas, pastures, & roadsides, SPOTTED KNAPWEED has been shown to reduce DNA of soil fungus by 80%. The restoration of contaminated areas will need to include mycorrhizal remediation. Cf *Alliaria*.

ethnobotany: To eradicate- wear gloves to pull or dig to protect from skin irritation; hot prescribed burns; herbicide specific to broadleaf or composite weeds.

VHFS: FNA refers to this plant as *Centaurea stoebe* Linnaeus subsp *micranthos* (SG Gmelin ex Gugler) Hayek. [*Acosta maculosa* auct non Holub, *Centaurea maculosa* auct non Lam]



Centaurea maculosa



*Centaurea stoebe micranthos*

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 of ILPIN.

**CHRYSANTHEMUM** Linnaeus 1753 **CHRYSANTHEMUM, WHITE WEED** *Chrysanthemum* golden-flower, Latin, from Greek *chrysanthemon*, from χρυσός, *khrysos*, gold, & ἀνθεμόν, n. *anthemon*, flower; akin to Greek *anthos*, flower. Date 1548. Genus including weeds, ornamentals grown for their brightly colored often double flower heads, & other spp important as sources of medicinals & insecticides. *Sensu strictu*, a genus of 3 spp of perennial herbs & shrubs of north Africa & Europe. Achenes striate; pappus none. Often split into *Chrysanthemum*, *Glebionis*, *Leucanthemum*, & *Tanacetum*. The commonly planted ornamentals are now in *Leucanthemum*, which see.

*Chrysanthemum leucanthemum* & *maximum*, sow at 20°C (68°F), germinates in less than two wks (tchn).

**CHRYSOPSIS** (Nuttall) Elliott 1823 **GOLDEN-ASTER, CAMPHORWEED** *Chrysopsis* New Latin, from Greek χρυσός, *khryos*, gold & ancient Greek ὄψις, *opsis*, appearance, sight, view, referring to the yellow corollas. North American chiefly perennial woolly, hairy, or glutinous herbs having large often-corymbose heads. Achenes hairy, compressed, pappus of the ray & disk similar, double, the exterior short, interior copious, capillary. Some authors place our plants on *Heterotheca* Cassini 1817, which see.

**CICHORIUM** Linnaeus 1753 **BELGIAN ENDIVE, CHICKORY, CHICORY, RADICCHIO** *Cichorium* (ki-KO-ree-um) from Theophrastus, from Latin *cichorium*, *cichorēum*, from Greek κίχωρή, κίχώρα, κίχόρεια, *kikhore*, *kichora*, *kichoreia*, succory, endive, from an ancient Arabic name *chikouryeh*, or Egyptian *kouryeh*. English  
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*succory* is derived from κικωρή, *kikhore*. According to Pliny, in Egypt, WILD ENDIVE was known as *cichorium*, cultivated endive was *seris*, meaning unknown, date: 15th century. A genus of 7 spp of herbs of Europe & North Africa. A thick-rooted usually blue-flowered, occasionally white or pink, European perennial or biennial composite herb widely grown for its roots & as a salad plant. The flowers are all ligulate & with flower heads solitary or in twos or threes. Achenes not rostrate, obscurely 5-sided; pappus scaly. Contractile tap root.

*Cichorium endivia* CULTIVATED ENDIVE, sow @ 68°F, if no germ, move to 39°F for 4w, recycle , 14-30d (tchn).

***Cichorium intybus*** Linnaeus CHICORY, aka BELGIAN ENDIVE, BLUE SAILORS, *CHICORÉE*, COFFEEWEED, FRENCH ENDIVE, SUCCORY, WITLOOF, (from *intubus*, *intybus*, the Latin name from a Greek name ἔντυβον, *entybon*, endive, succory. Both *intybus* & endive come from the Egyptian *tybi*, the month in which it was eaten.) The common name is an alteration of Middle English *cicoree*, from Anglo-French.

Habitat: distribution/range: More common than mapped. It is common in the botanical black hole that is Whiteside Co.

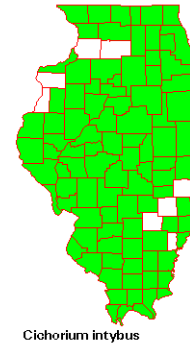
Culture: Seldom intentionally planted. ①No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) ②Sow at 20°C (68°F), if no germ. in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn). ③Sow @ 68°F, if no germ move to 39°F for 4w, recycle , 14-30d , invasive weed (tchn). Growth rate rapid. Seedling vigor high. Vegetative spread rate none. 425,000 (gran), 426,000 (ecs), 426,400 (usda), 432,000 (ew11) seeds per pound. Pure stand plant 4 lb per acre (gran).

Low to moderate moisture requirements. Full sun mesic soils. Full sun to partial shade. Best in moderately coarse to moderately fine soils. Said to tolerate compact soils. Anaerobic tolerance low. CaCO3 tolerance high. Drought tolerance medium. Fertility requirement high. Salinity tolerance none. Shade intolerant. pH 6.0-7.5, neutral soils, acid & base tolerant.

Description: Introduced biennial forb, 8” minimum root depth; 2.0-4.0(-5.0)’; flowers pale blue, occasionally white or pink, along main branches; N 2n = 18.

Comments: status: C list noxious weed in Colorado. This sp is considered invasive by the following authorities: Assorted authors. 200\_. State Noxious Weed Lists for 46 States, Haragan 1991, Uva et al 1997, SEPPC 1996, SWSS 1998, Stubbendieck et al 1994, Whitson 1996. phenology: Blooming summer to fall. Flowers close in the afternoon or on cloudy days. Deep taproot enables plant to compete well. Common along roadsides, highly invasive & persistent, widely & easily spread on mower decks. It is said to have no salt tolerance, but its presence on hundreds of miles of road shoulder leads one to wonder can you really believe anything you read? Indeed.

Associates: ethnobotany: Coffee substitute, condiment. “The parched root has been very generally used in Europe as a succedaneum for Coffee. The roots of *Leontodon Taraxacum* answer a similar purpose, & perhaps many more of the *Cichoraceae*.” (Nuttall 1817 v2.) WWII ersatz coffee.



*Cichorium intybus*



*Cichorium intybus*

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 of ILPIN.

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**CIRSIUM P** Miller 1754 **THISTLE, TRUE THISTLE** *Cirsium* New Latin, from Greek *kirsion*, a kind of thistle, probably from κίρσος, *kirsos*, a swollen vein or welt, from the use of thistles in antiquity in the treatment of swollen veins. Widely distributed north temperate genus of about 250 spp of prickly herbs having the bristles of the pappus plumose. Fruits are achenes, compressed, smooth; pappus copious, plumose. Even though this genus has spp that are federally endangered & candidates for endangered status, thistles are outlawed by most seed laws, & some by the laws supposed to protect the rare spp. Flowers provide nectar for *Satyrium acadica* Acadian Hairstreak, & *Danaus plexippus* Monarch. *Cirsium arvense*, CANADA THISTLE, aka CREEPING THISTLE, a native of Europe, not Canada, is said to be tonic, diuretic, & astringent (den28). Midwestern native thistles were formerly part of the genus *Carduus* Linnaeus.

Ornamental spp germ readily at 68°F or require 2-4 wks cold moist stratification (tchn).

***Cirsium altissimum*** (Linnaeus) Hill (also seen as (L) Spreng) TALL THISTLE, aka ROADSIDE THISTLE, WOOD THISTLE, (*altissimus -a -um* (al-TIS-i-mus) highest, very high, very tall, tallest, superlative of *altus*, & *-issimus*, superlative suffix; most so, to the greatest degree; most-, -est, such as largest, prettiest, whitest. Often referring to altitude, from Latin *altus*, adj, high; deep or profound; shrill; lofty, noble; deep rooted; far-fetched; grown great, & *-issimus*, suffix denoting most so, to the greatest degree; most-, -est.)

Habitat: Woodland edges, often at the base of bluffs in mesic wooded areas not prone to drying out. Pastures, woodlands, thickets. distribution/range:

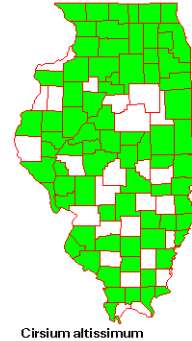
Culture: ①60 days cold moist stratification works well. 89,231 (gn02) seeds per pound.

Description: Biennial or short-lived monocarpic perennial, culms 3-5 feet; leaves mostly entire, woolly, white beneath; flowers pink to white (light purple); N 2n = 18.

Comments: Blooms August-September. Harvest early September to October. Seed source wooded bluffs Peoria & Woodford Cos. Some taxonomists feel this & the next sp (*C discolor*) represent a continuum within a single sp.

“Of frequent occurrence” *Cirsium altissimum* as *Cnicus altissimum* (L.) Willd. (Short 1845).

VHFS: [*Carduus altissimus* Linnaeus, *Cirsium altissimum* (L) Spreng var *biltmoreanum* Petr, *C iowense* (Pammel) Fern, *C X iowense* (Pammel) Fern (pro sp), *Cnicus iowensis* Pammel]



*Cirsium altissimum*



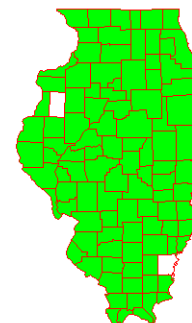
*Cirsium altissimum*

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

***Cirsium discolor*** (Muhlenberg ex Willdenow) Sprengel FIELD THISTLE, aka CHARDON DISCOLORE, PASTURE THISTLE, PRAIRIE THISTLE (*discolor* (DIS-ko-lor) of two colors or of different colors, of different coloring, often referring to the leaves that are green above & grey-white below.)

Habitat: Dry to mesic prairies, savannas, open woods, disturbed areas, & old fields. distribution/range: In fields & along roadsides, Quebec & Ont to Ga, S Dak, Neb, & Mo (nlb05).

Culture: ①Further germination pretreatments not sure? (pm) ②Seeds germinate after about 60 days of cold moist stratification (he99). ③Sow @ 68°F, if no germ move to Uncopyrighted Draft



*Cirsium discolor*

39°F for 4w, recycle, 14-30d, resents root disturbance (tchn). 64,000 (pm02), 100,000 (gn02), 111,193 (gnapr04) seeds per pound.

asexual propagation: Root cuttings will work, be careful where you set a flat of this sp. It will root into the soil & give you a new patch just like *Coreopsis palmata* does.

bottom line: Preliminary test data indicate dormant seeding is of significant benefit (20% dormant). Germ 35%, Dorm 20%. TZ 70%. Test 38 days.\*\*

greenhouse & garden: Easy by seedling transplant.

Description:  $N 2n = 20, 21, 22$ . key features: ⓪ Similar to *C altissimum*, but lower & more leafy, seldom over 2 m high. Outer bracts of the involucre coriaceous, ovate, slightly woolly, tipped with slender bristles, which are longer than those of *C altissimum*. (nlb05)

Comments: Blooms August - September. Collect seeds in se Wisconsin in October (he99). Seed source eastern Whiteside Co. Weedy biennial. Sørenson believes this & the previous sp represent a continuum. Hybrids, some fertile, are known, *C x iowense*.

Associates: Attracts butterflies. Pollinated by long-tongued bees, short-tongued bees, *Diptera*, *Lepidoptera*, & *Coleoptera*. Seed fluff used in nests.

ethnobotany: Used as medicinal plant by the Fox (sm28).

VHFS: White flowered plants are known as f *albiflorum* (Britton) House.

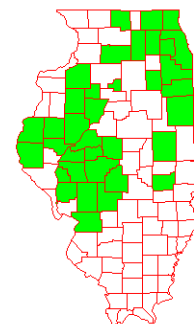
[*Carduus discolor* (Muhlenberg ex Willdenow) Persoon, *Cirsium discolor* (Muhl ex Willd) Spreng f *albiflorum* (Britton) House] *Carduus discolor* (Muhl) Nutt in nlb05.



*Cirsium discolor*

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 of ILPIN.

***Cirsium hillii*** (Canby) Fernald \*IN, MI, WI [new taxonomy this will be *Cirsium pumilum* (Nuttall) Sprengel var *hillii* (Canby) B Boivin] PRAIRIE or HILL'S THISTLE, aka HOLLOW-ROOTED THISTLE, PASTURE THISTLE, (*hillii hillii*, for Ellsworth Jerome Hill, 1833-1917. Epithet formerly capitalized.) upl



Habitat: Dry & hill prairies, mesic prairies, & oak openings. Sandy or gravelly soils, prairies, limestone barrens, pastures, pine barrens, open woods, & oak savannas (fna). distribution/range: Northern ⅓ of Illinois (m14). Ontario, Illinois, Indiana, Iowa, Michigan, Minnesota, & Wisconsin. Known but not mapped from Bureau, Ogle, & Whiteside cos.

Culture: ①Seeds germinate after about 60 days of cold moist stratification (he99). ②Sow @ 68°F, if no germ move to 39°F for 4w, recycle, 14-30d, resents root disturbance (tchn). 162,000 seeds per pound.

“*Cirsium hillii* Dry to mesic prairie. Blooms late June; PURPLE. Harvest late July. 1.5'; easy by method #1, but plants in cultivation are short-lived, susceptible to aphids; blooms 2nd year, then dies.” (rs ma)

greenhouse & garden: Easy by fall plant, light or GA3, alternating temperatures, easy by seedling transplant.

Description: Erect, herbaceous, native forb, biennial (perennial?) or (biennial? or monocarpic perennial) or each ramet monocarpic(?), spiny, sweet smelling; stems 0.3-2.0'; roots perpendicular, often tuberous thickened, hollow; basal leaves wavy, often edged with red, in a large persistent rosette; inflorescence terminal, usually solitary flowers, occasionally a few; flowering heads 1.50-2.0" wide; disk florets purple to red-purple to pink; achenes 4.5-5.0mm, on fluffy, feathery-divided pappus;  $N 2n = 30$ . key features: Thick, hollow roots, basal leaves edged with red.

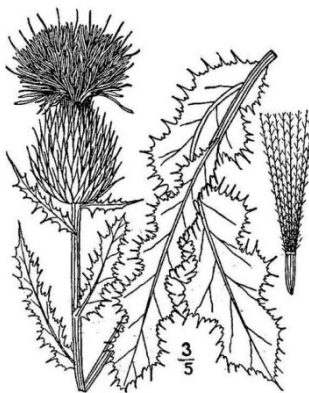
Comments: status: Threatened in Illinois & Wisconsin. Endangered in Indiana. Where noxious weed laws lump all *Cirsium* spp together, this is legally a noxious weed, as in the laws of Arkansas & Iowa. phenology: Blooms June - August. In northern Illinois, collect seeds in July. Collect seeds in se Wisconsin in July - August (he99). Like numerous native spp, HILL'S THISTLE populations have declined due to habitat destruction & fragmentation.

“Of frequent occurrence” *Cirsium Hillii* as *Cnicus Virginianus sensu* Short, non (L.) Pursh. (Short 1845).

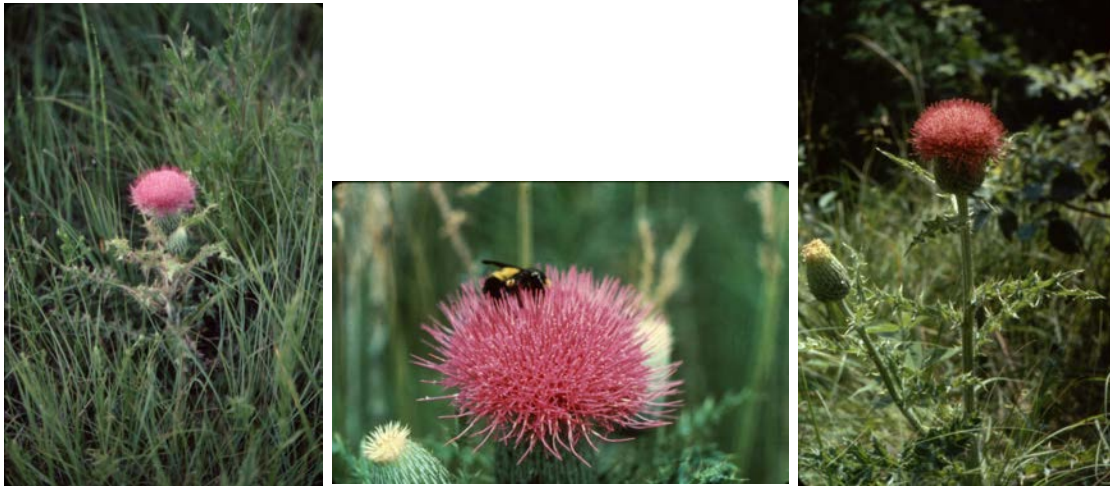
“Variety *hillii* occurs mainly in prairie areas from Minnesota & Iowa east to southern Ontario, Michigan, & northern Indiana. It has often been treated as a sp distinct from *Cirsium pumilum*. As R J Moore & C Frankton (1966) pointed out, the differences separating these taxa are, for the most part, metric characters that show considerable overlap. Some specimens, especially those from Ohio & western Pennsylvania, are difficult to place, & scattered individuals within the area of var *pumilum* would readily be assigned to var *hillii* were they growing in the area of that taxon. Moore & Frankton chose to recognize the infraspecific taxa within *C pumilum* as ssp, a rank that is seldom employed in North American *Cirsium* taxonomy.” (fna)

Associates: Pollinated by butterflies & bumblebees. Attracts butterflies, upland gamebirds & songbirds, small mammals. Seeds are often parasitized.

VHFS: [*Cirsium pumilum* (Nutt) Spreng subsp *hillii* (Canby) R J Moore & Frankton, *C pumilum* (Nutt) Spreng var *hillii* (Canby) B Boivin, *Cnicus hillii* Canby] *Carduus Hillii* (Canby) Porter in nlb05.







*Cirsium Hillii*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Bee photo by Don Pretzsch. Illinois map courtesy of ILPIN.

***Cirsium muticum*** Michaux SWAMP or FEN THISTLE, (*muticus -a -um* Classical Latin adj, awnless, lacking spines, blunt, pointless, blunt, curtailed, docked.) obl

Habitat: Calcareous fens, swamps, moist soils. distribution/range: “Occasional in the n ½ of Illinois, extending south to Wabash Co” (m14). Known from fen section of Hartz’ Sedge meadow & Irene Culls Fen. KBNMFBC. (Known but not mapped from Bureau Co.)

Culture: ① Sow seeds outdoors in fall, or 120 days cold moist stratification (he99). 247,868 (gnhm12), 302,400 seeds per pound. Seed & plants are rarely available in an on again, off again periodicity, always short of the demand. Wild crafted seeds are to be shunned. Bad karma.

bottom line: Preliminary test data indicate dormant seeding is strongly necessary. Germ 9.0-12%. Dorm 70-80%. Test 19-27 days. (#6)\*\*

greenhouse & garden: Dormant seed; light or GA3, alternating temperatures.

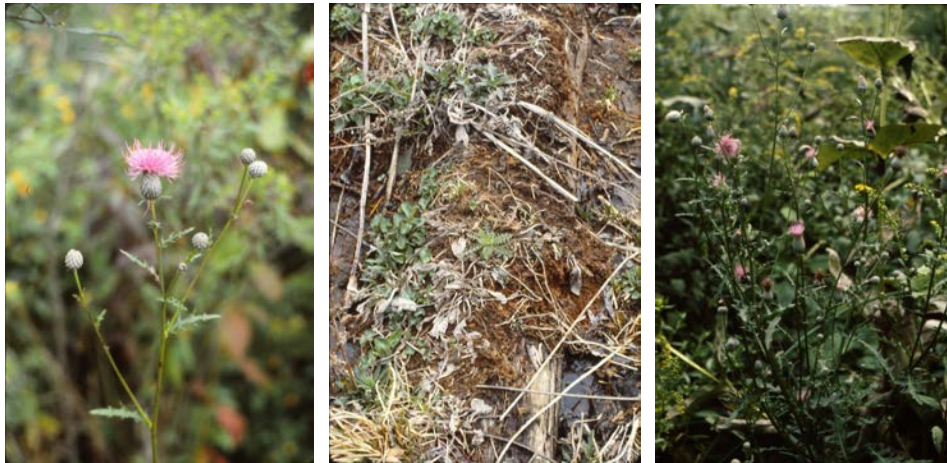
Description: Erect, herbaceous, biennial, native forb; leaves densely white tomentose beneath when young; flowers purple with sticky (viscid) bases.

Comments: status: phenology: Blooms 7,8,9. In northern Illinois, collect seeds in September - October. Collect seeds in se Wisconsin in September (he99). Calcareous soils. Wild populations could easily be over-collected.

Short (1845) used both *Cnicus muticus* (Michx) Pursh and *C glutinosum* Bigel in reference to *C. muticum*: both were “of frequent occurrence.”

Associates: Attracts butterflies, upland gamebirds & songbirds. Preferred food of SWAMP METALMARK.

VHFS: [*Carduus muticus* (Michx) Persoon, *Cirsium muticum* var *muticum*] Var *subpinnatifidus* Britton. Leaves lobed, not deeply pinnatifid, green, & nearly glabrous on both sides. NJ to W Va.



*Cirsium muticum*, including basal rosette

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

*Cirsium* spp, *Ma'zana'tig*, Ojibwa medicinal plant for diseases of women (den28).

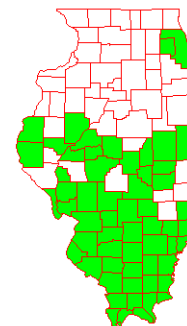
**Cirsium vulgare** BULL THISTLE Sow @ 68°F, if no germ move to 39°F for 4w, recycle, 14-30d, invasive weed (tchn).

**CONOCLINIUM DC MISTFLOWER** *Conoclinium* from Greek κώνος, *konos*, cone, & κλίνη, *kline*, bed or receptacle, referring to conic receptacles. Formerly part of the broadly defined *Eupatorium*. A genus of 4 spp of eastern & central North America into Mexico.

**Conoclinium coelestinum** (Linnaeus) AP de Candolle MIST FLOWER, aka AGERATUM, BLUE BONESET, BLUE MISTFLOWER, HARDY AGERATUM, WILD AGERATUM, (*coelestinus -a -um* (koy-les-TEEN-us) celestial, sky-blue, by inference, belonging to the gods, from Latin *coelestis*, from *caelestis*, belonging to heaven, heavenly, celestial, & *-inus*, belonging to or resembling, for sky blue for the flowers.)

Habitat: Wet prairies, low woods, & borders of streams. Hedges, thickets, & roadsides. In the se USA, “Moist to wet disturbed areas, especially ditches, probably more common than formerly” (w12). distribution/range: “Common in the s 2/3 of Illinois, rare northward where it may be introduced” (m14). In Illinois, it is possibly native as far north as Spring Hill Cemetery, city of Peoria, Peoria Co, but also adventive in some northern cos.

Culture: ①60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ②(Code C Ken Schaal) ③Sow 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). Easy by seed, self sows. Growth rate moderate. Seedling vigor medium. Vegetative spread rate none (?usda). 1,500,000 (usda, ecs), 5,040,000



*Eupatorium coelestinum*

(jfn04), 5,328,000 (ew11), 5,600,000 (pm02), 6,300,115 (gnhm13), 7,316,129 (gnhm11), 8,240,000 (gn) seeds per pound.

cultivation: Space plants 1.25-1.5'. Mesic soils, full sun to partial shade. Suited to heavy textured & highly organic soils. Anaerobic tolerance low. CaCO<sub>3</sub> tolerance medium. Drought tolerance medium. Fertility requirement medium. Salinity tolerance none. Shade tolerant. pH 5.5-7.5.

bottom line: Seed test data indicates dormancy is variable, ranging from 2% to 44% dormant seed. Flipping species of late! Germ 64, 64, na, sd 22, r42-86 (44)%. Dorm 23, 23, sd 21, na, r2.0-44 (42)%. Test 28, 28, na, r18-37 days. (#4).\*\*

Description: Erect, herbaceous, perennial, native forb; rhizomatous, 14" minimum root depth, often forming colonies; culms 1-3'; leaves opposite, oval-shaped, hairy, with toothed edges; flowers powder blue to violet or purple, fluffy, similar to *Ageratum*.

Comments: status: This plant is considered invasive in some regions & habitats (Haragan 1991). phenology: Blooms July to September. Attractive cut flowers, a beautiful sky blue. This sp survived 5+ years of benign neglect on a late glacial sand dune, droughty-soils, full sun, fire, & *Bromus inermis* competition on our farm, but ultimately succumbed to drought.

Associates: Pollinated by long-tongued bees, short-tongued bees, other *Hymenoptera*, *Diptera*, *Lepidoptera*, & *Coleoptera*. Attracts upland game birds, songbirds, & butterflies. Nectar source *Euphyes dukesi*, Dukes Skipper. Provides modest cover for small mammals & upland birds.

VHFS: Formerly known as *Eupatorium coelestinum* L. Rare white-flowered and reddish purple-flowered forms are known (m14).



*Conoclinium coelestinum* 1<sup>st</sup> photo in Peoria

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. 2<sup>nd</sup> photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. Illinois map courtesy of ILPIN

**CONYZA** Lessing 1832 **HORSEWEED, GNAT-BANE** *Conyza* from an ancient name used by Pliny for fleabane; possibly from Greek κώνωψ, *konops*, a gnat or flea, in reference to the plants supposed ability to expel gnats & fleas, or *konis*, dust, referring to the powdered dry plant being used to repel insects. About 60 spp of herbs, shrubs, & trees of temperate, subtropical, & tropical regions. Formerly included in *Erigeron*.

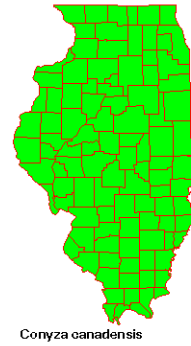
“Recent molecular studies have indicated the likely polyphyly of *Conyza* & its close relationship with *Erigeron*; the ultimate circumscription of these genera is in doubt (Nesom 2000b, Noyes 2000).” (w11)

***Conyza canadensis*** (Linnaeus) Cronquist var ***canadensis*** HORSEWEED, aka BUTTERWEED, CANADIAN OR COMMON HORSEWEED, FLEABANE, HOGWEED, LOGWEED, *Gababi'kwuna'tig*, knotted tree (Ojibwa, (*canadensis* -s -e (kan-a-DEN-sis, kan-a-DEN-see) of or from Canada or the north-east USA, of Canadian origin.)

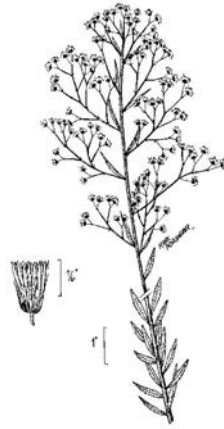
Habitat: Disturbed areas. distribution/range: Ubiquitous in Illinois. Southern Canada, most of the United States, south into tropical America.

Associates: ethnobotany: Used as medicinal plant by Ojibwa for pain in stomach & diseases of women (den28). Plant is diuretic, tonic, & astringent. Flowers used as a hunting charm by Ojibwa (sm32).

VHFS: This plant was long known as *Erigeron canadensis* Linnaeus. See also *Caenotus canadensis* in Nuttall (1817 v2). *Caenotus* Nuttall is now a name for a section of *Erigeron*. “From  $\chi\omicron\iota\nu\omicron\varsigma$ , *khoinos*, common or vulgar; *C canadensis* being one of the most common of all weeds in North America” (Nuttall 1817 v2).



*Conyza canadensis*



*Conyza canadensis*

Line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. Illinois map courtesy of ILPIN.

***Conyza ramosissima*** Cronquist DWARF HORSEWEED

“In illustration of this peculiarity of the Botany of the prairies, I will only further remark that we did not observe the little *Erigeron divaricatum* until we reached Bloomington, in the commons of which town it is extremely abundant; and that it ceases to occur, or is but rarely seen, a few miles south of that.” *Conyza ramosissima* Cronquist as *Erigeron divaricatum* Michx. (Short 1845).

**COREOPSIS** Linnaeus 1753 **COREOPSIS, TICKSEED** *Coreopsis* (ko-ree-OP-sis) looking like a bug, New Latin, from Greek κόρις, κορε-, *koris*, *kore-*, a bug, tick, or bedbug, & Greek -όψις, *opsis*, an appearance, a seeing, indicating a resemblance, for the resemblance of the concavo-convex, 2-horned *achenia* (*cypsela*) of the first described sp to ticks; akin to Greek *keirin*, to cut. The common name tickseed is also from the resemblance of the seed of some sp to a tick, especially that of *C lanceolata*. About 50 spp of herbs, of America, many in cultivation, which have showy flower heads with involucre bracts in two distinct series of eight each, the outer being commonly connate at the base. Ray flowers usually yellow, disk flowers yellow or dark purple. Fruits are achenes, obcompressed, emarginate; pappus 2-toothed, hispid, from one row of capillary bristles, sometimes none. Attracts songbirds. Very closely related to *Bidens*.

Seeds mature summer to fall. Perennial spp germinate better after cold moist treatment. Spring softwood cuttings root easily. You may also use root cuttings in spring before new growth commences. Code A or B. (cu00)

**Coreopsis grandiflora** Hogg ex Sweet LARGEFLOWER TICKSEED, aka BIGFLOWER COREOPSIS, LARGE-FLOWERED COREOPSIS, TICKSEED COREOPSIS, (*grandiflorus -a -um* large-flowered, with flowers larger than normal, New Latin, from *grandis*, full-grown, great, large, tall, *-i-*, & *florus*, participle from *floreo*, I bloom, I flower.)

Habitat: Upland woods & roadsides. distribution/range: Native south of our area.

Culture: ①No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) ②Sow at 20°C (68°F) in light, germinates in less than two wks (tchn). 320,000 (ew11) seeds per pound.

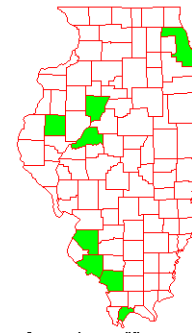
cultivation: Space plants 2.0-3.0'. Full sun, medium to dry soil.

Description: Erect, herbaceous, perennial, native forb; culms to 2' tall; flowers yellow.

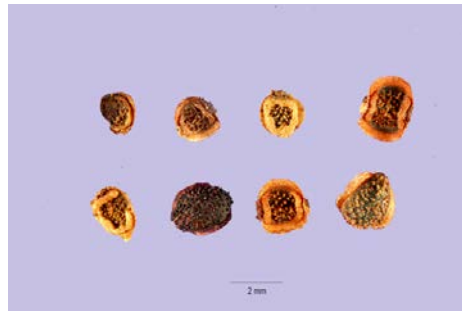
Comments: status: phenology: Blooms late May to July.

Associates: Attracts butterflies.

VHFS: Illinois has var *grandiflora* & var *harveyana* (Gray) Sherff. Variety *grandiflora* differs from *harveyana* in having leaf divisions 2-6 mm wide (vs 0.5-2mm) wide. Variety *inclinata* J Allison is in Mississippi, var *longipes* (Hook) Torr & Gray, is in Oklahoma & Texas, & var *saxicola* (Alexander) EB Sim is in Arkansas, Mississippi, Alabama, & Georgia.



Coreopsis grandiflora



Coreopsis grandiflora

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Tracey Slotta USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy of ILPIN

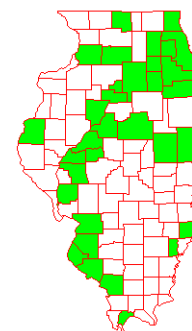
**Coreopsis lanceolata** Linnaeus SAND or LANCE-LEAVED COREOPSIS, aka LANCELEAF TICKSEED, LONG-STALK COREOPSIS, LONG-STALK TICKSEED, SAND TICKSEED, TICKSEED COREOPSIS, (*lanceolatus -a -um* (lan-kee-o-LAH-tus) New Latin from *lancea*, lance or spear, *-olus- -a- -um-*, diminutive, & *-atus -a -um*, possessive of or likeness of, for the lanceolate leaves.) facu

Habitat: Native stands are found in dry, sterile areas, such as dry, hill, & sand prairies, occasionally in dry-mesic areas. distribution/range: Common in east ½ of USA & in prairies.

Culture: ①30 days cold moist stratification (pm09). Seeds germinate after about 60 days of cold, moist stratification, or no pre-treatment needed, sowing outdoors in the spring is the easiest method. Easy from seed in spring. (he99) ②“10 days moist stratification improves germination in greenhouse, but not necessary for good crop. Field sow fall, spring, early summer” (pnnd). ③No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) Sow at 20°C (68°F), germination slow (tchn). Growth rate moderate. Seedling vigor high. Vegetative spread rate none. 155,028 (gnass04), 176,650 (gnh03), 182,037 (gna06), 191,399 (gnh02), 200,000 (pn02 & jfn04), 201,241 (gna05), 202,000 (appl01), 210,000 (stocks), 221,000 (cci, gran, usda, ecs), 234,323 (gna07), 256,000 (aes12), 270,000 (ew11), 320,000 (pm02), 1,114,176 (wns01) seeds per pound. Plant 10 lb

pls per acre 1/8 to 1/4” (do not bury, needs light to germinate) in spring or fall. Usually flowers second year in seedings. Seeded alone plant 4 oz per 1,000 ft sq (stocks). Pure stand plant 10 lb per acre (gran). Pure stand broadcast or shallowly drill 5-7 grams per 100 sq ft, or 5-7 lb per acre (usda). In Midwest mixes, as an accent flower, plant 0.25-0.50 pls lbs per acre (gni). Commercial seed availability is good. Local ecotypes may sell out quickly. This is not a mainstream plug sp; it is most cost efficient from seed.

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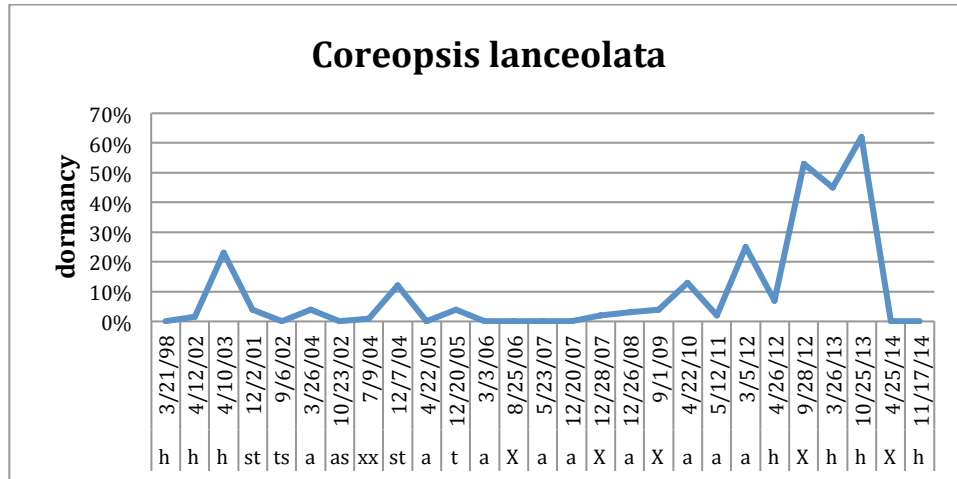
Coreopsis lanceolata

asexual propagation: Division of mature plants.

cultivation: Space plants 1.0-1.5'. Low to moderate water requirement. Prefers sandy or rocky soils. Establishes easily on disturbed soils. Tolerate range of soil types. Tolerant of moderately coarse to moderately fine soils, but longer-lived on well-drained soils. Anaerobic tolerance none. CaCO<sub>3</sub> tolerance none. Drought tolerance low? Fertility requirement medium. Salinity tolerance none according to USDA, but some salt tolerance reported by AES. Shade intolerant, full sun to partial shade. pH 6.0-7.0.

bottom line: Field sow spring or dormant. Seeds need light to germinate, surface sow or light cover according to the season. Commercial flipflop species, tending towards non-dormant. Increased dormancy of late. Germ 72.8, 78, 58, sd 17.2, r31-97.5 (66.5)%. Dorm 9.8, 2.0, 0.0, sd 16.9, r0.0-62 (62)%. Test 25, 24, 23, r14-41 days. (#33).\*\*

greenhouse & garden: Sow seeds out doors anytime. DSO70 (180 days) or moist cold stratify, light, KNO<sub>3</sub>, easy from dry stratified seed.



Description: Native, short-lived, clump-forming perennial, forb; with short rhizomes, 6" minimum root depth; culms 1.5-3.0'; leaves hairy or not, basal divided, upper entire, oval-shaped; flowers yellow rays & disk, 1-2" daisy-like flowers, on long, slender stems, 8-rayed flowers with 4 lobes at tip of each ray.

Comments: status: phenology: Blooms April to June or July. May occasionally flower first year. In northern Illinois, collect seeds in July. Collect seeds in se Wisconsin in July - September (he99). Excellent cut flowers, attractive dried seed heads, landscaping. Drought tolerant. Often used for immediate impact in prairie restorations, recommended for roadside plantings, wildflower mixes & stabilizing disturbed areas. Aggressive early in a planting, but short-lived except on sandy soil with little grassy competition. Nursery production original seed source Kane Co & East Grove Twp, Lee Co.

Associates: Attracts butterflies, songbirds (little food value? debated). Reported as deer resistant.

VHFS: [*Coreopsis crassifolia* Ait, *C heterogyna* Fern, *C lanceolata* L var *villosa* Michx]



*Coreopsis lanceolata*

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 of ILPIN.

**Coreopsis palmata** Nuttall \*MI. PRAIRIE COREOPSIS, aka FINGER TICKSEED, PRAIRIE TICKSEED, STIFF TICKSEED, (*palmatus -a -um* palmate, lobed or divided like a hand with fingers.) upl

Habitat: Mesic, dry, hill, & sand prairies, mesic prairies, open woods.

distribution/range: Next to but not in Lake Michigan.

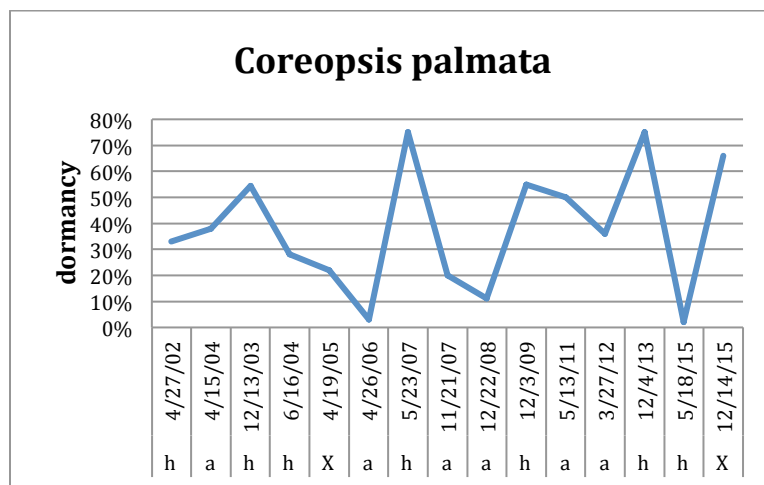
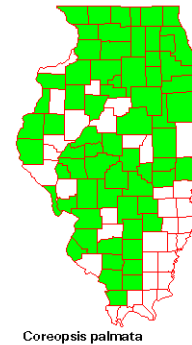
Culture: ① “Moist cold treatment, or fall sow. Light cover. Good germination.” (mfd93) ② 60 days cold moist stratification (pm09). ③ Fall plant or cold stratify for 2 to 3 months for best results. Sow on the soil surface at 70°F & water. (ew11) ④ Sow at max 5°C (41°F) for 8 wks, move to 22°C (72°F) for germ. in about 8 days (tchn). 157,913 (gna06), 160,000 (pm02), 174,400 (ew11), 177,778 (gn), 190,000 (jfn04), 192,000 (aes12), 200,000 (sh94), 210,575 (gnhm02), 230,457 (gnh07), 435,600; 1,408,000 seeds per pound.

“*Coreopsis palmata* Mesic prairie. Blooms late June to late July; YELLOW. Harvest November. 1 1/2'; easy by method #1. SEEDLING TRANSPLANT. Blooming 2nd year. A reliable garden plant. Forms compact vegetative colonies. Foliage turns black in fall.” (rs ma)

asexual propagation: Division of mature clumps most times with care, stem cuttings, root cuttings. If you set a flat of this plant on soil for several days, it will quickly root into the soil. After you remove the flat, you will have a flat-sized colony of coreopsis where the flat rooted.

cultivation: Space plants 2.5-3.0+. Full sun to partial shade, mesic to dry soil.

bottom line: Seed test data indicate >80% of lots receive significant to strong benefit from dormant seeding. Flipflop species, tending towards dormant. Germ 45.6, 44, na, sd 24.1, r11-92 (81)%. Dorm 37.9, 36, 75, sd 23.4, r2.0-75 (73)%. Test 29, 30, 31, r22-34 days. (#15:1).\*\*



greenhouse & garden: Moist cold stratify or fall plant, light, easy from dry stratified seed.

Description: Native, erect, herbaceous, perennial, forb; rhizomatous; culms 1.5-2.0'; flowers yellow; 2n = 26.

Comments: Threatened in Michigan. Blooms 6,7,8. In northern Illinois, collect seeds in late August through October. Collect seeds in se Wisconsin in November (he99). Excellent cut flowers, attractive dried seed heads. Useful in landscaping, naturalized plantings, too aggressive for small gardens or small prairies. Aggressively rhizomatous, rumor has it allelopathic. We have seen this form persistent monocultures, but we have also seen it form temporary large single sp clumps, that thin out in about 10 years forming interstitial stands. Seed source nursery production original sources Green River Lowland, Lee Center Twp, Lee Co, & Clyde & Lyndon Twps, Whiteside Co .

Short (1845) used *Coreopsis palmata* and *C senifolia* in reference to *C palmata*. “In other situations, where a depressed or flattened surface and clayey soil favor a continuance of moisture, a few species of yellow flowered *Coreopsis* occur in such profuse abundance as to tinge the entire surface with a golden burnish. The species of this genus more commonly met with in in such situations, were *Coreopsis trichosperma*, *C senifolia*, *C tripteris*, *C palmata*, &c., &c.” (*C. senifolia sensu* Short (1845) & Lapham (1857), non Michx. (1803)

Associates: Attracts butterflies & birds. Nectar source *Atalopedes campestris* Sachem, *Atrytone arogos* Arogos Skipper, & *Oarisma numotir* (*O poweshiek*) Poweshiek Skipper. Pollinated by long-tongued bees, short-tongued bees, *Diptera*, *Lepidoptera*. Reported to be deer resistant.



*Coreopsis palmata*

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

**Coreopsis pubescens** Elliot STAR TICKSEED, (Latin becoming hairy, from *pubescens*, *pubes*, youth, men; hair that appears at puberty.)

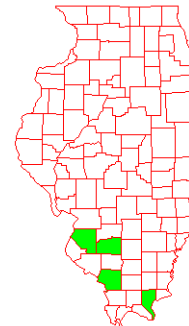
Habitat: Sandy soil & woods. distribution/range:

Culture: ①30 days cold moist stratification (pm09).

Description: Perennial; leaves broad pubescent; yellow flowers, 2-4'. 2n = 26 (+0-2Bs).

Comments: status: Special concern in Kentucky. phenology: Blooms July to September.

VHFS: Ours in Illinois is var *pubescens*. Var *debilis* (Sherff) EB Sm is native from Louisiana to Georgia & Florida. Var *robusta* Gray ex Eames grows from the se USA & Connecticut & Massachusetts.



Coreopsis pubescens



*Coreopsis pubescens*

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



**Coreopsis tinctoria** Nuttall PLAINS COREOPSIS, aka ANNUAL COREOPSIS, CALLIOPSIS, GOLDEN COREOPSIS, GOLDEN TICKSEED, PLAINS TICKSEED, (*tinctorius -a -um* (tink-TO-ree-us) belonging to dyers, of dyes, New Latin, used in dyeing, from *tinctus, tingo*, to wet; to dye, & *-orius*, capability, functionality or resulting action, as in tincture. Often refers to a plant that exudes some kind of stain when broken.)

Habitat: Well-drained soils, full sun to partial shade, roadsides, fields, & meadows.

distribution/range: Adventive to Illinois. Native to central Midwest, prefers low moisture areas. In the Midwest, it grows in disturbed areas, & is used for quick color in wildflower plantings. Or, native to central Great Plains & southern Midwest, in ditches or low-lying sites.

Culture: ①No pretreatment needed. Sow seeds on the soil surface at 70°F & water. (ew11) ②Plant in spring, or sow in fall in south & spring in north (pots). ③Best planted in spring (stocks). Sow outdoors after last frost in spring, light cover to 1/8 to 1/4 deep. Growth rate rapid. Seedling vigor high. Vegetative spread rate none. 1,381,632 (wns01), 1,400,000 (stocks, cci, gran), 1,488,525 (gna07), 1,650,000 (stocks), 1,667,000 (app02), 3,222,000 (usda, ecs) seeds per pound. 2 lb pls /acre. Seeded alone plant 0.8 to 1.0 oz per 1,000 ft sq (stocks). Pure stand plant 2 lb per acre (gran).

cultivation: Space plants 1.25-1.5'. May reseed. Full sun medium to dry soil. Needs full sun. Low moisture requirements. Best in moderately coarse to moderately fine soils. Anaerobic tolerance medium. CaCO3 tolerance medium. Drought tolerance low. Fertility requirement medium. Salinity tolerance none. Shade tolerance intermediate. pH 5.2-7.8.

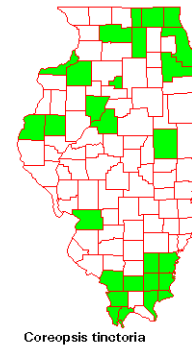
Description: Native western annual/biennial or short-lived perennial; 8" minimum root depth; culms 2-4'; fern-like leaves; flowers yellow, daisy-like, often with maroon banding, (or yellow flowers w/ maroon centers, or yellow & burgundy), 2n = 24 (+0-2Bs).

Comments: status: This spp is considered invasive by some authorities (Stubbenieck et al 1994; SWSS 1998.)

phenology: Blooms May to August. Drought tolerant. An attractive cut flower, may reseed itself. A widely cultivated spp with many commercial sources.

Associates: Attracts butterflies, bees, & birds. Reported as deer resistant.

VHFS: Variety *tinctoria* grows in 45 of the continental states. Var *similis* (Boynt.) HM Parker grows in Texas & var *atkinsoniana* (Dougl ex Lindl) HM Parker ex EB Sm. ATKINSON'S TICKSEED, grows from North Dakota to Washington, to California, Arizona, & New Mexico & also Georgia.



Coreopsis tinctoria

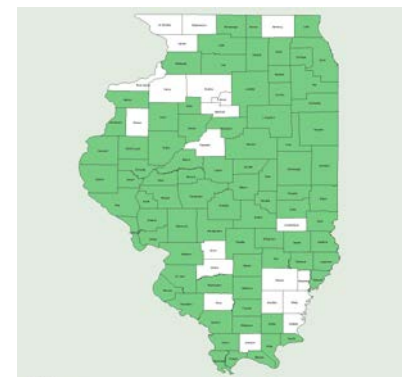


*Coreopsis tinctoria*

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 of ILPIN.

**Coreopsis tripteris** Linnaeus \*MD, WI TALL COREOPSIS, aka TALL TICKSEED, (*tripteris -is -e* three-winged, New Latin possibly from Latin *tri*, three, & from Hellenistic Greek περιδ, περῖς, *pterid-*, *pteris*, fern, akin to Greek πτερον, πτερυξ, *pteron*, *pteryx*, feather, wing.) Facultative

Habitat: Mesic prairies to wet prairies, mesic & dry savannas. Oldfields, woodland edges, & thickets. distribution/range:



**Culture:** ①“Moist cold treatment, or fall sow. Light cover. Good germination.” (mfd93). ②60 days cold moist stratification (pm09). ③Seeds germinate after about 60 days of cold moist stratification (he99). ④30 days moist stratification improves germination, but not needed for good greenhouse crop. Field sow fall, spring, early summer (pnnd). ⑤Fall plant or cold stratify at 40°F for 1 month for best results. Sow on the soil surface at 70°F & water. (ew11) ⑥Sow 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). 184,000 (jfn04), 200,000 (ecs), 204,091 (gna04), 204,800 (ew11), 224,000 (pm02), 237,138 (gna03), 258,101 (gna05), 260,769 (gnhm02), 261,144 (gnh03) 305,930 (gnh07), 448,000 (aes12), 453,600? seeds per pound. Due to potential aggressiveness, use conservative seeding rates, 0.015 - 0.031 lb pls per acre. Seed, transplants, & plugs readily available.

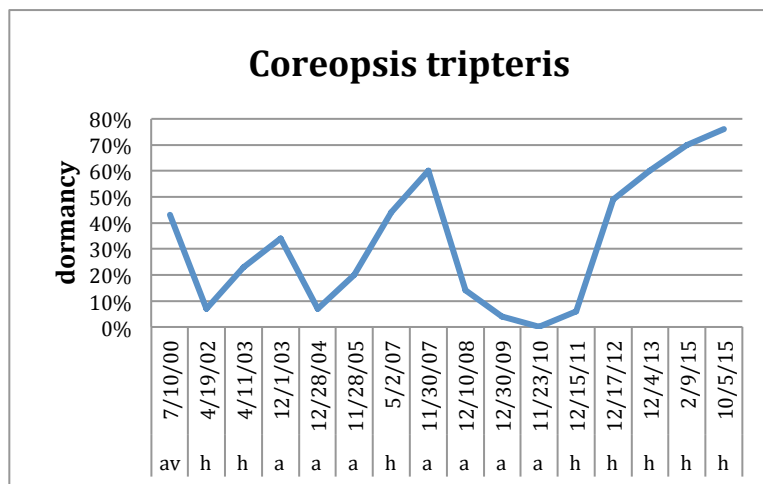
“*Coreopsis tripteris* General prairie. Blooms mid August to mid September; YELLOW. Harvest November. 5'; easy by methods 1, 2, & 3. Successful by SEEDLING TRANSPLANT, SPRING BROADCAST, & FALL BROADCAST; flowers 2nd year.” (rs ma)

**asexual propagation:** Division of mature clumps. Establishes easily from seed & self-sows. This spp is not suitable for small plantings.

**cultivation:** Space plants on 3.0-5.0'. Full sun to partial shade, mesic soils. Calcareous soils. Tolerates Parkland Sand. Tolerant of 1" inundation for short periods. Nutrient load tolerance low. Drought tolerant. Salt tolerance not available. Siltation tolerance low. Partial to full sun. pH data not available. This spp may be invasive in some plantings (Dot Wade, personal communication).

**bottom line:** Genesis seed test data indicates 60% of lots require dormant seeding, but dormancy mechanisms are variable with < 10% dormancy known. Flipflop and crossover species. Strongly dormant of late. Germ 55.6, 61, 84; sd 26.4; r14-90 (76)%. Dorm 32.3, 28.5, 7.0, sd 24.7, r0.0-76 (76)%. Test 29, 27, 27, r13-42 days. (#17)\*\*

**greenhouse & garden:** Moist cold stratify or fall plant: seeds need light, use shallow soil cover: easy from dry stratified seed.



**Description:** Perennial herb, 3.0-8.0(10)', flowers yellow.

**Comments:** **status:** Endangered in Maryland. Special concern in Wisconsin (native to one Co). **phenology:** Blooms July to October. In northern Illinois, collect seeds in late September - October. Collect seeds in se Wisconsin in November (he99). Useful in landscaping, naturalizing, herbaceous borders, rain gardens, tall grass plantings. A wildly successful plant, tolerating some competition. In some cases can be very aggressive in plantings, & aggressively self-sows. It can be invasive, almost weedy, on mesic, dry, & sandy soils. In the Center Prairie restoration, the section planted in 1976, one 'clump' now dominates about one-half acre. Interesting cut flowers & *Cannabis*-like foliage (a fact pointed out to me several years ago as I was planting some TALL COREOPSIS plugs in my road ditch as a Bureau Co deputy sheriff drove by, asking "What the hell are you planting, son?). Seed sources nursery production from genetic source Big Rock, Kane Co, mesic railroad remnants near Amboy, Lee Co, savannah remnants near LaFayette (Jones' Timber, Knox Co), Elmira, Stark Co., Peoria, & from Center Prairie from Windrift Prairie Nursery genetic stock. Heon et al (1999) call this a native western perennial, confusing *tripteris* & *tinctoria*. The plant is aromatic, some liken the scent to anise. To us, the 'aroma' is more reminiscent & typical of several other native species during harvest, *Petalostemum*, *Ratibida*, &c.

“In other situations, where a depressed or flattened surface and clayey soil favor a continuance of moisture, a few species of yellow flowered *Coreopsis* occur in such profuse abundance as to tinge the entire surface with a golden burnish. The species of this genus more commonly met with in in such situations, were *Coreopsis trichosperma*, *C. senifolia*, *C. tripteris*, *C. palmata*, &c., &c.” (Short 1845)

Associates: Pollinated by long-tongued bees, short-tongued bees, *Hymenoptera*, *Diptera*, *Lepidoptera*, & *Coleoptera*. Blooms attract butterflies, nectar plant. Excellent bee plant. Good nectar source? Said to be an important source of pollen, blooming when few other spp are in bloom. Reported as deer resistant.

VHFS: [*Coreopsis tripteris* L var *deamii* Standl, *C tripteris* L var *intercedens* Standl, *C tripteris* L var *smithii* Sherff, *C tripteris* L var *subrhomboidea* Sherff, *C tripteris* L var *tripteris*] **Add varieties.**



*Coreopsis tripteris*

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

**COSMOS** Cavanilles 1791 **COSMOS** plural **COSMOS** or **COSMOSES** *Cosmos* (KOS-mos) beautiful, New Latin from German *kosmos*, from Greek, Greek κόσμος, *kosmos*, ornament, beautiful, in reference from its elegant foliage; also order, a harmoniously ordered universe. Tropical American herbs, ca. 26 spp, having opposite leaves, flowers solitary in loose corymbose panicles, & flower heads with prominent rays. Most cultivated varieties are popular fall-blooming annuals, derived from a Mexican sp, *C bipinnatus*.

***Cosmos bipinnatus*** Cavanilles **COSMOS**, aka **COMMON COSMOS**, **COMMON GARDEN COSMOS**, **GARDEN COSMOS**, **MEXICAN ASTER**, (*bipinnatus -a -um* (bi-pin-AH-tus) twice-pinnate, double pinnate, or feathered, from Latin *bi*, *bis*, twice, & *pinnatus*, feathered, winged, with bipinnate leaves.)

Habitat: Does well on infertile, sandy soils. Adaptable, grows in most soils textures, low water requirements. Best in neutral soils, some acid & base tolerance. Full sun to part shade, mesic soils. distribution/range: Introduced from Mexico.

Culture: ☉No pretreatment needed. Scarify. Sow seeds just below the soil surface at 70°F & water. (ew11) Easy to establish, quick growing. 60,000 (gran), 64,000 (ew11), 65,000 (ecs), 80,800 (appl02) seeds per pound. Pure stand plant 15 lb per acre (gran).

cultivation: Space plants 1.25-1.5’.

bottom line: Non-dormant. Plant spring or dormant.

Description: Introduced annual; 30-60””; flowers pink, white, & crimson, showy, on tall stalks from summer to fall.

Comments: status: This is considered invasive in the se United States (SEPPC 1996). phenology: Blooms August to October. Recommended for roadsides, fence lines, exposed slopes, hedgerows, background areas.

Rarely escapes. Attractive cut flowers, as one website says, “suburb as a cut flower”.

Associates: Attract birds & butterflies, including Monarchs.



*Cosmos bipinnatus*

Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image.

***Cosmos sulphureus*** Cavanilles YELLOW COSMOS, aka KLONDIKE COSMOS, ORANGE COSMOS, SULPHUR COSMOS, (*sulphureus -a -um* (sul-FEWR-ree-us) sulfur-colored, sulphur yellow, generally for the sulphur yellow flowers.)

Habitat: Drought tolerant, full sun, mesic soils. Easily established on most sites, but prefers coarse soils. Grows in most soils textures, low water requirements. Used in roadside plantings, exposed slopes, background landscaping.

distribution/range: Introduced from Mexico or tropical America.

Culture: ① No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) 45,560 live seeds (s&snysstl01), 50,622 pure seed (s&snysstl01), 55,000 (gran), 61,000 (appl02), 62,400 (ew11) seeds per pound. Pure stand plant 15 lb per acre (gran).

cultivation: Space plants 1.25-1.5'.

bottom line: Non-dormant. Plant spring or dormant.

Description: Introduced annual, 24-36", with sulfur orange, yellow, or red flowers on tall branching stems.

Comments: status: This sp is considered invasive in the se United States (SEPPC 1996). phenology: Blooms from summer through fall. Attractive cut flowers. Seed source commercial stock.

Associates: Attracts birds, butterflies, & bees.



*Cosmos sulphureus*

Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image.

**DIMORPHOTHECA** Moench **AFRICAN DAISY, CAPE MARIGOLD** *Dimorphotheca* (di-mor-fo-THEE-ka) New Latin, from *dimorpho-*, from Greek *dimorphos*, *di, dis-*, two, twice, *morphe*, shape, & *-theca*, a fruit; a case or container, for the different type of cypselae produced by the ray & disk flowers. Southern African annuals, perennials, subshrubs, & shrubs, 7-18+ spp, with terminal solitary white, purple, orange, or yellow flower heads similar to those of plants of the genus *Calendula* & with conspicuously toothed leaves.  $x = 9$ .

***Dimorphotheca sinuata*** de Candolle **AFRICAN DAISY, aka CAPE MARIGOLD, STAR OF THE VELDT**, (*sinuatus -a -um* (sin-ew-AH-tus) sinuous, wavy, wavy-edged, for the wavy-edged leaves.)

Habitat: Drought tolerant, full sun. distribution/range:

Description: Yellow & orange flowers in spring & summer.  $N 2n = 18$ .

Comments: status: phenology: Blooms Recommended for quick covers, borders, or quick color. Occasionally specified in some "annual" mixes.

VHFS: [*D aurantiaca* Hort non de Candolle, *D calendulacea* Harvey)



*Dimorphotheca*

Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image.

**DRACOPIS** Cassini 1825 CONEFLOWER *Dracopsis* from Greek δράκων, *drakon*, dragon, serpent, or snake & ancient Greek ὄψις, *opsis*, appearance, resembling, sight, view, referring to the pubescent & fairly long stygmata of the disk flowers. A monotypic genus of an annual herb of south central & southeast North America. See *Rudbeckia* in part.



*Dracopsis amplexicaulis*

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

**DOELLINGERIA** Nees 1832 **FLAT-TOPPED ASTER**

*Doellingeria* for Ignatz *Doellinger*, 1770–1841, German botanist. A genus of about 7 spp of herbs of eastern North America & eastern Asia. It has been treated as a genus separate from *Aster* or as a subgenus of *Aster*. Nesom (1993) notes *Doellingeria*'s affinities are closer to *Solidago* & its relatives than to *Aster*, a classification that is supported by molecular evidence.

**Doellingeria pubens** (Gray) Rydb **HAIRY FLAT-TOPPED ASTER**

NOT MAPPED IN BONAP (2013).

Formerly *D seriocarpa* Small. [*Aster pubentior* Cronq.]

**Doellingeria umbellata** (P Mill.) Nees **FLAT-TOP ASTER**, aka *ASTER À OMBELLE*, CORNELL-LEAF WHITETOP, TALL FLAT-TOPPED WHITE ASTER, PARASOL ASTER, PARASOL WHITETOP, UMBELLATE ASTER, (*umbellatus -a -um* (um-bel-AH-tus) in umbels, umbrella-like flower heads, umbelliferous, from Latin *umbella*, *umbellae*, umbrella, “a little shadow”, & *-atus*, suffix indication possessive of or likeness of something, for the flowers appearing to be in umbels.) *facv* Subgenus *Doellingeria* Section *Triplopappus*

Habitat: Wet meadows, mesic savanna, boggy or peaty low areas, & calcareous fens. Swamps, low woods, & terrace woodlands. distribution/range: North central, northeast, & west central Illinois. Central Illinois is the southern limit of species distribution in this part of its range.

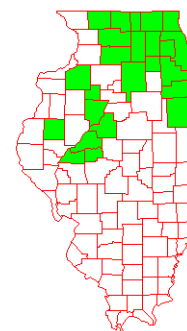
Culture: ① “Moist cold treatment or fall sow. Light cover. Very good germination.” (mfs93) ② 60 days cold moist stratification (pm09). ③ No pretreatment needed. Sow seeds on the soil surface at 70°F & water. Slow to germinate. (ew11) ④ Sow at 20°C (68°F) in light, if no germination in 3-4 wks, move to +2 to +4°C (34-39°F)

for 2-4 wks (tchn). © Without stratification, germination was only 15% (van der Grinten 2001). 651,725 (gnh11), 504,000 (lhn, aes12), 800,000 (gn), 772,109 (gnh06), 1,016,797 (gnam04), 1,072,000\* (pm02, ecs, ew11), 1,118,227 (gnh13), 5,040,000 (jfn04) seeds per pound.

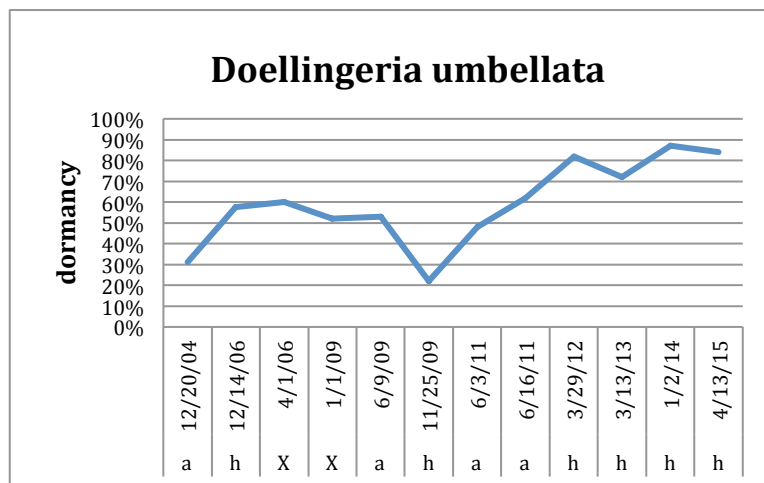
asexual propagation: Increase by division of mature plants in spring. Lift & separate.

cultivation: Space plants 18-24". Full sun to part shade. Moderate shade tolerance. Calcareous soils. Dormant seeding will produce flowering plants the second growing season.

bottom line: Dormant seeding is required for field establishment. Moist cold stratify or dormant seeding is required for a good greenhouse crop. 75% of lots are >50% dorm, 40%>70% dorm. Germ 21.6, 13.8, na, sd 15.8, r1.0-52 (51)%. Dorm 59.2, 58.8, na, sd 19.3, r22-87 (65)%. Test 30, 29, 34, r22-39 days. (#12:0).\*\*



Aster umbellatus



Description: Erect, herbaceous, perennial, native forb, 1.0-5.0' said to reach 8' in parts of its range; much branched at top, rhizomatous, forms small colonies; inflorescence corymbiform heads; ray flowers creamy white, tending to curve down or back, ray flowers yellow to pink, look unkempt, "disk florets perfect & fertile, ray florets pistillate & fertile (Ilpin), N 2n = 18. key features: Flat topped inflorescence, leaf 4-6 times as long as wide (fh). Distinct venation (brachidodromous, brochidodromous) on leaves. "The leaves have a well developed prominent near-marginal connected network of lateral veins forming the distinctive brachidodromous pattern" (Semple website).

Although this sp has a four-parted pappus, it is in the section *Triplopappus*.

"The x=9 genus *Doellingeria* includes only three spp all native to eastern North America. The genus is distinguished by its fruit pappi, phyllaries, inflorescence shape & the brachidodromous leaf venation. Cypselae (achenes) have a quadruple pappus consisting of: 1) short bristly scales (secondary outer series), 2) mid length bristles with attenuate tips (secondary inner series), 3) longer bristles with attenuate tips (primary outer series), & 4) the longest innermost bristles with strongly clavate (flattened & widened) tips." (Semple & Hood in press, from <http://www.jcsemple.uwaterloo.ca/Doellingeria.htm> )

Comments: status: phenology: Blooms 8,9,10. In northern Illinois, collect seeds in late September - October. Collect seeds in se Wisconsin in November (he99). Attractive cut flowers. Landscaping uses, shade & wet gardens. Species can be aggressive in gardens & small plantings. Genetic source Campton Twp, Kane Co (Horlock).

Bob Horlock was Seedsman for The Natural Garden in the 1980s & early 1990s, & a pioneer in this industry. We were fortunate to have a friendly business relationship with Bob during the early years of our nursery. Bob's seeds were collected in DuPage, Kane, & Will cos. We traded seeds back & forth with him, & several of our production plots originate from his collections. Bob passed away in the early 1990s.

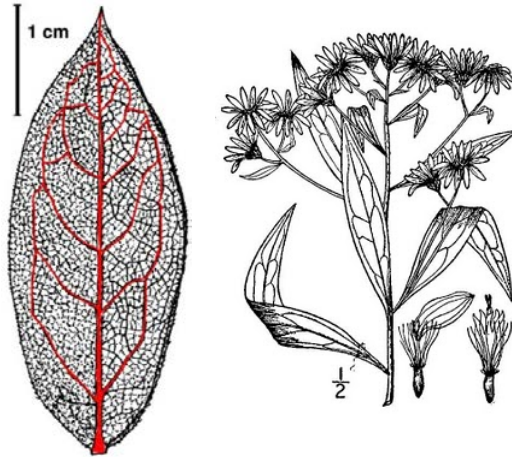
Associates: Attracts butterflies. The larval host of *Chlosyne harrisii* HARRIS' CHECKERSPOT. This butterfly & its host have the same range. Also larval host of PEARLY CRESCENT. Reported to be deer resistant. Species may be a facultative selenium absorber (Ilpin).

**ethnobotany:** Flowers were smudged to expel spirits from sick by Pottawatomie (sm33).

**VHFS:** Long known as *Aster umbellatus* Miller. [*Aster pubentior* Cronquist, *A sericocarpoides* (Small) K Schum, *A umbellatus* Mill var *latifolius* A Gray, *Doellingeria pubens* (A Gray) Rydb, *D sericocarpoides* Small, *D umbellata* (Mill) Nees subsp *pubens* (A Gray) A Löve & D Löve, *D umbellata* (Mill) Nees var *latifolia* (A Gray) House, *D umbellata* (Mill) Nees var *pubens* (A Gray) Britton] Formerly in the genus *Diplopappus*.

M van der Grinten, 2001. Propagation protocol for production of container *Aster umbellatus* P Mill. plants; Big Flats Plant Materials Center, Corning, New York. In: Native Plant Network. URL:

<http://www.nativeplantnetwork.org> (accessed 9 November 2006). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.



*Doellingeria umbellata*

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

Leaf drawing liberated without permission from <http://www.jcsemple.uwaterloo.ca/Doellingeria.htm>.

**DYSSODIA** Cavanilles 1802 FALSE DOG-FENNEL, DOGWEED *Dyssodia* New Latin, modification of Greek *dysōdia*, foul smell, bad odor, from *dysōdēs*, ill-smelling, & *-ia*. Genus of 4 species of herbs of North America south to Central America. Achenes elongated, 4-angled, compressed; pappus scales chaffy, in one series, fimbriately & palmately cleft into bristles. Several spp are now placed in *Thymophylla* or *Adenophyllum*, some of which are used as ornamentals.

### ***Dyssodia papposa* (Ventenat) AS Hitchcock DOGWEED**

Typical on saline/alkaline verges of interstates and expressways. In the se USA, "Waste areas near wool-combing mill, other disturbed areas" (w12b).

**distribution/range:** Adventive in disturbed soil and increasing rapidly in the ne cos; scattered in Illinois (m14). Native of c and sw North America. Apparently abundant in parts of Illinois in the 1830's. Gleason (1910) thought it native to Illinois prairies.

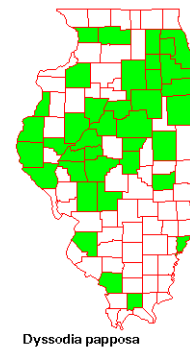
Perhaps it has always been in disturbed trails, paths, &c., in Midwest prairies.

An ill-scented plant, somewhat charming in a flowerbed. Unmowed plants are attractive. The rich, earthy, brown fall color has its 75 mph *gestalt*. Sp is an excellent cut flower for your mother -in-law or your ex.

"At some places between Peoria and Springfield the road-sides and even the beaten path, were so completely covered with little *Boebera chrysanthemoides*, that, trodden under our horses' feet, it exhaled a strong and nauseating odor. In many such localities, this noisome weed seems to take the place of the *Anthemis cotula* and *A. arvensis* (Mayweed and Dog-fennel,) in the more settled portions of the Western States." *Dyssodia papposa* (Ventenat) AS Hitchcock as *Boebera chrysanthemoides* Willd. (Short 1845).

"In 1837, C. W. Short noted of *D. papposa* on a specimen label, "This plant is so abundant, and exhales an odor so unpleasant as to sicken the traveler over the western prairies of Illinois, in autumn."

(<http://plants.jstor.org/compilation/dyssodia.papposa>)



*Dyssodia papposa*



*Dyssodia papposa*

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

**ECHINACEA** Moench 1794 **PURPLE CONEFLOWER** *Echinacea* (e-kee-NAH-kee-a, commonly e-kee-NAH-see-a) New Latin, from *echin-* & *-acea* (feminine of *-aceus -aceous*) from Greek ἐχῖνος, *ekhinos*, hedgehog, or Latin, *echinus*, sea urchin, for the spiny receptacle scales (pales). A genus of 4-9 spp endemic to eastern & central USA (or 4 spp, 10 taxa). Coarse herbs having thick rough leaves & long-stalked flower heads with showy purplish, crimson, white, or yellow rays. Achenes 3-4-angled, pappus 0. All *Echinacea* are self-sterile. Long-lasting showy flowers. Said to be aggressive by some. Many spp are harvested for medicinal use.  $x = 11$ . Formerly *Brauneria*, & at one time included in *Rudbeckia*. Either name may be seen in current seed catalogues. Plants are tap-rooted except for fibrous-rooted *E purpurea*. Pollen is yellow except for *E pallida* with white to lemon yellow pollen.

This genus is notoriously promiscuous in the nursery. For better or worse, flower breeders have emulated Doctor Moreau & produced many colorful selections & hybrids, because we needed an *Echinacea* that looks like a mum, so we can plant it beside our green selection of BLUE FESCUE. **The Missouri Botanical Garden recommends isolating seed production plots of *Echinacea* spp by several miles to maintain the genetic integrity of some spp, such as *E tennesseensis*.**

*Echinacea pallida* & *purpurea* easy from moist stratified seed. “Moist cold treatment, or fall sow. Very light cover. Good to fair germination.” (mfd93). Seeds mature late summer to early fall. The narrow-leaved spp are slower from seed & require well-drained potting soil. Code B. (cu00)

*Echinacea* roots are the most often used medicinal parts (*the foliage of E purpurea is also used*). Even in Illinois, you may see some one poaching *Echinacea* or *Veronicastrum* roots illegally along railroad rights of way, or you may see their potholes, sometimes with the *Echinacea* regrowing from the roots in the bottom of a shovel hole. Do not buy wild-crafted roots & do not dig wild roots. *Parthenium* roots are sometimes sold as *Echinacea*. Sustainably produced, farm-grown roots are available at most quality health food stores or on line. Place the *Echinacea* roots in a large glass bottle & cover with vodka or brandy & let stand for 30 days. Take two fingers twice daily. Call me in the morning.





Photo by Jock Ingels

***Echinacea angustifolia*** de Candolle NARROW-LEAVED PURPLE CONEFLOWER, aka BLACK SAMPSON, BLACKSAMPSON ECHINACEA, *ECHINACEA*, KANSAS SNAKEROOT, NARROW-LEAF CONEFLOWER, NARROW-LEAF ECHINACEA, NARROW PURPLE CONEFLOWER, STRIGOSE BLACKSAMPSON, WESTERN CONEFLOWER, (*angustifolia* - *a* -um narrow-leaved, from Latin *angustus*, adj, drawn together, narrow, -*i*-, connective vowel used by botanical Latin, & *folium*, *foli(i)*, n, a leaf.)

Habitat: Dry prairies, mostly west of our area. Dry prairies, barrens, rocky to sandy-clay soils (Urbatsch et al in fna). distribution/range: Many old local floras include this species as native in western Illinois. Mohlenbrock (2014) lists this as “prairies, very rare, scattered in w cos.” Map not available 1/2014. Sp is listed for Illinois in Groen (2005)

Culture: propagation: ①90 days cold moist stratification. Best planted outdoors in the fall. (pm09). ②Sow seeds outdoors in fall, or 90 days cold moist stratification. Seeds need light to break dormancy & germinate. Plant on top of growing media & do not cover (or light cover). (he99) ③“60 days moist stratification required for germination. Field sow fall.” (pnnd) ④Fall plant or cold stratify for up to 2 to 3 months for best results. Sow just below the soil surface at 70°F & water. (ew11) ⑤Sow at 18-22°C (64-71°F) for 2-4 wks, move to 4°C (40°F) for 9 wks, move to 10°C (50°F) for germination (tchn). ⑥Harvest seeds 7/22-8/21. Sow 1/4 inch deep in clean, firm, seed bed, late fall, in the field or sow seed in flats following cold-moist stratification. 9-15 weeks cold-moist stratification gave best results. 24% + 40% dormant = 64% (4 year average); Best results obtained at 19-26°C. Low humidity and temperature extends seed viability for at least 2 years under controlled environmental conditions (Wynia 2001) ⑦“Seeds exhibit physiological dormancy. Seeds are placed in cold moist stratification for 84 days. Germination occurs at 20°D/10°N C alternating temperature cycle. Germination was greater in light than dark” (bb02)

seed counts & rates: 80,640 (wns02), 88,000 (ew11), 108,800 (pn02), 112,000 (pm02, aes12), 150,000 (wynia) seeds per pound.

cultivation: Space plants 1.0-1.5'. Full sun, dry soils. Transplants must be replanted at their original soil depth.

greenhouse & garden: Dormant seeding gives our best germination or moist cold stratify for 90 days.

Description: Erect, herbaceous, perennial, native forb; culms 1.0-2.0', flowers pink. N 2n = 22, 44.

Comments: status: phenology: Blooms 7. Collect seeds in se Wisconsin in October - November (he99). Attractive cut flowers.

Associates: Attracts butterflies & hummingbirds. Eggs may be laid on the species, but it is not a larval host of *Hesperia ottoe* OTTOE SKIPPER. Reported as deer resistant.

ethnobotany:

VHFS: [*Echinacea angustifolia* var. *strigosa* McGregor]

CC Baskin & JM Baskin, 2002. Propagation protocol for production of container *Echinacea angustifolia* DC plants; University of Kentucky, Lexington, Kentucky. In: Native Plant Network. URL:

<http://www.nativeplantnetwork.org> (accessed 23 June 2014). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

AH Groen, 2005. *Echinacea angustifolia*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [].

R Wynia, 2001. Propagation protocol for production of *Echinacea angustifolia* seeds; Natural Resources Conservation Service - Manhattan Plant Materials Center, Manhattan, Kansas. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 23 June 2014). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.



*Echinacea angustifolia*

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

***Echinacea atrorubens* (Nuttall) Nuttall REFLEXED CONEFLOWER, aka TOPEKA PURPLE CONEFLOWER,**

Habitat: Dry limestone or sandstone outcrops (Urbatsch et al in fna). distribution/range: Kansas, Oklahoma, & Texas.

Culture: ①60 days cold moist stratification (pm09). ②Fall plant or cold stratify for up to 2 to 3 months for best results. Sow just below the soil surface at 70°F & water. (ew11) 128,000 (pm02, ew11) seeds per pound.

cultivation: Space plants 1.25-1.5'. Full sun, mesic to dry soils.

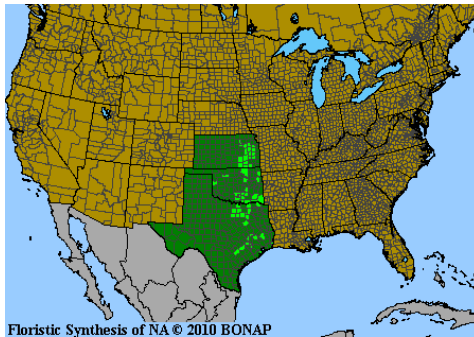
Description: Erect perennial, 2.0-4.0', N 2n = 11.

Comments: status: phenology: Blooms late spring. Attractive cut flowers.

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

VHFS: [*Rudbeckia atrorubens* Nuttall, J. Acad. Nat. Sci. Philadelphia 7: 80. 1834]





*Echinacea atrorubens*

Photos Mrs. WD. Bransford & Bruce Leander, [http://www.wildflower.org/gallery/result.php?id\\_image=26968](http://www.wildflower.org/gallery/result.php?id_image=26968) North America map courtesy of BONAP (2010)

***Echinacea pallida*** (Nuttall) Nuttall \*TN, WI PALE PURPLE CONEFLOWER, aka PALE CONEFLOWER, PALE ECHINACEA, PALE-FLOWER ECHINACEA, PINK CONEFLOWER, PRAIRIE CONEFLOWER, PURPLE CONEFLOWER, SWEET-SCENTED CONEFLOWER (*pallidus -a -um* pale, pallid, somewhat pallid, from Latin *pallere*, to be pale, from Greek *polios* gray, Sanskrit *palita* gray, hoary, cf Old Slavic *plavu*, white.) upl

Habitat: Dry, hill, & sand prairies, mesic prairies, open woods, open prairies, grassy slopes. It seems more common in dry & dry-mesic prairies, but in Earl Butz country, we have no mesic remnants, they are all farmed. Rocky prairies, open wooded hillsides, and glades; 50–1500 m (Urbatsch et al in fna).

distribution/range: Introduced in Connecticut, Georgia, Maine, Massachusetts, New York, North Carolina, and Virginia.

Culture: ①90 days cold moist stratification. Best planted outdoors in the fall. (pm09). ②Sow seeds outdoors in fall, or 90 days cold moist stratification. Seeds need light to break dormancy & germinate. Plant on top of growing media & do not cover (or light cover). (he99) ③Fall plant or cold stratify for up to 2 to 3 months for best results. Sow just below the soil surface at 70°F & water. (ew11) ④Sow 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). ⑤“60 days moist stratification required for germination. Field sow fall.” (pnnd). Growth rate moderate. Seedling vigor medium. Vegetative spread rate none.

seed counts & rates: 73,600 (aes12), 77,587 (gna05), 80,000 (sh94), 80,000 –85,000 (usda), 80,760 (agre03233), 83,200 (pm02, ew11), 86,915 (gna11), 86,816 (agr02233), 91,275 (gna05), 100,427 (stl), 101,602 (gnh02), 105,600 (jfn04), 106,000 (usda, ecs), 111,713 (gna04), 115,500 (stocks), 117,000 (gran), 161,074 (gni) seeds per pound.

For single sp stand, plant 4.5 oz per 1,000 ft sq (stocks). Pure stand plant 12 lb per acre (gran). For seed production, plant 3-5 pls pounds per acre in 36” rows. For a solid stand, plant 15-20 pls pounds per acre (usda). In seed mixes use 0.125 to 0.5+ pounds per acre. This sp may also be winter broadcast on prepared soils, into previously-burned, thin sods or no-till drilled into burned old fields & remnants, with spectacular results in 5-6 years. Our experience indicates dry-stored seed, summer-planted, may over-winter to grow the following year.

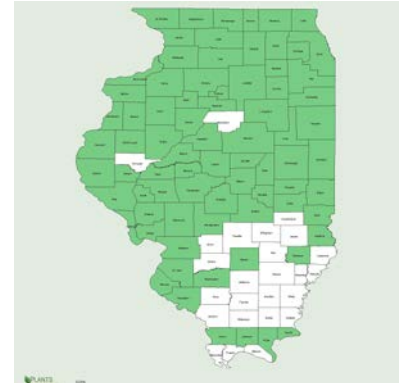
“*Echinacea pallida* Mesic to dry prairie. Blooms late June & early July; PURPLE. Harvest November! 2 1/2'; all methods successful. Successful by SEEDLING TRANSPLANT, SPRING BROADCAST, FALL BROADCAST. Too coarse without competition. Flowers 2nd year. Rodents eat roots. Achenes tight in heads until November.” (rs ma)

asexual propagation: There are references to division, but tap-rooted *Echinacea* should be planted in their permanent locations and not disturbed.

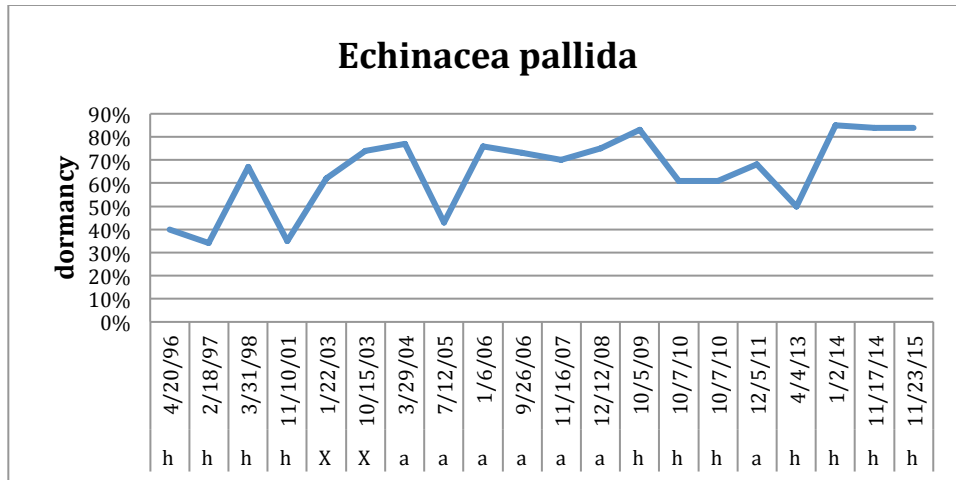
cultivation: Space plants 1.25-1.5'. Full sun or light shade, mesic to dry soils, shallow-rocky soils. Tolerates clay soils. Low moisture requirements. Anaerobic tolerance none. CaCO3 tolerance low. Drought tolerance medium. Fertility requirement low. Salinity tolerance low. Shade intolerant, or tolerates some shade. pH 6.5-7.2. Zones 3-10 or 4-9.

bottom line: Dormant seeding of local genetic material is required for field establishment. Commercial stock from ornamental growers has 0-4% dormancy. In a broad sense, a flipflop species, agriculturally induced. Local materials consistently significantly to strongly dormant. Germ 19.5, 14, 8.0, sd 15.6, r2.0-60 (58)%. Dorm 65.1, 69, 61, sd 16.2, r34-85 (51)%. Test 29, 29, 14, r14-51 days. (#28)\*\*

greenhouse & garden: Fall plant gives our best germination or moist cold stratify 90 days @ 35-40° F.



Successional restoration & inter-seeding works well. A spring no-till inter-seeding in a degraded remnant sandhill worked, but it took 7 years to develop well.



**Description:** Attractive native long-lived perennial in well-drained soils; 14” minimum root depth; stems 1.5-3.0'; spread 1.00-1.50'; rough hairy long narrow leaves, 5 to 20 times as long as wide; with long lavender-pink (pink-rose), incurving ray petals drooping around dark domed disc;  $N 2n = 22$ .

**Comments:** status: Threatened in Wisconsin & Tennessee. phenology: Blooms 6,7. In northern Illinois, collect seeds mid-August through October. Collect seeds in se Wisconsin in October - November (he99). Long stems make for good, fragrant cut flowers & attractive dried seed heads. Useful in roadside plantings, naturalizing, prairie restoration & landscaping. Establishes relatively quickly & increases on dry soils but somewhat slower on rich, black soils. Can be short lived on rich soils. Drought tolerant. Seed source nursery production genetic source BNRR east of Walnut, Bureau Co & Lee Co, & Com Ed prairie, Byron, Ogle Co.

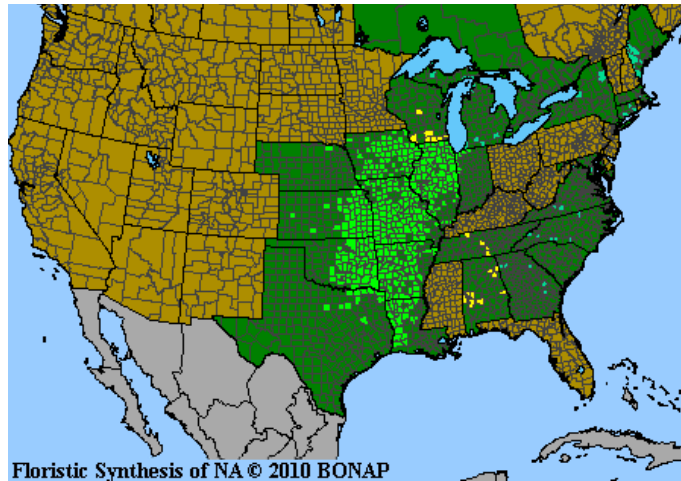
The spring of 2011 was very cold, wet, & cloudy, but turned immediately into full-blown summer, exceptionally hot & no rain for almost 5 weeks. The hot dry weather extended into the bloom & pollination period of *E pallida*. The sp responded by producing relatively large seeds! *vide supra*.

**Associates:** Sp is of special value to native bees. Flowers pollinated by bumblebees & beetles. Larval host for OTTOE-SKIPPER. Nectar source *Oarisma numotir*, (*O poweshiek*) POWESHIEK SKIPPER. Attracts bees, butterflies, hummingbirds, upland gamebirds, & songbirds. Goldfinches eat the seeds in late summer & fall. Useful in wildlife food & cover plots. Said to be deer tolerant.

ethnobotany: Medicinal uses, one of the sources of *Echinacea* extracts.

**VHFS:** [*Brauneria pallida* (Nutt) Britt, *Echinacea pallida* (Nutt) Nutt var *pallida*, *Rudbeckia pallida* Nuttall, J. Acad. Nat. Sci. Philadelphia 7: 77. 1834]





*Echinacea pallida*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010)

***Echinacea paradoxa*** (JBS Norton) Britton \*AK BUSH'S YELLOW CONEFLOWER, aka BUSH'S PURPLE CONEFLOWER, OZARK CONEFLOWER, YELLOW CONEFLOWER, (from Latin *paradoxus -a -um*, not of the expected, from Greek *paradoxa*, contrary to expectations, paradoxical, for the yellow petals, unusual to the genus.)

Habitat: Ozark barrens. distribution/range: Southcentral US.

Culture: ①60 days cold moist stratification (pm09). ②Fall plant or cold stratify for up to 2 to 3 months for best results. Sow just below the soil surface at 70°F & water. (ew11) ③Moist cold stratify (Code C Ken Schaal) or dormant seed. ④Sow at 18-22°C (64-71°F) for 2-4 wks, move to 4°C (40°F) for 9 wks, move to 10°C (50°F) for germination (tchn).

seed counts & rates: 71,800 (wms02), 80,000 (pm02, ew11), 360,000 (gn) seeds per pound.

cultivation: Space plants 1.25-1.5'. Full sun to partial shade, mesic to dry soils Plants are short-lived in rich soils.

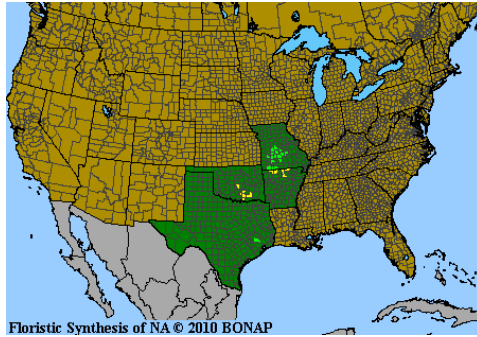
Description: Erect, herbaceous, perennial, native forb; stems 2.0-3.0'; flowers yellow;  $N 2n = 22$ .

Comments: status: Threatened in Arkansas. phenology: Blooms 6,7,8. Short lived in good soils, but long-lived in poor, sandy soils. It is persisting in a Stark Co roadside planting, just south of Bradford. Attractive cut flowers.

Associates: Attracts butterflies & hummingbirds.

VHFS: ①Var *neglecta* RL McGregor, BUSH'S PURPLE CONEFLOWER, with light purple, pink, or white rays, grows in rocky prairies & open, wooded hillsides Oklahoma & Texas,  $N 2n = 22$ . ②Var *paradoxa*, with yellow petals, grows in rocky prairies, glades, & bald knobs in Arkansas & Missouri,  $n 2n = 22$ . [*Brauneria paradoxa* Norton, Trans. Acad. Sci. St. Louis 12: 40, plate 8. 1902, *Echinacea atrorubens* Nutt var *paradoxa* (JBS Norton) Cronq.]





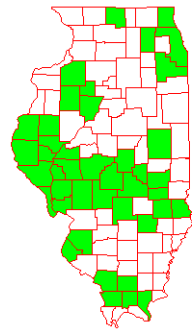
*Echinacea paradoxa*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. North American genus distribution map courtesy of BONAP (2010)

***Echinacea purpurea*** (Linnaeus) Moench \*FL, IA?, OH PURPLE CONEFLOWER, aka BLACK SUSANS, BROAD-LEAF PURPLE CONEFLOWER, COMB FLOWER, ECHINACEA, EASTERN PURPLE CONEFLOWER, HEDGE HOG, INDIAN HEAD, KANSAS SNAKEROOT, SCURVY ROOT, SNAKEROOT, (*purpureus* -a -um (pur-PEWR-ree-us) 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, for the purple flowers.) Still referred to as *Rudbeckia purpurea* in some seed catalogs. upl

Habitat: Bur oak savannahs, full sun or light shade. Prefers dry to mesic open prairies & open savannas, but establishes on a wide variety of soils.. Rocky, open woods, thickets, prairies, especially near waterways; 10–400+ m (Urbatsch et al in fna). distribution/range: In northwest Illinois, it is native as far north as Kewanee (Dobbs) & Sparland (the later not mapped). Also known from near Victoria & the old Rock Island Line, Wady Petra. Not considered native in Wisconsin.

Culture: ①No pre-treatment necessary other than cold, dry stratification (pm09). ②Sow seeds outdoors in fall, or 90 days cold moist stratification. Seeds need light to break dormancy & germinate. Plant on top of growing media & do not cover (or light cover). (he99) ③“30 days moist stratification improves germination, but not needed for good greenhouse crop. Field sow fall, spring, early summer.” (pnnd) ④Fall plant or cold stratify for up to 2 to 3 months for best results. Sow just below the soil surface at 70°F & water. (ew11) ⑤Sow 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). ⑥Plant anytime in El Paso (pots). Growth rate moderate. Seedling vigor medium. Vegetative spread rate moderate.



*Echinacea purpurea*

82,800 (wms02), 96,000 (pm02?), 105,600 (pm02, pn02, jfn04), 110,400 (ew11), 108,160 (gna05), 113,585 (gna06), 115,000 (stocks), 115,664 (usda), 160,000 (ecs), 116,739 (gnih02), 117,000 (appl02), 123,874 (gnh03), 128,000 (aes12), 133,408 seeds per pound. For single sp stand, plant 4.8 oz per 1,000 sq ft. Pure stand plant 12 lb per acre (gran).

asexual propagation: Cuttings, division of mature plants in spring.

cultivation: Space plants 1.5-2.0'. Full sun to partial shade, mesic soils. Low to moderate moisture requirements. Moderately coarse to moderately fine soils; tolerates clay soils. Anaerobic tolerance none. CaCO<sub>3</sub> tolerance low. Drought tolerance low. Fertility requirement low. Salinity tolerance low. Shade intolerant? pH 6.5-7.2, circum-neutral soils.

bottom line: Plant spring or dormant. Seeds need no further treatment. Commercial stock is essentially non dormant. Widespread cultivation has masked natural dormancy patterns. Germ 90.8, 92, 92, sd 4.3, r82-97 (15)%. Dorm 1.4, 0.0, 0.0, sd 2.8, r0.0-9.0 (9.0)%. Test 23, 21, 29, r13-34 days. (#30).\*\*

greenhouse & garden: Fall plant or moist cold stratify 60-90 days is indicated by some authors, but several lots of local ecotype, over a period of years are totally nondormant & germinate well without pretreatment. A savannah sp, but said to prefer full sun. Self sows.

Description: Native upright perennial, 24-36", with single lavender-purple (pink-rose) flowers with spiny golden-purple disk on long stems, fairly drought tolerant 2.0-3.0' 24" minimum root depth. N 2n = 22.

Comments: status: Endangered in Florida. Probably extirpated in Michigan. phenology: Blooms 6,7,8,9. In northern Illinois, collect seeds in September - October. Collect seeds in se Wisconsin in October (he99). Good cut flowers if cut before flowers are “blown”, or while slightly immature. Attractive dried seed heads.

Landscaping, savanna gardens, mesic rain gardens, commonly used in restoration seedings for quick color &

erosion control. Common element in wildflower & roadside mixes, good background plant. Seed source nursery production, originally from Cook, Knox & Marshall cos.

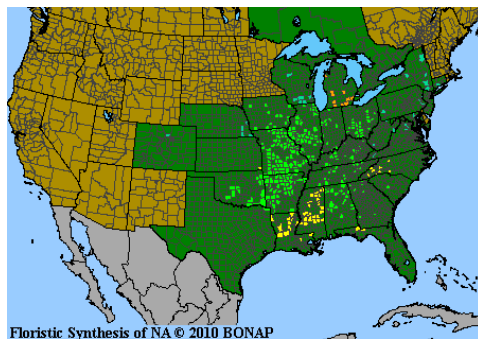
“There are, indeed, comparatively speaking, but few plants, except the grasses, (which are gregarious every where and are intermixed in greater or less degree and variety among all the other plants of the prairie,) which may be considered as indigenes of the prairie region generally. ---Among these we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

Associates: Pollinated by bumblebees & beetles. Attracts bees, butterflies & hummingbirds. Nectar source *Atrytone arogos* AROGOS SKIPPER, & *Speyeria cybele* GREAT SPANGLED FRITILLARY BUTTERFLY. Reported as deer resistant.

ethnobotany: The tops & roots of this sp have medicinal uses, & it is widely cultivated for such.

VHFS: [*Brauneria purpurea* (L) Britt, *Echinacea purpurea* (L) Moench var *arkansana* Steyermark, *Rudbeckia purpurea* L]

Some of the cultivars are King, Sombrero, Alba, Bright Star Leuchste, Crimson Star, Magnus, Ovation, Springbrook's Crimson Star, Talent, Thompson & Morgan Hybrids, White Flower Farm Strain, White Lustre, & White Swan.



*Echinacea purpurea*

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 of ILPIN. North America map courtesy of BONAP (2010)

**Echinacea sanguinea** Nuttall SANGUINE PURPLE CONEFLOWER is native of Arkansas, Louisiana, Oklahoma, & Texas.

**Echinacea simulata** RL McGregor \*TN WAVY-LEAF PURPLE CONEFLOWER, aka GLADE CONEFLOWER, PALE PURPLE CONEFLOWER, (*simulates -a -um*, past participle of *simulo, simulare*, to imitate or copy, referring to the plants simulation of *E pallida*.)

Habitat: Dolomite glades & slopes. Open woods, dry prairies (m14). distribution/range: Illinois, Missouri, Kentucky, Tennessee, Alabama, Georgia, Virginia & North Carolina. Adventive in some Illinois plantings, Jasper & Piatt cos. Not common but scattered in Illinois (m14).

Culture: ① Fall plant or cold stratify for up to 2 to 3 months for best results. Sow just below the soil surface at 70°F & water. (ew11) ② “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)

seed counts & rates: 92,800 (ew11) seeds per pound.

asexual propagation: Divide mature plants when they become crowded, about every four years.

cultivation: Space plants 0.67-1.5'. Full sun to partial shade, mesic to dry, well-drained soils. Tolerant of drought, heat, humidity, & poor soils.

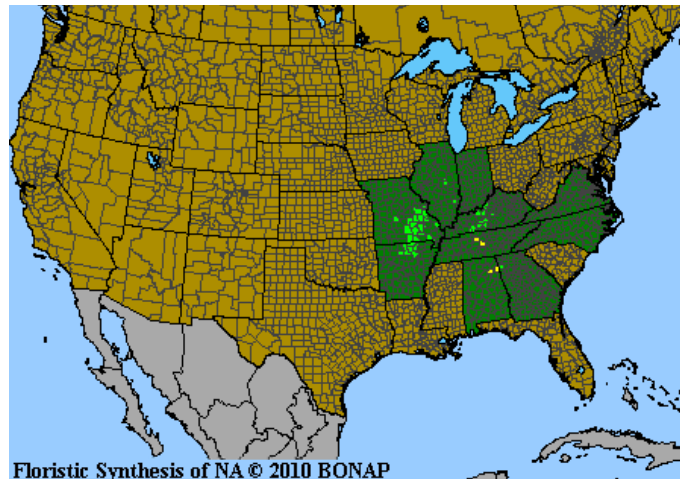
Description: Yellow pollen.

Comments: status: Threatened in Tennessee. phenology: Blooms 6-7. Attractive cut flowers & dried seed heads.

Associates: Attracts butterflies, hummingbirds, & goldfinches.

VHFS:

CC Baskin & JM Baskin, 2002. Propagation protocol for production of container *Echinacea simulata* RL McGregor plants; University of Kentucky, Lexington, Kentucky. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 28 June 2011). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.



*Echinacea simulata*

**Echinacea tennesseensis** (Beadle) Small \*F, TN TENNESSEE CONEFLOWER aka TENNESSEE PURPLE CONEFLOWER, (*tennesseensis -is -e* of or relating to Tennessee, USA.)

Habitat: Dry savannas & barrens. Cedar glades in Tennessee, dominated by *Juniperus virginiana* growing in thin soils over limestone, with much exposed bedrock. distribution/range: Known from three cos near Nashville, Tennessee.

Culture: propagation: ① Cold moist stratify 60 days (Wade). ② 10 days cold moist stratification (pm09). ③ Fall plant or cold stratify for up to 2 to 3 months for best results. Sow just below the soil surface at 70°F & water. (ew11) ④ Sow at 18-22°C (64-71°F) for 2-4 wks, move to 4°C (40°F) for 9 wks, move to 10°C (50°F) for germination (tchn). ⑤ “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) 96,000 (pm02, ew11) seeds per pound.

cultivation: Space plants 1.0-1.25. Average, medium, well-drained soils in full sun or partial shade. It also has a less vigorous growth habit & may be crowded out by other *Echinacea* spp.



greenhouse & garden: Easy from seed, moist cold stratify 60 days or dormant seed in an unheated coldframe for insurance.

Description: 1.0-1.5(-2.0)' tall, 1.0-1.5' spread; culms to 2.5' tall; leaves linear, dark green; flowers purple/rose, up-curved petals (ray flowers), disks coppery orange with a green tinge;  $2n = 22$ .

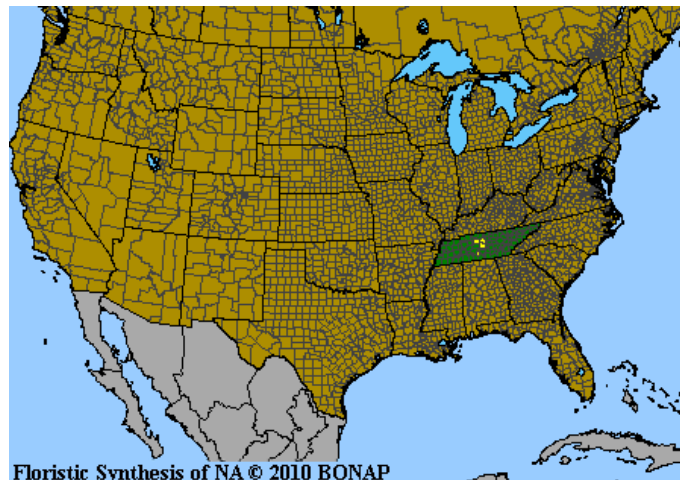
Comments: status: Species is listed as endangered in the United States & Tennessee. phenology: Blooms (5-)6-8. Attractive cut flowers & dried seed heads. In nurseries, this sp tends to hybridize with other *Echinacea* spp.

TENNESSEE CONEFLOWER is one of the rarest wildflowers in the United States. It was the second sp listed as threatened by the USF&W in 1979. The sp was thought to be extinct in the first one half of the 20<sup>th</sup> century. Rediscovered in 1968, it is known in the wild from 5 sites. The sites are threatened by commercial & residential development, off-road vehicles, livestock grazing, hybridization with other *Echinacea* spp, & lack of controlled burning. The genetics of all *Echinacea* are threatened by nursery propagation of multiple spp at one site, & the proliferation of numerous ornamental selections from the Island of Doctor Moreau.

Associates: Attracts butterflies & hummingbirds. May be damaged by Japanese beetles & leaf spot.

VHFS: [*Brauneria tennesseensis* Beadle, *Echinacea angustifolia* DC var *tennesseensis* (Beadle) Blake, *E pallida* (Nutt) Nutt var *tennesseensis* (Beadle) Binns]

CC Baskin & JM Baskin, 2002. Propagation protocol for production of container *Echinacea tennesseensis* (Beadle) Small plants; University of Kentucky, Lexington, Kentucky. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 28 June 2011). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

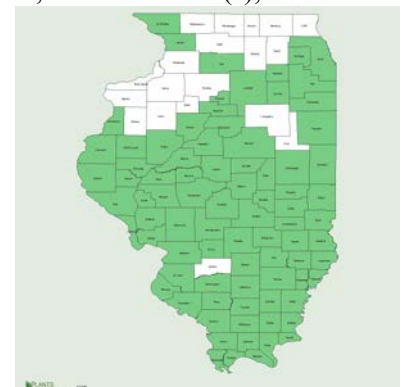


*Echinacea tennesseensis*

**ECLIPTA** Linnaeus 1771 from Greek *ekleipo*, deficient, or a failing, in reference to the minute or absent of a pappus. Genus of 1-4(4) species or annuals or perennials (1 in northern North America), mostly warm-temperate to tropical New World; introduced in Old World. Some sources feel sp is introduced in North America. Synonymy clouds the genus nativity & original distribution.  $x = 11$ .

**Eclipta prostrata** (Linnaeus) Linnaeus \*NY, WI, NOX OK *YERBA-DE-TAJO*, aka AMERICAN FALSE-DAISY, AMERICAN FALSE DAISY, ECLIPTA, *ÉCLIPTÉ BLANCHE* (F), FALSE-DAISY, FALSE DAISY, *HANRYEONCHO* (K), *HIERBA DE TAJO* (S), *LI CHANG* (CH), PROSTRATE ECLIPTA, PROSTRATE FALSE DAISY, *TAKASABUROO* (J), TATTOO PLANT, TRAILING ECLIPTA, *VITKNAPP* (SW), WHITE ECLIPTA, WHITE TWINHEADS, *YERBA DE TAJO* (S), *YERBADETAJO*, *YERBA-DE-TAGO*, *YERBA DE TAGO*,

Habitat: Moist, bottomlands; in muddy soil (fh). In the se USA, “Moist or wet disturbed areas, ditches, shores, disturbed bottomlands” (w12). Paddy fields of Japan. distribution/range: Common in the s  $\frac{3}{4}$  of Illinois, less common in the n  $\frac{1}{4}$  (m14). Hilty considers sp to be native to southern Illinois but possibly adventive in northern Illinois, while it is of Special Concern in Wisconsin. Hmmm. With the exception of some records in the upper Mississippi valley in Iowa, Minnesota, & Wisconsin, Illinois is at the northern limit of the species range. MA to WI, south to s FL & TX, and southward into the tropics.



Worldwide distribution, native to Central, North, & South America; introduced in Africa, Asia, Australia, Europe, & Pacific islands. Some sources feel sp is introduced in North America.

There is more than one concept of this species, hence the muddled distribution and ecology data.

Culture: propagation: ①“Seed - sow spring in a greenhouse and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer, after the last expected frosts. Give the plants some extra protection, such as a cloche, until they are established and growing away well.” (<http://www.pfaf.org/user/Plant.aspx?LatinName=Eclipta+prostrata>)

②*Eclipta* seed can germinate over a wide range of soil temperatures (50 to 95 °F) and pH levels (5 to 8). Optimum temperature for germination is 95 °F. *Eclipta* germination is greater in moist soils, so it is most often found in poorly drained or low lying areas of a field and in years of excessive rainfall. (Prostko 2012) 126,000 seeds per pound (usda). Seed weight: 0.292 mg/seed – (Pancho & Kim1985) Each plant can produce 17,000 seeds. Growth rate moderate. Seedling vigor medium. Vegetative spread rate none (annual). Seed spread rate rapid. No known commercial sources.

asexual propagation: Considering sp roots at the nodes, stem cuttings will probably work.

cultivation: “Requires a damp to wet soil and a position in some shade[238]. This is a tropical species and it might need more summer heat and a longer growing season than is normally available in British summers[K].” (<http://www.pfaf.org/user/Plant.aspx?LatinName=Eclipta+prostrata>)

Tolerant of coarse, medium & fine textured soils. Anaerobic tolerance high. CaCO<sub>3</sub> tolerance low. Drought tolerance low. Fertility requirement low. Fire tolerance none. Salinity tolerance low. Shade tolerance intermediate. pH 5.2-7.9.) Hardiness Zone ?

Description: Tropical perennial, summer annual in temperate areas. Weakly erect to spreading annual, hairy forb; stem with many branches, often rooting at the nodes, occasionally to 3.0'; leaves lanceolate to linear with a pointed tip, opposite, entire, sessile; inflorescence terminal or axillary, 1-3 heads; flowers 0.25” wide, whitish, minute disk; seeds thick, dry, 4-angled, ± flat, brown, glabrous; pappus a crown of minute bristles or lacking; N 2n = 22. Key Features: Leaf opposite.

Comments: status: Endangered in New York. Special Concern in Wisconsin. Noxious in Oklahoma. This taxon is considered weedy or invasive in some parts of its range or under certain applications (Haragan 1991, Uva et al 1997, SWSS 1998). Sp is considered one of the world’s worst weeds, being problematic in 17 crops in 35 countries (Prostko 2012). phenology: Blooms (early July)Aug - Oct. In some areas flowering year round. In Wisconsin, fruiting early August through early October. C3.

In 2013, this species appeared unannounced in our greenhouse wetland plant production beds.

For a detailed discussion of the biology and ecology of this widespread species, see <http://www.cabi.org/isc/?compid=5&dsid=20395&loadmodule=datasheet&page=481&site=144>

Associates:

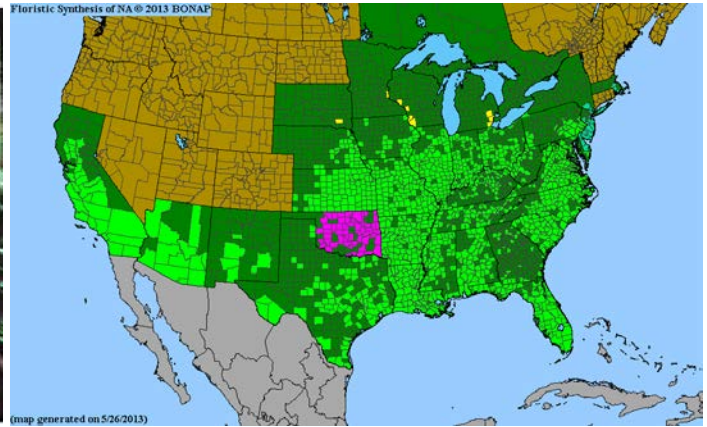
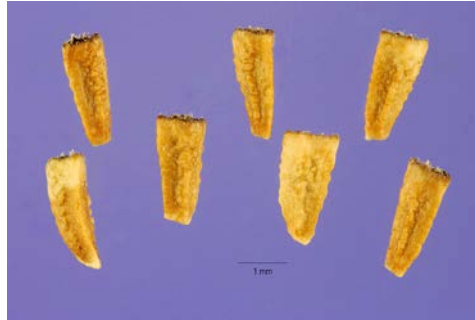
ethnobotany: Source of dark blue dye, sometimes used for tattoos. Used as medicine against roundworm parasites. Sp is widely used in traditional Chinese herbal medicine and in Ayurveda. The whole plant contains coumarin and the alkaloids nicotine and ecliptine. Sp is used against liver diseases and to restore hair growth.

Tender, young leaves and shoots can be cooked and used as a vegetable.

VHFS: Basionym *Verbesina prostrata* Linnaeus 1753. [*Cotula alba* (L) L, *Eclipta adpressa* Moench, *E alba* (L) Hasskart, *E alba* var *zippeliana* (Blume) Miquel, *E thermalis* Bunge, *E zippeliana* Blume, *E erecta* L, *Verbesina alba* L, *V prostrata* L]

<http://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDAST3A010>

Eric Prostko, 2012, *Eclipta* Identification and Control in Peanut, Circular 869, The Cooperative Extension Service, University of Georgia [http://www.caes.uga.edu/Publications/pubDetail.cfm?pk\\_ID=7305](http://www.caes.uga.edu/Publications/pubDetail.cfm?pk_ID=7305)



*Eclipta prostrata*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Steve Hurst USDA-NRCS PLANTS Database. - Not copyrighted image. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010)

**ERECHTITES** Rafinesque 1817 **FIREWEED, BURNWEED** *Erechtites* New Latin, from Greek ἐρεχθίτις, *erechthitis*, groundsel, a name used by Dioscorides presumably for *Senecio* or *Erechtheus*, from ἐρέχθω, *erechtho*, to rend, break. However, ἐρεχθίτις, *erechthitis*, is said to be another name for ἀριστολόχεια, *aristolokheia*, promoting birth, birthwort, ἀριστολόχεια στρογγύλη, *aristolokheia strongyle*, is *Aristolochia rotunda*. Alternately from ἐρέχθω, *erechtho*, to trouble, as many spp are troublesome weeds. *Erechtheus* is also the name of an archaic king of Athens, a character in the Iliad, & a surname of Poseidon, & a lost tragedy of Euripides. Coarse annual or perennial herbs, 12 widespread spp, commonly with whitish disc flower heads & a silky pappus of numerous, fine,

capillary bristles, that facilitates their wide distribution as weeds. The genus name has long been treated as grammatically feminine (m14), but genus names ending in *-ites* are masculine (w12b).  $x = 20$

***Erechtites hieraciifolius*** (Linnaeus) Rafinesque ex de Candolle FIREWEED, aka AMERICAN BURNWEED, (*hieraciifolius* -a -um with leaves like *Hiercium*, Hawkweed, from , & *folium, foli(i)*, n., noun, a leaf.) facu

Habitat: Wet meadows, & newly cleared & recently burned over areas. “Adept at appearing seemingly from nowhere in small soil disturbances” (w08).

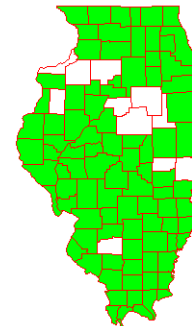
distribution/range: KBNMFBC.

Culture: Moist cold stratify or dormant seed.

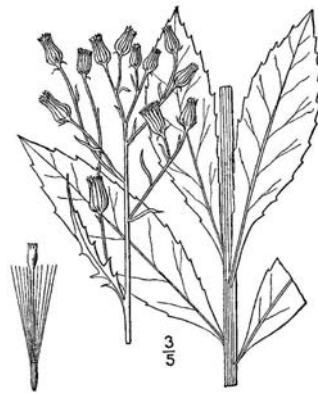
Description: Erect annual, 3.0-6.0', flowers yellow; fruits with a distinctive bright-white, fluffy pappus.  $2n = 40$ .

Comments: status: phenology: Blooms 8,9,10. Fire successional, disturbed sites. The specific epithet is also seen as *hieracifoli-*, masculine or feminine.

Because this is a disturbance dependent annual, this sp is hard to collect from year to year. It is routinely not available as seed most of the time. We lined out a small patch of this in the mid-90's, & learned it is an annual the hard way.



*Erechtites hieraciifolia*



*Erechtites hieraciifolius*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H. Mohlenbrock USDA-NRCS PLANTS Database - Not copyrighted image. Illinois map courtesy of ILPIN.

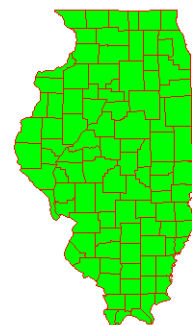
**ERIGERON** Linnaeus 1753 **FLEABANE, DAISY FLEABANE, ÉRIGÉRON, VERGERETTE** *Erigeron* (e-RI-ge-ron) New Latin, from Latin, groundsel, from Greek *erigeron*, early old man, from ἦρ, *er*, spring, early, or εριο-, *erio-*, woolly; & γέρον, *geron*, old man, the early flowering plant soon develops the solitary, woolly heads of some spp with hoary pappus. The accrescent, gray or white fluffy pappus is like the hair of an old man, perhaps prematurely gray. Widely distributed genus of about 390 spp of herbs having flower heads resembling asters but with fewer & narrower involucre bracts, & blooming in the spring. The leaves & tops of plants were formerly used as a diuretic & as a haemostatic in uterine hemorrhage. A volatile oil is sometimes distilled from *Erigeron canadense* for medicinal use.  $x = 9$ . Seed of desirable spp is not well represented in the trade. Many species germinate when sown at 68°F; *E speciosus* is said to require darkness to germinate (tchn).

***Erigeron annuus*** ANNUAL FLEABANE, AKA DAISY FLEABANE, WHITETOP FLEABANE.

“Species is distributed in clearings, waste ground, along roads and railroads, disturbed woodlands” (Ilpin) distribution/range: Ubiquitous.

“Disk florets are perfect and fertile; ray florets are pistillate and fertile. Regularly sets seed without fertilization. Species is used in domestic medicine as an astringent, tonic, and diuretic.” (Ilpin)

Mesic prairie; mesic soils, full sun to partial shade; 0.5-2.0'; biennial/annual; flowers white; blooms May-October; blooms 6-10.



*Erigeron annuus*



*Erigeron annuus* ?

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Illinois map courtesy of ILPIN.

**Erigeron philadelphicus** Linnaeus PHILADELPHIA FLEABANE, aka COMMON FLEABANE, MARSH FLEABANE, PHILADELPHIA DAISY, *VERGERETTE DE PHILADELPHIE*, (*philadelphicus* -a -um of or from the Philadelphia, USA region.)

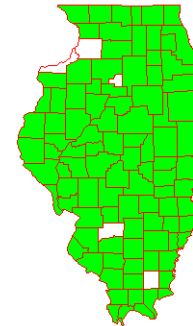
Habitat: Rich thickets, alluvium, shores, & springy slopes. Marsh edges, creek sides, ditch banks, often slightly disturbed sites. distribution/range:

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

Description: Annual or biennial, perennial with mild winters, white flowers with over 100 rays, young heads drooping, basal leaves withering by flowering.  $2n = 18$ .

Comments: status: phenology: Blooms May - August. Collect seeds in se Wisconsin in August - September (he99). Seed source wet ditches, DeKalb Co.

Associates: ethnobotany: Used as medicinal beverage by Ojibwa (sm32). Flowers included in hunting medicine smoked to attract deer by Ojibwa & smoked in tobacco or kinnikinnik mixture (sm32).



Erigeron philadelphicus



*Erigeron philadelphicus*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H. Mohlenbrock. USDA SCS. 1989. *Midwest wetland flora: Field office illustrated guide to plant species*. Midwest National Technical Center, Lincoln. Provided by USDA NRCS Wetland Science Institute (WSI). 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Illinois map courtesy of ILPIN.

**Erigeron pulchellus** Michaux ROBIN'S PLANTAIN, aka HAIRY FLEABANE, *VERGERETTE DÉLICATE*, (*pulchellus -a -um* (pul-KEL-us) beautiful but small, little beautiful.)

Habitat: Moist woods & stream banks. Wetlands. Dry to dry mesic prairies & savannas (he99). distribution/range:

Culture: ①Code C (Ken Schaal). ②60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). 1,600,000 (gn) seeds per pound.

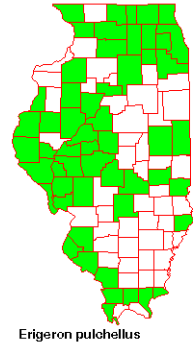
cultivation: Drought tolerant.

Description: Perennial, 3-20"; rhizomatous; basal leaves forming a compact, dense mat; flowers white or pink to bluish;

Associates: Pollinator friendly. Butterfly nectar plant. An important early nectar source.

ethnobotany:

Comments: status: phenology: Blooms 5-6. Aggressive. Collect seeds in se Wisconsin in July - August (he99).



*Erigeron pulchellus*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H. Mohlenbrock. USDA SCS. 1989.

*Midwest wetland flora: Field office illustrated guide to plant species.* Midwest National Technical Center, Lincoln. Provided by USDA NRCS Wetland Science Institute (WSI). 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species.* USDA Natural Resources Conservation Service. Not copyrighted image. Illinois map courtesy of ILPIN.

**Erigeron strigosus** Muhlenberg DAISY FLEABANE, aka COMMON EASTERN FLEABANE, COMMON ROUGH FLEABANE, PRAIRIE FLEABANE, ROUGH FLEABANE, *VERGERETTE RUDE*, WHITETOP, (*strigosus -a -um* bristly, strigose, covered with *strigæ*, or stiff, straight, flat-lying hairs, New Latin *strigosus*, from *striga* bristle, furrow, swath of hay or corn, flute of a column & Latin *-osus -ose*.)

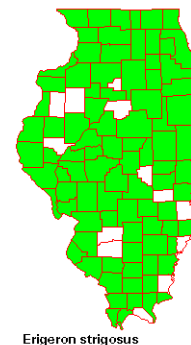
Habitat: Old fields, roadsides, successional areas. Somewhat weedy.

distribution/range:

Description: White to pink flowers.

Comments: status: phenology: Blooms ? Not available as seed or plants.

Associates: ethnobotany: Used as medicinal plant by Ojibwa (sm32).





*Erigeron strigosus*, seed bank species, nursery planting

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H. Mohlenbrock. USDA SCS. 1989. *Midwest wetland flora: Field office illustrated guide to plant species*. Midwest National Technical Center, Lincoln. Provided by USDA NRCS Wetland Science Institute (WSI). 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Illinois map courtesy of ILPIN.

**EUPATORIUM** Linnaeus 1753 **EUPATORIUM, BONESET, JOE PYE WEED, THOROUGHWORT, DOG-FENNEL**  
*Eupatorium* (ew-pa-TO-ree-um) New Latin, from Greek *eupatorion* (*E cannabinum*) hemp agrimony, said to be from Greek *eu*, good, & *pator*, father, from Mithridates VI *Eupator* (132-63 BC), King of Pontus, who, ca. 115 B.C, is said to be the first to use this plant in medicine, & to have discovered a sp was an antidote to a common poison. Mithridates was said to be immune to many poisons through repeated experimentation upon himself to find their antidotes. Mithridates held the Roman Empire at bay for almost 3 decades with natural resource-based, advanced weaponry. (*mithradate is an old term for medical restoring agency or an antidote to a poison, which see.*) Joe Pye Weed is found variously as 3 individual words, 1 hyphenated compound word, or a run on word (Northwest Illinois Institute for Kreatif Spelling, personal communication). Tribe *Eupatoriaceae*. In older publications, you may see this genus as *Cunigunda* Bubani 1890.

*Sensu lato*, a large genus of chiefly tropical herbs having heads of white or purplish flowers arranged in cymose clusters, with 5-angled achenes, a capillary pappus, simple, scabrous. Flowers are of de Candolle's cyanic color series, white, blue, red, &c, but never yellow. The size of the genus is variable with several spp sometimes placed in the genera *Ageratina* Spach, *Conoclinium* DC, or *Eutrochium* Rafinesque (formerly *Eupatoriadelphus* King & HE Robins), or elsewhere! Synonym lists & some variety names reflect impending changes. The spp listed below represent the genus *sensu strictu*.

In the se USA, there are several spp that originated as triploid or tetraploid hybrids & have been preserved by apomixis (w11).  $x = 10$  versus *Ageratina*  $x = 17$ , *Conoclinium*  $x = 10$ , & *Eutrochium*  $x = 10$ , *Fleischmannia*  $x = (4) 10$ .

Seeds mature in fall approximately one month after flowering. Most spp are easy from seed, with moist stratified seed bringing quicker & more uniform germination. Code B. Two-node tip cuttings root well. (cu00)

**Eupatorium altissimum** Linnaeus TALL BONESET, aka TALL EUPATORIUM, TALL JOE PYE WEED, TALL THOROUGHWORT, UPLAND BONESET, (*altissimus -a -um* (al-TIS-i-mus) highest, very high, very tall, tallest, superlative of Latin *altus -a -um*, high; deep or profound; shrill; lofty, noble; grown great, & *-issimus -a -um*, suffix denoting most so, to the greatest degree; most-, -est. This is not the tallest *Eupatorium*, & certainly not the most noble.) [facu]

Habitat: Mesic & dry prairies, mesic savanna. Often on limestone soils, but aggressive in mesic, dry, & sandy soils. Becoming a common roadside plant, often the only 'native' present; it has the ecology of a weed. distribution/range:

Culture: ①60 days cold moist stratification (pm09). ②Fall plant or cold stratify for 2 to 3 months for best results. Sow on the soil surface at 70°F & water. (ew11) ③Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). 471,933 (gnh13), 800,000 (pm02, ew11, aes12), 914,401 (gnam03), 981,622 (gn05) seeds per pound.

cultivation: Space plants 1.5-2.0' if you dare. Dry soils, full sun to part shade. AES (2010) reports some salt tolerance. Slowly, inexorably, persistently self sows, until someday, you wake up & it's everywhere.

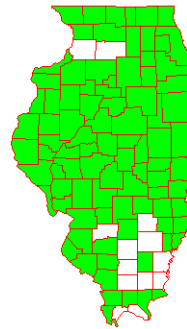
bottom line: Spring seeding works well, but 1/3 of lots benefit from dormant seeding. Slight to modest dormancy. Germ 73, 87, na, sd 25.7, r37-95 (58)%. Dorm 15.7, 17, na, sd 10.7, r2.0-28 (26)%. Test 26, 23, na, r21-34 days.\*\*

greenhouse & garden: Moist cold stratify or dormant seed. Small seeds need light to germinate, surface sow or very shallow cover.

Description: Erect perennial, 3.0-5.0', flowers white,  $N 2n = 20, 30, 40$ . The somewhat similar, blooming at the same time, but usually smaller & a bit more conservative, *Brickellia eupatorioides* has cream-colored flowers, 10-ribbed cypselae & plumose pappus bristles. Species is often seen on roadsides as the only "native" in Eurasian turf grass.

Comments: status: This plant is considered invasive in some habitats or in parts of its range (Stubbenieck et al 1994). phenology: Blooms 7,8,9(10). In northern Illinois, collect seeds in October. Collect seeds in se Wisconsin in October (he99). Attractive cut flowers. Aggressive, self sows, weedy, often visually dominating roadsides. Not suited for small plantings. Deadhead the ripe seeds to control spreading, & sell the seed to unsuspecting fools. Did I say that out loud? *Caveat emptor!* Some populations are apomictic polyploids. "A tall hoary plant with numerous sessile leaves that is common on roadsides, prairies, & hills. It is later flowering than *E rugosum*." (ewf55)

VHFS: [*Eupatorium saltuense* Fern, non *Ageratina altissima* (L) King & HE Robins.] Hybridizes with *E serotina*.



*Eupatorium altissimum*



*Eupatorium altissimum*

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 of ILPIN.

**Eupatorium coelestinum** see *Conoclinium coelestinum*

**Eupatorium fistulosum** see *Eutrochium fistulosum*

**Eupatorium maculatum** see *Eutrochium maculatum*

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**Eupatorium perfoliatum** Linnaeus COMMON BONESET, aka AGUEWEED, BONESET, *EUPATOIRE PERFOLIÉE*, FEVERWORT, INDIAN SAGE, PERFOLIATE BONESET, THOROUGHWORT, *Niya 'wibukbuk'*, no translation (Ojibwa), (*perfoliatum* -a -um perfoliate, with the leaves joined around stem, as though the stem were growing through the leaves, or with a leaf-like appendage through which the stalk passes, from Latin *per-*, a prefix, through, extra, very, & *foliatus*, adjective, provided with or having leaves.) The common name BONESET comes from the plant's medicinal use in setting broken bones, or in fighting 'break-bone' fever. Many people mispronounce the bone of BONESET as 'bahn' as in *autobahn. Fahrvergnügen. obl*

Habitat: Wet meadows, marshes, upland swamps, low woods or thickets, swales, wet shores, wet prairies. Floodplains, bogs, & wet ditches. Usually common.

distribution/range:

Culture: ① "Moist cold treatment, or fall sow. Very light cover. Very good germination." (Dunham 1993) ② No pre-treatment necessary other than cold, dry stratification, or 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ③ No 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 "30 days moist stratification required for germination. Field sow fall."

(pnnd) No pretreatment needed. Sow seeds on the soil surface at 70°F & water.

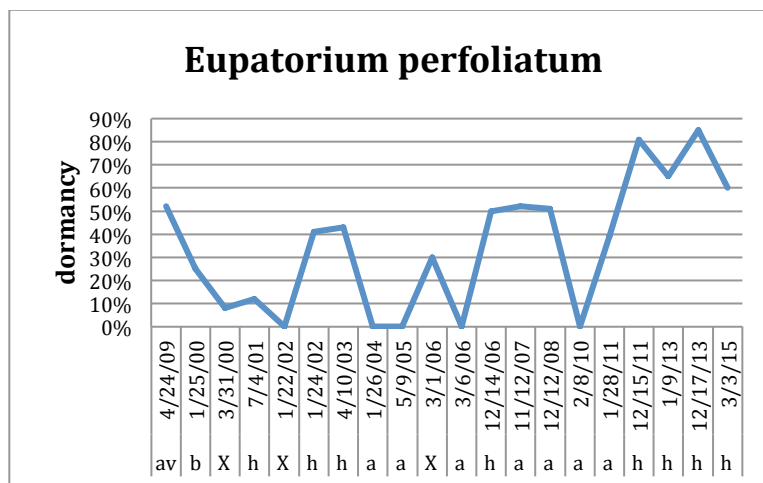
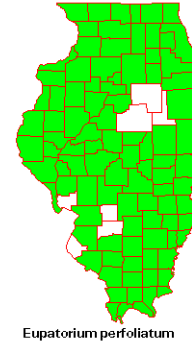
(ew11) ⑤ Sow at 20°C (68°F), germination slow (tchn). 752,000 (aes12), 756,800; 2,000,000 (jfn04), 2,526,272 (wns01), 2,560,000 (pm01), 2,734,939 (gnhm03), 2,880,000 (ecs, ew11), 3,131,034 (gnh02), 3,152,778 (gnh06), 3,200,000 (pn02, sh94), 3,505,791 (gna05), 4,344,498 (gna06) seeds per pound. In mixes plant up to 0.125 lb pls per acre (usda 1997), however, with debarbed seed, 0.015-0.031 lb pls is more than adequate. Seed & plugs widely & readily available; plug availability in late summer & fall may be tight.

asexual propagation: Division of clumps on fall or spring. Stem cuttings root easily.

cultivation: Space plants 1.5-2.0'. Prefers wet soil, full sun. Clay soil tolerant. Early in season tolerates inundation to 6" in natural areas such as wet meadows, edges of marshes, fens, & prairie swales, but intolerant of toilet bowl hydrology. Nutrient load tolerance low to moderate. Salt tolerance data not available, but AES (2010) notes some tolerance. Siltation tolerance low to moderate. pH data not available.

bottom line: Small seeds need light to germinate, surface sow or very shallow cover. Genesis seed tests indicate 60% of lots require dormant seeding for field establishment or cold moist treatment for greenhouse crops, with dormancies of 25-85%. Nonetheless, 25% of lots are nondormant. Flipflop species, strong dormancies becoming common, ca 2006.. Germ 43.9, 43, 61, sd 24.8, r2.0-90 (88)%. Dorm 32, 34.5, 0.0, sd 27.3, r0.0-85 (85)%. Test 34, 34, 26, r25-50 days. (#22).\*\*

greenhouse & garden: Best from seed, dormant seeding is recommended, small seeds need light, sow on soil surface.



Description: Perennial herb, 3.0-4.0', white flowers. N 2n = 20.

Comments: status: phenology: Blooms August to October. In northern Illinois, collect seeds in late September - October. Collect seeds in se Wisconsin in October (he99). Landscaping, used in wetland restoration in upper

shoreline zone, & in moist vegetated swales & moist rain gardens. Grows in more marginally wet areas than *E maculatum*. Fibrous root system good for erosion control. Attractive cut flowers & dried seed heads. Seed source nursery propagation, genetic source Fairfield Twp, Bureau Co & Montmorency Twp, Whiteside Co.

“Of frequent occurrence.” “Our two most valuable indigenous bitters *Eupatorium perfoliatum* and *Sabbatia angularis* are abundant, and *Aristolochia serpentaria* is seen occasionally in the groves, where various species of dogwoods (*Cornus*) are also of frequent occurrence.” (Short 1845)

“Common in wet places, sloughs, marshes, &c, throughout.” (ewf55)

Associates: Pollinator friendly. Attracts butterflies, nectar source for *Erynnis horatius*, Horace's Duskywing Skipper. Seeds are eaten by waterfowl, turkeys, & swamp sparrow. Mallards & grouse eat leaves. Provides cover for small mammals, reptiles, & amphibians. Reported as deer resistant.

ethnobotany: Used as medicinal beverage by Menominee & Ojibwa (Sm23, Gilmore 1933)

VHFS: Variety *perfoliatum* grows in the eastern 2/3 of the United States. Var *colpophilum* Fern & Grisc, ESTUARY BONESET, grows in Connecticut, Massachusetts, Maine (possibly extirpated), New Hampshire, & Vermont. Hybridizes with *E serotinum*.



*Eupatorium perfoliatum*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H. Mohlenbrock. USDA SCS. 1989. *Midwest wetland flora: Field office illustrated guide to plant species*. Midwest National Technical Center, Lincoln. Provided by USDA NRCS Wetland Science Institute (WSI). 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Illinois map courtesy of ILPIN. Last photo courtesy of Jock Ingels

**Eupatorium purpureum** see *Eutrochium purpureum*

**Eupatorium rugosum** see *Ageratina altissima*

**Eupatorium serotinum** Michaux LATE BONESET, aka LATE EUPATORIUM, LATE-FLOWERING THOROUGHWORT, (*serotinus -a -um* late, late in the year, late flowering or late ripening, autumnal, blooming in autumn, from Latin *serum*, late.)

Habitat: Mesic prairies, open woods & clearings. distribution/range:

Culture: ①60 days cold moist stratification (pm09). 968,000 (jfn04), 976,000 (aes12) seeds per pound.

Shade tolerant. Easy by seed, self sows.

Description: Perennial,  $N 2n = 20$ .

Comments: status: Considered introduced in Wisconsin. Endangered in New York.

phenology: Blooms August - October.

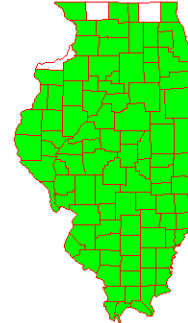
“Of frequent occurrence.” (Short 1845).

“A tall stiff plant that grows in the same places & flowers about the same time as *E altissimus*.” (ewf55)

Associates: Pollinated by long-tongued bees, short-tongued bees, other

*Hymenoptera*, *Diptera*, *Lepidoptera*, & *Hemiptera*. Attracts upland gamebirds, songbirds, & butterflies.

VHFS: Hybridizes with *E perfoliatum*.



Eupatorium serotinum



*Eupatorium altissimum* left, *E serotina* right

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

**Eupatorium sessilifolium** Linnaeus \*MI, MN, NH, VT, WI UPLAND BONESET, aka SESSILE-LEAF EUPATORIUM, WOODLAND BONESET (*sessilifolius -a -um* sessile-leaved.) upl

Habitat: Rich mesic woodlands. distribution/range: Occasional in the s ½ of Illinois; rare elsewhere (m14).

Culture: ①Sow at 20°C (68°F), germinates in less than two wks (tchn). 1,023,680 (agr07), 1,040,000 (agr08), 1,512,000 seeds per pound.

bottom line: Initial test data indicate the seed strongly benefits from dormant seeding. Small seeds need light to germinate, surface sow or very shallow cover. Germ 15%. Dorm 35%. Test 44 days.\*\*

greenhouse & garden: Moist cold stratify or fall plant, light.

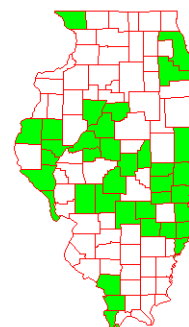
Description: Erect perennial with a single stem; roots; culms 2.0-2.5', plants glabrous below the inflorescence leaves opposite, distal sometimes alternate, blades pinnately nerved, margins serrate, dotted with glands, base rounded, mostly stalkless but not clasping; inflorescence small branched, widely spaced corymb; flowers heads with mostly 5 white flowers,  $N 2n = 20, 30$ . key features: Heads with mostly five flower heads, leaves toothed, bases rounded, mostly stalkless but not clasping.

Comments: status: Special concern in Wisconsin. Variety is Threatened in Michigan & Minnesota. Endangered in New Hampshire & Vermont. phenology: Blooms July - September.

VHFS: Illinois has both var *brittonianum* Porter, & var *sessilifolium*.

Variety *brittonianum*: leaves subcoriaceous, the larger ones 8-18 cm long, 3-6 cm wide, averaging about 3× as long as wide.

Variety *sessilifolium*: leaves membranaceous, the larger ones 9-18 cm long, 2-4 cm wide, averaging about 5× as long as wide.



Eupatorium sessilifolium

Variety *vaseyi* (Porter) Fern & Grise is south & east of our area.



*Eupatorium sessilifolium brittonianum*

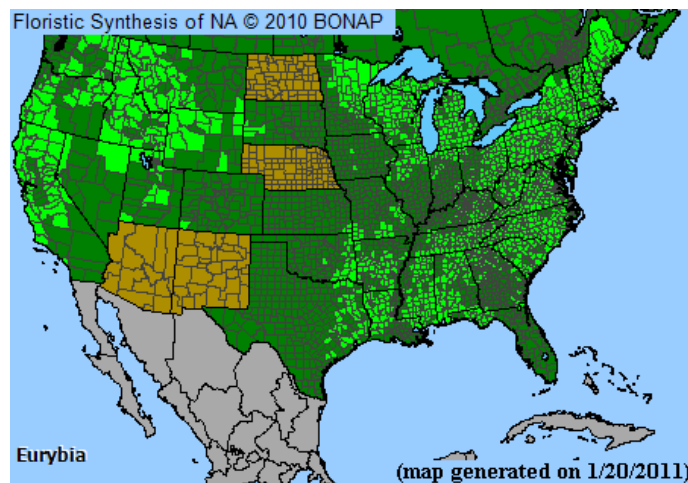
Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Seed photo Tracey Slotta USDA-NRCS PLANTS Database. - Not copyrighted image. Illinois map courtesy of ILPIN.

**EURYBIA** (Cassini) Cassini 1820 **WOOD-ASTER, EURYBIAN ASTERS** *Eurybia* Greek εὐρύς, *eurys*, wide, & βαιός, *baios*, few, small, little, humble, perhaps alluding to the few, wide-spreading ray florets; alternately from Greek Εὐρυβία, Εὐρυβίη, *Eurybia*, *Eurybiê*, meaning Wide-Force, from *eurys*-, & *bia*. *Eurybia* was the goddess of the mastery of the sea, a daughter of Pontos & Gaia, wife of the Titan Krios, mother of *Astraeus* (the Starry-One), *Pallas* (the Warrior), & *Perses* (the Destroyer), & grandmother of the *Anemoi* (Winds), the *Astra* (Stars), Hekate (Witchcraft), *Selene* (the Moon), *Nike* (Victory), *Bia* (Force), *Kratos* (Power), & *Zelos* (Rivalry). Her grandchildren represent several aspects of human command of the sea, from navigation, wind power, naval rivalry, & naval supremacy. A genus of about 23 (28) spp of herbs of North America, northern Eurasia, & apparently Dagobah, *vide infra*. Primary distribution is in eastern North America, with 4 spp in the western USA. With the exceptions of *E furcata* & *E schreberi* (& *E chasei*), the genus is absent from the Prairie Peninsula. White & blue-purple rayed asters mostly with flat-topped inflorescence, & phyllaries usually with thumbnail-shaped dark chlorophyllous zone & large marginal hairs.  $x = 9$ .



*When 900 years you reach, look as good, you will not.*

Jpg ripped from <https://uwaterloo.ca/astereae-lab/research/asters/eurybia> Photo by JC Semple.



*Eurybia* by county

***Eurybia chasei*** (GN Jones) Mohlenbrock CHASE'S ASTER,

Habitat: Wooded slopes, very rare. distribution/range: Illinois endemic. Restricted to Marshall, Peoria, & Tazewell cos (m14).

Culture: propagation:

Description: plant                      key features:

Comments: status: phenology: Blooms 7-10. C3.

Associates:                      ethnobotany:

VHFS: Basionym *Aster chasei* GN Jones. "Once considered distinct, *Aster chasei* is now considered as a disjunct member of the widespread *Aster schreberi* (Mohlenbrock, 1975)." (Ilpin) Semple (2014) includes this in *E. schreberi*.

***Eurybia divaricata*** (Linnaeus) GL Nesom \*CN WHITE WOOD ASTER, aka *ASTER À RAMEAUX ÉTALÉS*, COMMON WHITE HEART-LEAVED ASTER, [formerly subgenus *Eurybia*, sect *Eurybia* (*Biotia*)]

Habitat: Dry woods & steep slopes, moist to dry. Dry to mesic, eastern deciduous & mixed deciduous woods, edges, clearings, & roadsides. Forest. In the se USA, "moist to fairly dry forests & woodlands; common" (w11). distribution/range: Native east & south of Illinois. Mainly an Appalachian element of the Eastern Deciduous Forest. Introduced into Europe.

Culture: ① 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 (tchn). Spreads moderately to aggressively. ② "Can be started from seed, by dividing clumps in early spring or allowed to spread on its own" (lbj). 670,000 (ecs), 1,210,380 (gnihe11) seeds per pound. Growth rate medium. Readily self sows. Seeds are seasonally available from Ernst Conservation Seeds. Plants may be available in the wholesale ornamental market.

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asexual propagation: Ramets can be lifted & potted in spring.

cultivation: Space plants on 1.0-2.0' centers. Water use low. Shade tolerant, partial shade to full shade, best with 4 hours of sun. Drought tolerance medium. Tolerates dry soil & is best in dry soil, shade to part shade. Soil pH slightly acidic to circumneutral, <6.8-7.2. Marginally hardy to zone 3, zones 4-8(9). Vigorous or aggressive, even in dry shade. Cultivated due to its tough nature & showy flowers. Does not require staking in dry soil & flowers earlier than most other asters. Plants can be cut back in spring to delay blooming & to increase branching. Grows well with native woodland ferns including *Polystichium acrostichoides*, & woodland forbs such as *Aquilegia canadensis*, *Asarum canadensis*, *Eurybia macrophylla*, *Maianthemum racemosum*, *Polemonium reptans*, *Polygonatum canaliculatum*, *Rudbeckia triloba*, *Solidago caesia*, *Symphytichum cordifolium*, *Tiarella cordifolia*. Plant with *Arisaema triphyllum*, *Lobelia cardinalis*, *Lobelia siphilitica*, & *Osmunda cinnamomea* in moister woods.

bottom line: Preliminary datum indicates dormant seeding is strongly beneficial, with over 63% dormant seed. Germ 28-31%. Dorm 60-63%. Test 17-31 days.\*\*

Description: Erect, herbaceous, perennial, native forb; rhizomatous, forming dense clones; stems dark, sprawling, serpentine to zigzag, 1-2(3+)', 1.5-2.5' spread; leaves narrow, heart-shaped, sharply serrated; inflorescence flat-topped corymbiform; flowers to 1.0" diameter, ray florets white, disk florets yellow aging to reddish-purple; N 2n = 18.

Often confused with the similar *E schreberi*.

*E divaricatus*

dry soils  
6-15 teeth per leaf side

flower stalks densely hairy  
no sterile rosettes

*E schreberi*

not south of VA or TN  
moist to mesic soils  
15-30 teeth per leaf side  
leaves wider w/ broad sinuses at base  
flower stalks sparsely hairy  
sterile rosettes present

Comments: status: Threatened in Canada. phenology: Blooms August to September (October). Seeds mature late fall.

Attractive, long lasting cut flowers. The black twiggy stems are an attractive structural providing a nice contrast to the white flowers.

This sp is not native to Illinois, but it is often recommended & specified in landscape work in the metropolitan Chicago area. As of 2013, sp has started appearing in woodland seed mixes. Used as an accent plant, in shade gardens, shaded perennial borders, shaded groundcover, butterfly gardens, shaded container planting, & naturalizing. Sprawling flowers are said to look well when inter-planted with larger *Hosta*. Crispy, bright green leaves provide good pre-bloom texture. Some sources refer to this plant as a prolific self-sower, a bully, a weed, & not playing nice with delicate neighbors, all of which are the qualities of a good groundcover. It may become weedy & leggy in good soils, where it should be deadheaded after blooming. Our material has a genetic origin in Pennsylvania, but it beats the hell out of *Pachysandra* & *Hostas*. The species is a magnificent specimen plant and will survive at least 2 years in rich soils, full sun, with supplemental water.

Associates: Provides habitat & food for wildlife. Attracts butterflies, bumblebees & sphinx moths. Larval host for PEARLY CRESCENTS. Songbirds feed on the seed. Rabbit resistant. Reported to be deer resistant. No serious insect or disease problems.

ethnobotany: Young leaves may be cooked & eaten as greens.

VHFS: Formerly known as *Aster divaricatus* L. [*A corymbosum* Ait] Several horticultural selections are known, including 'Eastern Star', 'Fiesta', 'Raiche Form', & 'Snow Heron'. Note the photo below of blue WHITE WOOD ASTER cultivar, which is great, planted with a green cultivar of BLUE FESCUE, & an *Echinacea* that looks like a MUM. Dig It! So what if my Corn Flakes have bacteria genes in them!

This showy woodland aster should not be confused with *Symphytichum divaricatum* (Nuttall) G.L. Nesom, MIDWESTERN SALT-MARSH ASTER, which known from salted highways in Cook & DuPage Cos.



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



Photo “*Eurybia divaricata*” cv ‘Woods Light Blue’ as “in the trade,” aka *Symphotrichum oblongifolium*. We custom propagated some *Eurybia divaricata*” cv ‘Woods Light Blue’ for a good customer. A few plants were left over, with some planted on a bed near our office. They looked radically different than our field stock. As they matured, it was evident the plants were AROMATIC ASTER, a bed of which, is an excellent bumblebee draw.

***Eurybia furcata*** (Burgess) GL Nesom \* AR, IA, IL, MO, MI, WI, FORKED ASTER, aka HEART-LEAVED ASTER, MIDWESTERN WHITE HEART-LEAVED ASTER, STARWORT, FROSTFLOWER, (*furcatus -a -um* furcate, forked, cleft, with two long lobes, with prong-like terminal lobes, from *furca*, *furcae* f, Latin noun, a two-pronged fork; a prop.) subgenus *Aster* Section *Biotia* [subgenus *Eurybia* sect.

*Eurybia* (*Biotia*)]

Habitat: Rich woods. Calcareous soils. “Calciphile, ± open habitats (± shade intolerant), limestone, sandstone & dolomite areas, mostly n-facing slopes, seepy bluffs, moist deciduous woods, especially along streams, sometimes disturbed sites” (Brouillet in fna). distribution/range:

Culture: ①60 days cold moist stratification (pm09). No pretreatment needed. Sow seeds on the soil surface at 70°F & water. Slow to germinate. (ew11) 384,000 (ew11) seeds per pound.

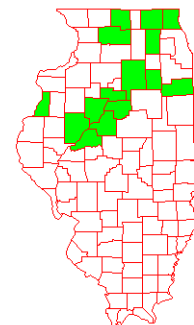
cultivation: Space plants 12-15”.

Description: Erect, herbaceous, perennial, native forb; 12-32” tall; flowers white. 2n = 18.

Comments: status: Endangered or threatened in all states where it is occurs.

phenology: Blooms

“A very unusual aster found in the “dells” of Hall Creek & in Kishwaukee River gorge. The large



*Aster furcatus*

heads & the petioled, cordate, coarsely serrate leaves are characteristic. We collected roseate flowers in the “dells” & a few years later all the flowers in the same patch were white.” (ewf55)

Associates: Attracts butterflies & hummingbirds.

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

VHFS: Formerly *Aster furcatus* Burgess.



*Eurybia furcata*

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

***Eurybia macrophylla*** (Linnaeus) Cassini \*IA, RI BIGLEAF ASTER, aka *ASTER À GRANDES FEUILLES*, BIG-LEAVED ASTER, FROSTFLOWER, *HERZBLÄTTRIGE ASTER*, LARGE-LEAVED ASTER, LUMBERJACK TOILET PAPER, STARWORT, (*macrophyllus -a -um* with large leaves, having elongated leaves or leaflets, from Greek μακρος, *macro*, long; tall, high, deep, far, -o-, & φυλλον, *phylon*, leaf, foliage, & -us, Latinizing suffix.) subgenus *Aster* Section *Bioitia* [subgenus *Eurybia* sect. *Eurybia* (*Bioitia*)]

Habitat: Mesic to dry savannas, dry to moist, open woods, thickets, & clearings, rich sandy woods, white oak woods. In the se USA, “moist to dryish forests, in NC mostly at moderate to high elevations, particularly in red oak forests on ridgetops; common (uncommon in Piedmont)” (w11). distribution/range: Rare in Illinois, Boone, Cook, DuPage, Lake, & Tazewell cos.

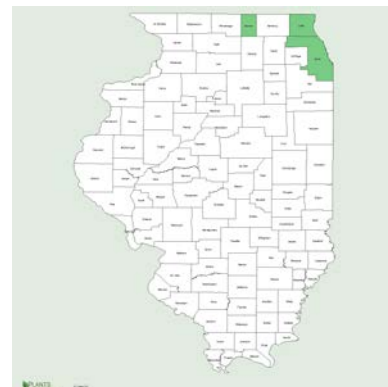
Culture: propagation: ①Moist cold treatment, or fall sow. Light cover. Excellent germination. (mfd93) ②60 days cold moist stratification (pm09). ③Sow at 20°C (68°F) in light, if no germination in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn). ④No treatment is necessary (van der Grinten 2001). Growth rate moderate. Seedling vigor medium. Vegetative spread rate moderate. 345,000 (jfn04), 352,000 (aes12), 432,000\* (pm01), 628,374 (gna09), 712,088 (gnh11), 741,830 (gna08), 800,000 (usda, ecs), 854,991 (gnam07), 1,216,000 (van der Grinten 2001) seeds per pound.

asexual propagation: Clone (he99). Division of mature plants.

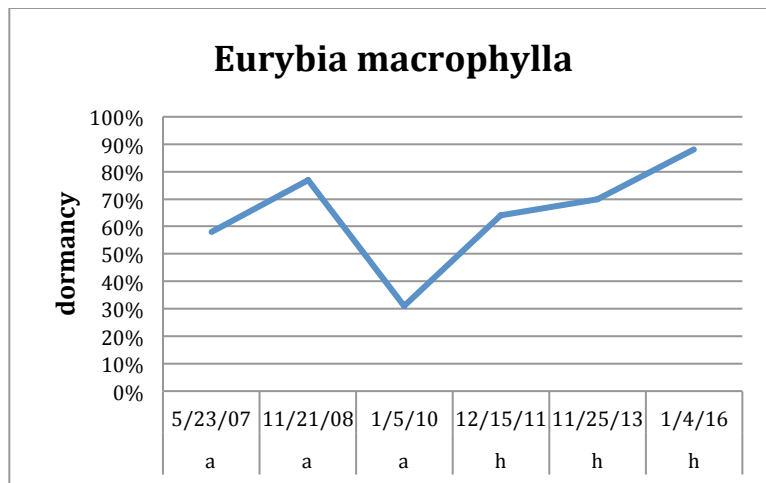
cultivation: Space plants on 1.0-2.0' centers. Anaerobic tolerance low. CaCO<sub>3</sub> tolerance medium.

Drought tolerance low. Fertility requirement medium, best in rich soils. Salinity tolerance none. Shade tolerant. pH 4.9-6.9

bottom line: Genesis seed test data indicates dormant seeding (or cold moist stratification for profitable greenhouse crops) is required. 80% of lots >58% dormant. Germ 24, 18.5, na, sd 14.2, r8-52 (44)%. Dorm 64.7, 67, na, sd 17.8, r31-88 (57)%. Test 33, 32, na, r17-44 days. (#6:0)\*\*







**Description:** Rhizomatous, 6-12” in our area, but in other parts of its range to 4’; leaves large, heart-shaped, fuzzy; flowers lavender to violet (white) flowers; N octoploid  $2n = 72$ . **key features:** Leaves serrate, with short, depressed teeth; petioles somewhat winged.

**Comments:** **status:** Endangered in Iowa. Special Concern In Rhode Island. **phenology:** Blooms July to October. In northern Illinois, collect seeds in October. Collect seeds in se Wisconsin in August -November (he99). Seed source nursery plantings, genetic source Cook cos. (Horlock).

Bob Horlock was Seedsman for The Natural Garden in the 1980s & early 1990s, & a pioneer in this industry. We were fortunate to have a friendly business relationship with Bob during the early years of our nursery. Bob’s seeds were collected in DuPage, Kane, & Will Cos. We traded back & forth with him, & several of our production plots originate from his collections. Bob passed away in the early 1990s.

A good woodland ground cover. A colonial aster that may slowly form large patches, with only a few of the plants in each patch flowering every year. Some colonies may not flower every year. Excellent for shady naturalized areas, woodland gardens, shaded ground covers, & shady borders. This plant is spreading well from plugs in our BLACK LOCUST/SMOOTH BROME, fire-managed, late Pleistocene sand dune backyard.

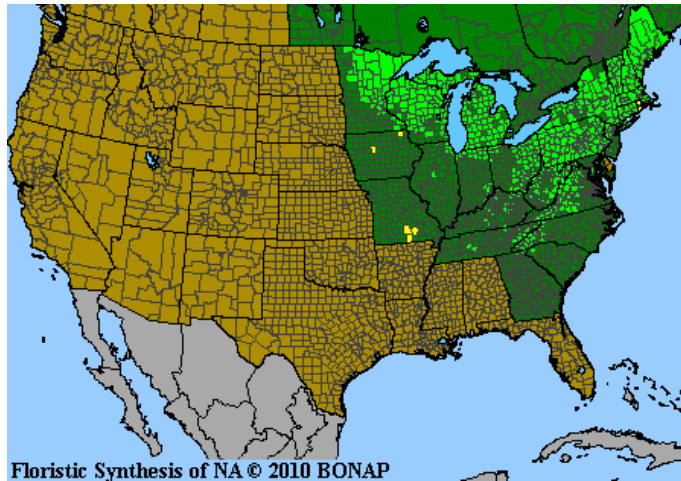
“Found in Boone Co in a woods on Rt. No. 173 east of Argyle near our line but we have not seen it in Winnebago Co.” (Ewf55)

**Associates:** Attracts butterflies & songbirds. In a Wisconsin pine plantation, water extracts of leaves from *Prunus serotina* BLACK CHERRY, *Rubus idaeus* RED RASPBERRY, *Eurybia macrophylla* BIGLEAF ASTER, *Lonicera tatarica* TATARIAN HONEYSUCKLE, *Solanum dulcamara* CLIMBING NIGHTSHADE, & *Solidago gigantea* GIANT GOLDENROD reduced red pine height growth, number of secondary needle fascicles, weight increments of roots & shoots, & radicle elongation of red pine seedling (Norby & Kozlowski 1980).

**ethnobotany:** Greens available in early summer. Greens used for food by Ojibwa (sm32). Root used as medicinal plant by Ojibwa (sm32). Smoked to attract deer by Ojibwa (sm32).

VHFS: Formerly *Aster macrophyllus* L. [*Aster ianthinus* Burgess, *A macrophyllus* L, *A macrophyllus* L var *apricensis* Burgess, *A macrophyllus* L var *excelsior* Burgess, *A macrophyllus* L var *ianthinus* (Burgess) Fern, *A macrophyllus* L var *pinguifolius* Burgess, *A macrophyllus* L var *sejunctus* Burgess, *A macrophyllus* L var *velutinus* Burgess, *A multiformis* Burgess, *A nobilis* Burgess, *A riciniatus* Burgess, *A roscidus* Burgess, *A violaris* Burgess, *Biota latifolia* DC, *Biota macrophylla* (L) DC]





*Eurybia macrophylla*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society as *A. ianthinus*, *A. macrophyllus*, *A. multiformis*, *A. nobilis*, *A. roscidus*, & *A. violaris*. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010)

***Eurybia schreberi*** (Nees) Nees \*IN, IA, ME, TN SCHREBER'S ASTER, aka SKOGASTER, (*schreberi* for Johann Christian Daniel Schreber, 1736-1810, German botanist.) subgenus *Aster* Section *Biotia* [subgenus *Eurybia* sect. *Eurybia* (*Biotia*)]

**Habitat:** "Damp to mesic deciduous (maple, elm, oak), mixed woods, thickets, shaded roadbanks; 0–1200 m" (Brouillet in fna). **distribution/range:** Rare in Illinois, (Cook) Knox, Marshall, Peoria, Rock Island, Tazewell, & Will Cos. Muscatine & Scott cos in Iowa. The Illinois, Iowa, & Wisconsin (?) records are several hundred miles west & north of the main distribution. Both county distribution maps include *E. chasei*. Species is rare or extirpated in many states at the northern limit of its range (fna). Illinois is the western limit of the species range.

**Culture:**

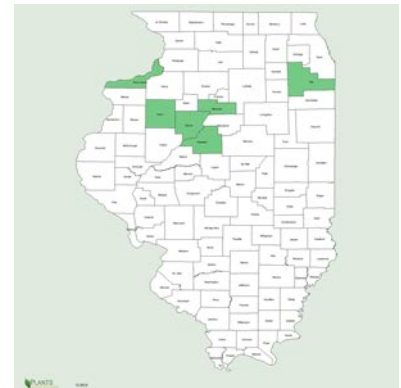
**Description:** 1-4'; ray flowers white, to 1" diameter. Similar to the usually lavender-flowered *A. macrophyllus*, but SCHREBER'S ASTER is always white flowered. Hexaploid,  $2n = 54$ .

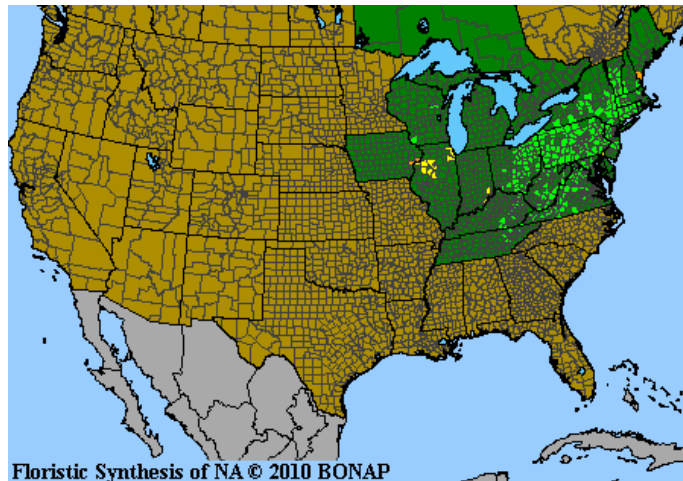
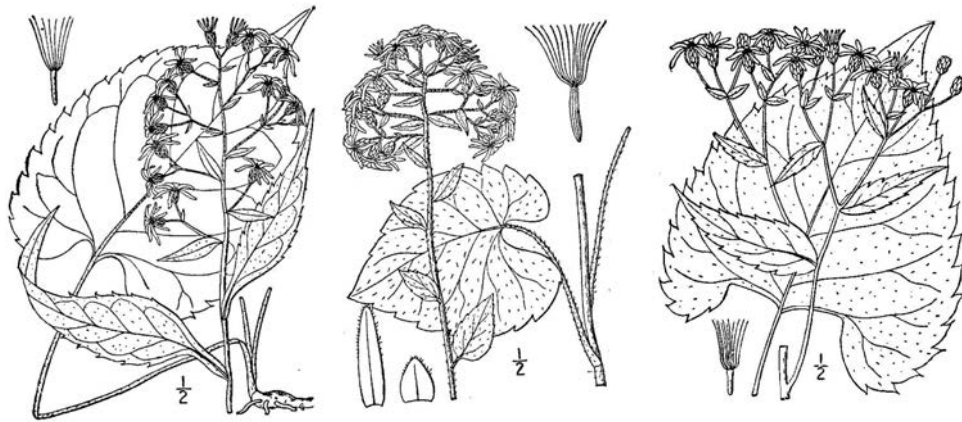
**Comments:** status: Endangered in Indiana & Iowa, possibly extirpated in Maine, special concern in Tennessee.

**phenology:** Blooms July - September.

When *Aster chasei* GN Jones (named for Dr. Virginicus H Chase, the patron saint of Wady Petra botany) was considered a valid taxon, it was one of Illinois' few endemic spp, along with *Iliamna remota* & *Thismia americana*. John Semple's website did maintain *Eurybia chasei* as a sp, but changed lumped the 2 in 2014. (<http://www.jcsemples.uwaterloo.ca/Eurybia.htm>). (<https://uwaterloo.ca/astereae-lab/research/asters/eurybia/eurybia-schreberi> )

**VHFS:** This has been known as *Aster schreberi* Nees since Shep was a pup. [*Aster chasei* GN Jones, *A. curvescens* Burgess, *A. glomeratus* (Bernh ex Nees) Burgess, *A. schreberi* Nees, *Biotia glomerata* (Nees) de Candolle, *Eurybia glomerata* Bernh ex Nees, *E. schreberi* (Nees) Nees] Mohlenbrock (2014) maintains *E. chasei* as a distinct species.





Line drawings Britton & Brown (1913) courtesy of Kentucky Native Plant Society, as *Aster curvescens*, *A. glomeratus*, & *A. schreberi*. Illinois map courtesy plants.usda.gov. North America map courtesy of BONAP (2010)

***Eurybia spectabilis*** (Aiton) Nesom \*CT, MA, NY, PA [new nomenclature this will be *Eurybia spectabilis* (Ait) Nesom] LOW SHOWY ASTER, aka EASTERN SHOWY ASTER, PURPLE WOOD ASTER, SEASIDE ASTER, SHOWY ASTER, (*spectabilis* -is -e spectacular from Latin *spectabilis* -is -e, notable, spectacle, that may be seen, worth seeing, notable, remarkable, showy.) Section *Calliastrum*, the violet-flowered asters.

Habitat: Dry sandy soil. Full sun to woods. distribution/range: Native east of our area. Massachusetts & New York to Mississippi.

Culture: ☉No pretreatment needed. Sow seeds on the soil surface at 70°F & water. Slow to germinate. (ew11) 1,200,000 (ew11) seeds per pound.

cultivation: Space plants 9-12". Octoploid,  $N 2n = 72$ .

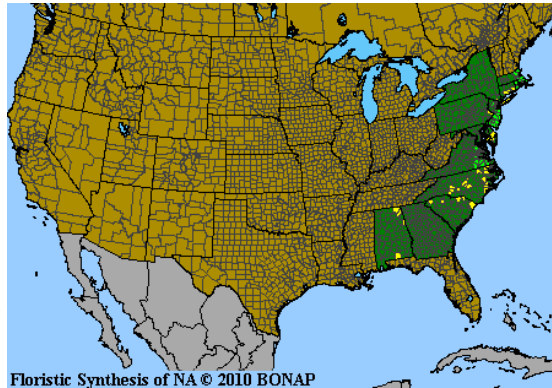
Description: Flowers violet purple.

Comments: status: Threatened in Connecticut & New York. Endangered in Maryland & Pennsylvania.

phenology: Blooms August to September. This sp is now in the Midwest seed trade, and it will show up in the Midwest in time. The inmates are running the asylum.

Associates: Attracts butterflies & hummingbirds.

VHFS: Formerly known as *Aster spectabilis* (Ait) Nesom.



*Eurybia spectabilis*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. North America map courtesy of BONAP (2010)

**EUTHAMIA** Nuttall ex Cassini [or (Nuttall) Cassini] 1825 **GOLDENTOP, FLAT-TOPPED GOLDENROD, FLAT-TOPPED GOLDENTOP** *Euthamia* New Latin, from *eu-*, good, well, & *thama*, *tham-* probably from Greek *thamees* crowded, & *-ia*; akin to Greek *tithenai*, to place, set, for the crowded branching pattern of the inflorescence. “In allusion to the crowding of the flowers” (Nuttall v2 1817). A genus of about 8-10 (5) spp of herbs of North America, the knowledge of which is not without some serious problems (w11). FNA recognizes 5 spp. “Arrangements of heads, gland-dotted leaves, & DNA sequence data demonstrate that *Euthamia* should be treated as distinct from *Solidago* (LC Anderson & JB Creech 1975; RD Noyes & LH Rieseberg 1999)” (fna).  $x = 9$ . Formerly a subgenus of the broadly defined *Solidago*. *Euthamia* was in vogue with Britton & Brown (1913).

“*Euthamia* is capable of tremendous phenotypic variation. Transitional aspects of a given plant are much more likely to be related to environmental factors than to introgression” (Haines in fna). The whats & wheres of *Euthamia caroliniana*, *E gymnospermoides*, & *E tenuifolia* are sorely lacking clarity.

***Euthamia graminifolia*** (Linnaeus) Nuttall **GRASS-LEAVED GOLDENROD, aka COMMON GOLDENTOP, FLAT-TOP GOLDENTOP, FRAGRANT GOLDENROD, LANCE-LEAVED GOLDENROD, SHORT BUSHY GOLDENROD FROM HELL, VERGE D'OR À FEUILLES DE GRAMINÉES, (graminifolius -a -um** with grass-like leaves, from Latin *gramen*, *gramineus*, grassy, of grass, or of cane or bamboo, *-i-*, & *folium*, *foli(i)*, n., noun, a leaf.) To ease the postpartum depression of the separation of this genus from *Solidago*, USDA calls *Euthamia* GOLDENTOP.

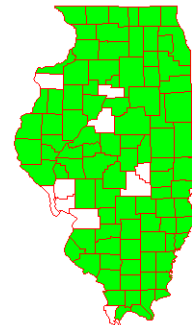
Habitat: Open disturbed habitats, often in weedy situations. Wet meadows, mesic prairies, dry prairies, damp to dryish shores, thickets, &c. Acidic to calcareous soils.

distribution/range:

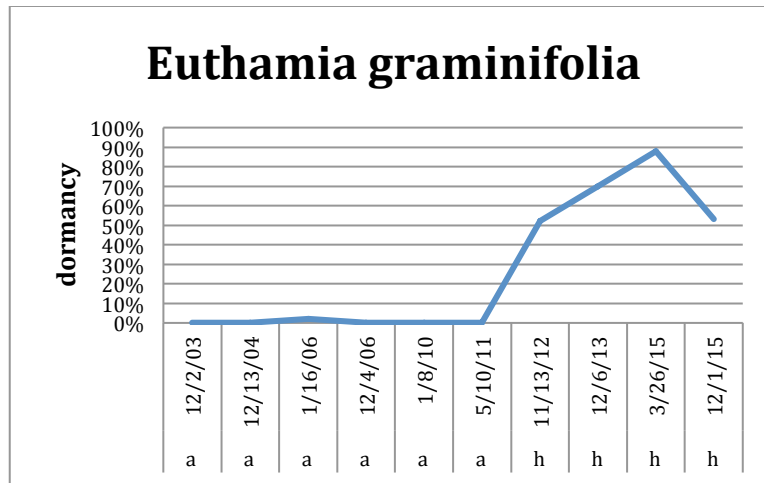
Culture: ①60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ②Seeds germinate after about 60 days of cold moist stratification (he99). ③Sow at 20°C (68°F), germinates in less than two wks (tchn). 1,512,000; 5,600,000 (ecs, aes10), 7,087,500 (gnh13), 7,895,652 (gna06), 8,035,398 (gna03), 8,107,142 (gnh03), 8,254,545 (gn04), 8,750,000 (jfn04), 9,736,441 (gna04), 13,159,420 (gna05) seeds per pound.

asexual propagation: Division of mature clumps, stem cuttings.

bottom line: Most lots can be sown in spring. Seed test data indicate zero to slight dormancy rates in ca 67% lots. 33% of lots are strongly dormant, 52-91%. With the high seed count, even poor germination has the illusion of a good crop. Flipflop species. Crossover species. Only a few plants per acre are needed. Germ 51.8, 48, na, sd 27.2, r5.0-90 (85)%. Dorm 26.5, 1.0, 0.0, sd 33.4, r0.0-88 (88)%. Test 29, 30, 38, r17-38 days. (#13).\*\*



*Euthamia graminifolia*



greenhouse & garden: Cold moist stratify 60 days or dormant seed, small seeds need light.

Description: Erect, herbaceous, perennial, native forb; colony forming rhizomatous; stems medium tall, 1.5-3.0'; stem & branch surfaces glabrate, pubescent; leaves linear; three linear leaf veins; inflorescence terminal corymbiform, flat-topped; yellow flowers, not secud; N 2n = 18. key features: "Leaves 3-5 nerved; not resinous or conspicuously glandular punctate." (Ilpin) "Stems glabrous or densely spreading-hirtellous; leaf blades usually 3–12 mm wide, faces glabrous or densely spreading-hirtellous, usually sparsely & obscurely gland-dotted" (fna).

Comments: status: phenology: Blooms 7,8,9,10. In northern Illinois, collect seeds in October - mid-November. Collect seeds in se Wisconsin in October - November (he99). Attractive cut flowers. Aggressively rhizomatous, useful in erosion control. Genetic seed source Squaw Grove Twp, DeKalb Co. Seed source nursery production.

"*S hirtella* (Greene) Bush. With us a well marked sp. It differs from *S media* in being less common, later in flowering, growing in wetter places & it is a larger plant which is more branched & has wider leaves. (*S remota* (Greene) Friesner, *S graminifolia* var *remota* (Greene) Harris.)" (ewf55)

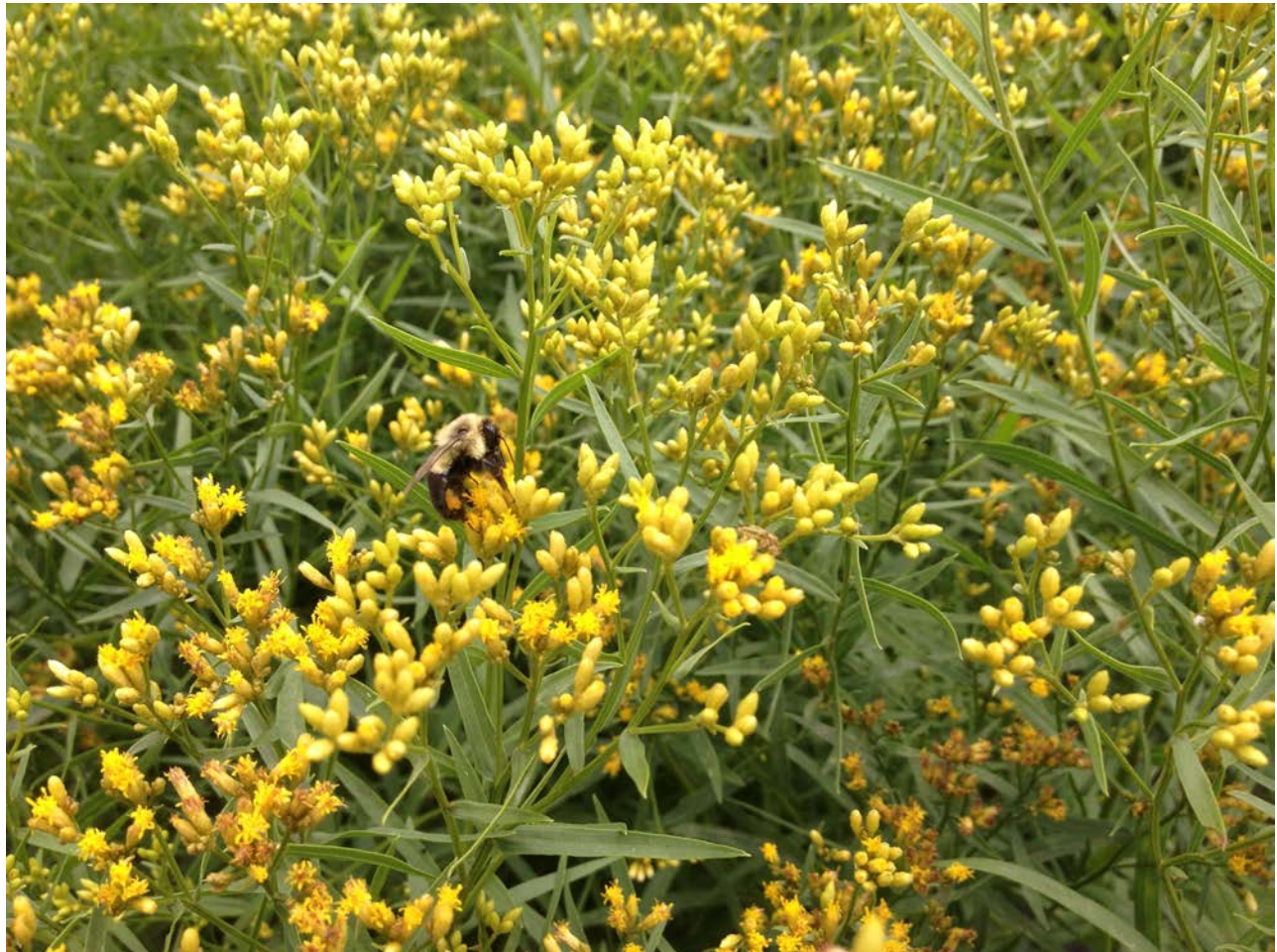
Associates: Attracts butterflies. Provides food & cover for wildlife. Reported as deer resistant. Species is reported as allelopathic, inhibiting the growth and survival of competing species by exuding toxic chemicals from its roots and leaves ([http://www.minnesotaseasons.com/Plants/grass-leaved\\_goldenrod.html](http://www.minnesotaseasons.com/Plants/grass-leaved_goldenrod.html)).

ethnobotany: Flowers used as medicinal beverage by Pottawatomie & Ojibwa (sm32, 33). Ojibwa medicine for chest pain (den28). Smoked by Ojibwa to attract deer.

VHFS: Formerly known as *Solidago graminifolia* (L) Salisb & *S lanceolata* Ait. It is now politically incorrect to include this in *Solidago*. Mohlenbrock (1986) placed this in *Euthamia* & lumped *Euthamia graminifolia* (L) Salisb, var *nuttallii* (Greene) W Stone, & *S hirtella* (Greene) Harris into this taxon. USDA places everything except var *hirtipes* (Fern) C&J Taylor in synonymy with var *graminifolia*, synonyms following: *Chrysocoma graminifolia* L, *Euthamia floribunda* Greene, *E graminifolia* (L) Nutt var *major* (Michx) Moldenke, *E graminifolia* (L) Nutt var *nuttallii* (Greene) W Stone, *E nuttallii* Greene, *S graminifolia* (L) Salisb, *S graminifolia* (L) Salisb var *major* (Michx) Fern, *S graminifolia* (L) Salisb var *nuttallii* (Greene) Fern, *S graminifolia* (L) Salisb var *polycephala* (Fern) Fern, *S hirtella* (Greene) Bush, *S nuttallii* (Greene) Bush, *S polycephala* Fern. [*Euthamia graminifolia* (L) Nutt?]

Leaf undersides, upper stems, & branches glabrate or nearly so, often with villous hairs on midrib of leaf underside ..... *E graminifolia* var *graminifolia*

Leaf undersides, upper stems, & branches copiously to moderately short villous (hirtellous) ..... *E graminifolia* var *nuttallii*



*Euthamia graminifolia*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 1<sup>st</sup> Photo Robert H. Mohlenbrock. USDA SCS. 1989. *Midwest wetland flora: Field office illustrated guide to plant species*. Midwest National Technical Center, Lincoln. Provided by USDA NRCS Wetland Science Institute (WSI). 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image.

*gymnospermoides*  
 (10)15-19 ray+disk florets  
 stems always hairless  
 slender leaves, single vein  
*punctae* on leaf upperside bold  
 shorter & bushier

*graminifolia*  
 20-35(50) ray+disk florets  
 line of hairs on stem  
 3 prominent veins  
*punctae* on leaf upperside obscure or not bold  
 tall & slender

The similar *E tenuifolia* (*E caroliniana* formerly *E remota*) of sand prairies near Lake Michigan has more slender leaves, flower heads not in sessile clusters, but on individual pedicels.

**Euthamia gymnospermoides** Greene GRASSLEAF GOLDENROD, aka GREAT PLAINS FLAT-TOPPED GOLDENROD, GREAT PLAINS GOLDENTOP, PLAINS GRASS-LEAVED GOLDENROD, STICKY EUTHAMIA, TEXAS GOLDENTOP, VISCID GRASS-LEAVED GOLDENROD, (*gymnospermoides* like a naked seed, from Greek *gymnos*, naked, *sperma*, seed, & *-oides*, resembling.)

**Habitat:** Sunny shores, dry to moist sandy soil. Prairies, sandy soil (m14). “Black soil prairies, sand prairies, gravel prairies, railroad prairies, meadows along rivers, rocky glades, roadsides, areas along railroads, & sandy fields” (Hilty). In the southeast USA, prairies, roadsides, & light woodlands” (w12). **distribution/range:** 1<sup>st</sup> map after Jones & Fuller (1955), second map plants.usda.gov. For Hilty’s discussion of sp distribution, see [http://www.illinoiswildflowers.info/prairie/plantx/plgr\\_goldenrod.htm](http://www.illinoiswildflowers.info/prairie/plantx/plgr_goldenrod.htm)

“Occasional in n & w Illinois” (m14).

**Culture:** Dormant seed or 60 days cold moist stratification. 4,934,783 (gnh13) seeds per pound.

**bottom line:** Field sow dormant. Seed tests show strong dormancy rates. Germ 8.0-24%. Dorm 72-77%. Test 29-41 days.\*\*

**Description:** Erect, herbaceous, perennial, native forb (or subshrub) mostly hairless except for rough leaf edges; roots branched creeping rhizome; culms 1.3-3.4(5.5)”; leaves thick, firm, linear, 0.13" wide, with 1 vein & obvious, glandular dots; inflorescence flat-topped to slightly rounded clusters of mostly stalkless heads; flowers heads with 10-14 (9-13, 16) short, yellow rays; fruit dry achene with fluffy pappus;  $N 2n = 36, 54$ . **key features:** “Flower heads almost stalkless, leaves 1/8” wide, with 1 vein.” (fh) “Leaves mostly 1-nerved, usually resinous & conspicuously glandular punctate.” (Ilpin) “Leaf blades linear to lanceolate, lengths 12–49 times widths, gradually reduced distally, faces abundantly & prominently gland-dotted, not pustulate; arrays (25–)35–60% of plant heights” (fna)

**Comments:** **status:** As *Euthamia remota*, GREAT LAKES GOLDENROD, endangered in Ohio. **phenology:** Blooms August to September. Great for naturalizing. Seed source nursery production, genetic source Richardson Wildlife Sanctuary, Shaw Station, Lee Co.

*Solidago graminifolia*” “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 than any others, ... *Solidago graminifolia*.” Short (1845) lists *Solidago graminifolia sensu auct non* (L.) Salisb. (1796), which jf55 place in *S. media* (Greene) Bush ex Friesner, which according to pugs is *Euthamia gymnospermoides* Greene.

“*S media* (Greene) Bush Rather common on high prairies, railroads & in sandy places. It grows in patches & is seldom over 2 feet tall. The ways that it differs from *S hirtella* are given above. *S graminifolia* var *media* (Greene) Harris.” (ewf55)

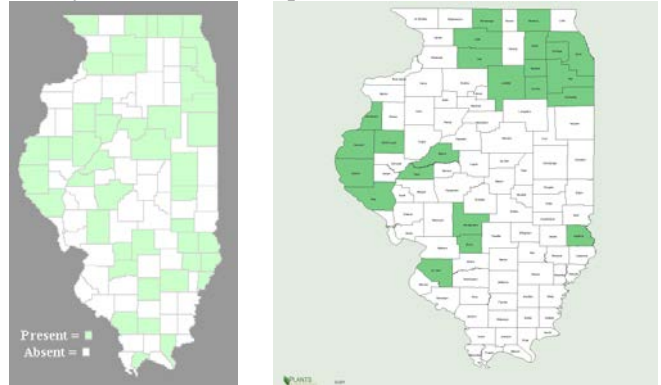
**Associates:** Species is of special value to native bees. Attracts wasps, flies, beetles, bees, & butterflies.

**ethnobotany:** Pollen possibly allergenic.

**VHFS:** For many years known as *Solidago gymnospermoides* (Greene) Fern. *E remota* is placed in *E tenuifolia* by some authors.

[*Euthamia camporum* Greene, *E chrysothamnoides* Greene, *E glutinosa* Rydb, *E media* Greene, *E pulverulenta* Greene, *E remota* Greene, *Solidago camporum* (Greene) A Nelson, *S chrysothamnoides* (Greene) Bush, *S graminifolia* (L) Salisb var *gymnospermoides* (Greene) Croat, *S graminifolia* (L) Salisb var *media* (Greene) SK Harris, *S gymnospermoides* (Greene) Fern, *S gymnospermoides* (Greene) Fern var *callosa* SK Harris, *S media* (Greene) Bush, *S moseleyi* Fern, *S perglabra* Friesner, *S remota* (Greene) Friesner, *S texensis* Friesner.

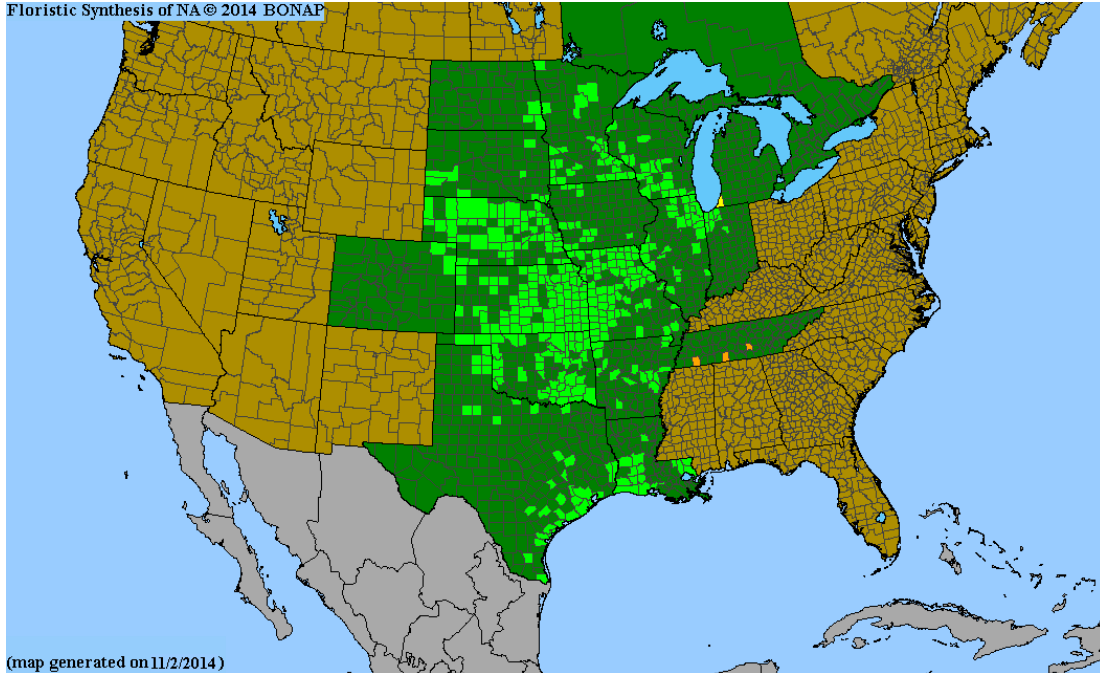
[http://www.efloras.org/florataxon.aspx?flora\\_id=1&taxon\\_id=112460](http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=112460)







Floristic Synthesis of NA © 2014 BONAP



(map generated on 11/2/2014)

*Solidago gymnospermoides*??? note 3 nerves per leaf in line drawing from Britton & Brown (1913)!  
 Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Illinois map courtesy plants.usda.gov & [http://www.illinoiswildflowers.info/prairie/plantx/plgr\\_goldenrod.htm](http://www.illinoiswildflowers.info/prairie/plantx/plgr_goldenrod.htm) North America map courtesy of BONAP (2016).

**Redo as *E caroliniana*??**

**Solidago tenuifolia Pursh** [new nomenclature this will be *Euthamia tenuifolia* (Pursh) Nutt, or in brand, spanking new nomenclature *Euthamia caroliniana* (Linnaeus) Greene ex Porter & Britton] SLENDER-LEAVED GOLDENROD, aka COASTAL PLAIN FLAT-TOPPED GOLDENROD, COASTAL PLAIN GOLDENTOP, GRASS-LEAVED GOLDENROD, SLENDER GOLDENTOP,

Habitat: Open disturbed habitats, sandy shores & sandy beaches, sand prairies & dunes near Lake Michigan. distribution/range: The distribution varies with the concept of this sp. Even Swink couldn't agree with Wilhelm on the sp concept (1994), & said it is in Indiana. In Illinois, it is near Lake Michigan (Ilpin), but in Wisconsin, it is mapped in many south central cos (fh). **Add maps.**

Culture: Sp is not in the Midwest native seed and plant trade.

Description: Erect herbaceous, perennial, native forb; colony forming rhizomatous; stems 2-4 feet, stem & branch surfaces glabrate, pubescent; leaves linear; one linear leaf vein; inflorescence terminal corymbiform, flat-topped; yellow flowers, not secund;  $N 2n = 18$ . "Leaves usually 1-nerved, resinous but not conspicuously glandular-punctate." (Ilpin)

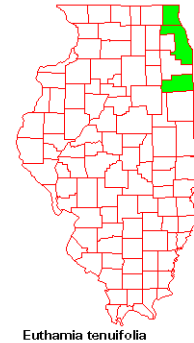
Comments: status: Endangered in Maine & Pennsylvania. phenology: Blooms 8-10. C3. "Rays pistillate and fertile; disk flowers perfect. Branched, Creeping rhizomes." (Ilpin)

Associates:

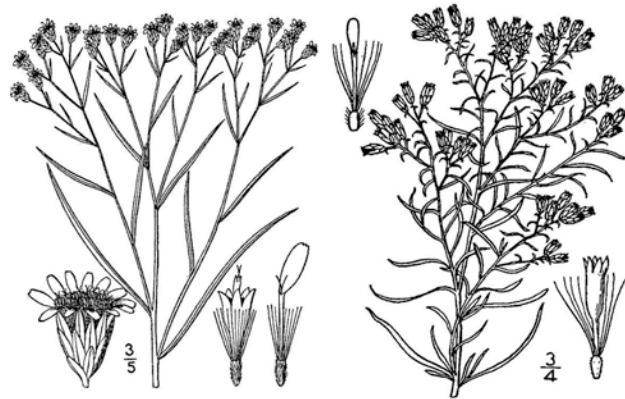
VHFS: For some time this was known as *Solidago tenuifolia* Pursh. FNA places *S tenuifolia* in synonymy with *Euthamia caroliniana* (Linnaeus) Greene ex Porter & Britton, which it maps from the Midwest.

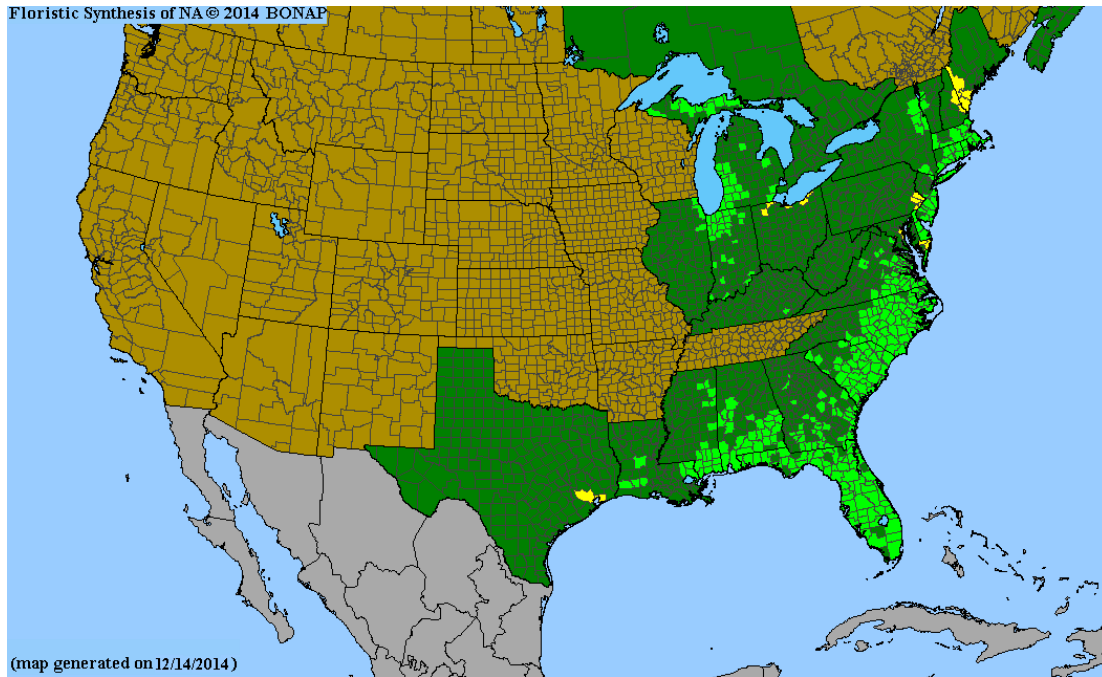
Plants.usda.gov maps *E caroliniana* from states on the Atlantic & Gulf coasts and Kentucky only. What did they do with all the SLENDER GOLDENTOP from the interior states? **Add maps.**

[*Erigeron carolinianus* Linnaeus, Sp. Pl. 2: 863. 1753 (as *carolinianum*), *Euthamia caroliniana* (L) Greene ex Porter & Britton, *E microphylla* Greene, *E remota* Greene, *Solidago caroliniana* Britton, Sterns & Poggenb., *S microphylla* (Greene) Bush, *S remota* (Greene) Friesner, *S tenuifolia* Pursh]



Euthamia tenuifolia





*Euthamia caroliniana/tenuifolia*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society, as *Euthamia minor* and *E tenuifolia*.

**EUTROCHIUM** Rafinesque 1838 **JOE PYE WEED** *Eutrochium* from Greek *eu-*, well, truly, & *trocho-*, wheel-like, alluding to the whorled leaves of the verticillate *Eupatoriums*. The genus formerly known as *Eupatoriadelphus* King & HE Robins, & was part of the broadly defined *Eupatorium* before that.

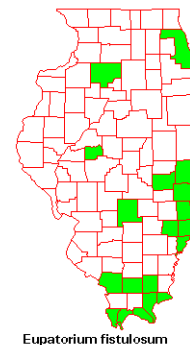
***Eutrochium fistulosum*** (Barratt) EE Lamont \*ME, MI, NH HOLLOW JOE PYE WEED, aka HOLLOW-STEMMED JOE PYE WEED, TRUMPETWEED, TUBULAR THOROUGHWORT, (*fistulosus -a -um* (fist-ew-LO-sus) Tubular, dude!, hollow, pipe-like, hollow like a pipe, but closed at both ends, hollow throughout as the leaf of an onion; full of holes, New Latin from *fistula*, a water-pipe; a reed-pipe, shepherd's pipe, tube, hollow reed or stalk, or Pan pipe, & *-osus*, adjective suffix for nouns, plenitude or notable development.)

Habitat: Moist thickets, floodplains, wet meadows. distribution/range: “Low wet ground; occasional in the s ½ of Illinois, less common or rare elsewhere (m14). Northern Illinois is the northwest limit of the sp range.

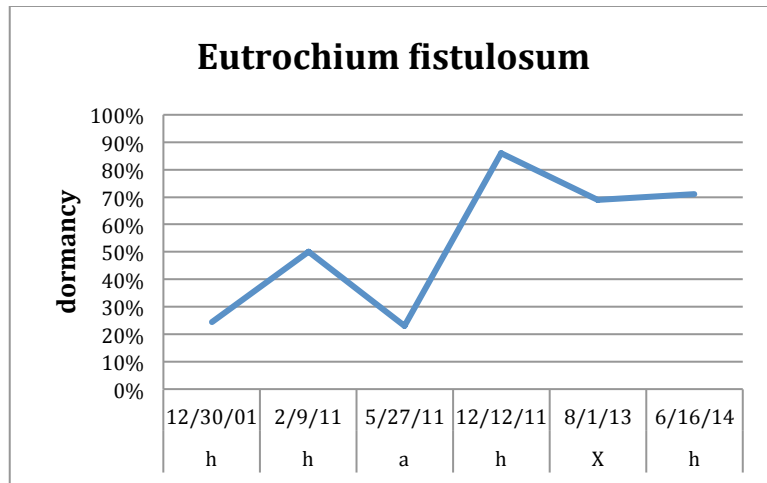
Culture: Dormant seed or cold moist stratify. Growth rate rapid. Seedling vigor low. Vegetative spread rate slow. 1,210,667\* (gnh01), 1,238,745 (gnae11), 1,246,154 (gnher11), 1,250,000 (jfn04), 1,440,000 (ecs), 1, 444, 585 (gnhe14), 2,000,000 (usda) seeds per pound.

cultivation: Anaerobic tolerance medium. CaCO3 tolerance low. Drought tolerance low. Fertility requirement medium. Salinity tolerance none. Shade tolerant intermediate. pH 4.5-7.0.

bottom line: Genesis seed test data indicates a strong requirement for dormant seeding. Germ 28.8, 24, na, sd15.6, r7.0-56 (49)%. Dorm 53.9, 59.5, na, sd23.8, r23-86 (63)%. Test 30, 31, na, r25-33 days.\*\*



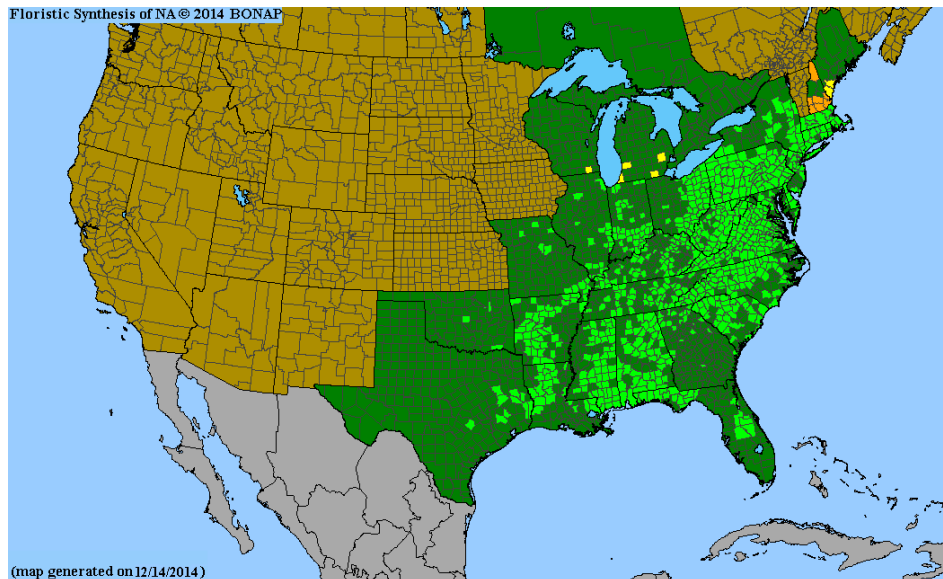
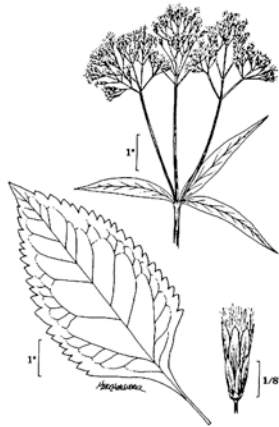
*Eupatorium fistulosum*



**Description:** Perennial herb to 6'+; rhizomatous; stem is strongly glaucous & hollow with a large central cavity; leaves 6-7 per node.  $N 2n = 20$ .

**Comments:** status: Special concern in Maine. Threatened in Michigan. Endangered in New Hampshire. To the contrary, this plant is considered invasive in some regions & habitats (Haragan 1991). phenology: Blooms July to September. Seed source central Indiana and/or Pennsylvania.

**VHFS:** Long known as *Eupatorium fistulosum* Barret. Before this revision, briefly known as *Eupatoriadelphus fistulosus* (Barratt) King & HE Robins. Also (Barratt ex Hook)



*Eutrochium fistulosum*

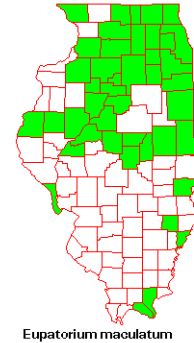
Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. Photo Robert H. Mohlenbrock. USDA SCS. 1989. *Midwest wetland flora: Field office illustrated guide to plant species*. Midwest National Technical Center, Lincoln. Provided by USDA NRCS Wetland Science Institute (WSI). Illinois map courtesy of ILPIN. North America map courtesy of BONAP (2016).

**Eutrochium maculatum** (Linnaeus) EE Lamont \*KY, MD SPOTTED JOE PYE WEED, aka *EUPATOIRE MACULÉE*, JOE PYE WEED, PURPLE BONESET, SPOTTED BONESET, SPOTTED TRUMPETWEED, *Me'skwana'kuk Bugiso'win*, swimming (Ojibwa), (*maculatus -a -um* (mak-ew-LAH-tus) spotted, stained, blotched, blotchy, mottled, New Latin from *macula*, a spot, mark, stain; sometimes the mesh of a net; a moral stain, blemish. See also *maculatus*, past participle of *maculo*, I spot, stain, pollute, defile, for the spotted leaves & stem.)

Obligate

**Habitat:** Wet meadows, calcareous fens, wet to wet-mesic prairies. Floodplains & thickets. **distribution/range:** *E. maculatum* is the widest ranging geographically & the most morphologically variable sp in the genus (*Eutrochium*) (fna). Illinois is at the southern limit of sp range in Midwest.

**Culture:** ① “Moist cold treatment, or fall sow. May be moist cold treated. Light cover. Very good germination.” (mfd93). ② No pre-treatment necessary other than cold, dry stratification, or 60 days cold moist stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09). ③ No 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 Sow at 20°C (68°F), germinates in less than two wks (tchn). ⑤ “30 days moist stratification required for germination. Field sow fall” (pnnd). ⑥ No pretreatment needed. Sow seeds on the soil surface at 70°F & water. (ew11). Growth rate rapid. Seedling vigor low. Vegetative spread rate slow. 1,136,000 (aes12), 1,250,000 (jfn04), 1,342,208 (wns01), 1,360,000 (pn02, sh94, aes12), 1,385,600 (ew11), 1,440,000 (ecs), 1,518,395 (gnhe02), 1,520,000 (pm01), 1,621,429 (gna), 1,830,645 (gnhe?02), 1,919,662 (gnam06), 2,000,000 (usda) seeds per pound seeds per pound. USDA (1997) recommends 0.06-2.0 lb pls per acre (but why?). Seeds, plugs & bare root material are readily available.

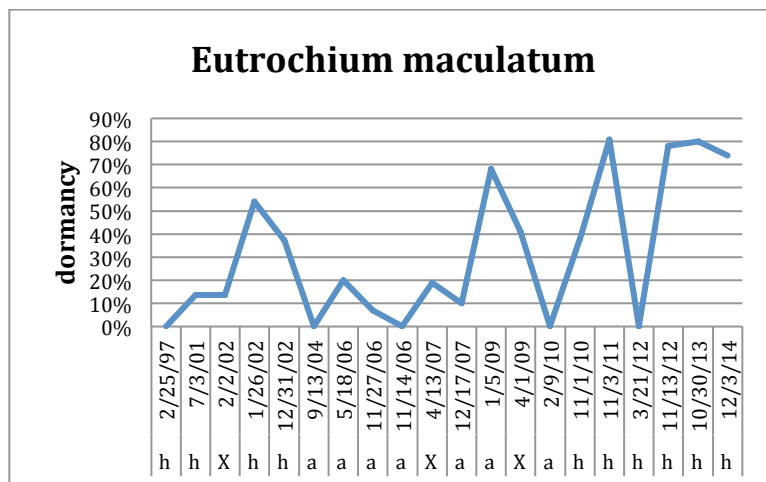


**asexual propagation:** Division of clumps in spring every 2-4 years. Stem cuttings are easily rooted.

**cultivation:** Space plants 1.5-2.0'. Full sun to partial shade, wet soils. Prefers moist soils. Tolerates inundation up to 6" early in season in natural habitats such as wet meadows, open marshes, & fens. Tolerant of flooding for short periods in spring. Clay soil tolerant. Nutrient load tolerance low. Siltation tolerance not available. Anaerobic tolerance medium. CaCO3 tolerance high. Drought tolerance low. Fertility requirement medium. Salinity tolerance none. Shade tolerant intermediate. pH 5.5-7.0.

**bottom line:** Dormancy mechanisms vary, with spring planting working with ca 50% of lots, but dormancy may be as high as 41-81%. Flipflop species. Small seeds need light to germinate, surface sow or very shallow cover. Germ 49, 50.5, 80, sd 25.7, r11-94 (83)%. Dorm 31.7, 19.5, 0.0, sd 29.8, r0.0-81 (81)%. Test 33, 30, 27, r24-47 days. (#18:4)\*\*

**greenhouse & garden:** Easy from seed, but germination can be spotty. Seed is very small & needs light to germinate, sow on top of the ground.



Description: Perennial herbaceous, native forb; 16" minimum root depth; 4.0-6.0'; stems usually speckled with purple; leaves whorled; flowers light pink to deep rose.  $N 2n = 20$ .

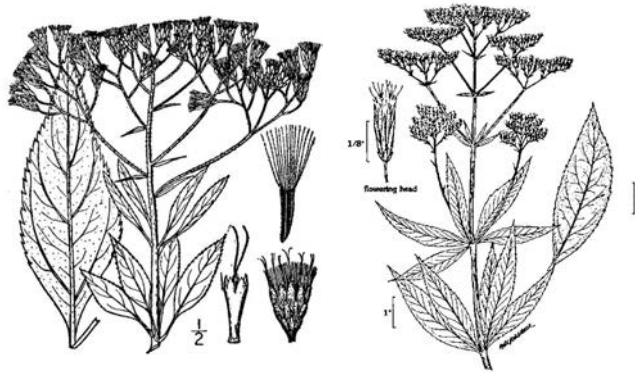
Comments: status: Historical in Kentucky. Endangered & extirpated in Maryland. phenology: Blooms 7,8,9. In northern Illinois, collect seeds in September - October. Collect seeds in se Wisconsin in September - October (he99). Attractive cut flowers, wetland restoration. Flowers have a slight fragrance. Said to be aggressive. Genetic seed sources Big Rock Twp, Kane Co & Bureau & Rock Falls, Whiteside Cos.

"Less common than *E purpureum*, which it resembles, & more likely to be in open places. In many wet places in Coon Creek bottom. The low prairies on the two branches of Kent Creek & elsewhere." (Ewf55)

Associates: Pollinator friendly. Butterfly nectar plant. Attracts butterflies, bumblebees, & other insects. Larval host for *Limenitis archippus*, Viceroy Butterfly. Nectar source for *Poanes zabulon*, Zabulon Skipper, *Pompeius verna*, Little Glassywing, *Speyeria cybele*, Great Spangled Fritillary, & *Vanessa cardui*, Painted Lady Butterfly. Provides cover for small mammals, amphibians, & reptiles. Seeds are eaten by swamp sparrows. Swamp sparrows are eaten by marsh hawks. Provides cover for cover for small mammals, amphibians, & reptiles. Reported as deer resistant.

ethnobotany: Used as medicinal plant by Ojibwa for strengthening baths, dried leaves & flowering tops used for diaphoretic tea (den28).

VHFS: For some time known as *Eupatorium maculatum* Linnaeus. Before this revision, briefly known as *Eupatoriadelphus maculatus* (L) King & HE Robins. Illinois has var *maculatus* [synonyms *Eupatorium maculatum* L, *E maculatum* L var *maculatum* L [superfluous autonym], *E purpureum* L var *maculatum* (L) Darl]. Var *bruneri* (Gray) King & HE Robins is northeast, north & west of Illinois, including Wisconsin, Iowa, & Missouri [synonyms *Eupatorium bruneri* Gray, *E maculatum* L ssp *bruneri* (Gray) GW Douglas, *E maculatum* L var *bruneri* (Gray) Breitung]. Var *foliosum* (Fern) Kartesz, comb nov ined is north & northeast of Illinois [*Eupatorium maculatum* L var *foliosum* (Fern) Wieg, *E purpureum* L var *foliosum* Fern, *E trifoliatum* L var *foliosum* (Fern) Farw]



*Eutrochium maculatum*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society as *Eupatoriadelphus maculatus* var. *maculatus*. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image. Illinois map courtesy of ILPIN.

**Eutrochium purpureum** (Linnaeus) EE Lamont PURPLE JOE PYE WEED, aka JOE-PYE-WEED, GRAVEL-ROOT, GRAVEL WEED, GREEN-STEMMED JOE-PYE-WEED, PURPLE BONESET; PURPLE-NODE JOE-PYE-WEED, QUEEN OF THE MEADOW, TRUMPET-WEED, SWEET-SCENTED OR SWEET JOE PYE WEED, (*purpureus -a -um* (pur-PEWR-ree-us) 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.) upl

Habitat: Wet-mesic savannas, mesic to dry-mesic woodlands, & thickets.

distribution/range: Note the botanical no-mans land of Lee-Whiteside cos.

Culture: ① “Moist cold treatment, or no pretreatment, or fall sow. Light cover. Very good germination.” (mfd93) ② No pre-treatment necessary other than cold, dry stratification, or 60 days cold moist stratification. Seeds germinate most successfully in cool soil. (pm09). ③ No 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 “30 days moist stratification required for germination. Field sow fall” (pnnd). ⑤ No pretreatment needed. Sow seeds on the soil surface at 70°F & water. (ew11) ⑥ 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).

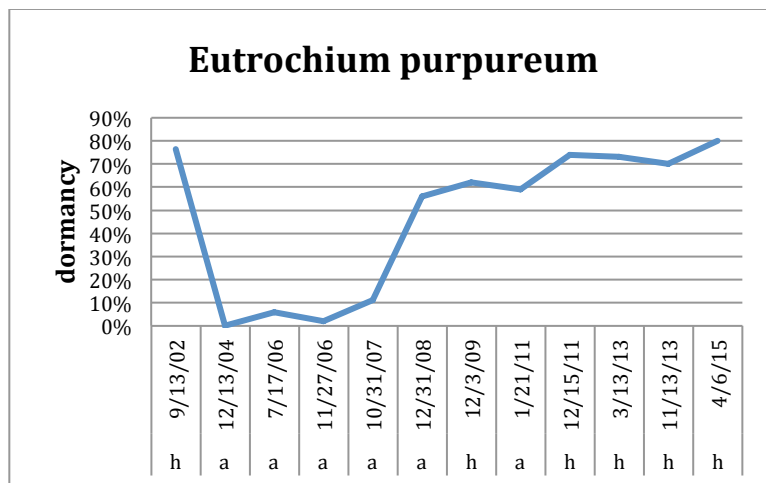


672,000 (pm01, ecs), 720,000 (ew11), 752,000 (aes12), 756,000; 768,000 (pn02, jfn04), 769,492 (gna04), 818,772 (gnh11), 836,866 (gnam06), 869,732 (gnhm02) seeds per pound.

cultivation: Space plants 1.5-2.0'. Full sun to woodland, mesic soils. Tolerates partial shade.

bottom line: Seed tests indicate >60% of lots have a strong requirement for dormant seeding for field establishment or cold moist treatment for greenhouse crops. Zero to slightly dormant lots are known. Small seeds need light to germinate, surface sow or very shallow cover. Flipflop species. Crossover species. Germ 43.7, 29.5, 88, sd 29.1, r12.5-88 (75.5)%. Dorm 47.5, 60.5, na, sd 31, r0.0-80 (80)%. Test 31, 31, 27, r20-44 days. (#12:4)\*\*

greenhouse & garden: Moist cold stratify or dormant seed, small seeds need light.



Description: Erect perennial, 3.0-5.0(8)', flowers purplish or pink in an open dome. Stems usually dark purple at the nodes, usually solid, rarely ± hollow at the base. Aromatic.

Comments: status: phenology: Blooms 7,8,9. In northern Illinois, collect seeds in late September. Collect seeds in se Wisconsin in November (he99). Attractive cut flowers. Landscaping, woodland restoration, shaded rain gardens. The bruised stems have a pleasing vanilla-like odor, hence the SWEET or SWEET-SCENTED common name. Seed source nursery production, from wooded roadsides near Princeton, Bureau Co, & Du Page, Kane, & Will (Horlock) Cos.

Bob Horlock was Seedsman for The Natural Garden in the 1980s & early 1990s, & a pioneer in this industry. We were fortunate to have a friendly business relationship with Bob during the early years of our

nursery. Bob's seeds were collected in DuPage, Kane, & Will Cos. We traded back & forth with him, & several of our production plots originate from his collections. Bob passed away in the early 1990s.

"Of frequent occurrence." (Short 1845).

"Not uncommon, usually being in woods as in Ingersoll Park west of Rockford. The heads are narrower & the flowers lighter in color than *E maculatum*." (ewf55)

Associates: Good nectar source, butterfly plant.

ethnobotany: Used as medicinal plant by Ojibwa, Menominee, & Pottawatomie (Gilmore 1933, sm23, 33).

VHFS: Long known as *Eupatorium purpureum* Linnaeus. Before this latest revision, briefly known as *Eupatoriadelphus purpureus* (L) King & H Robins. Illinois has var *purpureum* & var *holzingeri* (Rydb) E Lamont HOLZINGER'S EUPATORIUM, [*Eupatorium holzingeri* Rydb]

[*Eupatoriadelphus purpureus* (L) King & H Rob, *Eupatorium falcatum* Michx., *E purpureum* L var *amoenum* (Pursh) A Gray, *E purpureum* L, *E trifoliatum* L]

*Eutrochium purpureum* is morphologically variable & is known to hybridize with all other spp of the genus (fna).



*Eutrochium purpureum*

Line drawing Britton & Brown (1913) courtesy of Kentucky Native Plant Society. 2<sup>nd</sup> line drawing Mark Mohlenbrock, USDA-NRCS PLANTS Database / USDA NRCS. *Wetland flora: Field office illustrated guide to plant species*. USDA Natural Resources Conservation Service. Not copyrighted image.

End Asters Part One

Endnotes & abbreviations. The following math functions violate Abbey's 1<sup>st</sup> 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.

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\*\* 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)  
rrn97 (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)  
tlp (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.*