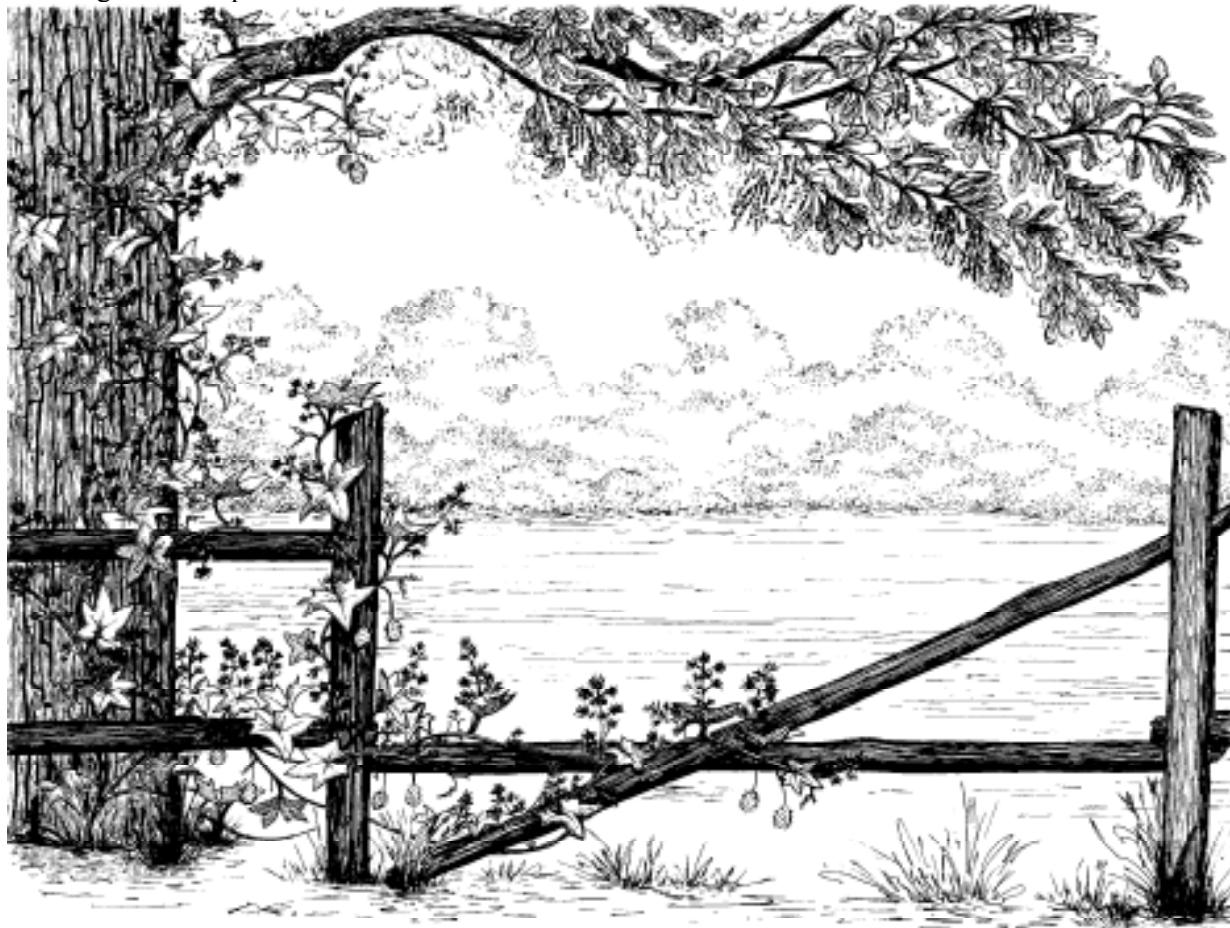


COMPOSITAE

PART DEUX

Gaillardia to *Oligoneuron*
Working Draft 1 April 2015



SUNFLOWER FAMILY 2 COMPOSITAE

Fleischmannia	Iva
Gaillardia	Krigia
Gnaphalium	Kuhnia
Grindelia	Lactuca
Hasteola	Liatris
Helenium	Machaeranthera
Helianthus	Nabalus
Heliopsis	Nothocalaïs
Heterotheca	Oclemena
Hieracium	Oligoneuron
Hymenoxys	
Ionactis	

FLEISCHMANNIA Schultz-Bipontinus 1850. *Fleischmannia* for Gottfried F Fleischmann, 1777–1850, teacher of Schultz-Bipontinus at Erlangen. A genus of ca 80 species, 2 in northern North America: se, s, c United States, Mexico, Central America, Andean South America. 1 species in southern Illinois formerly part of a broadly defined *Eupatorium*.

GAILLARDIA Fougeroux 1786 **BLANKETFLOWER, GAILLARDIA, FIRE-WHEELS** *Gaillardia* (gay-LARD-ee-a) New Latin, from M Gaillard de Marentonneau (Merentonneau or Charentonneau in some sources), 18th century French magistrate & botanist (or botanical patron) & New Latin -ia. About 15-30 (15-17+) spp of temperate North American & South American annuals, perennials, & subshrubs, having hairy foliage & long stalked flower heads with showy yellow, purple, or variegated rays, achene villous, with long hairs from its base; pappus of 6-10 long awns, which are membranous at base. X = 19.

Seeds mature summer. No seed treatment is necessary. Code A. The perennial spp may be divided in spring. (cu00)

Gaillardia aristata Pursh **BLANKET FLOWER**, aka **BROWN EYED SUSAN, COMMON BLANKET-FLOWER, COMMON GAILLARDIA, FIREWHEEL, INDIAN BLANKET**, (*aristatus -a -um* aristate, awned (like heads of wheat), bearded, a long bristle like tip, with bearded awns like the ear of Barley, from Latin *arista*, noun, the beard of an ear of grain, corn silk; ear of grain or corn, & -atus -a -um, adjectival suffix, possessive of or likeness of something. As maize was probably unknown in Europe during Roman times, corn refers wheat or other small cereals.)

Habitat: Full sun to partial shade, dry soils. distribution/range: Adventive in Jackson Co, undoubtedly elsewhere.

Culture: ①No pretreatment needed. Sow seeds on the soil surface at 70°F & water. (ew11) ②Sow under thin cover at 20°C (68°F) in light, germinates in less than two wks (tchn). Broadcast 0.12-0.25" deep 10 lb pls per acre. Growth rate moderate. Seedling vigor medium. Vegetative spread rate none. 128,000 (ew11), 130,368 (wns01), 132,000 (gran), 156,000 (stocks), 160,000; 160,200 (appl02), 186,000 (ecs), 186,436 (usda) seeds per pound.

Stocks recommends when planted alone 4 oz per 1,000 ft sq Pure stand plant 10 lb per acre (gran). Seed supplies are generally good, with occasional shortages, but foreign-grown seed is more common than domestic-grown seed.

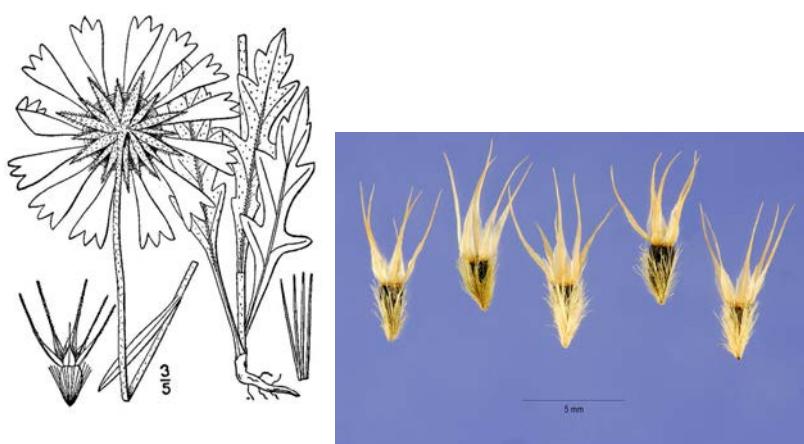
cultivation: Space plants 1.25-1.5'. Tolerates partial shade. Does well on any well-drained soil. Low moisture requirement. Coarse to moderately fine textured soils. Neutral to basic soils. Anaerobic tolerance none. CaCO₃ tolerance medium. Drought tolerance medium. Fertility requirement low. Salinity tolerance low. Shade intolerant, full sun. pH 5.5-7.9. Remove spent blooms to prolong flowering.

bottom line: Seed spring or dormant seed.

Description: Native, western, short-lived, perennial subshrub, 12-24", 16" minimum root depth; hairy stems & dandelion-like leaves; with large red scarlet, bronze, & yellow (red & yellow) petaled daisy-like flowers with "domed" red centers; N 2n = 34, 68.

Comments: status: phenology: Blooms June thru fall. Fairly drought tolerant, used in erosion control or "annual" mixes. Sometimes flowers the first year from seed. Attractive cut flower. Seed source commercial stock.

Associates: Attracts butterflies & hummingbirds.



Gaillardia aristata

Seed photo Steve Hurst

Gaillardia pulchella Fougeroux INDIAN BLANKET, aka ANNUAL GAILLARDIA, BLANKET FLOWER, FIREWHEEL, INDIAN BLANKET FLOWER, ROSE-RING BLANKET FLOWER, (*pulchellus -a -um* (pul-KEL-us) pretty, beautiful; beautiful but small, little beautiful.)

Habitat: Full sunlight, dry soils. Native to sandy plains & roadsides in deserts. distribution/range: Adventive in 10 Illinois cos.

Culture: ①Sow under thin cover at 20°C (68°F) in light, germinates in less than two wks (tchn). Does well from seed. As an annual, it blooms first year from seed. Sow in the spring in the north & in the fall in the South. Growth rate rapid. Seedling vigor high.

Vegetative spread rate none. 132,000 (cci), 153,000 (stocks, gran), 217,280 (wns2001), 223,300 (appl02), 224,000 (ew11), 238,000 (ecs), 238,144 (usda), 298,340 [204,113 pls] (s&s02) seeds per pound. In single sp plot plant 4 oz per 1,000 ft sq (stocks). Pure stand plant 10 lb per acre (gran).

cultivation: Space plants 1.25-1.5. Adapted to a wide range of soils.

Coarse to moderately fine soils. Sun loving, adapted to many soil types.

Anaerobic tolerance none. CaCO₃ tolerance high. Drought tolerance high.

Fertility requirement medium. Salinity tolerance none. Shade intolerant. Neutral to basic soils. pH 7.0-8.5.

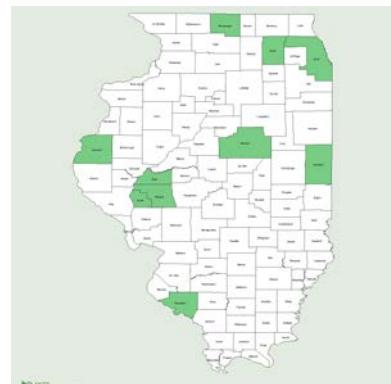
bottom line: Seed spring or dormant.

Description: Western native annual subshrub (?), 12" minimum root depth; culms 1.5-2.0'; very showy red daisy-like flowers with yellow margins, 1-2'. 2n = 34.

Comments: status: phenology: Blooms May to July into early fall. Can be annual, biennial, or perennial. Recommended in "annual" mixes or mass plantings. One variety is native to coastal dunes from North Carolina to Florida, hence it is said to be salt tolerant enough to plant on coastal properties in Virginia. Seed source commercial sources.

Associates: Attracts butterflies & hummingbirds.

VHFS: A known hybrid, *Gaillardia X grandiflora* = *G aristata X G pulchella*



Gaillardia pulchella

GNAPHALIUM Linnaeus 1753 **CUDWEED, EVERLASTING, RABBIT TOBACCO** *Gnaphalium* Gnapha'lium (na-FAY-lee-um) floccose-woolly, New Latin, alteration of Latin *gnaphalion*, cudweed, modification of Greek *gnaphallion*, a downy plant, an ancient name applied to these & similar plants, from γνάφαλλον, *gnaphallon*, lock of wool or cotton, from *gnaptein*, to card, alteration of *knaptein*, in reference to the soft, cottony surface of the herbage; akin to Old English *hnæppan* to strike, Old Norse *hnafa* to cut, Lithuanian *knabeti* to peel, Latin *cinis* ashes. About 40 spp of hoary or woolly-tomentose widely distributed herbs having whitish persistent involucres. Pappus a single row of scabrous, hair-like bristles. x = 7.

Gnaphalium obtusifolium see *Pseudognaphalium obtusifolium*

Uncopyrighted Draught

GRINDELIA Willdenow 1807 **GUM-PLANT, TARWEED, ROSINWEED, RESIN-WEED, GUMWEED, GUM-PLANT**
Grindelia New Latin, from David Hieronymus *Grindel*, 1776–1836, German (variously Latvian or Russian) botanist, pharmacologist, physician, & professor of botany at Riga, Estonia, & New Latin *-ia*. A genus of about 30 (55) spp of coarse gummy or resinous herbs & evergreen shrubs chiefly of western North America that have flower heads with involucres consisting of phyllaries with spreading tips. The dried leaves & stems of various gumweeds used internally as a remedy in bronchitis & as a local application in ivy poisoning. $x = 16$.

Grindelia integrifolia & *robusta*, sow at 20°C (68°F), germination slow (tchn).

Grindelia squarrosa (Pursh) Dunal **CURLY CUP GUMWEED**, aka **CURLY-TOP GUMWEED, GUM PLANT, GUM-WEED, TARWEED, (squarrosus -a -um)** rough, scurfy, with protruding scales, with leaves spreading at right angles, with parts spreading horizontally, or even recurved at the ends, from Latin *squarrosus*, rough, scurfy.) facu

Habitat: Disturbed sandy roadsides; dry, sunny disturbed sites.

distribution/range: Introduced from the western United States.

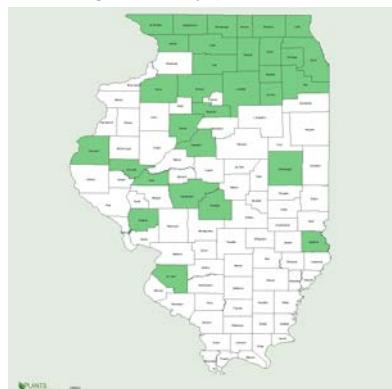
Culture: ①No pre-treatment needed. Sowing outdoors in the spring is the easiest method. Easy from seed. (he99)

Description: Erect biennial/perennial (subshrub), native forb; roots; culms 4-40"; leaves simple, entire, serrate, pinnately-veined; flowers yellow, disk florets are perfect & fertile; ray florets are pistillate & fertile; N $2n = 12$. key features: "Leaves are perfoliate, ovate-cordate, weakly toothed. This typical variety is distinguished by: 1) radiate heads; 2) leaves closely & evenly serrulate-crenate; 3) upper & middle leaves 2-4 times as long as wide, ovate-oblong." (Ilpin)

Comments: status: phenology: Blooms 7,8,9. C3. In northern Illinois, collect seeds in October. Collect seeds in se Wisconsin in October (he99). Possibly a rare native weed in the Green River Sands, growing on a roadside adjacent to the *Andropogon hallii* / *Cyperus grayoides* site in west Bureau Co. On selenium-rich soils, GUMWEED concentrates selenium to levels toxic to livestock.

"Becoming plentiful in the south & east parts of the co. Also seen in Ogle, Boone, Stephenson, & De Kalb cos." (ewf55)

VHFS: The variety *serrulata* (Rydb) Steyermark is distinguished by: 1) radiate heads; 2) closely & evenly serrulate-crenate leaf margins; 3) upper & middle leaves 2-4 times as long as wide. (Ilpin)



Grindelia squarrosa

HASTEOLA Rafinesque 1838 **SWEET INDIAN PLANTAIN** *Hasteola*, spear-shaped, from Latin *hasta*, (asta), a spear, lance, pike, javelin, & *-ola*, diminutive, for the leaves of the type sp. A genus of 2 spp of herbaceous perennials of eastern North America. Formerly included in the broadly defined *Cacalia*, & sometimes placed in *Senecio* Linnaeus. The genus has also been known as *Synosma* (seen from 1905-2001). Asian spp are placed in *Parasenecio*. $x = 20$.

Hasteola suaveolens (Linnaeus) Pojarkova * IA, WI SWEET INDIAN PLANTAIN, aka FALSE INDIAN PLANTAIN, HASTATE INDIAN-PLANTAIN, (*suaveolens* (gen.) *suaveolentis* sweet smelling, fragrant, from Latin *suavis* -is -e, pleasant, sweet, delightful, ultimately from PIE *swə₂d-, swād, sweet, (cognate with sweet), pleasant, & -eolens, scented, or *olens*, (gen) *olentis*, Latin with an odor good or bad, odorous, fragrant, stinking.) Obligate

Habitat: Wet meadows, rich or low woods, base of rich slopes or bluffs, & calcareous fens. distribution/range: Wet ground, calcareous fens; not common in n Illinois (m14). Known but not mapped from Spring Slough, Whiteside Co. Rhode Island & Connecticut west to Minnesota, south to Georgia & Missouri (absent from Michigan & South Carolina. Rare throughout much of its range (w11).

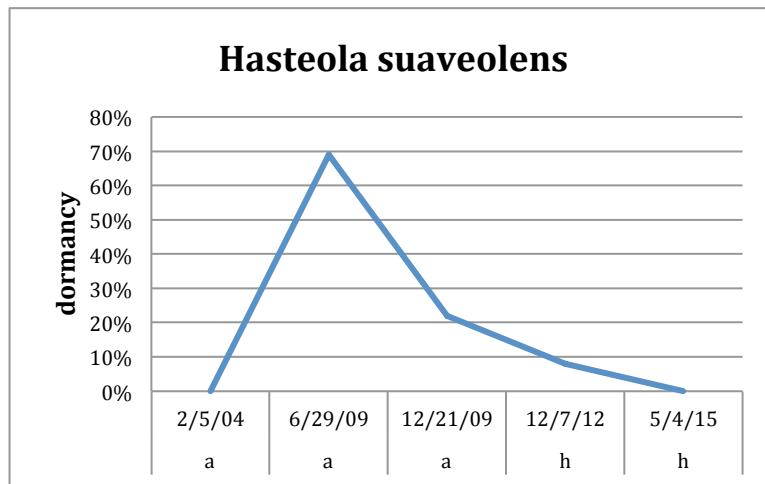
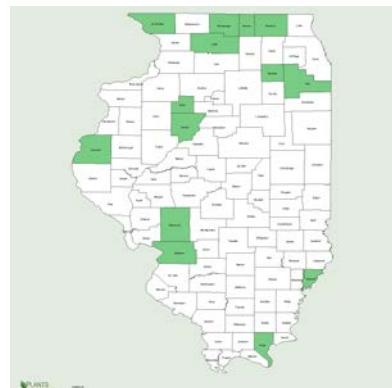
Culture: ①“Moist cold treatment, or fall sow. Light cover.” (mfd93) ②60 days cold moist stratification (pm09). 192,000 (jfn04), 224,000 (pm02), 303,614 (gnh12), 309,054 (gna04), 377,600 (aes12), 571,788 (gna04) seeds per pound.

cultivation: Neutral to calcareous soils.

asexual propagation: Division of mature plants in spring.

bottom line: Limited seed test data indicate dormant seeding has a significant to strong benefit on some lots, but >10% & 0 dorm are known.

Flipflop species. Germ 53.4, 44, na, sd 34.2, r3.0-96 (93%). Dorm 19.8, 8.0, 0.0, sd 25.9, r0.0-69 (69%). Test 25, 26, na, r18-28 days. (#5:1)**



Description: Native, erect, herbaceous, perennial, forb; from rhizomes; culms 2.5-5.0'; leaves sharply triangular; flowers cream-white (ochroleucous) to brilliant white, rarely pinkish. N 2n = 40.

Comments: status: Special concern in Wisconsin. phenology: Blooms 7,8,9. In northern Illinois, collect seeds in October - mid November. Collect seeds in se Wisconsin in September - October (he99). Wetland restoration, mildly aggressive. Seed source nursery production from genetic source Spring Slough, Hume Twp, Whiteside & Lee cos.

“*Hasteola suaveolens* is now less common or absent in the northeastern part of its historic range” (Anderson in fna). W12b notes this sp is rare through much of its range & has not been seen in North Carolina in recent years.

VHFS: Long known as *Cacalia suaveolens* L. W12b considers this *Senecio suaveolens* (L) Elliott. [*Hasteola suaveolens* (L) Pojarkova, *Senecio suaveolens* (L) Elliott, *Synosma suaveolens* (L) Raf ex Britt]



Hasteola suaveolens

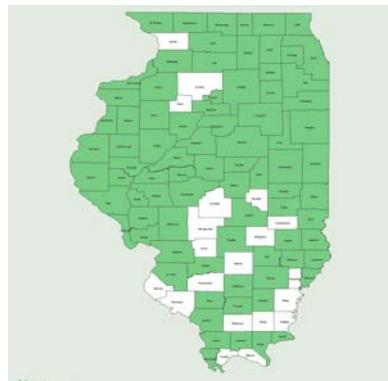
HELENIUM Linnaeus 1753 **AMERICAN SNEEZEWORT** *Helenium* (he-LE-nee-um) from Greek name for another plant named after the celebrated Helen of Troy, from whose fallen tears these flowers are said to have sprung, or ‘who is said to have availed herself of its cosmetic properties’ (Wood 1873). Alternately New Latin, from Latin, a plant, elecampane, from Greek *helenion*, perhaps from *helene*, wicker basket; akin to Greek *helix* (adjective) twisted, (noun) spiral, anything of spiral shape, *helissein* to turn, wind, *eilein* to wind, roll, *eilyein* to enfold, enwrap, reference uncertain. A genus of about 32-40 spp of herbs of North America, Mexico, Cuba, Central America, & South America, with heads of yellow-rayed flowers, truncate-style branches, & leaves alternate, decurrent. Fruit is an achene (or is it?), pappus of 5, one-awned, chaffy leaves; seed villous. $x = 17$.

Helenium autumnale Linnaeus SNEEZEWEED aka AUTUMN SNEEZEWEED, AUTUMN SNEEZEWORT, BITTERSWEET, BITTERWEED, COMMON SNEEZEWEED, DOGTOOTH DAISY, FALSE SUNFLOWER, *HÉLÉNIE AUTOMNALE*, *HELENIUM*, HELEN’S FLOWER, SNEEZE-WORT, (*autumnalis -is -e* (ow-tum-NAH-lis, or locally awtum-NA Y-lis) autumnal, of the autumn, by extension, autumn flowering, from Latin *auctumnalis*, of or pertaining to autumn, from *autumnus*, autumn, for its blooming period, & *-alis -is -e*, adjectival suffix meaning pertaining to or belonging to.) Facultative Wet (+)

Habitat: Shores, meadows, & low thickets wet meadows, upland swamp, sedge meadows, lowland woods, shores, & calcareous fens. Rich humusy soils, wet to wet-mesic prairies. distribution/range:

Culture: propagation: ①“No pretreatment needed, or moist cold treatment, or fall sow. Light cover. Very good germination. Self sows.” (mfd93). ②No pre-treatment necessary other than cold, dry stratification. Surface sow, seeds are very small or need light to naturally break dormancy & germinate. (pm09)

③No pre-treatment needed. Sowing outdoors in the spring is the easiest method. Easy from seed. (he99) ④“30 days moist stratification improves germination, but not needed for good greenhouse crop. Field sow fall, early spring.” (pnnd).



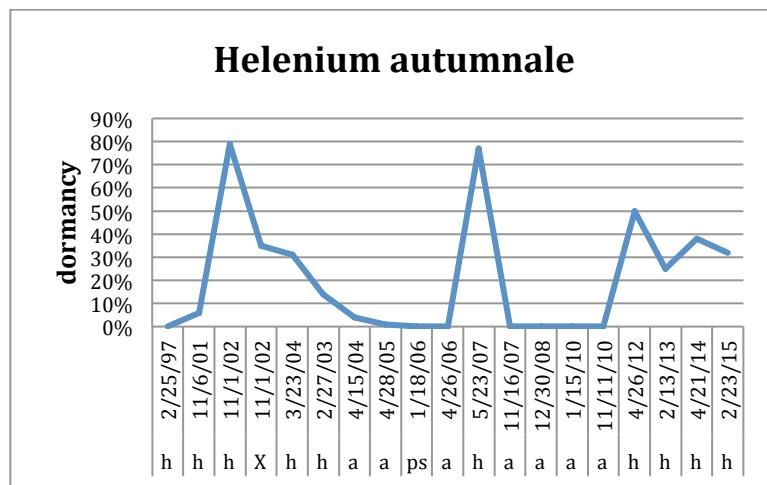
⑤No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) ⑥Sow at 20°C (68°F), if no germination in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn). Growth rate rapid. Seedling vigor high. Vegetative spread rate none. 201,600 (wns01), 1,600,000 (pn02, sh94), 1,936,000 (ew11), 1,956,897 (gna06), 1,776,908 (gna04), 2,080,000 (pm01), 2,131,455 (gna05), 2,268,000 (jfn04), 2,460,705 (gnh03), 2,522,222 (gnh07), 2,272,000 (aes10), 3,310,948 (gnh11) seeds per pound. In mixes, sow 0.12-0.5 lb pls per acre (us97). Our recommendation is up to 0.125 lb per acre.

asexual propagation: Divide mature plants in spring. Cuttings.

cultivation: Space plants 2.0-3.0'. Prefers moist to saturated soils. Plants may be short-lived. Tolerant of brief shallow inundation typical of natural areas, such as wet prairies, sedge meadows, & fens. Nutrient load tolerance moderate to high. Siltation tolerance moderate to high. Anaerobic tolerance low. CaCO₃ tolerance high. Drought tolerance low. Fertility requirement low. Salinity tolerance none to low (USDA & noted by AES 2010). Shade intolerant. Full sun to partial shade. pH 4.0-7.5 or 6.0-7.0.

bottom line: Spring plant works most years. Genesis seed test data indicate about 50% of lots will require dormant seeding for field establishment or cold moist stratification. Flipflop species. Germ 60.2, 63, 63, sd 22.4, r8.0-92 (84%). Dorm 20.6, 6.0, 0.0, sd 25.2, r0.0-79% (79%). Test 33, 28, 28, r22-38 days. (#19:3). **

greenhouse & garden: Summary: easy from seed, usually good germination in 30 days, typically no treatment, readily grown. Over 50% of lots will require cold moist stratification for 30 days. If you intend to grow without CMS, have prop stock germ tested for insurance.



Description: Native, erect perennial forb, very bitter; 3.0-6.0'; leaves alternate, decurrent; flowers yellow, 5-merous, drooping ray petals ending in 3 obtuse teeth. N 2n = 32, 34, 36. key features: Leaves serrate, decurrent; flowers loosely corymbous (Wood).

Comments: status: This sp is considered invasive in some parts of the United States or in certain applications (Stubbendieck et al 1994). (*Sp may be a serious weed in pastures in the west, with seriousness in the eye of the beholder.*)

phenology: Blooms 7-10. Collect seeds in se Wisconsin in October (he99). Attractive cut flowers, landscaping, wetland restoration, rich soil rain gardens, fibrous root system helps provide erosion control in upper shoreline zone, stream bank, & vegetated swales. Aggressive. Seed source nursery production, with genetic sources Chicago Botanic Garden, & wetland remnants, Shaw Station, Lee & Como, Whiteside cos.

“Of frequent occurrence.” (Short 1845).

Associates: Pollinated by long-tongued bees, short-tongued bees, other *Hymenoptera*, *Diptera*, *Lepidoptera*, & *Hemiptera*. Attracts butterflies, upland game birds, songbirds, & small mammals. Larval host of *Nathalis iole* DAINTY SULPHUR. Nectar source for *Erynnis horatius* HORACE'S DUSKYWING SKIPPER, *Euphyes dion* DION SKIPPER, *Euphyes dukesi* DUKES SKIPPER, & *Hylephila phyleus* FIERY SKIPPER. Roots are eaten by small mammals in winter. ☹ May be harmful if ingested by livestock.

ethnobotany: Used as medicinal beverage by Menominee (sm23).

VHFS: Ours is variety *autumnale*. Var *montanum* (Nutt) Fern MOUNTAIN SNEEZEWEED, grows from the Great Plains to the Pacific Ocean. Var *grandiflorum* (Nutt) Torr & Gray FALL SNEEZEWEED, grows from Washington to California. Add varieties in m14.



Helenium autumnale

Helenium flexuosum Rafinesque PURPLE-HEADED SNEEZEWEED, aka SOUTHERN SNEEZEWEED, (*flexuosus -a -um* flexuosus, zigzag, tortuous, bent alternately in opposite directions, to the right & the left, like the path of a snake, from Latin *flexibilis*, *flexilis*, flexible.)

Habitat: Bottomland pastures & wet meadows. Moist disturbed sites. distribution/range: Introduced in northern Illinois.

Culture: ①No pre-treatment necessary other than cold, dry stratification (pm09). Growth rate moderate. Seedling vigor high. Vegetative spread rate none. 1,920,000 (pm02), 2,000,000 (usda, ecs) seeds per pound.

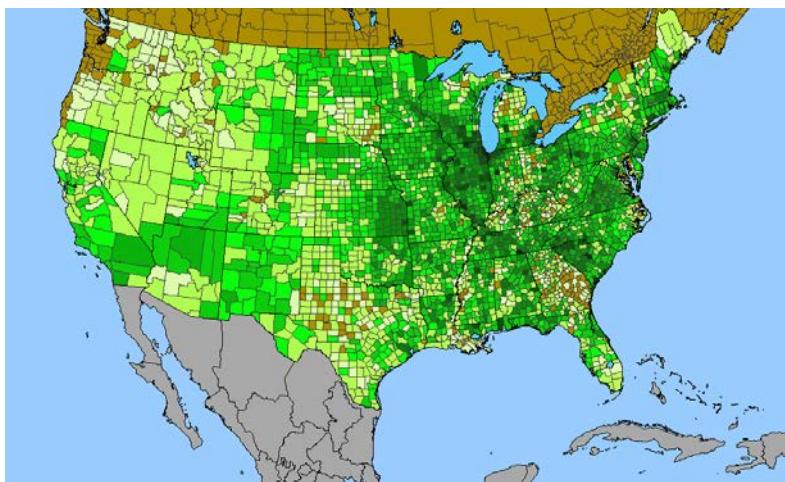
cultivation: Anaerobic tolerance none. CaCO₃ tolerance low. Drought tolerance medium. Fertility requirement medium. Salinity tolerance none. Shade intolerant. pH 4.5-7.5.

Description: 6" minimum root depth; multiple stem; ray florets yellow; disk florets purple; key features: "Sp has leaves which are widely spaced; strongly decurrent." (Ilpin)

Comments: status: Introduced & naturalized. phenology: Blooms May to August. Known from Springdale Cemetery in Peoria.

VHFS: [*Helenium floridanum* Fern, *H godfreyi* Fern, *H nudiflorum* Nutt, *H polyphyllum* Small.]

HELIANTHUS Linnaeus 1753 **SUNFLOWER** *Helianthus* New Latin, from Greek ἥλιος, *helios*, the sun, & ἄνθος, *-anthos*, flower, from the flower heads. A genus of about 50 (52) spp of tall erect or sometimes much-branched American annual or perennial herbs comprising the sunflowers & having flower heads with purple or yellow disk flowers & showy yellow sterile rays. The greatest spp density is in the western Great Lakes region, with Cook Co, Illinois having 14 spp. Fruits are achenes, compressed or 4-sided; pappus of 2 chaffy awns. Perennial spp are rhizomatous, & can be quite aggressive & weedy. SUNFLOWERS attract upland gamebirds, songbirds, & small mammals, providing important wildlife food. Some spp are phytotoxic &/or autotoxic. Sunflowers may be a source of some hay fever (Ilpin). Plants are generally self-sterile. X = 17.



Density gradient of native spp for *Helianthus* within the US (data 2011). Darkest green (14 spp Cook Co, IL; Richland Co, SC) indicates the highest spp concentration. ©BONAP

Seeds are achenes, ripening in fall. Easy from dry stratified seed, Code A (cu00), but some spp or lots will require cold moist stratification (Wade various years). Five to seven node stem cuttings in spring from the top foot are generally successful (cu00).

Germination of most spp of sunflowers seeds can have some difficulty. Seeds may be sown in permanent locations in spring, but germination is improved by sowing seeds in pots or flats & placing them outside in early winter where the seeds are exposed to freeze & thaw cycles that break dormancy. Sunflowers may also be dormant sown in their permanent locations. Most spp can be started from seed, but even with the outdoor treatment, some spp are still difficult.

When second set of true leaves appear, transplant seedlings into 32s or 38s, or with care into permanent garden spot. Take care to disturb roots as little as possible. Garden plants should be watered frequently until established, generally in about two to three weeks, depending on weather, time of the year, &c. For naturalized plantings, use established 32s or 38s, & water until established. Juvenile plants of Midwestern spp are tolerant of a slight frost, especially if grown outside. Most perennial sunflowers can be increased by dividing the rootstocks or rhizomes. Garden plants can be divided as early as the end of their first growing season. It is a good practice to divide garden sunflowers every two to three years, lift & separate. Dead flower stalks should be removed in fall or spring before the new shoots develop. Sunflowers require occasional weeding, & may not do well with competition. Most are rank feeders & will produce larger plants with rich soil, fertilizer, & water. Tall spp such as *H grosseserratus* can be cut back in late spring or early summer for shorter bushier specimens. If more than one genetic individual per sp is in a planting, seed is produced in abundance. If more than one spp is planted, hybrids may be produced. (Heiser 1976)

Sunflowers are an incredibly beautiful addition to the late summer & fall landscape, but are aggressive as all get out. *Helianthus* have absolutely no place in most *de novo* seedings. In Weaver's work, *Helianthus* were some of the most frequently encountered plants in the prairie. Because of the potential aggressive behavior of most spp in some restorations, we recommend not including *Helianthus* at the seeding stage, or in the general seed mix. Sunflowers should be established by spot seeding, spot seeding after the seeding develops, or by planting plugs or bare root material in specific areas. *Helianthus* are probably best used in conjunction with mycorrhizal inoculants.

Many spp have potential use as a breadstuff, oil, & a coffee substitute (Ilpin). One sp is cultivated for its edible seeds, & one for its esculent roots. One taxon exists only in cultivation.

From a letter from Charles C Deam, while preparing a flora of Indiana, to Paul Weatherwax, a botanist at Indiana University, May, 1937, commenting on classifying *Helianthus* specimens: "If I have another attack of *Helianthus*, I am a dead one. I am not sure I shall survive this one. Last night I came across a nondescript. Say man how I hate them. Doubtless sometimes you wish to call someone a mean name. Well, I have found it. Just call him a sunflower. That combines all that is needed. The brutes have no principles, guided by no laws, & seem to [be] free for all."

From Charles B Heiser Jr, 1976, *The Sunflower*, University of Oklahoma Press, Norman, OK, 198 pp.

Various *Helianthus* spp are larval host to *Chlosyne lacinia* BORDERED PATCH BUTTERFLY, *Chlosyne gorgone* GORGONE CHECKERSPOUT BUTTERFLY, *Chlosyne nycteis* SILVERY CHECKERSPOUT BUTTERFLY, & STREAMSIDE CHECKERSPOUT, *Grammia arge* ARGE TIGER MOTH, *Hypercompe scribonia* GREAT LEOPARD MOTH, *Phragmatobia fuliginosa* RUBY TIGER MOTH, & *Pyrrharctia isabella* BANDED WOOLYBEAR MOTH; also a nectar source for *Erynnis baptisiae* WILD INDIGO DUSKYWING, & *Hesperia ottoe* OTTOE SKIPPER.

Helianthus angustifolius Linnaeus *IL, NY, PA NARROW-LEAVED SUNFLOWER, aka SWAMP SUNFLOWER, (*angustifolius -a -um* narrow leaved, from Latin *angustus*, adjective, drawn together; narrow, *-i-*, connective vowel used by botanical Latin, & *folium, foli(i)*, n., noun, a leaf.)

Habitat: distribution/range:

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

Description: Stems short-hairy, plants seldom over 6' tall, leaves long & narrow (linear to linear-lanceolate) margins without teeth or obscurely toothed N 2n = 34. key features: Leaves are opposite at base. Root crowns have abundant buds that give rise to stems." (Ilpin)

Comments: status: Threatened in Illinois & New York. Extirpated in Pennsylvania. phenology: Blooms August to October. C3.

VHFS: [*Helianthus angustifolius* L var *planifolius* Fern]



Helianthus angustifolius

Helianthus annuus Linnaeus ANNUAL, COMMON, GARDEN or WILD SUNFLOWER, aka *Girasol*, (*annuus -a -um* (AN-ew-us or AN-yew-us) annual, one year's, from Latin *annuus*, adjective, that lasts for a year; returns, or recurs every year.)

Habitat: Open areas, roadsides & agricultural fields. Full sun, mesic soils. Coarse to moderately fine soils.

Anaerobic tolerance low. CaCO₃ tolerance medium. Drought tolerance medium. Fertility requirement low.

Salinity tolerance low. Shade intolerant full sunlight. pH 5.5-7.8. distribution/range:

Culture: ①No pretreatment needed. Sow seeds just below the soil surface at 70°F & water. (ew11) Easily established. Growth rate rapid. Seedling vigor low. Vegetative spread rate none. 46,919 (usda), 47,000 (ecs), 56,000 (ew11), 58,240 (wns01), 58,500 (gran) seeds per pound. Pure stand plant 10 lb per acre (gran).

cultivation: Space plants 1.5-2.0'.

Description: Native &/or naturalized, includes weedy, cultivated, & escaped plants (adventive to some, admittedly some strains are) robust, coarse annual, 3-10(-12)', stems rough hairy; leaves usually over 5" long, ovate, cordate at base; phyllaries ovate or ovate-lanceolate, abruptly attenuate; heads much larger than other sunflower spp; flowers yellow daisy-like with dark centers; N 2n = 34. key features: "Pales (chaff of the flower head) without conspicuous apical white hairs; achenes glabrous, 4-8mm broad; leaves rough-hairy, & lower ones usually heart-shaped. Involucral bracts conspicuously long-haired on margin & usually on back." (Ilpin)

Comments: status: Secondary noxious weed in Iowa. State flower of Kansas. This plant is considered invasive by some authorities (Assorted authors. 200_. State Noxious Weed Lists for 46 States.; Stubbendieck et al 1994, SWSS 1998, Whitson et al 1996). phenology: Blooms 7-8(9), late July to August. Collect seeds in se Wisconsin in October - November (he99). Multi-stemmed plants in ag fields, roadsides, disturbed areas. Often forming large colonies. Probably moved into Illinois about 7,000 or 6,000 years ago last Thursday during the Altithermal.

Associates: Seed is good food for many birds, & is sought out by doves. Attracts butterflies. Some authorities feel the seeds are of low value (Everitt et al 1999; Yarrow et al 1999). Endomycorrhizal.

ethnobotany: Important Native American pre- & post-maize crop in Midwest. One of the few North American crop plants domesticated north of Mexico.

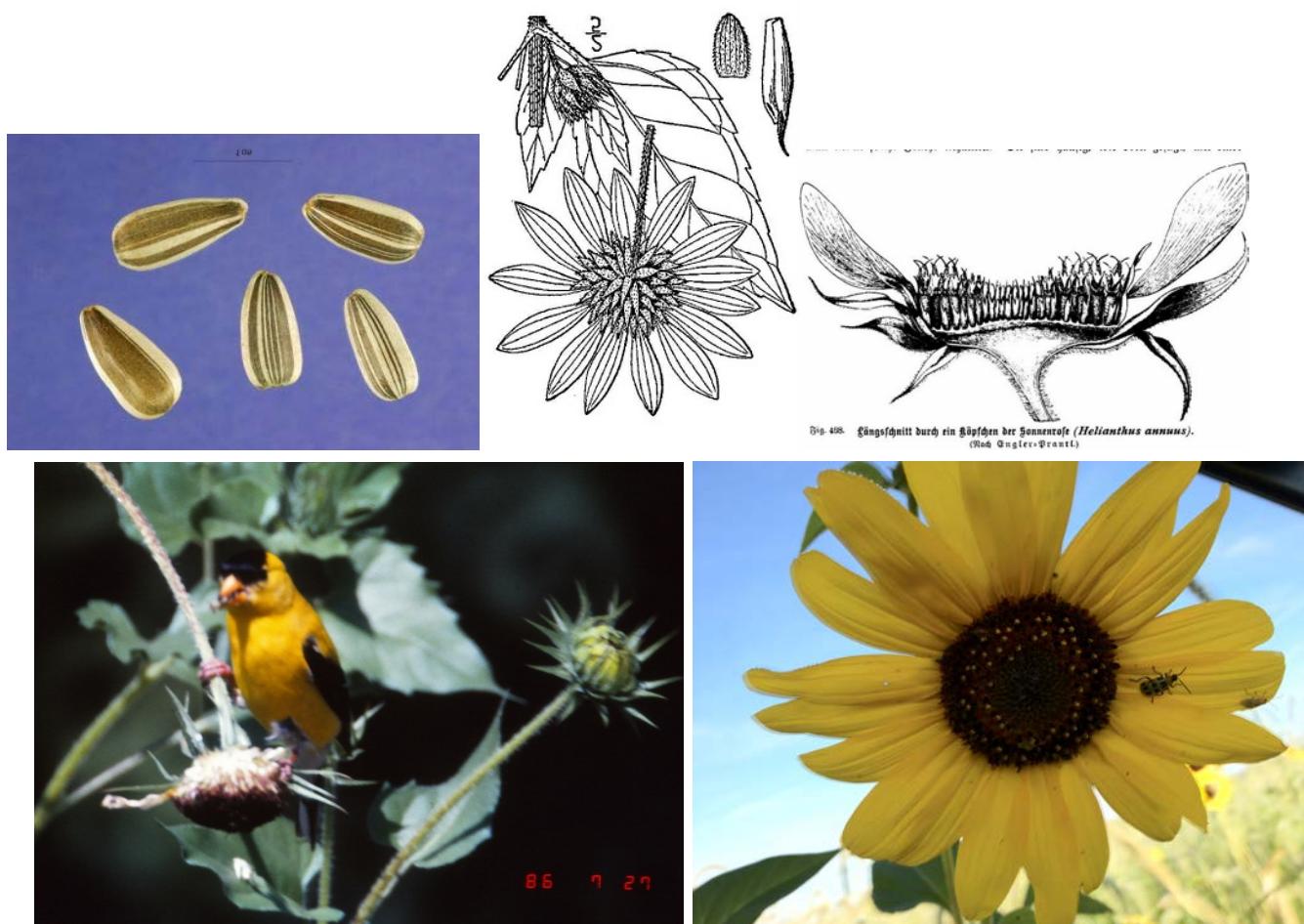
VHFS: [*Helianthus annuus* subsp *jaegeri* (Heiser) Heiser, *H annuus* subsp *lenticularis* (Dougl ex Lindley) Cockerell, *H annuus* var *lenticularis* (Dougl ex Lindley) Steyermark, *H annuus* var *macrocarpus* (de Candolle) Cockerell, *H annuus* subsp *texanus* Heiser, *H aridus* Rydberg, *H jaegeri* Heiser, *H lenticularis* Dougl ex Lindley, *H macrocarpus* DC]

Heiser (1976) lists 3 subspecies:

Subsp *lenticularis* (Dougl) Ckll. The wild sunflower of western North America, smaller & less showy than the other subspecies. Source of the original red sunflower.

Subsp *annuus*. The weedy sunflower of the central & eastern USA. Source of many ornamental varieties, including red sunflowers & the double cultivar SUN GOLD are of this taxon.

Subsp *macrocarpus* (DC) Ckll. The giant-headed, unbranched sunflowers. Numerous cultivars have been named based on height & achene markings, including MAMMOTH RUSSIAN with the gray striped achene.



Helianthus annuus

Goldfinch photo by Jock Ingels

***Helianthus annuus* ‘Seneca’ SENECA SUNFLOWER,**

Habitat:

Culture: ①In Midwest, sow in spring as early as ground can be worked. In arid southwest, sow in fall or spring (pots).

Description: An old, open-pollinated, Native American variety. Heart shaped leaves. Blooms summer through fall. Produces oil type & edible seeds in a single planting. Seed colors & textures are highly variable. Large seed heads, occasionally reverts to small multiple heads, 8-12 feet. Staking helps. Annual

Nursery production, 8,000 to 59,800 seeds per pound. Counting this sp' seed is meaningless! Seed counts must be variety specific!

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Helianthus ciliaris de Candolle BLUEWEED, aka BLUEWEED SUNFLOWER, TEXAS BLUEWEED, *YERBA PARDA*, (*ciliaris -is -e* (kil-ee-AY-ris, kil-ee-AY-ree) ciliate, with marginal hairs, fringed with hairs like an eyelash or eyelid.)

Habitat: distribution/range: In Illinois known only from St. Claire Co.

Culture:

Description: Rhizomatous, or with creeping roots, forming colonies; leaves often bluish green; N 2n = 68,102; key features: “Leaf margins have conspicuous bristly ciliate margins; rays are short, less than 1 cm. long. Lower leaves opposite, upper ones alternate (Herbarium at Survey). Leaf venation may be pinnate or other.” (Ilpin)

Comments: status: Noxious or listed weed in Arizona, Arkansas, California, Oregon, South Carolina, & Washington. phenology: Blooms summer to fall. C3. May form extensive colonies. Broken pieces of rhizome will grow into new plants.

Associates:

VHFS:



Helianthus ciliaris

Seed photo Steve Hurst

Helianthus decapetalus Linnaeus THIN LEAVED SUNFLOWER, aka FOREST SUNFLOWER, *HÉLIANTHE À DIX RAYONS*, PALE SUNFLOWER, TEN PETALED SUNFLOWER, (*decapetalus -a -um* ten petaled, with ten petals, from Greek δέκα, *deka*, adjective, ten, & πετάλον, *petalon*, n, leaf, tablet, Modern Latin petal, & *-us* adjective a Latinizing suffix.)

Habitat: Open woods, woodland borders, & thickets, mesic to wet mesic. Woods & streambanks.

distribution/range: Southeast Canada to Iowa south to Georgia.

Culture: ①No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ②Sow at max 5°C (41°F), germination irregular, often several months (tchn). ③Difficult from seed even after winter outdoor planting method (Heiser 1976)

Description: Erect perennial native forb, (2-)4-5' tall; rhizomatous; stems nearly glabrous or sparingly rough-hairy; leaves opposite along lower stem, upper becoming alternate, thin, ovate to ovate-lanceolate, 3-8" long, 1.5" wide, serrate, roughish above, slightly hairy & pale beneath, tapering to the stalk; phyllaries linear lanceolate to lanceolate; inflorescence branches hairy, one to a few heads on long stalks; phyllaries usually longer than the disk, pointed, leaf-like, slightly spreading; flower heads 1.5-4.0", rays 8-15, pale yellow, disk 0.75", yellow; N 2n = 34, 68. key features: “Leaves opposite below, becoming alternate about halfway up stem; Leaves dark green, gritty about, light green & nearly hairless below. Leaf bases tapering to a winged petiole.” (Ilpin)

Comments: status: phenology: Blooms 8-9-(10). Collect seeds in se Wisconsin in October (he99). Sp normally grows in woods & is the only common ornamental that does well in deep shade garden.

VHFS: [*Helianthus scrophulariifolius* Britt, *H trachelifolius* P Mill.]

Helianthus divaricatus Linnaeus SAVANNA SUNFLOWER FROM HELL, aka DIVERGENT SUNFLOWER, SPREADING SUNFLOWER, WOODLAND SUNFLOWER, (*divaricatus -a -um* widely divergent, widely spreading apart, spread asunder, straggly, divergent.)

Habitat: Sandy, black oak savannas & white oak woodlands. Full sun to partial shade. distribution/range:

Culture: ①30 days cold moist stratification (pm09). ②(Code C Ken Schaal). 76,800 (pm02, aes10), 114,286 (gn), 136,000 (gn) seeds per pound. This spp is marginally available as seeds (packets only) & plants.

cultivation: Well drained soils, partial shade. Tolerates clay soils. Drought tolerant.

bottom line: Initial test datum indicates a strong requirement for dormant seeding. Considering the aggressive rhizomes, even a poor stand from seed will be successful. In favorable environments, a clone may grow to 1600 square feet in a decade. Do not plant near your back door or any desirable plants. Germ 10%. Dorm 72%. Test 21 days.**

Description: Erect perennial, 2-5'; from rhizomes; flowers yellow daisy-like; 2n = 34. "Stems with a whitish bloom, with or without small, stiff hairs; leaves thick, opposite narrowly lanceolate to triangular ovate; short or no petioles." (Ilpin)

"One of the earlier flowering perennial *Helianthus*, *H divaricatus* resembles the tetraploid *H hirsutus* but differs by its usually glabrous & often glaucous stems, sessile or subsessile leaves, & smaller reproductive organs (disc corollas, *paleae*, *cypselae*). Plants from the Ozark region of Arkansas have larger leaves & heads & may represent a polyploid form of *H divaricatus*. Natural hybrids with *H microcephalus* have been named *H glaucus* Small (DM Smith & AT Guard 1958). Hybrids with other spp differ from *H divaricatus* in having short but distinct petioles, hairy stems, leaves with more rounded bases, & primary lateral leaf veins diverging in a subopposite manner distal to bases, rather than being strictly opposite & basal." (Schilling in fna)

Comments: status: phenology: Blooms July to October. Aggressively rhizomatous, do not plant in small areas or near other desirable plants. Attractive cut flowers. Landscaping, good summer color, woodland borders suited for naturalizing; provides low diversity native cover, shaded slope erosion control, & shaded rain gardens. Seed source nursery production.

Associates: Pollinator friendly. Attracts butterflies & hummingbirds. Nectar source. Walnut tolerant.

Helianthus giganteus Linnaeus *IL GIANT SUNFLOWER, aka TALL SUNFLOWER, TUBEROUS SUNFLOWER, SWAMP SUNFLOWER, (*giganteus -a -um* very large, giant, gigantic, unusually high, higher or taller than the type, from Latin *giganteus -a -um*, adjective, of or belonging to giants, gigantic, and *-ēus* a Greek adjectival suffix indicating a state of possession or 'belonging to', or 'noted for'.) FACW

Habitat: Generally prairie fens, but can also be found in moist calcareous prairies & Tamarack bogs. Mesic to wet-mesic prairies. Usually in moist soil. distribution/range: Ontario to Minnesota, south to Georgia & Kentucky. Absent from nw Illinois.

Culture: ①30 days cold moist stratification (pm09). ②No 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. Slow to germinate. (ew11) 168,000 (ew11), 175,008 (jfn04), 264,877 (gnhe14) seeds per pound. Seeds available from several commercial sources in several geographic areas.

cultivation: Space plants 1.5-2.0'. Full sun to partial shade, mesic soils. Clay soil tolerant.

bottom line: Preliminary data indicate a significant to strong need to dormant seed. Germ 14-52%. Dorm 40-62%. Test 25 days.**

Description: Erect, herbaceous, perennial, native forb; from rhizomes, roots tuberous; stems 4-6(8-12)', several, rough hairy, stem hairs spreading; leaves mostly alternate, lanceolate, 3-8" long, generally flat, shallowly toothed, nearly sessile, dark green; heads on numerous long stalks, phyllaries linear-lanceolate, ciliate; flowers disk yellow, rays pale yellow;

Comments: status: Endangered in Illinois. phenology: Blooms 8-9. Collect seeds in se Wisconsin in September - October (he99). Great for naturalizing in a wild patch off by itself, it needs a lot of room.

Associates: Pollinator friendly. Attracts butterflies, including Monarchs, nectar source. Seeds provide food for songbirds, including goldfinches.

VHFS: A hybrid between *H giganteus* & *H grosseserratus* was found at Bluff Springs fen in Cook Co (E Watson 1929). [*Helianthus alienus* EE Wats, *H borealis* EE Wats, *H giganteus* L ssp *alienus* (EE Wats) RW Long, *H giganteus* L var *subtuberous* Britt, *H nuttallii* Torr & Gray var *subtuberous* (Britt) Boivin, *H subtuberous* (Britt) Britt, *H validus* EE Wats]

Helianthus grosseserratus M Martens SUNFLOWER FROM HELL, aka BIG TOOTH SUNFLOWER, *HÉLIANTHE À GROSSES DENTS*, SAWTOOTH SUNFLOWER, THICK-TOOTH SUNFLOWER, (*grosseserratus -a -um* large saw-toothed, from Latin *grossus -a -um*, great or large, thick, coarse, gross, & *serratus -a -um*, toothed like a saw, saw-toothed, serrated. The specific epithet is also spelled *grosse-serratus*.) Facultative Wet (-)

Habitat: Wet meadows, mesic to wet-mesic prairies, & degraded prairies; prefers moist to saturated soils.

distribution/range: "The original range of this sp was apparently centered in OH, IN, IL, IA, & MO, but its exact Uncopyrighted Draught

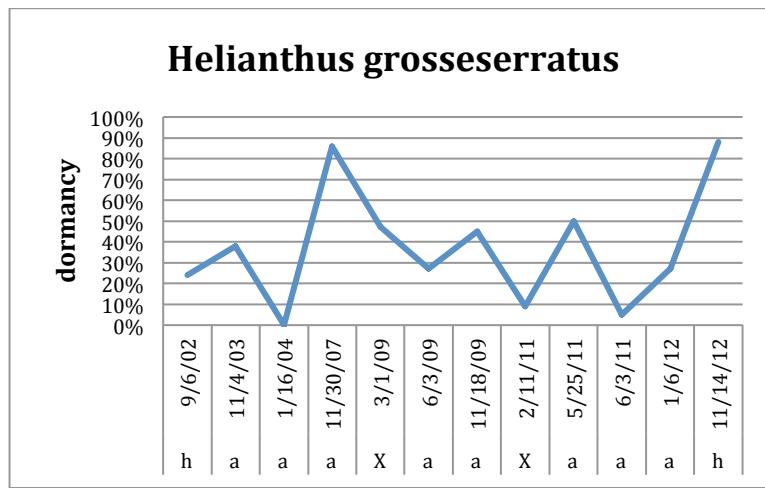
extent is obscured by its subsequent spread.” (w08) Hmmmm, a WEED perhaps?

Culture: ①30 days cold moist stratification (pm009). ②No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ③“30 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 +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). Rapid growth rate. 200,000 (pn02, jfn04), 220,800 (ew11), 229,525 (gnh13), 240,000 (pm01, aes10), 259,651 (gnhm02), 261,295 (gnam11), 313,970 (gna03), 827,586 (gn) seeds per pound. Seeding rate not available (us97). Seeding rate not advisable, or < 1 seed per acre (gni). Regardless of what you plant, in ten years you will be taking its name in vain.

asexual propagation: Easy by division in spring or fall. Stem cuttings in spring root easily.

cultivation: Space plants 2.0-3.0’. Tolerant of seasonal inundations typical of natural areas, ie. wet prairies & sedge meadows. Nutrient load tolerance moderate. Salt tolerance moderate (usda & noted by AES 2010). Siltation tolerance moderate. Full sun. pH data not available.

bottom line: Field establishment from spring seeding is possible most years, but germination is significantly enhanced by dormant seeding. But does this really need enhancement? Considering the aggressive rhizomes, even a poor stand from seed will be successful. Flipflop species. Germ 42.8, 41, 6.0, sd 30.2, r6.0-91 (85%). Dorm 37.2, 32.5, 27, sd 27.2, r0.0-88 (88%). Test 26, 24, 21, r21-32 days. **



greenhouse & garden: Summary: Our greenhouse experience shows it is easily grown with no treatment in some years, but cold moist stratification may be absolutely required by some seed lots (91% dormant seed). Cold moist treatment is advised for greenhouse crops, but not for natural area seeding. Fall seeding works well.

Description: WEED. Showy, kinda nice in the early fall but a WEED. Aggressive perennial herb, 3-10(14)', from rhizomes, roots thickened, tuberous; stems several, leafy, smooth, glabrous, & glaucous; leaves mostly alternate, lanceolate, middle stem leaves alternate; flowers yellow to cream, disk yellow; but a WEED. 2n = 34.

Comments: status: phenology: Blooms July to October. In northern Illinois, collect seeds in October. Collect seeds in se Wisconsin in October - November (he99). Showy in mass, but it is always in mass. When is the last time you saw a few SAWTOOTH SUNFLOWERS? Have you ever seen a few SAWTOOTH SUNFLOWERS? When is the last time you saw a lot of SAWTOOTH SUNFLOWERS? Aggressive, but useful in landscaping, herbaceous borders, wildlife plantings, rain gardens, wetland restoration, soil stabilization in upper shoreline zone & vegetated swales. Good pioneer sp. Weedy, self-sows, rhizomatous. Spreads rapidly with moisture & may become a pest. Genetic seed source Tampico, Whiteside Co.

Short (1845) recognized both *Helianthus grosseserratus* Martens and *H. angustifolia sensu* Short (1845), &c., non L. (1753) as species. “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, ...”

Associates: Provides nectar & pollen for bees, &c. Attracts butterflies. Provides reproductive & foraging habitat for GORGONE CHECKERSPOT BUTTERFLY. Seeds are eaten by insects, birds, & small mammals. Reported as deer resistant.

VHFS: [*Helianthus grosseserratus* M Martens f *plenifolius* Wadmond, *H g* M Martens subsp *maximus* RW Long, *H g* M Martens var *hypoleucus* A Gray, *H instabilis* E Watson]



Helianthus grosseserratus

Helianthus hirsutus Rafinesque ROUGH SUNFLOWER, aka HAIRY SUNFLOWER, OBLONG SUNFLOWER, (*hirsutus -a -um* *hirsutus* (hir-SOO-tus, or her-SOO-tus) *hirsute*, hairy, covered with hair, with straight hairs, having long distinct hairs, rough, stiffly hairy; from Latin *hirsutus -a -um*, rough, shaggy, hairy, bristly, prickly, *hirsute*, or rude, unpolished, & *-utus -a -um*, Latin adjectival suffix indicating possession, from *hirtus -a -um*, hairy or shaggy.)

Habitat: Dry woods & meadows. distribution/range:

Culture:

Description: Native, erect perennial forb; stems 2-6.5' tall, with spreading hairs; leaves; inflorescence with one to a few heads on thick stalks; flowers head 1.75-3.50" wide, 10-15 yellow rays, disks yellow; N 2n = 68. key features:

①“*Helianthus hirsutus* is distinguished from *H strumosus* by hairy stems & usually yellow (as opposed to dark) anther appendages, & from *H divaricatus* by petioles & leaf blades 3-nerved distal to bases” (Schilling in fna).
②Inflorescence with thick stalks, leaves mostly all opposite, bases rounded, short stalks.

Comments: status: phenology: Blooms 7-10. 96,000 (pm02) seeds per pound.

Associates: Attracts butterflies. Reported as deer resistant.

VHFS: [*Helianthus hirsutus* Raf var *stenophyllum* Torr & A Gray, *H hirsutus* Raf var *trachyphyllus* Torr & A Gray, *H stenophyllum* (Torr & A Gray) E Watson]

Helianthus X laetiflorus Persoon (pro sp) [*pauciflorus* × *tuberous*] CHEERFUL SUNFLOWER, aka BEAUTIFUL SUNFLOWER, HÉLIANTHE À BELLES FLEURS, HYBRID PRAIRIE SUNFLOWER, MOUNTAIN SUNFLOWER, PERENNIAL SUNFLOWER, SHOWY SUNFLOWER, (*laetiflorus -a -um* bright- or pleasing-flowered, with bright flowers, from Latin *laetus -a -um*, & *flos, floris*, flower.)

Habitat: Full sun, dry roadsides & disturbed areas. Dry to dry-mesic prairies. distribution/range: Michigan to Minnesota south to Indiana & Missouri. Adventive eastward, an occasional escape in northeastern USA.

Culture: ①30 days cold moist stratification (pm09). ②Fall plant or cold stratify for 2 to 3 months for best results. Sow just below 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). 56,637 (gnha14), 64,000 (pm02, ew11), 73,161 (gnh12), 115,228 (gnam11), 121,781 (gnam09) seeds per pound.

“*Helianthus laetiflorus rigidus* General prairie. Blooms late August to mid September: YELLOW. Harvest October. 3'; all methods work too well; SEEDLING TRANSPLANT; soon forms large colonies by rhizomes; needs tight competition. Very aggressive at first, but when community mature, is no problem. Rhizomatous. Flowers 1st year.” (rs ma)

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

bottom line: Dormant seed is best. Considering the aggressive rhizomes, even a poor stand from seed will be successful. Germ 14.3, 9.0, na, sd 12.4, r2.0-43 (41%). Dorm 62.1, 71, 74, sd 24, r18-88 (70%). Test 25, 25, 21, r20-33 days.**

Description: Native, erect perennial forb; roots rhizomatous, tubers usually lacking; culms 1.5-6(8)', rough or hairy, stems usually leafless near the top; leaves shiny & rough, 2.5 to 8 times as long as wide, mostly all opposite, up to 9-15 pairs below the inflorescence, tapering to a 1-5 cm petiole; flowers 3-6 heads, 2-3.5" wide, 10-21, rays

deep yellow, disk purple but often yellow; inflorescence of one to a few heads on long stalks, seeds seldom formed; N 2n = 102. key features: Disk flowers often yellow, leaves mostly all opposite, with long stalk; very similar to *H pauciflorus* but with longer leaf stalks & often yellow disks.

Similar to *H rigidus* but generally taller, more leafy, & with phyllaries more lanceolate in shape & with tips generally acute. This "sp" resembles hybrids between *H rigidus* & *H tuberosa* & probably originated through such hybridization." (Heiser 1976)

Comments: status: phenology: Blooms 8-10 (8-9). In northern Illinois, collect seeds in October - early November. Attractive cut flowers. One of the most cultivated perennial sunflowers. Very aggressive. "Plants called *Helianthus ×laetiflorus* are usually interpreted to be hybrids & backcrosses of *H tuberosus* & *H pauciflorus*; they are widely cultivated & often escape. An alternative treatment has been to use the name *H laetiflorus* for plants that are treated here as *H pauciflorus*, sometimes with infraspecific taxa." (Schilling in fna)

Seed source nursery production & dry railroad remnant, 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, ..." (Short 1845).

Associates:

VHFS: Mohlenbrock (2014), this hybrid is *H subrhomboideus × tuberosus*. Parents *Helianthus pauciflorus* Nutt subsp *subrhomboideus* (Rydb) O Spring & EE Schill x *H tuberosus* L.

[*Helianthus atrorubens* Lamarck 1789, not Linnaeus 1753, *H laetiflorus* Pers, *H laetiflorus* var *laetiflorus*, *H scaberrimus* Elliott, *H severus* E Watson, *H superbus* E Watson]

Helianthus maximilianii Schrader MAXIMILIAN SUNFLOWER, aka *HÉLIANTHE DE MAXIMILIEN*, NARROW LEAVED SUNFLOWER, NEW MEXICO SUNFLOWER, PRAIRIE SUNFLOWER, (named for Prince Maximillian van Wied-Neu (1782-1867), Prince of Wied, explorer in North & South America, a naturalist making numerous botanical observations, & the leader of an expedition in the Western USA in the 1830s, & discoverer of this sp. The sp epithet is also spelled *maximiliani*.) Upland

Habitat: Degraded prairies, largely adventive in our area, where native common on deep or heavy soils. Dry mesic to wet mesic prairies & savannas. distribution/range: Native to mid-continental prairies, south central Canada to Texas. Cultivated as an ornamental & adventive over much of North America. Introduced in Illinois & Wisconsin from farther west.

Culture: ①No pre-treatment necessary other than cold, dry stratification, or 60 days cold moist stratification (pm09). No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ③No pretreatment needed. ②Sow seeds just below the soil surface at 40°F & water. Slow to germinate. (ew11) ④Sow at max 5°C (41°F), germination irregular, often several months (tchn). ⑤Cold moist stratify 56 days. Germination best at 30°C day & 15°C night. (source?, a high White Horse souse) Sow any time, cut to the ground in winter (pots). Growth rate rapid. Seedling vigor high. Vegetative spread rate moderate. 150,000 (stock), 182,000 (appl, usda TX, NC), 184,000 (ew11), 196,360 (usda), 208,000 (pm02), 216,000 (ecs), 225,000 (gran), 246,848 (wns2001), 250,000 (usda SD) seeds per pound. Where native, use 0.1 to 0.25 pounds per acre in mixes. Pure stand plant 10 lb per acre (gran). USDA recommends 1 pound per acre for solid seedings. If you don't care about genetic origin, this sp is readily available. When regionally local genetic material is available, it may sell out early.

cultivation: Space plants 2.0-3.0'. Full sun to partial shade, mesic soils. Moderate moisture requirement. Tolerant of most soil textures. Anaerobic tolerance none. CaCO₃ tolerance medium. Drought tolerance medium. Fertility requirement medium. Salinity tolerance low. Shade intolerant. Neutral soils. pH 6.0-8.0.

bottom line: Initial datum indicates dormant seeding is not needed. Germ 76%. Dorm 15%.*

greenhouse & garden: Plant from early winter through early spring. Best established with mechanical weed control.

Description: Native to middle USA, very aggressive, erect, rhizomatous perennial; roots tuberous, rhizomes, 16" minimum depth; culms several, 3-5', with some varieties to 7-10-(12)'; stems with fine obvious white hairs especially at the top of the stem, stem hairs appressed; leaves mostly alternate, lower opposite, upper mainly alternate, grayish green, generally conduplicant (more or less trough-shaped), rough on both sides, firm, lanceolate, 3-10" long, base sessile or nearly so tapering to short winged stalk, edges usually not toothed; flowers along the stalk like a hollyhock, inflorescence with several heads in tall, narrow clusters, heads numerous on short stalks; phyllaries pubescent, linear-lanceolate; flowers disk yellow, perfect, fertile, rays florets sterile, deep yellow, 3" (1.75-4"), with 20-40 (10-25) rays; N 2n = 34; key features: "Several stems, disk yellow, inflorescence tall, narrow cluster, leaves upper mainly alternate, rough on both sides, winged stalk" (fh). "Diagnostic features Uncopyrighted Draught

include: 1) elongate, tapering bracts; 2) leaves light or gray-green, sessile, longitudinally folded, smoothed-margined, & covered with soft hairs; 3) stems light green to light red." (Ilpin) This sunflower is similar in overall appearance to *H grosseserratus*, but grey-green hairy stems & numerous, long, folded leaves, with the large, clear yellow flowers give this sp a distinct 45 mph *gestalt*.

Comments: status: May be a weed of economic consequence in some areas. phenology: Blooms September to October. C3. Collect seeds in se Wisconsin in October - November (he99). Very showy & quite interesting as specimen plantings, rhizomatous, very competitive in mixes. Self sows. Tall enough to use as a privacy screen next to that jerk of a neighbor, but allow 3 feet on each side of the bed, & judiciously control your side. Good in erosion control seedings. Allelopathic, inhibits nearby plants. Excellent cut flower, we liberated some stems in full bloom in Iowa City & threw them in the back seat. Two hours later, with a fresh cut & water, they revived very quickly & are pictured below. Seed source commercial sources.

The landscaping in the cloverleaves & intersections of I-80 near Coral Ridge Mall, Coralville, Iowa (I-80, Rt 218, & Rt 6) is dominated with natives, including several *H maximilianii* plantings. The sunflower is very stately with pale green leaves that produce a medium to fine texture. It is used in mass plantings, always at some distance from the road, adjacent to tall grass monocultures (plugged plantings), & in one case, behind & overtopping limestone walls. Monocultures of *Apocynum cannabinum* are counterpoised with the grasses & sunflowers, & are in brilliant yellow-gold fall color when the sunflowers are in full bloom. The *Apocynum* leaves fall, leaving the naked red stems with a brief, poor-man's red-twigs dogwood effect. *Apocynum* are not showy bloomers, but they are important nectar plants & have two seasons of substantial color.

"The northern strains of this sp are small in stature & flower quite early (June-July) when grown in Indiana, whereas the larger plants from the southern part of the range are quite late (Sept - Oct). By far the most ornamental races are those from the Ozarks to Texas." (Heiser 1976)

To quote the USDA Plant Fact Sheet, "The plant's long flowering period & spreading habit, along with its tendency to form thickets or large colonies, make it ideal for wildlife food & cover." Just the thing to put in a prairie seed mix, not.

Associates: Flowers attract butterflies, beetles, & long- & short-tongued bees. Larval host for butterflies & moths. Used in permanent wildlife food plots, providing habitat, cover & food. Palatable to livestock, especially sheep & goats, but of low nutritional value. Upland game birds, songbirds & some waterfowl consume the seeds. Small mammals eat young shoots. Elk, mule deer, white-tailed deer, & pronghorn antelope browse & graze older shoots. Look for that ungulate!

ethnobotany: Though we have never tried to bounce one, the stems contain natural rubber, indicating a potential future crop with no gene splicing necessary. No Frankenplants.

VHFS: Several improved varieties available. Some nurseries offer local ecotypes that are reported to have somewhat decent manners. Nevertheless, it is still a sunflower!



Helianthus maximilianii, distinctive bracts, & IaDOT planting, Coralville, Iowa.

***Helianthus microcephalus* Torr & A Gray *MD, MI SMALL HEADED SUNFLOWER, aka SMALL WOOD SUNFLOWER, SMALL WOODLAND SUNFLOWER, WOOD SUNFLOWER, (small headed, from μικρο-, mikro, small, little, short, -o-, Greek connecting vowel & κεφαλη, *kephale*, head, front, end point, source, top, chief person.)**

Habitat: Woods & thickets. distribution/range: Southern $\frac{1}{3}$ of Illinois.

Culture:

Description: Perennial, rhizomatous, numerous crown buds on fibrous roots. 3-6'. 2n = 34. "*Helianthus microcephalus* is distinguished by its relatively small heads, which have relatively few phyllaries, ray florets, & disc florets, as well as the usually tomentulose abaxial faces of the leaves." (Schilling in fna) "Sp is recognized by its small head, hairless stems, & relatively long petioles. Outer involucral bracts are loose, spreading with long, pointed tips. Sp may reach 3-4.5 in.(??) Leaf venation may be pinnate or other." (Ilpin)

Comments: status: Endangered in Maryland. Probably extirpated in Michigan. phenology: Blooms August to September.

"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, ..." (Short 1845).

Associates: Attracts butterflies. Attracts seed eating birds.

VHFS: Hybridizes with *H divaricatus*.

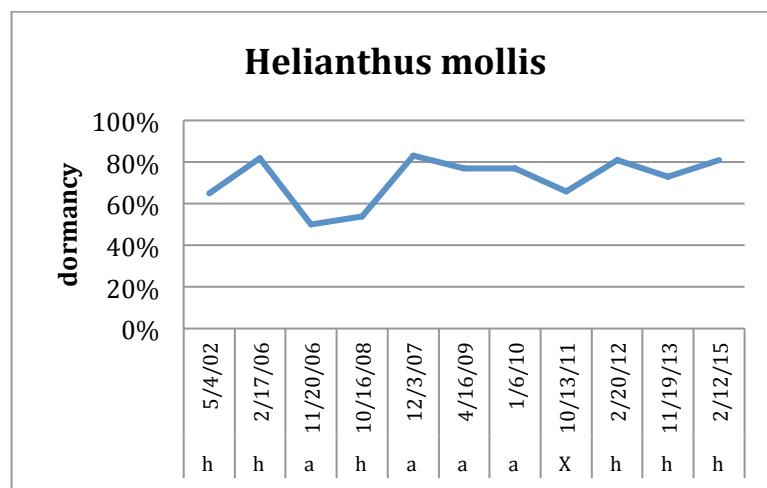
***Helianthus mollis* Lamarck *MI, OH FUZZY SUNFLOWER FROM HELL, aka ASHY SUNFLOWER, DOWNTY SUNFLOWER, SOFT SUNFLOWER, (soft, from Latin *mollis* -is -e, adjective, swaying, swinging; pliant, tender, easily moved; soft, graceful, delicate.) Upland**

Habitat: Mesic & dry prairies & savannas. Roadsides & railroads. Full sun, often sandy soils. distribution/range: Apparently native to the Midwest, but spreading. "*Helianthus mollis* is introduced in Ontario & adventive in the eastern United States (e.g., Maine), where it is continuing to spread, particularly along roads." (fna) Massachusetts to Wisconsin, south to Georgia & Texas. Adventive in Wisconsin.

Culture: ①30 days cold moist stratification (pm09). ②Moist cold treatment Ken Schaal. ③"30 days moist stratification required for germination. Field sow fall" (pnnd) ④No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ⑤Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). 112,000 (pm02), 123,200 (pn02, jfn04), 141,322 (gnhm02), 151,200; 162,578 (gnan06), 242,113 (gna06), 263,341 (gnhm11) seeds per pound. The demand for seed greatly outstrips the supply; often unavailable or in short supply.

"*Helianthus mollis* Dry prairies. Blooms August; YELLOW. Harvest October. 3'; all methods work well; SEEDLING TRANSPLANT, SPRING BROADCAST. Flowers late 1st year. Foliage attractive & flowers large; seeds especially liked by goldfinches. Aggressive at first & highly rhizomatous, but not weedy in long run." (rs ma)

bottom line: For field establishment dormant seed only. Dormant seed may be over 80%. Considering the aggressive rhizomes, even a poor stand from seed will be successful. Germ 12.4, 12, 4.0, sd 7.1, r2.0-26 (24%). Dorm 71.7, 77, 77, sd 11, r50-83 (33%). Test 28, 27, 33, r20-38 days. (#11:2)**



Description: Erect to drooping perennial; from spreading, thick rhizomes, forming dense colonies; culms 4.0-5.0' (2.5-5.0), often multi-stemmed; rather densely hairy; leaves mostly opposite, ovate, strictly sessile or clasping, usually cordate at the base, 3.0-6.0" long, soft-hairy, turning black when dried or damaged; (phyllaries (bracts) short, lanceolate, curly, hairy; flower head few, 2" wide, rays yellow (pale yellow), disk yellow, slightly domed; N 2n = 34. key features: ①"Readily recognized by: 1) broad, clasping leaves, 2) numerous spreading bracts, 3) extreme hairiness." (Ilpin) ②Stems very grey-hairy,

Comments: status: Threatened in Michigan & Ohio. phenology: Blooms (7-)8,9. Collect seeds in se Wisconsin in October - November (he99). One of the more interesting looking sp. Aggressive, spreads rapidly with moisture, auto-toxic? It forms a ground cover of sorts. Crowds out CANADA THISTLES, BOUNCING BET, itself, & desirable plants too! This is too aggressive for small plantings & gardens. A significant portion of the flower stems are often killed by insects, which, combined with its aggressive nature, means leave this sp alone. For many years, a component of IDOT forb seed mixes. It is currently over specified in too many commercial restoration projects by people who don't understand the sp or its seed. Seed source nursery production & dry railroad remnant, Whiteside Co.

Short (1845) recognized both *Helianthus mollis* Lamarck and *H. pubescens* Vahl as species. "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, ..."

Associates: Pollinated by long-tongued bees, short-tongued bees, *Diptera*, *Lepidoptera*. Favorite food of goldfinches. Reported to be deer resistant.

VHFS: [*Helianthus mollis* Lam var *cordatus* S Watson] "Natural hybrids between *H mollis* & *H occidentalis* have been named *H cinereus* Torrey & A Gray (RC Jackson & AT Guard 1957), they differ from *H mollis* by having smaller heads with fewer ray florets & narrower leaves with cuneate bases. Hybrids of *H mollis* with *H giganteus* have been called *H doronicoides* Lamarck (Jackson 1956)." (Schilling in fna)



Helianthus mollis & H cinereus (3rd photo)

Helianthus X multiflorus Linnaeus (pro sp) [*annuus* × *decapetalus*] THIN LEAVED SUNFLOWER, aka MANYFLOWER SUNFLOWER, PERENNIAL SUNFLOWER, (*multiflorus* -a -um many-flowered, with many flowers, from classical Latin *multi-*, much, many & *-florus*, -flowered.)

Roots not thickened; leaves ovate or ovate-lanceolate, middle stem leaves usually opposite; heads usually double, not producing seed. Triploid, $2n = 51$, cf *H decapetalus* $n = 34$, & *H annuus* $2 = 17$. The "doubled" heads are the result of the disk florets being replaced by ray florets.

4-5(6)' tall, 2-4' wide; flowers early summer to early fall; space plants 3.0' centers; full sun, normal or clay soils, well watered soil with good drainage; Zones (4-)5-8; excellent as a screen, at the back of borders, middle of the border, foundation plantings, mass plantings, butterfly gardens, cutting gardens, cottage gardens; can be

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invasive; excellent cut flowers; growth rate medium; attracts butterflies; neutral to slightly alkaline soils, flowers yellow, leaves ovate, hairy, dark green, to 8" long; not a plant for garden neat freaks. Characteristics & tolerances may vary with the cultivar. Propagation methods: vegetative stem cuttings with intermittent mist & bottom heat.

Similar to *H decapetalus*, but stems slightly more hairy (hispid), leaves broader & thicker & often cordate at the base; phyllaries broader; rays not as pale. *H multiflorus* has no well-established common name & is not known in the wild. Plant is completely sterile & probably originated as a spontaneous hybridization between *H annuus* & *H decapetalus*. Many named varieties based on doubling of flowers & height. Single forms are known.

Sp was first described by Tabernaemontanus in 1591, & was later named by Linnaeus. The habitat was variously ascribed to "Virginia", or "dry mountain woods, Pennsylvania to Carolina", but it has not been found in the wild. It is most likely the plant originated by the spontaneous hybridization of *H decapetalus* & *H annuus* in Europe after the two parents had been introduced. Authors have noted the sp tolerance to urban smoke in 18th century Europe, & propagation is 'by parting its roots in autumn'. Several horticultural selections are available.

Sp is sometimes included as a variety of THINLEAF SUNFLOWER, *H decapetalus* var *multiflorus* (Linnaeus) A Gray.

CB Heiser, Jr & DM Smith, The Origin of *Helianthus multiflorus*, American Journal of Botany, Vol. 47, No. 10 (Dec, 1960), pp. 860-865.

Helianthus occidentalis Riddell *MD SHORT SUNFLOWER FROM HECK, aka FEWLEAF SUNFLOWER, NAKED SUNFLOWER, NAKED-STEMMED SUNFLOWER, WESTERN SUNFLOWER, (*occidentalis* -is -e of the west, western, from Latin *occidens*, *occidentis*, noun, the west, towards the setting sun, & -alis, adjective suffix of or pertaining to, as opposed to *orientalis* of China.) Facultative-

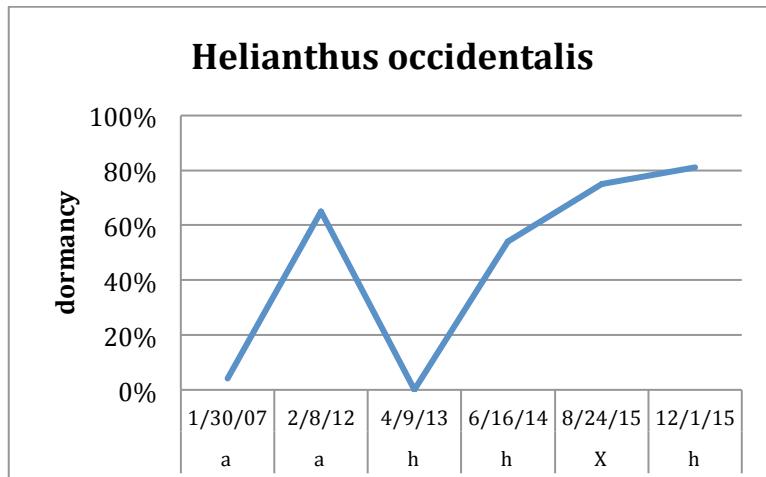
Habitat: Hill prairies & sand prairies, occasionally in mesic prairies. Full sun to partial shade, mesic to dry soils.
distribution/range: Ohio to Minnesota south to the Ozarks.

Culture: ①"No pretreatment needed, or moist cold treatment, or fall sow. Very good germination. Self sows." (mfd93). 30 days cold moist stratification (pm09). No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) Sow at max 5°C (41°F), germination irregular, often several months (tchn). "30 days moist stratification improves germination, but not needed for good greenhouse crop. Field sow fall, spring, early summer" (pnnd). No pretreatment needed. Sow seeds just below the soil surface at 40°F & water. Slow to germinate. (ew11) Successional restoration in mature plantings. 151,200, 208,000 (pn02, jfn04, sh94, aes10), 216,000 (ew11), 224,000 (pm02), 289,080 (gnam11) seeds per pound. In lieu of a seeding rate, we recommend establishing this sp from plugs.

Helianthus occidentalis Dry & sand prairie. Blooms early August to mid September; YELLOW. Harvest October. 3'; all methods work well; SEEDLING TRANSPLANT; too coarse; flowers 1st year, blooming late; rapidly forms large vegetative colonies by rhizomes, levels off later; apparently highly allelopathic." (rs ma)

cultivation: Space plants 2.0-3.0'. Spreads rapidly in rich, mesic soils.

bottom line: Dormant seeding is best. 1/3rds of lots are slight to nondormant, with others strongly dormant. Considering the aggressive rhizomes, even a poor stand from seed will be wildly successful. Flipflop species. Genesis 2001 green house experience indicated the 'no treatment' method is not always successful. Germ 40.2, 28.5, na, sd 30.4, r12-98 (86%). Dorm 46.5, 59.5, na, sd 32.6, r0.0-81 (81%). Test 28, 22, 22, r21-43 days. (#21-43 days. (#6:3)**



Description: Erect, herbaceous, perennial, native forb; from long slender rhizomes; stems 2.0-3.0(-4.0)', with no to few cauline leaves, glabrous or nearly so, relatively few basal leaves & scapiform stems; leaves largest & most leaves basal on very long stalks, oblanceolate to spatulate, 4-12" long, only 3-8 small opposite pairs on the stems much reduced in size, usually entire or nearly so, scabrous or hirsute, rough to the touch; inflorescence of several heads in loosely-branched clusters; petiole barely winged; phyllaries linear-lanceolate; flowers heads few & small, 1.50-2.75" wide with 10-15 yellow rays, disk yellow; N 2n = 34. key features: ①“Sp has long, naked stems (often red), reduced leaves (most near base of plant), involucral bracts narrow, spreading, or tightly pressed; long, slender rhizomes. Leaf venation may be pinnate or other.” (Ilpin) ②Stems with few small leaves, large basal leaves. ③“In its typical form, *Helianthus occidentalis* is distinctive with its relatively few basal leaves & scapiform stems.” (Schilling in fna)

Comments: status: McDOWELL'S SUNFLOWER is threatened in Maryland. phenology: Blooms 7,8,9. In northern Illinois, collect seeds in September - October. Collect seeds in se Wisconsin in October (he99). Attractive cut flowers. Aggressive, but the best-behaved, local, perennial member of the genus, ALTHOUGH IT CAN FORM INSIDIOUS MONOCULTURES. The monocultures become weak in the center & will bloom only at the edges. These monocultures can be considered a dubious groundcover. This sp is known to spread into & persist in a dry, mowed lawn. The heads are too small to be an ornamental, hence little seen in cultivation.

“Disk florets are perfect & fertile; ray florets are sterile. Plants have antibiotic & autotoxic properties, some unique diterpenoid acids, & resist several insect pests of common sunflowers.” (Ilpin) (emphasis added)

Genetic source mesic prairie remnants, Bureau Co, Clarion.

“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, ...” (Short 1845).

In diverse remnants, this & other *Helianthus* do not form large clones & are well behaved. In disturbed areas & plantings, most sunflowers form large, clones of mass destruction.

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

VHFS: Ours is var *occidentalis*, with leaves entire or nearly so, scabrous or hirsute, & rough to the touch. According to the USDA, the following are synonymous with var *occidentalis*. [*Helianthus dowellianus* MA Curtis, *Helianthus occidentalis* Riddell var *dowellianus* (MA Curtis) Torr & Gray. This taxon has multiple pairs of well-developed cauline leaves with the head morphology of *H occidentalis*, & is known from the southern Appalachians. According to CB Heiser et al (1969), this may be a hybrid with *H atrorubens*.]. Ssp *plantagineus* (Torr & Gray) Shinners, with leaves usually serrate, strigose or glabrous, & smooth to the touch, grows in Arkansas, Louisiana, & Texas.

Sp occasionally crosses with *H mollis*, forming *H X cinereus* Torrey & A Gray.



Helianthus occidentalis

Helianthus petiolaris Nuttall PETIOLED SUNFLOWER, aka KANSAS SUNFLOWER, PETIOLED SUNFLOWER, PLAINS SUNFLOWER, PRAIRIE SUNFLOWER, (*petiolaris* -is -e petioled, being stalked, with a leaf stalk, with a long leaf stalk, from scientific Latin *petiolaris* (Linnaeus Philosophia Botanica (1763) 108), from *petiolus* & -āris, -āre, stem -āri, suffix meaning of the kind of, belonging to.) Upland

Habitat: Newly disturbed sandy areas; tolerant of sterile sandy soils. Railroads, roads, & waste ground.

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distribution/range: "Native to the w US; adventive in sandy soil in fields, along roads, and along railroads, occasional throughout Illinois" (m14). Native of the Great Plains to the Rockies. Rogers et al (1982) consider this native to Illinois.

Culture: ① Seeds exhibit physiological dormancy. Cold moist stratification for six weeks improves germination. Germination occurs at 21°C. (bb00) Very difficult to find seed sources.

Description: Erect annual, 0.5'-6.0'; stems rough; leaves alternate, deltoid-ovate to lanceolate, 2-5" long, simple, petioled, rough on both sides, base not cordate, bluish-green (pale green), phyllaries lanceolate or ovate-lanceolate;

flower heads: 1-2", disks reddish purple, center of disk with conspicuous white hairs on chaff; N 2n = 34. key features: "Pales (chaff of flower head) conspicuously white-haired at tip; involucral bracts short haired on margins, the hairs scarcely showing; achenes hairy, 1.2-2.5 mm broad; leaves with appressed hairs but not scabrous; lower leaves usually not heart-shaped. One of the earlier-flowering sp of the genus. Similar to *Helianthus annuus*, but smaller." (Ilpin)

Comments: status: This sp is considered weedy or invasive by some authorities (SWSS 1998). phenology: Blooms 6 -11. Native to & successional in our disturbed sand areas, & present as a sandy soil seed bank sp. Most populations soon fade. A very handsome bedding plant. Extremely long stems make for a great fresh cut flower. Slightly aggressive, self sows in sandy soils, but successional, not competitive in the long run. The manuals say sp may grow to 6.0', but it is 2.0' or less in our area. This sp provided the genes for cytoplasmic male sterility for commercial sunflower oil seed industry.

Associates: Late summer favorite of gold finches.

VHFS: Hybridizes with *H annuus*.



Helianthus petiolaris

Rewrite as H pauciflorus.

Helianthus rigidus (Cassini) Desfontaines [It is popular to call this *Helianthus pauciflorus* Nuttall (*pauciflorus* with few flowers, from classical Latin *pauci-*, combining form of *paucus*, few.)] LITTLE SUNFLOWER FROM HELL, aka FEW-LEAVED SUNFLOWER, PRAIRIE SUNFLOWER, STIFF SUNFLOWER, SUNFLOWER THAT ATE COOK COUNTY, (*rigidus* rigid, stiff, inflexible, for the stiff leaves, from Latin *rigidus -a -um*, adjective stiff, hard, unbending, stern, inflexible, rigid.) Upland

Habitat: Dry prairies & sand prairies, mesic & dry savannas. distribution/range: Michigan to Minnesota south to northern Texas.

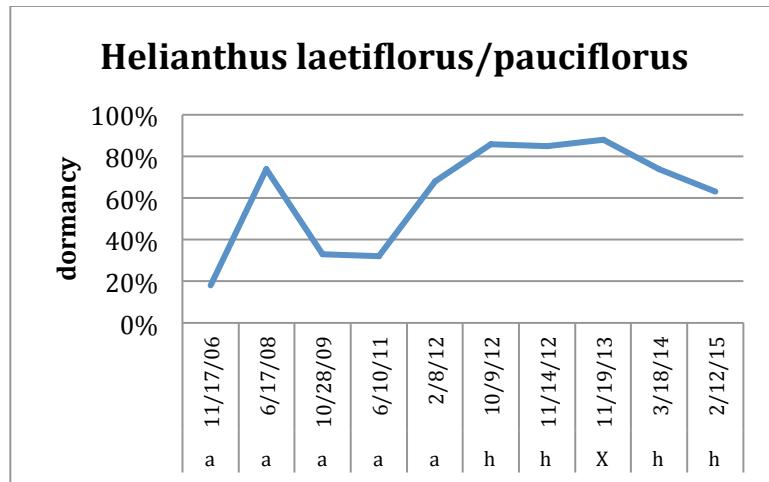
Culture: ① Sow at max 5°C (41°F), germination irregular, often several months (tchn). ② "30 days moist stratification required for germination. Field sow fall." (pnnd) 64,000 (pm02), 73,026 (gnhm12), 73,600 (pn02), 85,000 (usda), 96,822 (gna06), 250,000 (jfn04), 264,000? (wns01), 289,080 (gnam11) seeds per pound.

asexual propagation: Easy by division of rhizomes.

bottom line: Dormant seed is best. Considering the aggressive rhizomes, even a poor stand from seed will be successful. Germ 11.5, 7.5, na, sd 12.2, r2.0-43 (41%). Dorm 60.5, 71, na, sd 26.5, r18-81 (70%). Test 25, 23, 21, r20-33 days.*

greenhouse & garden: Most lots may be highly dormant, moist cold stratification is necessary.

Successional restoration.



Description: A weedy sunflower by any name, erect perennial native forb; from thick rhizome; stems 3.0-6.0', rough, leafy; leaves mostly all opposite, up to 15 pairs, usually lanceolate, (linear-lanceolate to ovate-lanceolate), to 1", tapering to a short stalk, very rough, often folded along the midrib, stiff & thick, light green; petioles slightly winged; phyllaries ovate, obtuse; disks usually reddish-brown to purplish, sometimes yellow; N 2n = 102.

key features: “Leaves long - tapering & pointed at the tip; leaves of stem gradually tapering to a short petiole or nearly stalkless; upper leaves may be alternate. Involucral bracts mostly tapering to an acute tip. Forms dense colonies from creeping underground rootstocks.” (Ilpin) “Very similar to *H X laetiflorus* but with shorter leaf stalks & reddish-purple disks. reddish-purple disk flowers, leaves mostly all opposite, short petiole, very rough, often folded up along the midrib.”

Comments: status: phenology: Blooms 7,8,9,10 (8-9). C3. Attractive cut flowers, & dried seed heads. Weedy, allelopathic. A dubiously well-behaved, dainty little plant of dry prairies, but “the sunflower from Hell” in mesic plantings. Keep this plant in the dry only, in the back 40, next to that neighbor you don’t like. Very showy in years with normal to above rainfall. Spreads rapidly with moisture. ON THE CREST OF A DRY, BROME-INFESTED SAND DUNE, WE HAVE WATCHED A 4' LONG CLUMP GROW TO 55' LONG IN 18 YEARS.

“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, …” (Short 1845).

“This sp grades into the next (*H X laetiflorus*), although in general the disk color is red in *H rigidus*, whereas it is always yellow in *H X laetiflorus*. (ewf 55)

Associates: Seed weevils may impact seed production. Readily grazed by livestock.

VHFS: [*H laetiflorus rigidus*, *H pauciflorus* Nutt, *H scaberrimus*] Oddly, a Wisconsin website says there are no synonyms for this taxon.

Some split *Helianthus pauciflorus* Nutt into ①ssp *pauciflorus*, plants 80–200 cm; leaves usually alternate distally; blades oblong-lanceolate to lance-ovate, 8–27 cm, apices acuminate; [*Helianthus laetiflorus* Pers var *rigidus* (Cass) Fern, *H rigidus* (Cass) Desf] & ②ssp *subrhomboideus* (Rydb) O Spring & E Schilling, plants 50–120 cm, leaves opposite; blades rhombic-ovate to lance-linear, 5–12 cm, apices acute or obtuse. Illinois has both varieties. Mohlenbrock (2014) treats var/subsp *rhomboideus* as *H. subrhomboideus*.

[*H laetiflorus* Pers var *subrhomboideus* (Rydb) Fern, *H pauciflorus* Nutt var *subrhomboideus* (Rydb) Cronq, *H rigidus* (Cass) Desf ssp *laetiflorus* (Rydb) Heiser; *H rigidus* (Cass) Desf ssp *subrhomboideus* (Rydb) Heiser, *H rigidus* Cass) Desf var *subrhomboideus* (Rydb) Cronq, *H subrhomboideus* Rydb].

The vPlants Project. vPlants: A Virtual Herbarium of the Chicago Region. <http://www.vplants.org> lists *H pauciflorus* & *H rigidus* as valid taxa.

H rigidus often hybridizes with *H tuberosus* L. The hybrid is known as *H X laetiflorus*, & is frequently cultivated.

‘Bismarck’ is a USDA pre-varietal release of ssp *pauciflorus*.



Helianthus rigidus, the insidious 55' clump, growing your direction! Don't turn your back. Don't look away. And DON'T BLINK. Good luck.

Helianthus salicifolius A Dietrich WILLOW-LEAVED SUNFLOWER, (*salicifolius -a -um* willow-leaved, with leaves like a willow, from classical Latin name *salix*, *salicis* f, a willow-tree, & *folium*, *fol(i)*, n., noun, a leaf.)

Habitat: Limestone prairies. distribution/range: Formerly known from an adventive colony near Morton Grove, Cook Co, Illinois. Also adventive in Wisconsin. Native to Kansas, Missouri, Nebraska, Oklahoma, & Texas. Chiefly in the Ozark Plateau.

Culture:

Description: Stems smooth, plants usually over 6' in cultivation; leaves long & narrow (linear to linear-lanceolate) margins without teeth or obscurely toothed; N 2n = 34. key features: "This is a showy sp with white stems & drooping leaves. Eventually this sp forms dense beds from creeping rhizomes. Leaf venation may be pinnate or other." (Ilpin)

Comments: status: phenology: Blooms 8-10.

Associates:

VHFS: [*Helianthus filiformis* Small; *H orgyalis* DC]

Helianthus silphioides Nuttall *KY SILPHIUM SUNFLOWER, aka ROSINWEED SUNFLOWER, (*silphioides* resembling a *Silphium*, from Latin *silphium*, from Greek σιλφίον, *silphion*, & -*odes*.)

Habitat: Open sites, borders of woods; upland, dry, open wood, & along roads. distribution/range: Alexander & St. Clair cos in Illinois. Alabama, Arkansas, Illinois, Kentucky, Louisiana, Missouri, Mississippi, Oklahoma, Tennessee.

Culture:

Description: Leaves long & narrow (linear to linear-lanceolate) margins without teeth or obscurely toothed N 2n = 34. key features: "Showy sp is readily recognized by the leaves which tend to fold longitudinally; stem leaves abrupt contract to a slender petiole; upper leaves always alternate. Involucral bracts rounded at tip, corolla lobes of disk florets dark. Leaf venation may be pinnate or other." (Ilpin) "Similar to *Helianthus atrorubens*, *H silphioides* is distinguished by shorter hairs (less than 2 mm) on stems proximally & on abaxial leaf midveins, & by petioles of basal leaves less than 1/2 lengths of blades & winged less than 1/2 their lengths." (Schilling in fna)

Comments: status: Endangered in Kentucky. phenology: Blooms 7-10. Does well as a garden plant.

Associates: Insect pollinated, possibly allergenic pollen.

VHFS: [*Helianthus atrorubens* L var *pubescens* Kuntze; *H kentuckiensis* FT McFarland & WA Anderson]

Helianthus strumosus Linnaeus *VT PALE-LEAVED SUNFLOWER, aka HARSH SUNFLOWER, *HÉLIANTHE SCROFULEUX*, PRAIRIE SUNFLOWER (?), ROUGH SUNFLOWER, ROUGH-LEAVED SUNFLOWER, SWOLLEN SUNFLOWER, WOODLAND SUNFLOWER FROM HELL, (*strumosus -a -um* having cushion-like swellings, from Latin for swelling or tumor.) Upland

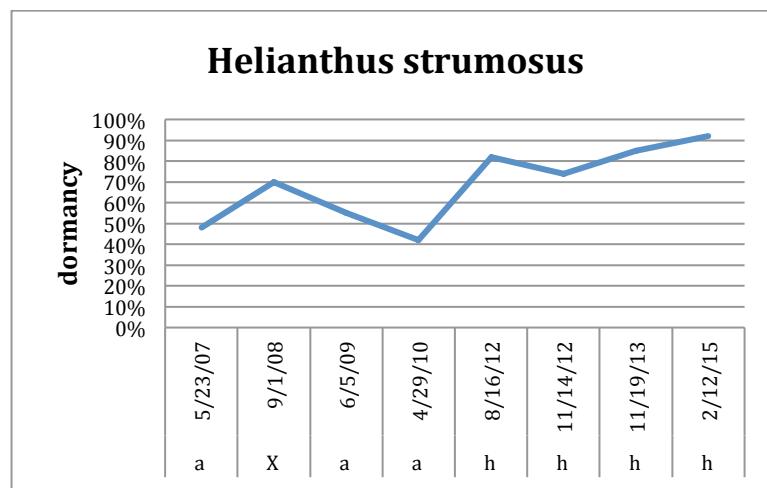
Habitat: Mesic savanna & oak woods. Open woods, wet meadows, roadsides & railroads. distribution/range:

Culture: ①30 days cold moist stratification (pm09). ②Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). ③"30 days moist stratification required for germination. Field sow fall." (pnnd) Successional restoration. 67,200 (pm02), 72,000; 73,600 (aes10), 84,211 (gn00), 87,230 (gnhm12), 94,500 (gnmh12), 105,618 (gnam07), 113,392; 115,200 (jfn04) seeds per pound. Seed is available on an irregular basis & Uncopyrighted Draught

when available may sell out by early to mid-spring. Prebook seed to insure availability. Plants are more cost effective & allow strict placement in restorations.

cultivation: Plant 5-10 plugs per acre in diverse plantings. Extremely aggressive from rhizomes. Clay soil tolerant. Sp is not tolerant of extreme drought.

bottom line: Dormant seed only, dormant seed ranges from 42% to 85%. Considering the aggressive rhizomes, even a poor stand from seed will be successful. Do not plant near your back door. Germ 10.1, 11, 12, sd 3.3, r4.0-14 (10%). Dorm 68.5, 72, na, sd 17.1, r42-92 (50%). Test 25, 26, na, r16-31 days.**



Description: Native, erect perennial forb; roots rhizomatous; stems 2.0-6.0', smooth below the inflorescence but often with a whitish fuzz; leaves lower mostly opposite, upper becoming alternate; usually widely lance-like to narrowly oval, thick, firm, upper side rough to fuzzy, lower side fuzzy, short winged stalk, shallow or no teeth; flowers heads 1.5" - 4" wide, 8-15 yellow rays, disk yellow; unequal bracts (phyllaries) usually the same or slightly longer than the disk, pointed, & slightly spreading; N 2n = 68, 102. key features: ①“Sp is very diverse in appearance. It is called the "wastebasket" sp by some.” (Ilpin) ②“It differs from *H tuberosus* in having glabrous (or glabrate) stems & in lacking tubers” (Schilling in fna). ③Stems smooth below the inflorescence, phyllaries pointed & slightly spreading, leaves wide lanceolate to narrowly oval, upper side rough to fuzzy, shallowly toothed or entire. (fh)

Comments: status: Threatened in Vermont. phenology: Blooms 7,8,9. In northern Illinois, collect seeds in late September - October. Collect seeds in se Wisconsin in October (he99). Very aggressive, allelopathic, will grow to the exclusion of other spp, but it acts as a woodland groundcover, which may indicate potential in shaded erosion control projects. Variable leaf shape & indumentum. Genetic source woodland edges near Walnut, Walnut Twp, New Bedford, Normandy, both in Greeneville, all 3 in Bureau Co.

Associates: Attracts butterflies. Reported as deer resistant.

VHFS: [*Helianthus montanus* E Watson; *H saxicola* Small]





Helianthus strumosus, a colony established from one plug.

Seed photo Tracey Slotta - USDA-NRCS PLANTS Database - Not copyrighted image

Insert H subrhomboideus Rydb.

Helianthus tuberosus Linnaeus FRANKEN-SUNFLOWER, aka EARTH APPLE, JERUSALEM ARTICHOKE, SUNCHOKE, SUNROOT, TOPINAMBOUR, TUBEROUS SUNFLOWER, *A'skibwan*, raw thing (Ojibwa), (*tuberosus -a -um* (tew-be-RO-sus) tuberous, producing or resembling tubers, from the Latin *tuberous*, for the tuberous, or thickened root, related to the root words of *Typha*, Latin *tumere* to swell.) The common name Jerusalem is from folk etymology from Italian *girasole* from *girare* to turn, & *sole* sun, from Latin *sol*.

Habitat: Sloughs, floodplains, & waste ground. Moist alluvial soil. Mesic to wet mesic prairies & savannas, floodplain thickets. May be both native & escaped from cultivation. This sp may occasionally be seen as a weed in cultivated crops, especially in no-till or minimum till situations. distribution/range: Eastern North America.

Widespread as a weedy and formerly cultivated sp, it's original range impossible to know. Cultivated & escaped in Europe.

Culture: ①Send in the clones. 125,008 (jf04) seeds per pound. This sp is virtually nonexistent in the *native* seed & *native* plant trade. There were occasional sources in the past. Moreover, if it were available, it should never be used in a seed mix. If you wish to establish this sp, you may need to locate existing stands & liberate a few tubers, or order some from a vegetable seed company. A handful of tubers per acre is adequate. Local populations may be composed of one genetic individual; as many composites are largely self-incompatible, seeds may have low viability.

Description: Erect native perennial forb; tubers usually present; stems rough or hairy, 5-14'; leaves oblong-ovate to lance-ovate, cuneate to cordate at base, 5-12" long, hairy & dull, serrate, opposite below, frequently alternate above; phyllaries lanceolate; rays deep yellow; N 2n = 102. key features: "Upper & middle leaves alternate, moderately & inconspicuously pubescent below with mostly appressed hairs. Tubers present on many plants." (Ilpin)

Comments: status: This sp is considered weedy or invasive in some areas (Uva et al 1997; Stubbendieck et al 1994, SWSS 1998). phenology: Blooms 8-10 (8-9). Collect seeds in se Wisconsin in October - November (he99). JERUSALEM ARTICHOKE is not recommended for landscaping as it is very aggressive & will take over the garden.

"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, ..." *Helianthus tuberosa* as *H. tomentosa* Michx. (Short 1845).

Associates: Provides some food for large mammals, small mammals, & upland birds (JH Miller, & KV Miller. 1999).

ethnobotany: Edible tuber. Used as food plant by Ojibwa (den28). Tubers are eaten raw cooked, or pickled. The tubers contain the carbohydrate inulin with the fruit sugar levulose, which can be eaten by diabetics.

VHFS: A variable sp that hybridizes with other polyploid sunflowers, including *H pauciflorus*, *H resinosus*, & *H strumosus*. It is sometimes possible to observe a continuum of sunflowers, with *H pauciflorus* on dry slopes, then intermediate plants, grading into typical *H tuberosa* in rich, low ground.

Variety *subcanescens* A Gray, with all leaves opposite except possibly uppermost, densely pubescent below with loose or spreading hairs, is widespread in Illinois. FNA reduces this to synonymy.

[*Helianthus tomentosus* Michx, *H tuberosus* var *subcanescens* Gray]

Several commercial cultivars are known, differentiated primarily by tuber characteristics.



Helianthus tuberosa

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

HELIOPSIS Persoon 1807 **OXEYE, SUNFLOWER-EVERLASTING** *Heliosis* (hay-lee-OP-sis) from Greek ἥλιος, *hēlios*, sun, & from ancient Greek ὄψις, *opsis*, appearance, sight, view, for similarity the radiant flower heads to the sun. Small genus of American herbs resembling a sunflower with fertile ray flowers & a conical receptacle. Achenes 4-sided, pappus 0.

Seeds ripen late summer. Easy from dry stratified seed, Code A (cu00), but some spp or lots will require cold moist stratification (Wade various years). Five to seven node stem cuttings in spring from the top foot are generally successful (cu00).

Heliopsis helianthoides (Linnaeus) Sweet FALSE SUNFLOWER, aka HELIOPSIS SUNFLOWER, ORANGE SUNFLOWER, OXEYE, ROUGH HELIOPSIS, SMOOTH OXEYE, *Gi'ziso 'bugons'* sun, small leaf (Ojibwa), (*helianthoides* (hay-lee-anth-OI-deez) like or resembling *Helianthus*, Sunflower, from Greek ἥλιος, *helios*, the sun, & ἄνθος, *-anthos*, flower, & οειδής, *oeides*, having the form or likeness of, from the flower heads.) Habitat: Upland Mesic, dry, hill, & sand prairies, mesic savanna, open woods. Open woods & prairies (m14). distribution/range: Var *helianthoides* common throughout Illinois. Var *scabra* occasional throughout Illinois. (m14)

Culture: ①“Moist cold treatment, or fall sow, or on pretreatment needed. Light cover. Excellent germination, self sows.” (mfd93). ②30 days cold moist stratification (pm09). ③Seeds germinate after about 60 days of cold, moist stratification, or no pre-treatment needed, sowing outdoors in the spring is the easiest method. (he99) ④“30 days moist stratification improves germination, but not needed for good greenhouse crop. Field sow fall, spring, early summer” (pnnd). ⑤No pretreatment needed. Sow seeds just below 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). 60,000 (stock), 96,000 (ew11), 100,000 (gn00), 100,800 (pm02), 101,646 (gna04), 102,000 (ecs), 102,645 (gnia05),

102,700 (aes10), 102,727 (gna03), 104,000 (pn02, jfn 04, sh94), 105,456 (agrec11), 113,408; 115,860 (gnh02), 121,408 (wns01), 132,130 (gnh07), 164,784 (agrecol03) seeds per pound.

"Heliopsis helianthoides" Moist to mesic prairie. Blooms early July to mid August; ORANGE-YELLOW. Harvest October. 3 1/2'; all methods; SEEDLING TRANSPLANT, SPRING BROADCAST, FALL BROADCAST; flowers late 1st year. Coarse in garden, but no problem in field. Not weedy." (rs ma)

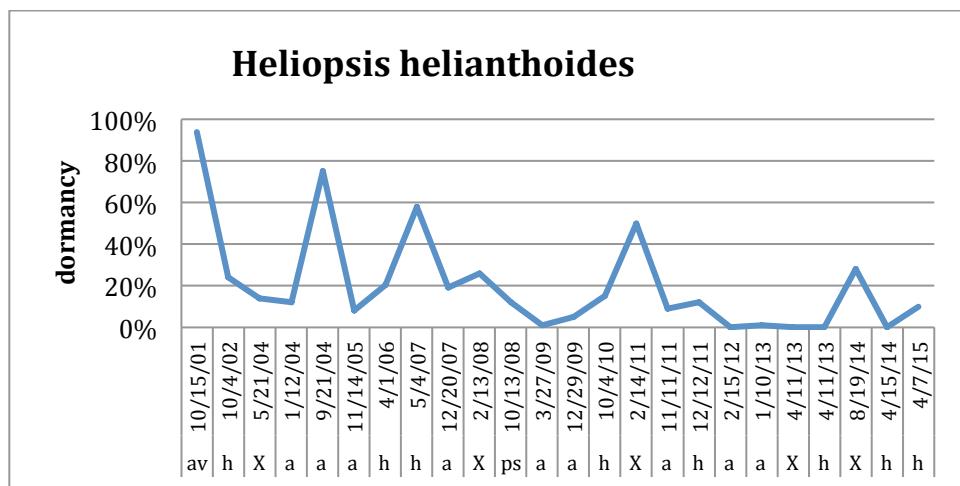
asexual propagation: Easy to grow. Blooms 1st or 2nd year from seed. Planted alone seed 8 oz per 1,000 sq ft (stock).

cultivation: Space plants 1.5-2.0'. Clay soil tolerant. Dry soils.

bottom line: Field establishment is good from spring or dormant seeding, but rare lots may have very high percent dormant seed. Flipflop species. Germ 68.9, 76.5, 92, sd 25.9, r1.0-98.5 (97.5)%. Dorm 20.6, 12.0, , 0.0, sd 24.3, r0.0-94 (94)%. Test 27, 27, 32, r18-39 days. (#26)**

Heliopsis helianthoides, unlike other species, shows diminishing dormancy in recent years, perhaps domestication in progress? Curiouser & curiouser.

greenhouse & garden: Easy from seed, no treatment or moist cold stratify may help some lots, successional restoration works well.



Description: Hardy perennial 2.0-5.0', shorter than most sunflowers, with numerous yellow daisy-like flowers; achenes 4-sided; pappus 0; N. key features: "Heads radiate on conical receptacles; rays yellow; achenes becoming papery. Pappus none (incomplete), or of 2-4 short teeth (complete flower), thus flower structure is not consistent. Concerning leaf venation, it may be pinnate or other." (Ilpin)

Comments: status: This sp is considered invasive in parts of its range (Stubbendieck et al 1994). phenology: Blooms 6,7,8,9. In northern Illinois, collect seeds in September. Collect seeds in se Wisconsin in October (he99). Landscaping, good for roadside seedings & disturbed areas, naturalizing. Aggressive, self-sows, may tend to be somewhat early successional with tall grassy competition. Seed source nursery production genetic source mesic remnants near Walnut, Bureau Co.

Associates: Pollinator friendly. Pollinated by long-tongued bees, short-tongued bees, other *Hymenoptera*, *Diptera*, *Lepidoptera*. Attracts butterflies & hummingbirds, nectar plant. Nectar source? for *Oarisma numotir*, (*O poweshiek*) POWESHIEK SKIPPER. Provides food & cover for upland gamebirds & songbirds. Small birds eat the seeds. Reported as deer resistant.

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

VHFS: Formerly called *H scabra* Dunal or *H laevis* Pers.

Mohlenbrock (2014) recognizes 2 varieties. Expand here

According to usda, this sp can be divided into four varieties, three of which are in Illinois, ①variety *helianthoides* EASTERN SUNFLOWER-EVERLASTING, aka EASTERN OXEYE [*Heliopsis helianthoides* (L) Sweet var *solidaginoides* (L) Fern], ②var *occidentalis* (TR Fisher) Steyermark [*H helianthoides* (L) Sweet ssp *occidentalis* TR Fisher], & ③var *scabra* (Dunal) Fern [*H helianthoides* (L) Sweet ssp *scabra* (Dunal) TR Fisher, *H minor* (Hook) C Mohr, *H scabra* Dunal]. Variety *gracilis* (Nutt) Gandhi & Thomas [*H gracilis* Nutt] SMOOTH OXEYE, aka PINEYWOODS OXEYE, COASTAL PLAIN SUNFLOWER-EVERLASTING, COASTAL PLAIN OXEYE, grows from Louisiana to Georgia & Florida.



Heliopsis helianthoides, including reddish stems, & maturing seed

HETEROTHECA Cassini 1817 CAMPHORWEED, GOLDEN-ASTER *Heterotheca* Heterothe'ca (het-er-o-THEE-ka) from Greek ἔτερος, *heteros*, different, and θήκη, *theka*, envelop, container, ovary, referring to dimorphic cypselae of the ray and disk florets. A genus of about 28 spp of North American herbs, 17 species in northern North America. Some species have a camphor odor. Formerly, our local spp were part of a broadly defined *Chrysopsis*. Mohlenbrock (2014) maintains the Illinois species in *Chrysopsis*. BONAP maps *Chrysopsis* s & e of our area. Genus formerly known as *Ammodia* Nuttall, *Chrysopsis* (Nuttall) Elliott subg *Ammodia* (Nuttall) A Gray, *Heterotheca* sect *Ammodia* (Nuttall) VL Harms. X = 9.

Heterotheca camporum (Greene) Shinners GOLDEN ASTER, aka LEMON-YELLOW FALSE GOLDEN ASTER,

PRAIRIE GOLDEN ASTER, (*camporus -a -um* (kam-PO-rus) New Latin, relating to or smelling like camphor, a tough gum-like crystalline from the wood & bark of the camphor tree & used chiefly as a carminative, & stimulant in medicine from medieval Latin *camphora*, [French *carminatif*, from Latin *carminatus*, past participle of *carminare* to card, from *carrere*, to card, & French *-if*-ive, for expelling gas from the alimentary canal; relieving colic, griping, or flatulence]. Or, seemingly more grammatically appropriate, also simply meaning of plains, of fields or plains, by implication growing in meadows, where the deer & the antelope play! From Latin *campus*, *campi*, m, any open, level land, without reference to cultivation or use, an even flat place; cf Doric Greek *kapos*, *képos*, a garden, orchard, or plantation.) upl

Habitat: Sand prairies & disturbed sands. “Species is distributed in sandy, open ground, fallow fields, along roads and railroads” (Ilpin). “Prairies, sandy plains, limestone bluffs, ledges and glades, sandy banks, slopes of sandhills, dry rocky or sandy barrens, railroad rights-of-way, sandy disturbed areas, and in open oak woods of the central oak-hickory vegetation zone; 100–300 m” (in fna). distribution/range: Var *camporum* grows on bluffs along the Mississippi River, sandy areas near rivers, and roadsides in eastern Missouri, northern Arkansas, Illinois, and western Indiana (Semple in fna).



Culture: ①60 days cold moist stratification (pm09). ②Cold moist stratify (90) Code B (cu00). 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) 481,600 (wns01), 720,000 (ew11), 1,120,000* (pm) seeds per pound.

cultivation: Space plants 1.0-1.25'. Tolerates sterile sands. Full sun, dry soils. Drought resistant.

Description: Native, erect perennial forb; 8-12", flowers yellow. N 2n = 36. key features: “Disk florets are perfect and fertile; ray florets are pistillate, with little or no pappus” (Ilpin).

Comments: status: phenology: Blooms 6,7,8,9. C3. Provides a long season of color. Seed matures mid-summer to fall (3-5 weeks after flowering, but plants may have blooms & seeds at the same time). In northern Illinois, collect seeds July through fall. This sp may be expanding its range eastward with an adventive “weedy” race.

“Of frequent occurrence.” *Heterotheca camporum* (Greene) Shinners (*Chrysopsis camporum* Greene) as *C. mariana sensu* Short, &c., non (L) Ell. (Short 1845).

Associates: One of the known host spp of parasitic *Orobanche fasciculata*. Attracts butterflies.

VHFS: Long known as *Chrysopsis camporum* Greene. The specific epithet seems to be neuter, in opposition to the female gender of the current genus name. The suffix is actually *-orum*, genitive plural, not the neuter *-um*.

Heterotheca camporum (Greene) Shinners var *glandulissima* (as *glandulissimum*) Semple. “Prior to 1925 the species was collected only in the Mississippi River valley of Missouri and Illinois and along the Wabash River in Indiana. By 1949 a “weedy” ecotype of the species had colonized parts of Kentucky, Tennessee and Alabama.

Post-1950 collections indicate that it had spread through much of eastern Tennessee and reached Mississippi, Virginia and North Carolina. Typical plants may have expanded their range slightly in Indiana and southern Missouri since 1925. Populations from throughout the present range were found to be tetraploid, $2n=36$." (Semple 1983). incorporate info from fna [*Chrysopsis camporum* Greene var *glandulissima* (Semple) Cronquist] (gender issues with varietal epithet?)



Heterotheca camporum, with fairy ring developing

Heterotheca subaxillaris (Lamarck) Britton & Rusby is adventive in Illinois by some authors.

Heterotheca villosa (Pursh) Shinners HAIRY GOLDEN ASTER, aka GOLDEN ASTER, HAIRY FALSE GOLDEN ASTER, (*villosus -a -um* Latin for with hairs, villous, soft-hairy, softly hairy, from *villus* - *a* - *um*, shaggy, hairy, rough, from *villus*.)

Habitat: Sand, & dry to dry-mesic prairies. distribution/range: The disparate distributions denote differing species concepts for this taxon.

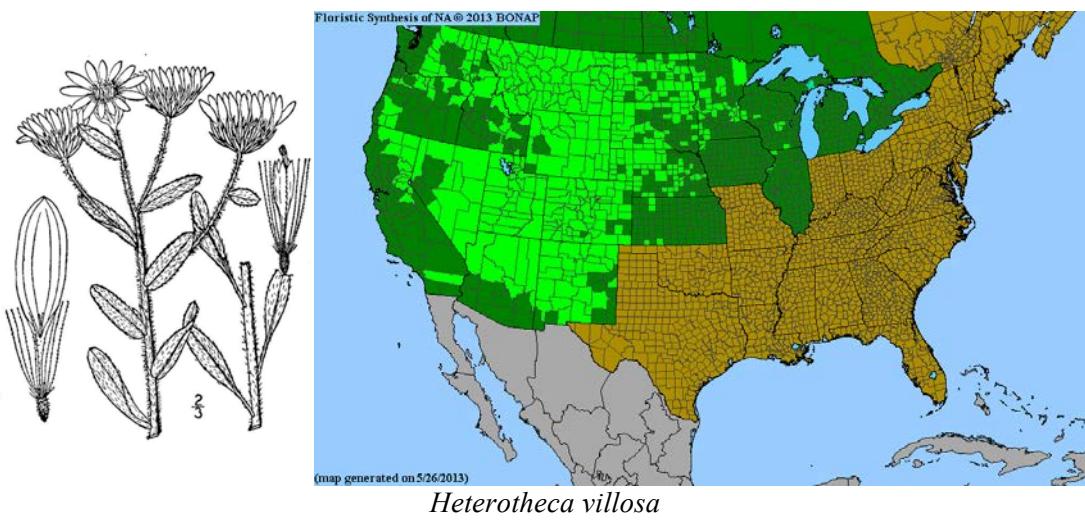
Culture: ①60 days cold moist stratification (pm09). ②Sow at 20°C (68°F), if no germ. in 3-4 wks, move to +2 to +4°C (34-39°F) for 2-4 wks (tchn). ③Sow in spring, germination improved by 30 days cold moist stratification (pots2000). 1,120,000* (pm02) seeds per pound.

Description: Short-lived perennial, 18-24"; flowers yellow; N $2n = 18, 36$.

Comments: status: Threatened in Indiana. phenology: Blooms July - August. Collect seeds in se Wisconsin in August (he99).

VHFS: Long known as *Chrysopsis villosa* (Pursh) Nuttall. A highly variable sp with 9 varieties.





HIERACIUM Linnaeus 1753 **HAWKWEED, KING-DEVIL** *Hieracium* (hee-a-RAH-kee-um) New Latin, from Greek *hierakion* hawkweed, from *hierak-*, *hierax* hawk, from *hienai*, to hurry. No etymology was given in protologue; said to be from Greek *hierax*, hawk (Strother in fna). Alternately, from Greek *iépaξ*, *hierax*, a hawk, referring the plant supposedly strengthening the vision of birds of prey (Wood). Large (250-1000 spp) & nearly cosmopolitan genus of weedy perennial herbs & conservative wildflowers, having simple often-basal leaves & heads of yellow or reddish orange ray flowers. Achenes not rostrate; pappus a single row of copious, tawny, fragile bristles. Sometimes split into *Hieracium* & *Pilosella* (*the latter European spp?*). The many apomictic races make definition of taxa difficult. $X = 9$. “Given the complexity of the reproductive modes among the plants & the likelihood of misidentifications of vouchers, I have not included chromosome numbers for spp. Sexual *Hieracii* are usually diploids ($2n = 18$) & the apomictic *Hieracii* are usually triploids ($2n = 27$).” (Strother in fna).

H pilosella has shown antimicrobial properties, particularly against *Salmonella typhimurium* (Frey & Meyers 2010).

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>

Hieracium canadense Michaux CANADA HAWKWEED, aka NORTHERN HAWKWEED, (*canadensis -is -e* (kan-a-DEN-sis, kan-a-DEN-see) of or from Canada or the north-east USA, of Canadian origin.)

Habitat: Dry mesic to mesic prairies & savannas. distribution/range: Maine, Michigan, & Ohio. *Sensu latu* circumboreal.

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).

Description: Erect perennial, 2-4', yellow dandelion-like flower; leaves toothed or sharp-lobed;

Comments: status: phenology: Blooms 7-9. Collect seeds in se Wisconsin in October - November (he99). 1,440,000 (pm02) seeds per pound.

Associates: ethnobotany: Flowers used as a hunting lure by Ojibwa (sm32).

VHFS: Taxon may currently be seen as *Hieracium umbellatum* L, *H kalmii* L, or as above. *Hieracium umbellatum* broadly defined includes *H canadense* & *H kalmii*. Reznicek et al (2011) & the Freckmann Arboretum maintain *H kalmii* & *H umbellatum*.

Hieracium longipilum Torrey HAIRY HAWKWEED, aka LONG-BEARDED HAWKWEED, LONGHAIR HAWKWEED, LONG-HAIRED HAWKWEED, PRAIRIE HAWKWEED, (*longipilus -a -um* with long hairs.) Upland

Habitat: Dry, dry mesic, & sand prairies, sandy old fields, & dry sand savannas.

Culture: ①Seeds germinate after about 60 days of cold moist stratification (he99). ②Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). 113,400; 1,360,000 (sh94) seeds per pound.

greenhouse & garden: Easy from seed, fall plant / moist cold stratify.

Description: Native, erect, perennial forb; 2.0-4.0', yellow flowers, leaves mostly basal.

Comments: status: phenology: Blooms 7,8. In northern Illinois, collect seeds in late August - September. Collect seeds in se Wisconsin in October (he99).

Hieracium scabrum Michaux HAIRY HAWKWEED, aka ROUGH HAWKWEED, (*scaber, scabra, scabrum* scabrous, scabby, rough or gritty to the touch on account of numerous minute projections, from Latin *scaber*, scabby, rough.) Upland

Habitat: Mesic & dry savannas. distribution/range:

Culture: ①Dormant seed / moist cold stratify (Code C Ken Schaal). 3,200,000 (gn) seeds per pound.

Description: Yellow flowers 3.0-4.0'.

Comments: status: phenology: Blooms 8,9. Landscaping, shade or woodland gardens.

Associates: Pollinated by bees & Diptera.

HYMENOXYS Cassini 1825 **BITTERWEED, RUBBERWEED** *Hymenoxys* from Greek ὑμήν, ὑμένος, *hymēn*, *hymenos*, thin skin, membrane, & ὄξυς, *oxys*, sharp, referring to aristate pappus scales. A genus of about 25 spp of herbs of western North America, Central America, & South America. *Tetraneuris*, which see, was part of a broadly defined *Hymenoxys*. X = 15.

Hymenoxys spp Perennials, sow in spring or fall or anytime (pots).

IONACTIS Greene 1897 **STIFF-LEAVED ASTER, ANKLE-ASTER, LEAST ASTER** *Ionactis* from Greek ιόν, *ion*, violet, & ακτίς, *aktis*, ray, alluding to colored ray florets. A genus of 5 spp of herbaceous perennials or subshrubs of eastern & western North America. *Ionactis* is more closely related to *Heterotheca* than *Aster*. Formerly placed in the broadly defined *Aster*, as *Aster* Linnaeus subg *Ianthe* (Torrey & Gray) Gray. X = 9. The genus is interpreted as grammatically masculine and feminine, *vide infra*.

“Plants of *Ionactis* are distinctive in their woody caudices, narrow, stiff, evenly distributed leaves, heads borne singly or in loose, corymbiform arrays, keeled phyllaries, flattened & slightly dimorphic cypselae, pappi of apically attenuate bristles with a shorter outer series, & base chromosome number of X = 9” (Nesom in fna).

Ionactis linariifolius (L) Greene *IA FLAX-LEAVED ASTER, aka *ASTER À FEUILLES DE LINAIRES*, FLAX-LEAF ANKLE-ASTER, FLAXLEAF ASTER, SAVORY LEAF ASTER, STIFF ASTER, plants.usda.gov has the unusual name FLAXLEAF WHITETOP ASTER & FNA has FLAXLEAF WHITETOP. (*linariifolius* -a -um with leaves of *Linaria*, Toad-flax, from , & *folium*, *fol(i)*, n., noun, a leaf.) upl subgenus *Ianthe*

Habitat: Sand & sandstone prairies. Stable, old inland dunes. In the southeast USA, “dry savannas, sandhills, pine flatwoods, prairie-like openings, glades, & barrens, high elevation rock outcrops & glades, to at least 1450 m, dry roadbanks, woodland edges, rocky woodlands” (w12). distribution/range: “Black oak savannas, sandy prairies, sandy barrens; occasional in the n ½ of Illinois, extending s to St Clair Co” (m14).

Culture: ①No pre-treatment necessary other than cold, dry stratification (pm09). ②No pre-treatment needed. Sowing outdoors in the spring is the easiest method (he99). ③“30 days moist stratification required for greenhouse crop. Field sow fall. (pnnd). ④Sow at 20°C (68°F), germination slow (tchn). 1,134,000, 1,136,000 (aes12) seeds per pound.

asexual propagation: Division of mature clumps.

Description: Erect, herbaceous, perennial, native forb; 0.5-1.5'; woody, fibrous rooted; flowers lavender/violet; N 2n = 18.

Comments: status: Threatened in Iowa. phenology: Blooms 8,9,10. In northern Illinois, collect seeds October. Collect seeds in se Wisconsin in November (he99). Attractive, tiny cut flowers, landscaping, excellent for sunny rock gardens & xeriscaping. Non-competitive, does not like tall, aggressive neighbors, but who does? One of the more attractive “asters”.

“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, *Ionactis linariifolia* (L.) Greene (*Aster linariifolius* L.) as *Aster rigidus* L,” (Short 1845)

Associates: Attracts butterflies.

VHFS: Long known as *Aster linariifolius* Linnaeus. [*Aster rigidus* L, *Ionactis linariifolius* (L) Greene, or *linariifolia* orthographic variant] At one time placed in *Diplopappus*.

IVA Linnaeus **MARSH-ELDER, HIGHWATER SHRUB** *Iva* New Latin, probably from *iva*, specific epithet of *Ajuga iva*, a mint with a similar odor, probably from French *ive* ground pine, from Middle French, from Old French *yve*, from *yf* yew, of Celtic origin; from its similarity in smell; akin to Old High German *īwa* yew. Achene obconic, obtuse; pappus none.

redo as *I annua*

Iva ciliata Willdenow ANNUAL MARSH-ELDER, aka ROUGH MARSH-ELDER, (*ciliatus -a -um* (ki-lee-AH-tus) ciliate, with marginal hairs, fringed with hairs like an eyelash or eyelid.)

“Common on roadsides, railroads, & in fields & waste places.” (ewf55)

“Fields, disturbed places; rare, in the eastern and inland part of area probably introduced (by native Americans) from farther west. September-November. PA, ND, and CO south to FL, NM, & Mexico (the original distribution uncertain). This species was apparently an important crop of native Americans. The so-called var *macrocarpa* (Blake) RC Jackson, known only from archeological remains & presumed extinct, is almost certainly a cultivated form, selected for its large seeds.” (w12)

Move to *Cyclachaena*

Iva xanthifolia Nuttall [new name *Cyclachaena xanthifolia* (Nuttall) Fressenius] BURR-WEED MARSH-ELDER, aka GIANT SUMP-WEED, (*xanthifolius -a -um* yellow, from Greek ξανθός, *xanthos*, yellow, yellow-red, & *folium*, *foli(i)*, n, noun, a leaf.)

Erect annual

“An occasional weed of waste places especially moist ones. Vacant lot in east Rockford & Rock River bank near the ICRR depot in Rockford.” (ewf55)

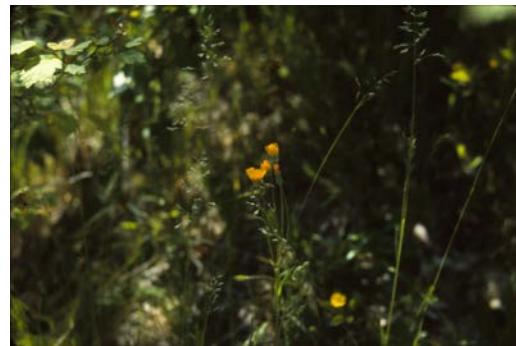
KRIGIA Schreber 1791 **CYNTHIA, DWARF DANDELION** *Krigia* New Latin, from David *Krig* (16??-1713), 18th century American plant collector in Maryland & Delaware & New Latin *-ia*; alternately for Dr. Daniel Krieg, German botanist who traveled in this country. About 7 spp of small branched yellow-flowered North American herbs that are related to the chicories but resemble dandelions & have a pappus of both bristles & chaff & short achenes. Achenes turbinate, striate, 5-angled; pappus double, consisting of 5 broad, membranous scales alternating with as many slender, scabrous bristles (old genus *Krigia*). Achenes short, pappus double, the outer minute, scaly, inner copious, capillary (old genus *Cynthia*)

Krigia biflora (Walter) SF Blake CYNTHIA, aka TWO-FLOWERED CYNTHIA, ORANGE DWARF-DANDELION, (*biflorus -a -um* (bye-FLO-rus) blooming in pairs, or having two flowers.)

Habitat: Rich woods. Mesic to wet mesic savannas & woods. [distribution/range](#):

Culture: ①Code C Wade. ②60 days cold moist stratification (pm09). ③No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). 640,000 (pm02), 2,272,000 (aes10) seeds per pound.

Description: Erect perennial, 8-24(32)”, orange-yellow dandelion-like flowers. One source lists this as an annual. Blooms May, June, & July. In northern Illinois, collect seeds in June. Collect seeds in se Wisconsin in September (?) (he99).





Krigia biflora

Krigia virginica DWARF DANDELION

Habitat: Sterile, open, dry sands & dry sandy savannas. distribution/range:

Culture: ①No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) ②Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn).

Description: Erect annual, 2-16", orange-yellow dandelion-like flowers.

Comments: status: phenology: Blooms Collect seeds in se Wisconsin in September (?) (he99).

KUHNIA FALSE BONESET *Kuhnia* New Latin, from Dr. Adam *Kuhn*, died 1817, of Pennsylvania, an American physician, botanist, & pupil of Linnaeus who carried a living plant to Linnaeus, & New Latin *-ia*. North American perennial herbs with alternate resinous leaves & heads of cream-colored tubular flowers. Achene cylindrical, striate, pubescent; pappus in a single series. Our sp is often placed in *Brickellia* Elliott, which see. Tribe *Eupatoriaceace*. X = 9.

LACTUCA Linnaeus 1753 **WILD LETTUCE, LETTUCE, aka MILKWEED** *Lactuca* (lak-TOO-ka) lettuce, from Latin *lactūca*, a name used by Pliny, ..., *et ideo lactucis nomen a lacte*, Pliny describes lettuces, their seeds & planting, from *lac, lactis*, milk, a reference to its abundant milky juice, milky sap. *Lactis* is contracted from Greek γαλαχτος, *galakhtos*. Related to GARDEN LETTUCE, from Middle English *letuse*, from Old French *laitues*, plural of *laitue*, also related to galaxy, ie the Milky Way. No etymology in the protologue. A genus of about 75 spp mostly north temperate nearly cosmopolitan. Achenes obcompressed (flattened the same way as the more unequal scales), glabrous, abruptly narrowed to a long, filiform beak; pappus copious, soft, capillary, white, fugacious. The yellow ray flowers of some spp may dry blue.

Lactuca biennis (Moench) Fernald TALL BLUE LETTUCE, (*biennis -is -e* (bye-EN-is) biennial, plants which bloom in the second year.)

Habitat: Woodland edges, hedgerows, wooded roadsides. Dry mesic, mesic & wet mesic savannas, open woodlands. distribution/range:

Culture: ①Germination method unknown (he99).

Description: Erect biennial, 6-8', blue-yellow flowers.

Comments: status: phenology: Blooms 7-9. Collect seeds in se Wisconsin in October (he99).

Associates: ethnobotany: Used as medicinal plant by Ojibwa & Pottawatomie (sm32, 33). Used as hunting lure by Ojibwa (sm32).

Lactuca canadensis Linnaeus AMERICAN WILD LETTUCE, aka CANADA LETTUCE, LETTUCE, TALL LETTUCE, TALL WILD LETTUCE, WILD LETTUCE, *Odjici'gomin* (Ojibwa), (*canadensis -is -e* (kan-a-DEN-sis) of or from Canada or the north-east USA, of Canadian origin.)

Habitat: Woodland edges, hedgerows, roadsides. Mesic to wet mesic prairies & savannas, humusy soils.

Culture: ①No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99)

Description: Erect annual/biennial, 1-8', yellow flowers, purple with age.

Comments: status: phenology: Blooms 7-8. Collect seeds in se Wisconsin in September (he99).

Associates: ethnobotany: Used as medicinal plant by Ojibwa & Menominee (den28, sm23). Ojibwa medicine for warts (den28). Juice of plant is said to be mildly narcotic (den28). Seconds on salad, anyone?

Lactuca floridana (Linnaeus) Gaertner BLUE LETTUCE, aka WILD OPIUM, WOODLAND LETTUCE, (*floridanus -a -um* of or from Florida, USA.) fac-

Habitat: Mesic savanna, moist woodlands. distribution/range:

Culture: ①Seeds need light to germinate. 188,992 seeds per pound.

Description: Blue flowers 3.0-5.0'

Comments: status: phenology: Blooms 8,9. In northern Illinois, collect seeds in late September - early November.



Lactuca floridana

Lactuca ludoviciana Nuttall (Riddell) PRAIRIE LETTUCE, aka BLUE-LEAVED WILD LETTUCE, LOUISIANA LETTUCE, (*ludovicianus -a -um* (loo-do-vik-ee-AH-nus, or correctly loo-do-wik-ee-AH-nus) of Louisiana, or St. Louis, the western USA at that time, so named by LaSalle in honor of the French king, a reference to King Louis XIV (*Ludvig* is a Germanic version of Louis, & easily Latinized into *Ludovic*), & by extension, to the Louisiana Territory (or Louisiana Purchase) or a reference to the State of Louisiana, which was also named after King Louis.)

Habitat: Dry mesic to mesic prairies & savannas. distribution/range:

Culture: ①Code C, biennial Ken Schaal. ②No pre-treatment needed. Sowing outdoors in the spring is the easiest method. (he99) 912,000 (gni) seeds per pound.

Description: Erect biennial, 1-4', bluish leaves, flowers yellow.

Comments: status: phenology: Blooms 7-9. Collect seeds in se Wisconsin in September (he99).

LEUCANTHEMUM P Miller 1754 **OXEYE DAISY** *Leucanthemum* Leucan'themum (lew-KAN-the-mum) New Latin *leucanthemum*, white flowered, from Greek λευχός, λευκός, *leukhos*, *leukos*, bright, brilliant, clear, white, pale, & ἄνθεμον, *anthemon*, flower, & -us, Latinizing suffix, in reference to the large, conspicuous, white rays. A genus of about 35 spp of Eurasian herbs. Formerly part of a broadly defined *Chrysanthemum*. x = 9.

Leucanthemum vulgare Lamarck NOX several states ♀ OXEYE DAISY, aka BUTTER DAISY, COMMON DAISY, DAISY, DOG DAISY, FIELD DAISY, DUN DAISY, GOLDENS, HORSE DAISY, MARGUERITE, OXEYE, MAUDLIN DAISY, MOON DAISY, POORLAND FLOWER, WHITE DAISY, WHITE OXEYE, WHITEWEED, (New Latin *leucanthemum*, white flowered, from *leucos*, bright, brilliant, clear, white, pale, & *anthemon*, flower, & -us, Latinizing suffix.)

Habitat: distribution/range:

Culture: ①No special treatment. Growth rate moderate. Seedling vigor medium. Vegetative spread rate none. 200,000 (usda, ecs), 400,000 (gran) seeds per pound. Pure stand plant 6 lb per acre (gran).

cultivation: Low to moderate water requirement. Tolerant of most soil textures. Anaerobic tolerance none. CaCO₃ tolerance low. Drought tolerance medium. Fertility requirement low. Salinity tolerance none. Shade tolerance intermediate. Full sun to partial shade. pH 5.2-7.0, neutral soils, tolerant of acid & base

Description: Introduced, herbaceous, perennial, forb; 8" minimum root depth; 2-4'; flowers white daisy-like, ray petals & yellow disk flowers;

Comments: status: ♀ B list noxious weed in Colorado. Restricted (secondary) noxious weed in Illinois. Category 1 noxious weed in Montana. Prohibited noxious weed in Ohio. Class B noxious weed with noxious weed seed & plant quarantine in Washington. Noxious weed in Wyoming. This spp is considered invasive by the following authorities: Assorted authors 200 . State Noxious Weed Lists for 46 States, CEPPC 1999, Haragan 1991, Uva et al 1997, SEPPC 1996, SWSS 1998, Hoffman & Kearns 1997, Whitson et al 1996). phenology: Blooms May to

August. Relatively aggressive sp useful for groundcover or beautification. This sp is still specified in some Illinois seeding work. Always substitute *Chrysanthemum maximum*.

VHFS: Formerly referred to as *Chrysanthemum leucanthemum* Linnaeus. [*Chrysanthemum leucanthemum* L, *C leucanthemum* L var *boeckeri* Boivin, *C leucanthemum* L var *pinnatifidum* Lecoq & Lamotte, *Leucanthemum leucanthemum* (L) Rydb, *L vulgare* Lam, *L vulgare* Lam var *pinnatifidum* (Lecoq & Lamotte) Moldenke]

Leucanthemum maximum (Ramond) de Candolle ♀ SHASTA DAISY, aka MAX CHRYSANTHEMUM, (*maximus -a -um* (MAHK-si-mus) Latin superlative adj, the largest, very large.)

Habitat: Disturbed sites.

Culture: ① Sow at 20°C (68°F) in light, germinates in less than two wks (tchn). 300,000 (gran), 436,000 (stock, app102) seeds per pound. Alone, plant 2 oz per 1,000 sq ft (stock).

cultivation: Partial shade tolerant. Tolerant of most soil textures. Neutral soils, tolerant of acid & base.

Description: Perennial, 1-3', white flower with yellow disk, similar to OXEYE DAISY, but taller with each flower head up to 4" across. N 2n = 90. 180.

Comments: status: ♀ phenology: Blooms June to July. Excellent cut flower. Ground cover. Will colonize? Seed source commercial stock.

VHFS: Formerly *Chrysanthemum maximum* Ramond.



Leucanthemum maximum

Seed photo Tracy Slotta - USDA-NRCS PLANTS Database - Not copyrighted image

LIATRIS Schreber 1791 (or Gaertn. ex Schreb.) **BLAZING-STAR, GAYFEATHER** *Liatris* (lee-AHT-ris) New Latin, derivation obscure, unknown, lost. Possibly Greek λεια, *leia*, booty, or λειος, *leios*, smooth or bald. Or, perhaps the color of some spp is reminiscent of the color of a *liatico*, a red Tuscan wine, imagine Schreber in his study, considering this purplish New World composite over a glass of red wine. Tribe *Eupatoriaceace*. A genus of about 40-50 (37 north of Mexico) spp of perennial eastern & central North American herbs having aromatic often cormous roots, linear grassy leaves, & spikes of rose-purple or white, or yellow discoid heads of perfect tubular flower. Spicate, racemed, or paniculate heads. Achenes tapering to the slender base, 10-striate, styles much exerted, pappus of many capillary bristles, mostly plumose. "The globose perennating structures of *Liatris* have been described as corms & cormoid rootstocks, the elongate ones as rhizomes & penetrating rootstocks. They are here regarded as corms & rhizomes, rather than roots with adventitious buds. New stems may be produced from various lateral points (nodes) of the corms. Some taxa show various stages of transition between globose structures & elongate structures that function like horizontal rhizomes." (Neesom, fna, vol 21) Genus formerly known as *Lacinaria* or *Seratula*. X = 10.

Provides nectar for Monarch butterflies, *Danaus plexippus*.

All spp moist cold stratification or dormant seeding, careful division of mature plants, cut flowers, dried flowers, landscaping, attracts butterflies, upland gamebirds, songbirds, & small mammals. Seeds are achenes with tufts of hair. Several spp are mass-produced for cut flowers.

The genus is somewhat promiscuous, with several known hybrids. Some native nurseries are growing formerly far-flung, widely separated species in close proximity, & then offering seeds & plants, with potential hybridization & loss of valuable genetics. *Caveat emptor!* Be wary of strange hybrids. Kartesz (2013) maps 13 naturally occurring named hybrids.

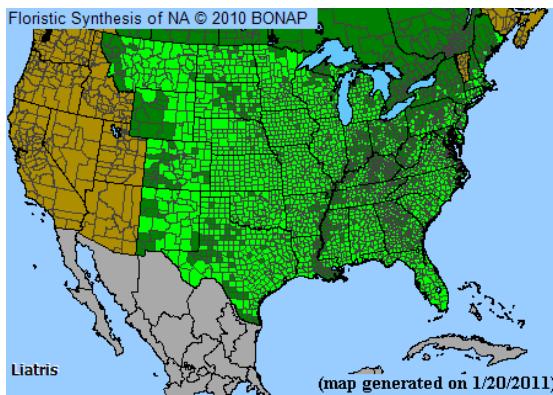
"Moist cold treatment, or fall sow. Light cover. Good germination. Watch over watering. Transplant when small corm is formed." (mfd93). Seed matures in the fall. Young seedlings are sensitive to root disturbance. Code A but treat as B. Two-inch long softwood stem cuttings. Division of mature corms in winter. (cu00) There may be germination inhibitors in the pappus.

Levin & Kerster (1969) experimented with rows of *Liatris aspera* & *L cylindracea* set crosswise to prevailing winds. With 10-20 mph winds, mean dispersal of both seeds was 2.5 meters, maximum 9 meters. *Liatris aspera* is twice as tall as *L cylindracea*, which would seemingly imply greater dispersal distance. The distance was the same because *L cylindracea* has a large plumose pappus & *L aspera* has a small barbellate pappus. A bigger parachute helps.

Most Midwestern *Liatris* form corms, a few form a caudex or horizontal rhizomes. The corms have contractile roots, which literally pull the developing corms into the soil. When *Liatris* are grown from seed, the 1st year corms are formed at the soil surface or to ½" deep. If you have ever salvaged a *Liatris*, you have seen the corms are 4-6" deep in the soil. Contractile roots are thick, fleshy roots that push the soil aside, elongate, anchor, & then contract, pulling the corm a little deeper every year. When a region of stable soil temperatures develops, contractile roots are no longer formed. In the built up soils of commercial restoration sites, contractile roots cannot penetrate the compacted soils, & the exposed corms are usually eaten by critters or perish from exposure.

When harvesting ripening *Liatris* seeds, always clip the stem. Many people strip the seeds from the stem by hand. This disturbs the roots (corms) to the extent the plants may not flower the following year, or the plant may die. Minimize the amount of leaves removed when clipping the seeds.

"Its (the Flora of the prairies) leading feature is rather the unbounded profusion with which a few species occur in certain localities, than the mixed variety of many different species occurring anywhere. Thus from some elevated position in a large prairie, the eye takes in at a glance thousands of acres literally empurpled with the flowering spikes of several species of *Liatris* among which the most prominent are *L. spicata*, *L. squarrosa*, *L. scariosa*, *L. cylindracea*, and *L. pycnostachya*." "Among the œconomical and medicinal plants of the prairies may be mentioned several species of *Liatris*, the tuberous roots of which are possessed of acrid pungent qualities ...; all these plants have a considerable reputation, which perhaps is but little deserved, against the bites of poisonous serpents, and they are known indifferently by the names of 'snake-root,' 'button snake-root,' 'rattle-snake's masterpiece,'" (Short 1845).



Liatris aspera Michaux BUTTON BLAZINGSTAR, aka LACERATE BLAZING-STAR, ROUGH BLAZING STAR, TALL BLAZINGSTAR, TALL GAYFEATHER, (*asper -era -erum, asperi-* (AS-pir, AS-pir-a) rough, sharp to the touch, from Latin *asper, asperi*, adjective, rough, in reference to the surface texture.) upl

Habitat: Dry, dry mesic, & mesic prairies, hill, & sand prairies. Open sand savannas, barrens, old fields, sand dunes, sandstone outcrops, & limestone ridges. Drought resistant, thrives in dry sand prairies. distribution/range:

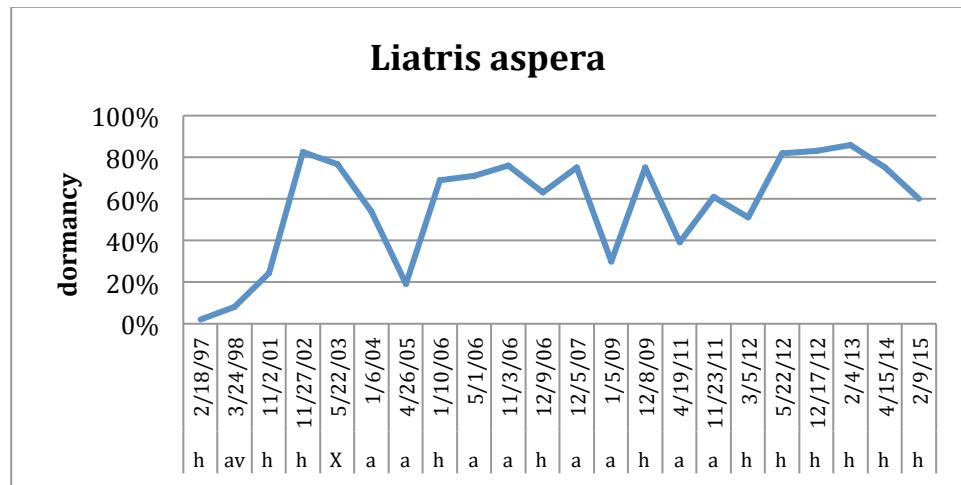
Culture: Some say this & the following are easy from dry stratified seed. Our 1999 crop seed was the first crop year we debearded seed, & germination began 10 days after sowing in an unheated coldframe. Are there germination inhibitors in the pappus? The same results were noted with hulled *Parthenium integrifolium*.

①60 days cold moist stratification (pm09). ②Seeds germinate after about 60 days of cold moist stratification (he99). ③"30 days moist stratification requires for germination. Field sow fall." (pnnd) ④No pretreatment needed. Sow seeds on 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 many empty seeds (tchn). 160,000, 183,657 (gna06), 191,440 (gna03), 203,724 (gna06), 206,270 (gna05), 208,000 (jfn04), 216,000 (pn02, sh94, aes10), 232,000 (ew11), 236,000 (ecs), 252,672 (wns01), 256,000 (pm01), 280,507 (gnh02), 311,813 (gnh06) seeds per pound.

"*Liatris aspera* Mesic to dry & sand prairie. Blooms mid August to late September; PURPLE. Harvest October. 2 1/2'; method #1; SEEDLING TRANSPLANT. Blooms 2nd year. Floppy & gross in garden, needs competition." (rs ma)

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

bottom line: Field sown results are meager with spring seeding, as >70% of lots require dormant seeding. Germ 25.4, 18.5, 36, sd 18.7, r4.0-64 (60%). Dorm 57.4, 66, 75 sd 25.2, r2.0-86 (84%). Test 32, 33, 36, r18-55 days. (#22:6)**



Description: Erect perennial, 2.0-4.0', spikes of pink-purple, thistle-like flowers. Corms globose. $2n = 20$.

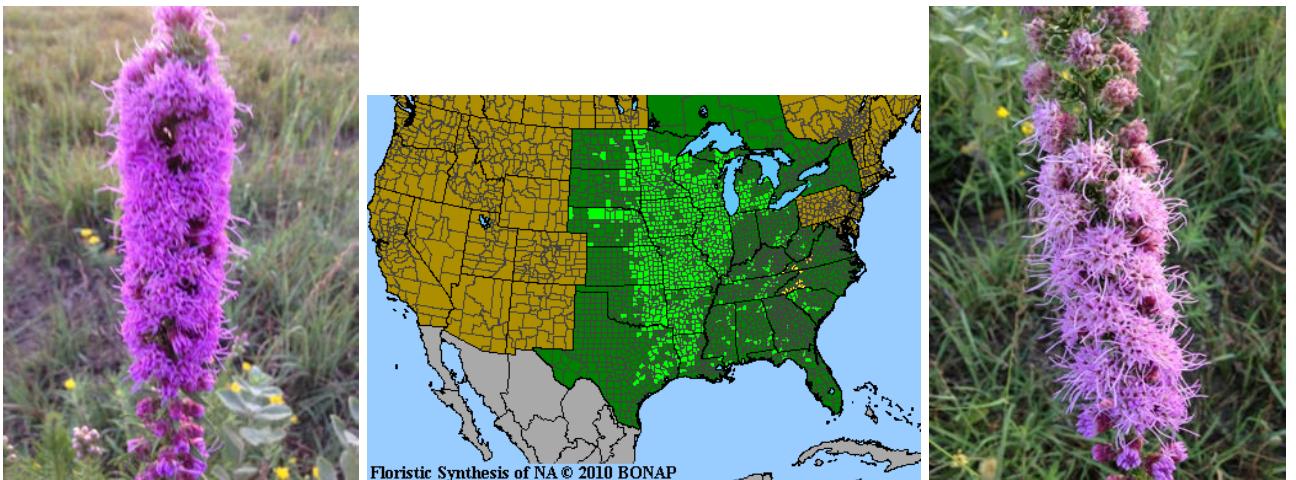
Comments: status: phenology: Blooms 8,9,10. C3. In northern Illinois, collect seeds in mid-September - early November. Collect seeds in se Wisconsin in October - November (he99). Attractive cut & dried flower. Seed source, remnant prairies, Shaw Station, Lee Co., & nursery production.

"Our common sp, being plentiful in sand areas & the prairie hills south & east of Rockford. Very variable as to pubescence, denseness of the spike, length of peduncles, &c. White forms are occasional." (ewf55)

Associates: Attracts butterflies, bees & hummingbirds. Pollinated by bees, butterflies, & flies. Bees include honeybees, bumblebees, little carpenter bees, miner bees, & leaf-cutting bees. Butterflies include monarchs, painted ladies, black swallowtails, & sulfurs. (pm.com11) Reported as deer resistant.

VHFS: Var *aspera* & var *intermedia* (Lunell) Gaiser grow in Illinois. **expand**. Var *salutans* (Lunell) Shinners grows in Texas & Louisiana.





Liatris aspera

Liatris cylindracea Michaux *OH DWARF BLAZING STAR, aka BARRELHEAD BLAZING-STAR, BARRELHEAD GAYFEATHER, CYLINDRIC BLAZING STAR, FEW-HEADED BLAZING STAR, (*cylindraceus -a -um* cylindric, of cylindrical form.) The common name is from the cylindrical- shaped flower heads. upl

Habitat: Dry & dry mesic prairies & savannas. Sandstone & limestone prairies, dry open woods. In the se USA limestone glades (w08). distribution/range:

Culture: ①60 days cold moist stratification (pm11). ②Seeds germinate after about 60 days of cold moist stratification (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 +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination many empty seeds (tchn). 148,800; 168,000 (aes10), 212,800 (jfn04), 219,200 (ew11), 224,000 (pm02), 314,404 (gnhm13) seeds per pound.

availability: Seed quickly sells out.

“*Liatris cylindracea* Dry hill or sand prairie. Blooms late August & early September; PURPLE. Harvest October. 14"; method #1; SEEDLING TRANSPLANT. Blooming 2nd year; first year seedlings have only one linear leaf, are easily lost in hoeing.” (rs ma)

asexual propagation: Skillful division of mature corms before plants resume growth in the spring.

cultivation: Space plants 1.0-1.25'. Full sun to partial shade, dry soil. Drought tolerant. AES (2010) reports some salt tolerance.

bottom line: Dormant seed only. Initial test datum indicates seeds are strongly dormant, 77%. Germ 15%, Dorm 70%. Test 29 days.**

greenhouse & garden: Cold moist stratify or dormant seed.

Description: Erect perennial, 0.5-1.5', attractive spike of individual pink-purple, thistle-like flowers; corms globose, rarely elongate; 0.5-1.5'. 2n = ?. key features: “Heads are few or solitary.” (Ilpin) Phyllaries (bracts) with sharp pointed tips, few heads, leaves ½" wide, dry soils. (fh)

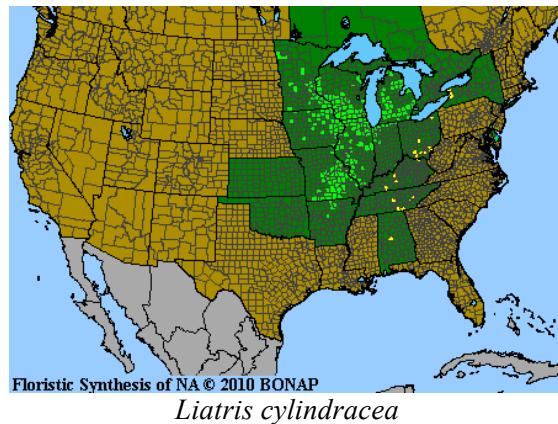
Comments: status: Threatened in Ohio. phenology: Blooms 8,9,10. In northern Illinois, collect seeds in September - October. Collect seeds in se Wisconsin in October - November (he99). Useful in landscaping, rock gardens, xeriscaping, dry pollinator gardens, mass plantings along dry paths; non-competitive, drought resistant. An attractive cut flower, but this action may remove enough photosynthetic leaf area to cause diminished over-wintering carbohydrate reserves & long-term damage to the plant. If you must try cut flowers, always do so from your own planting & bear the consequences. Seed source nursery production originally from Nachusa Twp, Lee Co & Taylor Twp, Ogle Co dolomitic gravel prairies.

“Dry prairies & gravel hills. Not uncommon especially on the gravel prairie hills bordering Rock River.” (ewf55)

Associates: Pollinator friendly. Attracts butterflies & hummingbirds, nectar plant. Pollinated by bees, butterflies, & flies. Reported as deer resistant.

VHFS: “Stems & leaves of *Liatris cylindracea* sometimes are hairy (Kentucky, Missouri), perhaps reflecting genetic influence from *L hirsuta*” (Neesom in fna).

Hybrid.

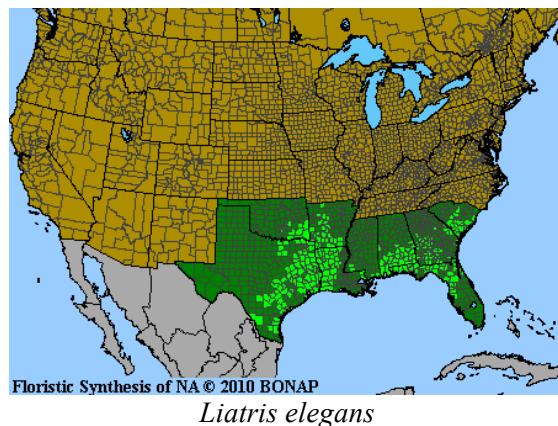


Liatris elegans (Walter) Michaux PINKSCALE GAYFEATHER, aka ELEGANT GAYFEATHER, (*elegans*, *elagantis* (AY-le-gahnz) elegant, graceful, neat, nice, from Latin adjective *elegans*, (gen) *elegantis*, elegant, choice, fine, handsome, neat, tasteful, luxurious, or sometimes in bad sense fastidious, fussy, or too nice.)

Habitat: “Dry, sandy sites, sandy clays, dunes, pine-hardwoods, pine-live oak, longleaf pine, turkey oak” (Neesom in fna). distribution/range: Native Texas & Oklahoma to South Carolina & Florida.

Sp included because it is now in the Midwest seed trade. ①Fall 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) ②Sow at 20°C (68°F), germination slow (tchn). 192,000 (ew11) seeds per pound.

Sp plus 3 local varieties.



Liatris hirsuta Rydb HIRSUTE BLAZINGSTAR,

Liatris lancifolia (Greene) Kittell GREAT PLAINS GAYFEATHER, aka WESTERN MARSH BLAZING STAR, (*lancifolius -a -um* lance-leaved, with lance-like leaves, from , & *folium*, *foli(i)*, n, a leaf.)

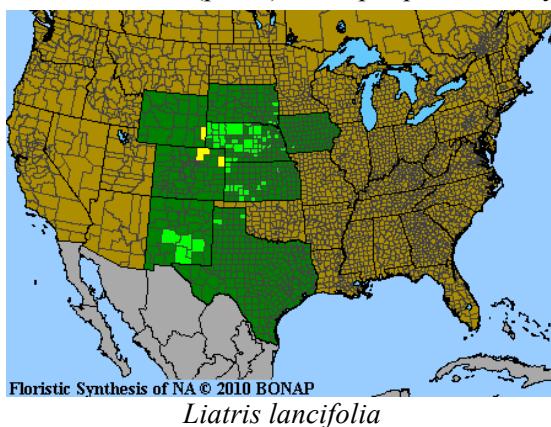
Uncopyrighted Draught

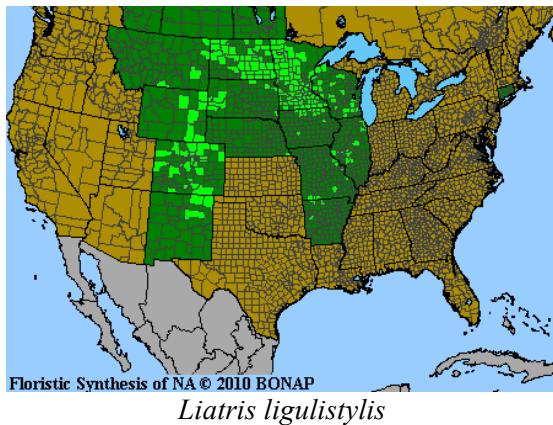
Habitat: “Prairies (often wet or moist), banks of spring-fed streams, sandy & sandy-clay soils, saline sites” (Neesom in fna). distribution/range: South Dakota to Wyoming, south to north Texas & New Mexico, but not recorded from Oklahoma.

Sp included because it is now in the Midwest seed trade.

Description: 2n = 20.

Comments: status: phenology: Blooms 160,000 (pm02) seeds per pound. Very similar to *L. spicata*.





Liatris mucronata, sow at 18-22°C (64-71°F) for 2-4 wks, move to 4°C (40°F) for 12 wks, move to 5-12°C (41-53°F) for germination many empty seeds (tchn).

Liatris punctata Hook *WI DOTTED BLAZING STAR, aka NEBRASKA BLAZING STAR, SNAKEROOT, SPOTTED GAYFEATHER, (*punctatus -a -um* spotted, marked with dots, from Latin *punctatus*, spotted, dotted, from Latin *punctum*, noun, something that is pricked; a puncture; a small spot; a small portion, *-atus*, adjectival suffix for nouns: possessive of or likeness of something, or with, shaped, made.) upl

Habitat: Full sun to partial shade, dry & dry mesic soils. Dry prairies northwest, west & southwest of our area.

distribution/range: Adventive in ne Illinois. “Native to the w US; adventive along a railroad: DuPage Co. Not seen in Il since 1925.” (m14)

Culture: ①60 days cold moist stratification (pm11). 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 many empty seeds (tchn). ④“30 days moist stratification required for germination. Field sow fall,” (pnnd) ⑤Sow in fall or cold moist stratify 30-90 days & spring. Difficult to transplant (pots). 112,000 (pm02, ew11, aes10), 133,056 (wns01) seeds per pound.

cultivation: Space plants 1.0-1.25’.

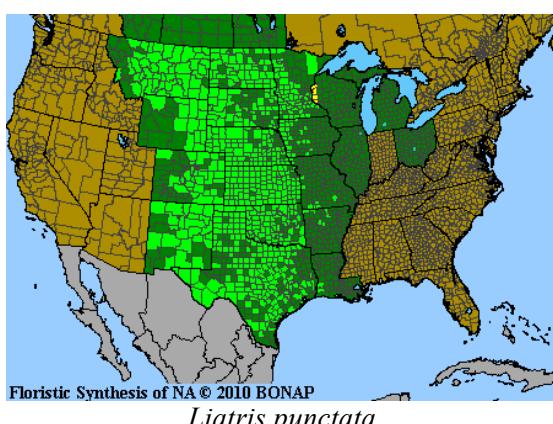
Description: Erect, tap-rooted perennial, 1.0-2.0(3.0)', flowers in rose-purple spikes, small-fringed, thistle-like.

Corms elongate or becoming rhizomes. 2n = 20, 40, 60. key features: ①“Sp may have an elongate, thickened caudex, even a stout horizontal rhizome.” (Ilpin) ②Phyllaries (bracts) dotted, with a sharp tip, leaves with dots. (fh)

Comments: status: Endangered in Wisconsin. phenology: Blooms 7,8,9. Attractive cut or dried flowers. Drought resistant, taproot to 15'. Ultimately forming large, many stemmed clumps.

Associates: Attracts butterflies. Nectar source *Hesperia leonardus*, Leonard's Skipper.

VHFS: note variety.



Liatris pycnostachya Michaux *IN PRAIRIE BLAZING STAR, aka BLAZING STAR, BUTTON SNAKE ROOT, CATTAIL GAYFEATHER, GAYFEATHER, KANSAS GAYFEATHER, THICKSPIKE BLAZINGSTAR, THICKSPIKE GAYFEATHER (*pycnostachyus -a -um* (pik-no-STAK-ee-us) with densely or thickly clustered flower spikes, from Greek πυκνός, *pyknos*, dense, -ο- connective vowel in botanical Latin, Greek σταχύς, *stachys*, spike, ear of wheat or Uncopyrighted Draught

grain, & *-us*, adjectival Latinizing suffix.) fac-

Habitat: Wet meadows, mesic & wet mesic prairies, moist prairies, fields, & meadows. distribution/range:

Culture: ①60 days cold moist stratification (pm09). ②“30 days moist stratification required for germination.

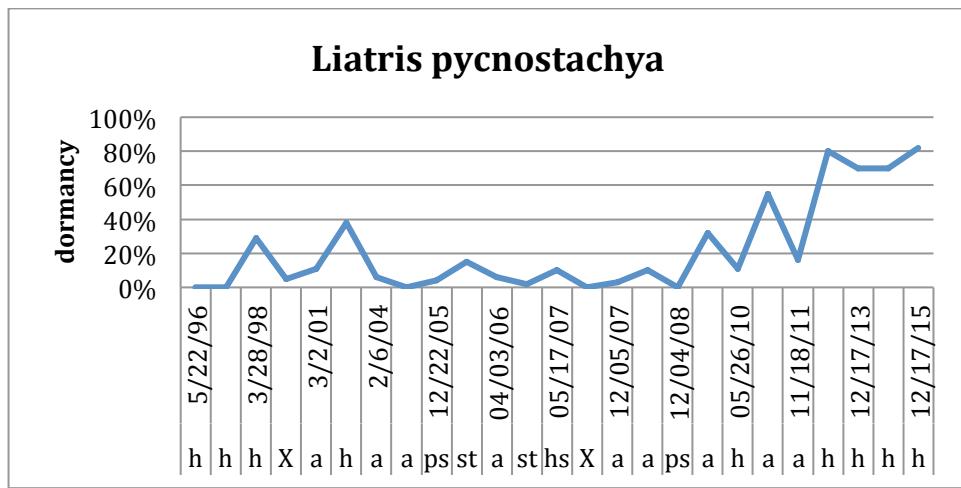
Field sow fall,” (pnnd). ③Fall plant or cold stratify for up to 2 to 3 months for best results. Sow just below the soil surface at 70°F & water. (ew11) ④Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination many empty seeds (tchn). 126,336 (wns01), 128,000 (gran), 135,725 (gna06), 136,000 (stocks), 143,535 (gna06), 143,762 (gnh07), 154,529 (gnh02), 172,000 (jfn04), 174,400 (ew11), 176,000 (pm02, aes10), 181,782 (gna04), 192,000 (pn02, sh94) seeds per pound. In single sp plots, plant 4.8 oz per 1,000 ft sq (stocks) Pure stand plant 12 lb per acre (gran).

“*Liatris pycnostachya* Mesic prairie. Blooms late July, early August; PURPLE. Harvest October. 3'; method #1; SEEDLING TRANSPLANT. Blooming 2nd year; needs staking in the garden because of excessive growth.” (rs ma)

cultivation: Space plants 1.5-2.0'. Low to moderate moisture requirements, full sun to partial shade.

Prefers rich, moist, but well drained sites. Best in moderately coarse to medium textured soils. Said to tolerate clay soils. Neutral to basic soils. Greenhouse grown plugs may flower first year.

bottom line: Most bearded lots can be planted spring or dormant. 1 in 4 lots may significantly benefit from dormant seeding. Since 2011, 6 lots average 62.2% dormant. Times, they are a'changing. Flipflop species. Crossover species. Germ 50.3, 54.5, 75, sd 20.8, r12-81 (69%). Dorm 22.2, 10, 0.0, sd 26.8, r0.0-82 (82%). Test 31, 28, 24, r24-46 days. (#25:4).**



greenhouse & garden: Summary: easy from moist stratified seed.

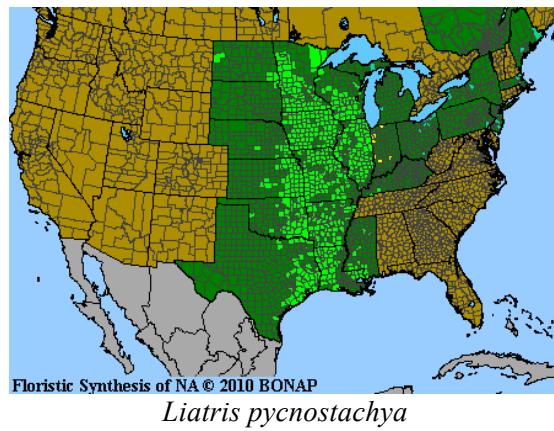
Description: The tallest of our blazing stars, erect native perennial, 2.0-4.0(5.0)', flowers rose-purple, thistle-like, in crowded cylindric, spike-shaped head. Globose corms, sometimes becoming elongate rhizomes. N 2n = 20, 40.

Comments: status: Threatened in Indiana. phenology: Blooms 7,8,9. In northern Illinois, collect seeds in September - October, on Tuesdays & Saturdays. Collect seeds in se Wisconsin in October (he99). Short lived, said by some to be drought resistant. We noted in the dry years of 1988 & 1989, this sp was not evident above ground in some local remnants, but it returned in the following, moister years. Excellent cut flowers & dried flowers.

Landscaping, used in formal gardens, & clean, rich soil rain gardens. Seed source nursery production, genetic source Green River Ordinance Plant, Lee Co.

“Found in low places in the sand areas & in low prairie situations in the Searle tracts, on the C & NW Ry east of Winnebago, &c. Also in the contiguous cos. Used somewhat as a garden plant. (*L. bebbiana* Rydb)” (ewf55)

Associates: Pollinated by long-tongued bees, short-tongued bees, *Diptera*, *Lepidoptera*. Attracts butterflies, bees, birds, & hummingbirds.



Liatris scabra (Greene) K Schumann

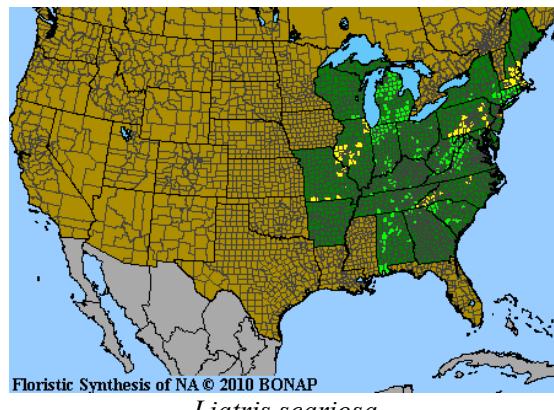
Liatris scariosa (Linnaeus) Willdenow NORTHERN BLAZING STAR, aka DEVIL'S BITE, EASTERN BLAZING STAR, NORTHERN GAYFEATHER, PLAINS BLAZING STAR, (*scariosus -a -um* scarios, thin & not green, dry & membranous, shriveled (?), new Latin *scariosus*, dry & membranous in texture.)

Habitat: Dry, dry mesic, & mesic prairies & savannas. [distribution/range](#):

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) ③Sow at 20°C (68°F), germination slow (tchn). 172,800 (pm11, ew11) seeds per pound.

cultivation: Space plants 1.25-1.5'.

Associates: Attracts adult Monarchs.



Liatris scariosa (Linnaeus) Willdenow var **nieuwlandii** (Lunell) EG Voss *IL, ME NIEUWLAND'S BLAZING STAR, aka SAVANNA or MEADOW BLAZING STAR, *O'mucko'zowa'no*, Elk tail (Ojibwa), (*scariosus -a -um* scarios, thin & not green, dry & membranaceous, shriveled(?), new Latin *scariosus*, dry & membranous in texture).

Date ca 1806; *nieuwlandii*) [upl]

Habitat: Bur oak white oak savanna. Mesic & wet mesic prairies, rich organic soils. distribution/range:

Culture: ①Code C, D Ken Schaal. ②60 days cold moist stratification (pm09). ③Seeds germinate after about 60 days of cold moist stratification (he99). ④Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination many empty seeds (tchn). ⑤“30 days moist stratification required for germination. Field sow fall.” (pnnd) 160,000 (pm01), 208,000 (pn02&jfn04), 280,000 (gni) seeds per pound.

Description: Erect perennial, 2.5-4.0', spikes of rose-purple, thistle-like flowers.

Comments: Threatened in Illinois & Maine. phenology: Blooms August to September. C3. Collect seeds in se Wisconsin in October (he99).

Associates: Attracts butterflies.

ethnobotany: Used as medicinal plant by Ojibwa for diseases of horses & noted for dysentery (den28).

VHFS: Var *novae-angliae* Lunell, NORTHERN BLAZINGSTAR, is special concern in Connecticut & Massachusetts, endangered in New Hampshire, & New Jersey, & Rhode Island, & threatened in New York.

[*L ligulistylis*, *Lacinaria scariosa* (Linnaeus) Kuntze.] [*Lacinaria scariosa* (L) Hill var *nieuwlandii* Lunell; *Liatris ×nieuwlandii* (Lunell) Gaiser; *L novae-angliae* (Lunell) Shinners var *nieuwlandii* (Lunell) Shinners]

Liatris spicata (Linnaeus) Willdenow WI* DENSE BLAZING STAR, aka BLAZING STAR, BUTTON SNAKEROOT, BUTTON SNAKEWORT, DENSE GAY FEATHER, FLORIST'S GAYFEATHER, MARSH BLAZING STAR, MARSH GAYFEATHER, SESSILE-HEADED BLAZING STAR, SPIKED GAYFEATHER, (*spicatus -a -um* (spee-KAH-tus) with flowers in a spike, spicate, bearing a spike, from Latin *spicatus*, past participle, *spico*, I grow ears, spikes, like wheat or corn (corn in an Old World sense).)

Habitat: Wet meadows; wet, wet mesic & mesic prairies & savannas. Low lying moist areas, prairies, & meadows. distribution/range: Does not occur naturally west of the Mississippi River, except 10 cos in Missouri, Arkansas, & Louisiana.

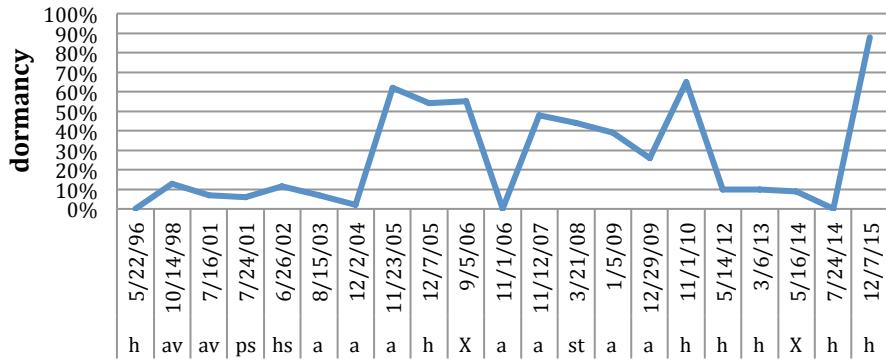
Culture: ①60 days cold moist stratification (pm11). ②Seeds germinate after about 60 days of cold moist stratification (he99). ③Sow at 20°C (68°F), germination slow (tchn). ④“30 days moist stratification required for germination. Field sow fall” (pnnd). ⑤Fall plant, or cold moist stratify 1-2 months & sow in spring (pots). Growth rate slow. Seedling vigor low. Vegetative spread rate slow. 100,000 (usda, ecs), 135,000 (appl), 135,059 (gnia04), 136,000 (stock), 137,071 (gnh05), 138,000 (gran), 139,264 (gna05), 176,000 (pm02, aes10), 182,256 (gnih02), 192,000 (pn02, jfn04) seeds per pound. In single sp plot, plant 4.8 oz per 1,000 ft sq (stocks). Pure stand plant 12 lb per acre (gran).

“*Liatris spicata* Moist to mesic prairie. Blooms early August to early September; PURPLE. Harvest October. 5'; method #1; SEEDLING TRANSPLANT, SPRING BROADCAST. Blooming 2nd year; needs competition, too coarse & floppy for garden. The most aggressive of the genus.” (rs ma)

cultivation: Space plants 1.5-2.0'. Full sun to partial shade, wet to mesic soils. Short lived plants. calcareous soils, somewhat flood tolerant, & drought tolerant. Moderate moisture requirements. Moderately coarse to moderately fine soils. Neutral soils, some acid & base tolerant. Anaerobic tolerance medium. CaCO₃ tolerance low. Drought tolerance low. Fertility requirement low. Salinity tolerance low. Full sun, shade tolerance intermediate. pH 5.6-7.5.

bottom line: Field sown results are possible with spring seeding, but 40% of lots have significant to strong benefits from dormant seeding. Flipfloshish species. Germ 51.8, 46, 46, sd 23.9, r4.0-94 (87)% . Dorm 26.5, 11.5, 0.0, sd 26, r0.0-88 (88)%. Test 30, 27, 25, r15-52 days. (#21:3)**

Liatris spicata



greenhouse & garden: Perhaps this sp has been cultivated long enough that seed dormancy has been bred out of some cultivars, or possibly germination inhibitors are present in the pappus, which is normally removed in commercial seed.

Description: Erect, herbaceous, perennial, native forb; 14' minimum root depth; stems 12-60(-72)"; stiff, crowded cylindric, spike-shaped head 2-3'; flowers rose-purple, in ?, not as tall as *L pycnostachya*, with a more slender inflorescence. (Gra.) 2n = 20.

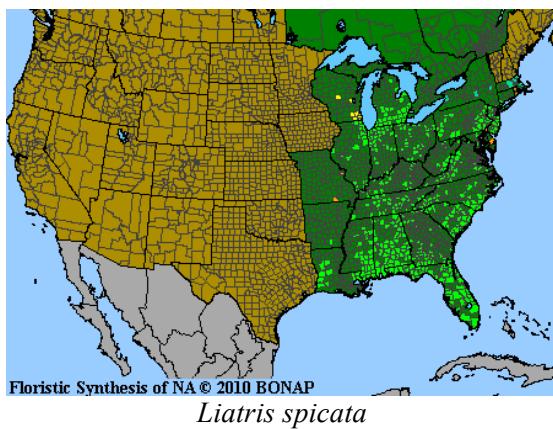
Comments: status: Special concern in Wisconsin. phenology: Blooms from 7-9. Very popular commercial cut flower, also dries well. Seed source nursery production, from genetic source DuPage & Will cos stock from Bob Horlock & DuPage Co FPD contract grow out of DCFPD seed.

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

"Very uncommon, we having found it only on the C & NW Ry row west of Cherry Valley. It is also used as a garden plant." (ewf55)

Associates: Pollinator friendly. Butterfly nectar plant. Attracts butterflies, bees, & hummingbirds & goldfinches. Reported as deer resistant.

VFHS: [*L callilepis* hort.]



Liatris squarrosa (Linnaeus) Michaux SCALY BLAZING STAR, aka COLICROOT, LOOSESCALE GAYFEATHER, SAVANNA BLAZING STAR, (*squarrosus -a -um* rough, scurfy, with protruding scales, with leaves spreading at right angles, with parts spreading horizontally, or even recurved at the ends, from Latin *squarrosum*, rough, scurfy.)

Habitat: Dry mesic & dry prairies & savannas. distribution/range: Native west, south, & east of our area, absent from the northern 3/4 of Illinois.

Culture: ①60 days cold moist stratification (pm11). 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) ③Sow at 20°C (68°F), germination slow (tchn).

cultivation: Space plants 1.25-1.5'.

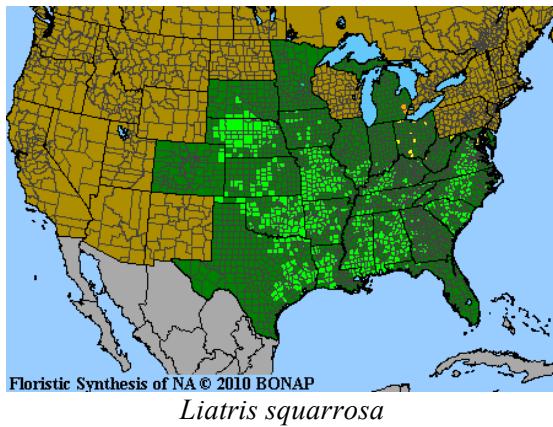
Description: Native, erect perennial forb; to 2.0';

Comments: status: phenology: Blooms 7,8,9. Attractive cut flowers. 112,000 (pm02, ew11), 172,800 (pm11) seeds per pound.

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

VHFS: Mohlenbrock (2014) separates var *hirsuta* (Rydb) Gaiser as *L hirsuta* Rydb.

Liatris squarrosa is similar & interrelated to *L compacta*, *L hirsuta*, & *L cylindracea*. "Intermediates & intergrades among *L squarrosa*, *L hirsuta*, & *L cylindracea* are relatively common in areas of sympatry". (Neesom in fna)



Liatris squarrulosa Michaux BLAZING-STAR,
Dry woods, glades, rare: Alexander & Union cos (m14).

MACHAERANTHERA Nees **TANSYASTER** A genus of 2 spp of annuals & biennials of western North America & northern Mexico, some adventive eastward. Formerly part of the broadly defined *Aster*. X = 4. (*Macranthera* Nuttall ex Bentham is hemi-parasitic herb of se North America, in the BROOMRAPE family.)

Machaeranthera tanacetifolia (Kunth) Nees PRAIRIE ASTER, aka TAHOKA-DAISY, TANSEYASTER, TANSEY-ASTER, TANSEYLEAF ASTER, TANSEYLEAF GOLDENWEED, (*tanacetifolius -a -um* tansy-leaved, with leaves like *Tanacetum*, tansy.)

Habitat: Drought tolerant, full sun to partial shade. Native to dry, rocky hillsides & open sandy areas, from the Southwest to the Prairies. Elevations 5000-8000'. distribution/range: Native in the southern Rocky Mountains, western Great Plains, & southwestern desert regions. Introduced in Illinois & New York.

Culture: ①No pretreatment needed. Sow seeds on the soil surface at 70°F & water. Slow to germinate. (ew11)
②Sow in spring or fall in sandy soil. Plant 2 oz per 1,000 ft sq (stocks). Pure stand plant 6 lb per acre (gran.) 489,664 (wns01), 496,000 (stocks, gran), 4,000,000 (ew11), seeds per pound.

cultivation: Space plants 12-15". Sandy or lighter soils in full sun. Coarse to moderately fine soils. Neutral to basic soils.

Description: Western native annual, 1.5-2'; flowers daisy-like, bright violet, purple, to lavender with yellow centers; N 2n = 8.

Comments: status: phenology: Blooms (March) June to October, summer. Occasionally specified in Illinois mixes as quick color, or at times in the permanent matrix due to confusion of common name, PRAIRIE ASTER, with that of *Sympyotrichum turbinellum* (*A turbinellus*). Used to stroke the ego of those needing instant gratification.

UHFS: Formerly *Aster tanacetifolius* Kunth. [*Machaeranthera coronopifolia* (Nutt) A Nelson, *M parthenium* Greene]



Machaeranthera tanacetifolia

NABALUS Cassini 1825 **RATTLESNAKEROOT, CANKERWEED, GALL-OF-THE-EARTH, PRENANTHE** North American *Prenanthes* are sometimes segregated into *Nabalus* (Mohlenbrock 2014, Weakley 2012). $x = 8$. See *Prenanthes*. *Nabalus* is grammatically masculine, while *Prenanthes* is feminine.

NOTHOCALAÏS (A Gray) Greene 1886 **FALSE AGOSERIS, FALSE DANDELION** *Nothocalaïs* from Greek *notho*, false, & *Calais*, a synonym of *Microseris*. A genus of 4 spp of perennial herbs in central & western North America. $x = 9$. *Agoseris cuspidata* is often included here.

The two dots over the ‘i’ is a diaeresis, indicating the ‘ai’ is not a diphthong, but pronounced in separate syllables, as in naïve, coöperate, or Zoë.

Nothocalaïs cuspidata (Pursh) Greene *IL, WI PRAIRIE DANDELION, aka FALSE DANDELION, PRAIRIE FALSE DANDELION, upl

Habitat: Dry hill prairies. distribution/range: Very rare in the n ½ of Illinois.

Culture: propagation: ①“Moist cold treatment 30 days. Likes cooler soils: sow early spring or late fall. Light cover. Fair germination. (mfd93) ②30 days cold moist stratification. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (he99) ③Sow at +2 to +4°C (34-39°F) for 12 wks, move to 20°C (68°F) for germination (tchn). 128,000 (pm02) seeds per pound.

Native, erect, perennial forb, with white latex sap; 0.25-1.0'; leaves alternate, basal, narrow, entire; N 2n = 18.

Endangered in Illinois. Special Concern in Wisconsin. Collect seed July.

VHFS: Placed in *Nothocalaïs* by fna & in *Microseris* by fh. [*Nothocalaïs cuspidata* (Pursh) Greene, *Agoseris cuspidata* (Pursh) Raf, *Microseris cuspidata* (Pursh) Sch Bip]



Nothocalaïs cuspidata

OCLEMENA E L Greene 1903 **WOOD ASTER, ASTER, NODDING ASTER** Derivation unknown. Small genus of 3(4) spp of eastern North America. Formerly, another part of the broadly defined *Aster*, with one sp at one time in *Doellingeria*. Not native in Illinois. X = 9

"It appears that *Oclemena* is most closely related to *Ionactis*, & that these two genera are more closely related to *Solidago* & *Heterotheca* than to *Aster* (in a narrower sense)" (w11).

Oclemena nemoralis (Aiton) Greene *CT, DE, PA WOOD ASTER, aka *ASTER DE BOIS, ASTER DES TOURBIÈRES*, BOG ASTER, FROSTFLOWER, STARWORT, *Wini'sikens*, dirty, little, (Ojibwa), (*nemoralis -is -e* (ne-mor-RAH-lis) of or growing in woods or groves, sylvan, from Latin *nemoralis*, adjective, of or in a wood or grove; nemoral, pertaining to or living in a forest or wood.)

Habitat: "Sphagnum bogs & very poor fens, edges of floating bogs, damp sandy shores, acidic or peaty lakeshores, pond margins, cracks in acidic, barren rocks in perhumid area" (fna). distribution/range: Native e & se of our area. Boreal eastern North America, from eastern Canada, Maine west to Michigan, south to Delaware, Maryland, New Jersey, & Pennsylvania.

Culture: propagation:

Description: flowers pale to deep pink, rarely white; N 2n = 18. key features:

Comments: status: Endangered in Connecticut & Pennsylvania. Considered extirpated from Delaware.

phenology: Blooms summer to early fall.

Associates:

ethnobotany: Used as medicinal plant by Ojibwa for diseases of ear (den28).

VHFS: Formerly *Aster nemoralis* Aiton. [*Aster nemoralis*, *Eucephalus nemoralis*, *Galatella nemoralis*]



Oclemena nemoralis

OLIGONEURON Small FLAT-TOPPED GOLDENRODS A genus of about 7 spp & 3 hybrids in cis-Rocky Mountain North America.

Formerly part of a broadly defined *Solidago*. W12b notes the separation from *Solidago* is controversial & maintains *Oligoneuron* in *Solidago*.

O rigidum & the closely related & shorter-lived *O riddellii* are classic examples of the boom & bust of seed production plots. Many spp are phenomenally large & produce seed in abundance for 2-3 years after plugging, but the production declines as phyto-chemicals (secondary metabolites) build up in the soil (nature abhors a monoculture), the plants get smaller, &, in some spp, they senescence & die. *Asclepias incarnata*, *Cinna arundinacea*, *Festuca obtusa*, *Pycnanthemum spp*, & *Verbena hastata* are other examples.

A grower works hard to establish a production plot, and often has a well-deserved sense of accomplishment. You feel that this is one more species you do not have to worry about again. But, 2 years later, seed production has dropped by 80% from that plot. Its hard to establish a plot, but its even harder to plow one under and start over.

In contrast, spp such as *Amorpha canescens*, *Ceanothus americanus*, *Silphium laciniatum*, & *S terebinthinaceum* produce for many, many, many years.

Oligoneuron album (Nutt) Nesom *CT, IN, MA, NH, NC, OH, TN [*Solidago ptarmicoides* (Nees) Bolvin, *S. asteroides*, *Oligoneuron album* (Nutt) Nesom] PRAIRIE GOLDENROD, aka SNEEZEWORT ASTER, SNOWY ASTER, STIFF ASTER, UPLAND WHITE ASTER, WHITE PRAIRIE GOLDENROD, WHITE UPLAND GOLDENROD, (*ptarmicoides* ptarmica-like, for resemblance to *Achillea Ptarmica*, sneezewort, from a Greek name for the same plant which caused sneezing, & was used for snuff, the sniffed, not smokeless tobacco kind, & from classical & post-classical Latin *oīdēs*, a suffix indicating having the form or likeness of, resemble.) [fac]

Habitat: Sandstone, sand & limestone prairies. Dry calcareous hill prairies & calcareous sand flats close to Lake Michigan. distribution/range:

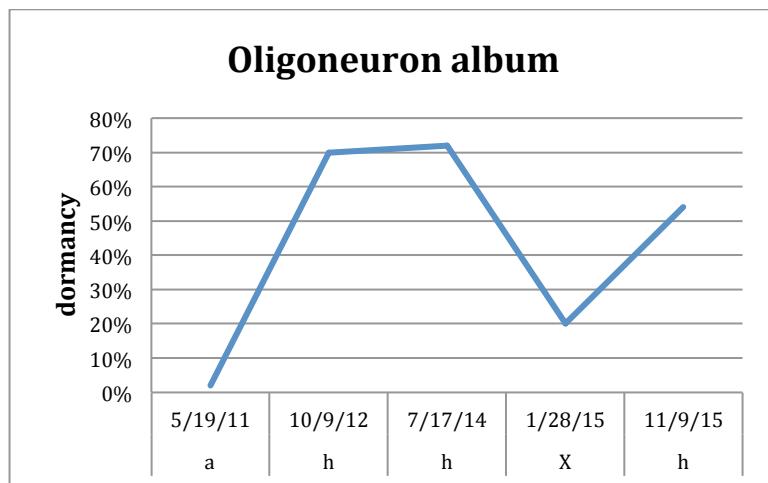
Culture: ①“No pretreatment needed. My experience suggests moist cold treatment may be counter indicated. May fall sow. Light cover. Good germination.” (mfd93) ②No pre-treatment necessary other than cold, dry stratification (pm09). ③No pretreatment needed. Sow seeds on the soil surface at 70°F & water. Slow to germinate. (ew11) ④Sow 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). ⑤Fall plant or 30 days moist stratification required for greenhouse crop. Field sow in fall. (pnnd). 892,913 (gmhm14), 92,800 (ew11), 1,024,000* (pm02), 1,120,000, 1,648,000 (aes10), 2,180,769 (gnh12) seeds per pound.

“*Aster ptarmicoides* Dry hill or sand prairie. Blooms early August to mid September; WHITE. Harvest early October. 1 1/2'; methods #1 & #3. One of the best prairie asters, a neat, small plant for use in the dry garden. Successful by SEEDLING TRANSPLANT & FALL BROADCAST.” (rs ma)

asexual propagation: Division of mature clumps.

cultivation: Space plants 18-24”. Full sun, well-drained soils. Drought tolerant.

bottom line: Genesis limited data indicates some lots may be significantly dormant & need dormant seeded. Germ 43.6, 44, na, sd 18.9, r21-67 (46%). Dorm 43.6, 54, na, sd 27.9, r2.0-72 (70%). Test 23, 23, na, r20-27 days. (#5:2)**



Description: Erect, herbaceous, perennial, native forb; 0.70-2.0', flowers white.

Comments: Endangered in Connecticut, Massachusetts New Hampshire, North Carolina, & Tennessee. Rare in Indiana. Ohio presumed extirpated. phenology: Blooms 7,8,9. In northern Illinois, collect seeds in October - November. Collect seeds in se Wisconsin in October (he99). Attractive cut flowers, landscaping, low growing, suitable for rock gardens & xeriscaping, drought tolerant. Very low maintenance. Non-competitive, needs small neighbors. Seed source nursery production, Dot Wade, Nachusa source & flat sand prairie, CNRR at Nelson, east of Rock Falls, Lee Co.

Associates: Pollinator friendly. Attracts butterflies & birds. Drought tolerant.

VHFS: A recent alias of this sp has been *Aster ptarmicoides* (Nees) Torrey & Gray or *Solidago ptarmicoides* (Nees) B Boivin. *Oligoneuron* finally seems to be catching on some, even IDOT is jumping on the wagon. In our area, it is politically incorrect to not place this in *Solidago* in specifications. This plant has been placed in six genera; *Aster*, *Doellingeria*, *Inula*, *Oligoneuron*, *Solidago*, & *Unamia*. Known to hybridize with many *Solidago* spp in the section *Oligoneuron* [synonym *Ptarmicoidei*].



Oligoneuron album, aka *Aster ptarmicoides*

Oligoneuron ohioense (Riddell) GN Jones *NY, WI OHIO GOLDENROD, (*ohioensis -is -e* of or pertaining to Ohio.) obl Section *Ptarmicoides*.

Habitat: Wet meadows, fens, & moist ground. Marshes & wet sand dunes.

distribution/range: Northeast Illinois, se Wisconsin.

Culture: ①“Dry cold store only, may be fall sown, or moist cold treated.

Light cover. Good germination.” (mfd93). ②30 days cold moist stratification.

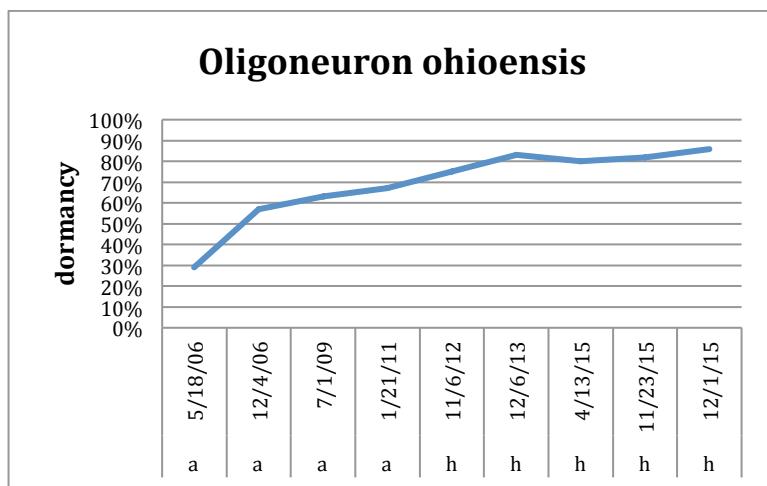
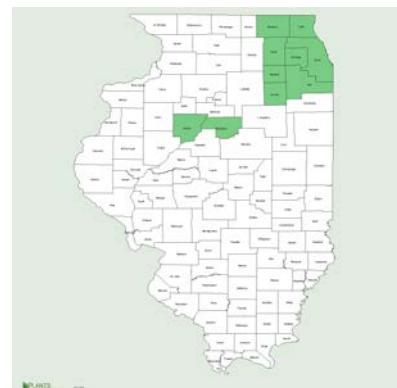
Surface sow, seeds are very small or need light to naturally break dormancy & germinate (pm09) ③“30 days moist stratification improves germination, but not needed for good greenhouse crop. Field sow fall, spring, early summer.”

(pnnd) ④“No pre-treatment needed. Sow seeds on soil surface at 60°F & water.” (Cold moist stratify 30 days, small seeds need light. 1,440,000 (pn02, jfn04), 1,600,000 (ew12), 1,835,539 (Agrecol 04138-2), 2,008,850 (gn06), 2,017,777 (gn03), 2,172,249 (gna06), 2,223,529 (gnha12), 2,236,448 (Agrecol 04138-B), seeds per pound.

cultivation: Space plants on 1.0-1.5' centers. Wet to wet mesic soils that never dry out, full sun.

Calcareous soils.

bottom line: Dormant seed only. Test data indicate a significant to strong dormancy rate. Upwardly mobile species. Germ 17, 14, 11, sd 7.3, r9.0-31 (22%). Dorm 69.1, 75, na, sd 17, r29-86 (57%). Test 30, 28, na, r18-44 days. (#9:3).**



Description: Erect perennial, 2.0-3.0'. N 2n = 18. key features: “*Solidago ohioensis* is most likely to be confused with *S riddellii*, which has folded & multi-nerved leaves, & *S houghtonii*, which has arrays with few large heads” (fna). The latter is a rare Great Lakes coastal sp from Ontario, Michigan, & New York.

Comments: status: Threatened in New York. Special concern in Wisconsin. phenology: Blooms 7,8,9,10. Attractive cut & dried flowers. Landscaping, rain gardens, & pond edges. Genetic source wetlands near Algonquin & Huntley, Grafton Twp, McHenry 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, ... *Solidago Ohioensis*.” *Oligoneuron ohioense* (Riddell) G. N. Jones as *Solidago Ohioensis* Riddell. (Short 1845).

Associates: Said to be deer resistant.

ethnobotany: Attracts butterflies.

VHFS: Long known as *Solidago ohioensis* Riddell. [*Aster ohioensis* (Riddell) Kuntze; *Oligoneuron ohioense* (Riddell) GN Jones]

Oligoneuron riddellii (Frank ex Riddell) Rydberg *AR RIDDELL'S GOLDENROD, (*riddellii* for John Leonard Riddell, 1807-1865) obl Section *Ptarmicoide*.

Habitat: Wet meadows, fens, seeps, moist ground, wet to mesic prairies, & calcareous soils. distribution/range: Central United States.

Culture: ①“Moist cold treatment or fall sow. Will germinate with dry cold storage. Prefers cooler soils, sow in early spring or late fall. Light cover. Very good to excellent 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 germinate most successfully in cool soil. Sow in early winter through early spring. (he99) Sow at 20°C (68°F), germinates in less than two wks (tchn). ④“30 days moist stratification improves germination, but not needed for good greenhouse crop. Field sow fall, spring, early summer” (pnnd). ⑤“No pre-treatment needed. Sow seeds on soil surface at 60°F & water.” (ew12) Seed counts 1,682,256, 1,500,000, #N/A, sd501,555, max 2,686,391, min1,170,103, r1,516,288++

“*Solidago riddellii* Alkaline, wet to dry prairie. Blooms early September to early October; YELLOW.

Harvest October. 3'; easy by methods #1 & #3; SEEDLING TRANSPLANT, FALL BROADCAST; has attractive lily-like foliage.” (rs ma)

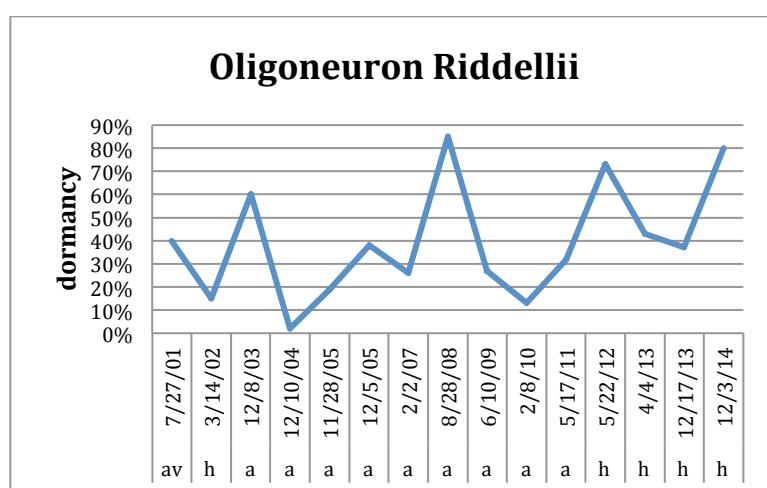
cultivation: Space plants on 1.25-2.0' centers. Wet to mesic soils, full sun. Calcareous soils.

asexual propagation: Division of mature clumps.

bottom line: Dormant seeding is best & required by most lots, dormancy is variable, from 2% to 85%.

Flipflop species. Germ 39.3, 42, 6.0, sd 26.4, r6.0-84 (78%). Dorm 39.3, 37, na, sd 24.2, r2.0-85 (83%). Test 29, 28, 28, r22-46 days.**

greenhouse & garden: Easy from seed, cool soils. Cold moist stratify 60 days, small seeds need light. Self sows.



Description: Erect, herbaceous, perennial, native forb; plants slowly expand by *short* rhizomes; 1.5'-3.5' tall, stems usually thick & mostly smooth; leaf sickle-shaped, smooth, with no teeth, often folded along midrib, stalked, upper leaves becoming stalkless to sheathing but not much smaller; inflorescence a crowded flat-topped cluster often with up to 100 heads; flower yellow, 7-9 rays; fruit mostly smooth dry achene, with fluffy pappus; N 2n = 18.

Comments: status: Threatened in Arkansas. phenology: Blooms August - October. In northern Illinois, collect seeds in mid - late October. Collect seeds in se Wisconsin in October (he99). Cut flowers, landscaping, specimen plantings, moist borders & pond edges, wetland restoration, rain gardens, & pollinator gardens. Attractive foliage. Sp lives 2-3 years in production fields in mesic & wet mesic soils, but is known from mesic remnants. The first year or two, the plants may be quite robust, *vide infra*. Seed source nursery production plots, from Green River Ordinance Plant, Amboy Twp, Lee Co, & mesic railroad remnant, Big Rock, Kane Co, & Spring Slough, Hume & Montmorency Twps, 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, ... *Solidago Ridellii*.” *Oligoneuron riddellii* (Frank ex Riddell) as *Solidago Ridellii* Frank ex Riddell. (Short 1845).

“A late goldenrod that grows on low prairies. It is quite uncommon in such places as Searle Tract. It is also found in Boone & De Kalb cos.” (ewf55)

Associates: Butterfly nectar source. Pollinated by bumble bees, honey bees, & flies. *S riddellii* production plots

have a tremendous pollinator drawing power. Attracts seed eating birds. Reported to be deer resistant

VHFS: Long known as *Solidago riddellii* Frank (or Frank ex Riddell). In some taxonomies, this is *Oligoneuron riddellii* (Frank ex Riddell) Rydb. Known to hybridize with *Aster ptarmicoides*.



Solidago riddellii production plots

Oligoneuron rigidum (Linnaeus) Small *CT, MD, NJ, NY, PA, RH RIGID GOLDENROD, aka BOLD GOLDENROD, HARD-LEAVED GOLDENROD, PRAIRIE GOLDENROD, STIFF GOLDENROD, STIFF-LEAF GOLDENROD, *A'djidamo'wano*, squirrel tail (Ojibwa), (*rigidus -a -um* rigid, stiff, inflexible, Latin *rigidus*, adjective, stiff, hard, unbending, stern, inflexible, rigid in reference to the stiff leaves.) Facultative Upland (-) Section *Ptarmicoide*.

Habitat: Mesic, dry, hill, & degraded prairies, also dry savannas. Prairie soils, dry open places (esp. sandy soils), open woods, thickets. distribution/range:

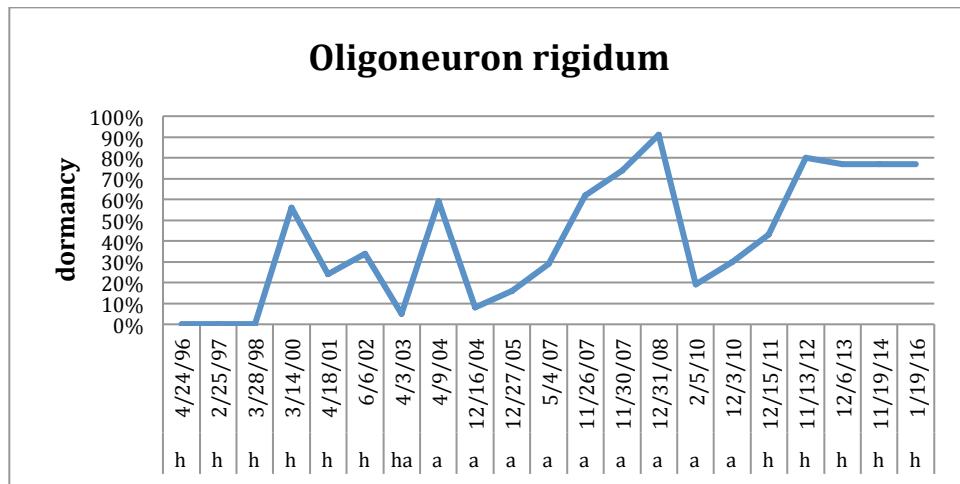
Culture: ①“Prefers cooler soils, sow in early spring or late fall. Light cover. Very good to excellent germination. *S rigida* may self sow. (mfd93). ②60 days cold moist stratification (pm09). ③“30 days moist stratification improves germination, but not needed for good greenhouse crop. Field sow fall, spring, early summer” (pnnd). ④Seeds germinate after about 60 days of cold moist stratification. Seeds germinate most successfully in cool soil. Sow in early winter through early spring. (he99) ⑤Direct seed on bare soil in fall for best germination & coverage (usda 1997). ⑥“No pre-treatment needed. Sow seeds on soil surface at 60°F & water.” (ew12) ⑦Sow at 20°C (68°F), germinates in less than two wks (tchn). Growth rate rapid. Seedling vigor medium. Vegetative spread rate moderate. Seed counts 779,749, 716,000, #N/A, sd353,155, max1,926,400, min320,000, r1,606,400 seeds per pound.++ Pure stand plant 2 lb per acre (gran). In mixes, plant 0.06 to 0.3 lb pls per acre (us97). Widely available as seed, bare root & potted material.

“*Solidago rigida* General prairie. Blooms late August to early October: YELLOW. Harvest October. 3 1/2'; easy by all methods. SEEDLING TRANSPLANT, SPRING BROADCAST, FALL BROADCAST. Too coarse for the garden; should be sown with much grass for competition.” (rs ma)

cultivation: Space plants on 1.25-2.0' centers. Dry to mesic soils, full sun to part shade. Minimal flooding tolerance. Nutrient load low to moderate, siltation tolerance low. Clay soil tolerant. Tolerant of coarse & medium textured soils. Anaerobic tolerance none. CaCO₃ tolerance medium. Drought tolerance high. Moderate water requirement. Fertility requirement medium. Salinity tolerance none or low, but some salt tolerance noted by AES (2010). Shade tolerance intermediate. pH 5.0-7.5, neutral to acidic soil. Removing spent blooms is said to extend blooming period.

asexual propagation: Division of mature plants in early spring.

bottom line: Dormant seeding is best. Field establishment is possible from spring seeding, but ca 60% of lots are significantly to strongly dormant. Trending towards strong dormancy of late. Flipflop species. Germ 39.7, 38, 81, sd 16.8, r1.0-85 (84%). Dorm 41, 34, 0.0, sd 30.2, r0.0-91 (91%). Test 31, 32, 28, r13-44 days. (#21:3)**
greenhouse & garden: Easy from seed. Moist cold stratify 60 days or fall sow. Some lots will germinate with cold dry storage only.



Description: Erect, herbaceous, perennial, native forb; 2.0-6.0'; 12" minimum root depth, said to penetrate to 15'; stems 2.0-4.0'(6+'), tall hairy stems; flat-topped clusters of golden yellow flowers.

Comments: status: Endangered in Connecticut, New Jersey, & Pennsylvania. Endangered & extirpated in Maryland. Threatened in New York. Historical in Rhode Island. phenology: Blooms 7,8,9,10. In northern Illinois, collect seeds in mid-October - early-November. Collect seeds in se Wisconsin in October (he99). Plants are largely cross-pollinated. Good cut flower & dried flower. Landscaping, specimen plantings, herbaceous borders, mesic rain gardens, & pollinator gardens. Too aggressive for small sites, self sows, can be invasive in moist sites or in overgrazed pastures. Judging from the lack of weeds in our fields, *O rigidum* is allelopathic. A tremendous seed producer, there was a noticeable lack of seedlings near the mother plants in our early monoculture plantings, maybe exhibiting some type of autotoxicity. The field rows showed absolutely no other plants! An area where we plugged this sp into one of our hillsides in 1994, was showing, by 1998, greatly reduced growth of *Bromus inermis*, compared to the areas immediately adjacent to the *S rigida* planting. Seed source nursery production plots & nursery remnants, genetic sources from railroad remnants Clarion Twp, Bureau Co, Squaw Grove Twp, DeKalb, & Kane Co from Bob 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.

"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 rigida*."
Oligoneuron rigidum (L.) Small as *Solidago rigida* L. (Short 1845).

"A stiffly erect, late flowering goldenrod usually found in dry places, such as high prairies, roadsides & railroads" (ewf55).

Associates: A field of this sp has a tremendous pollinator draw. Pollinator friendly. Butterfly nectar plant. Pollinated by long-tongued bees, short-tongued bees, other *Hymenoptera*, *Diptera*, *Lepidoptera*, & *Coleoptera*. Attracts butterflies, bumblebees, honeybees, & other beneficial insects. Visited by *Popillia japonica*, Jap beetles, but no damage was observed. Provides cover, food, & mortgage payments for songbirds, game birds, & Genesis estimators. Reported to be deer resistant.

ethnobotany: Used as medicinal plant by Ojibwa for urinary trouble. Herb is astringent & styptic. (den28).

VHFS: Long known as *Solidago rigida* Linnaeus, finally in Illinois *Oligoneuron rigidum* (L) Small is beginning to be used. Var *rigidum* grows over much of the eastern United States, including Illinois. Synonyms are *O*

grandiflorum (Raf) Small, *Solidago grandiflora* Raf, *S rigida* L. Var *humile* (Porter) Nesom grows from Michigan, Indiana, Illinois, & Missouri to Texas & west to the Rockies. Var *glabratum* (EL Braun) Nesom grows in Ohio, Missouri & southward.



Will Powers in a 2-year-old *Solidago rigida* plot, a young man truly outstanding in his field. *S rigida* production plot exhibiting allelopathy, John Deere 6620 combine for scale, heading for Mr. Powers.

End Asters Part Two

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

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

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

Reference abbreviations May 04 2014

CEPPC California Exotic Pest Plant Council

CIPC California Invasive Plant Council

SEPPC Southeast Exotic Pest Plant Council

SWSS Southern Weed Science Society

RBG Kew RBG Kew, Wakehurst Place

aes10 (AES 2010)

afvp (Atlas of Florida Vascular Plants)

anef (Angelo & Boufford: Atlas of New England flora)

apl (Applewood)

asfg (Audubon Society Field Guide)

Uncopyrighted Draught

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 & Kesseler 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.