

CONTRIBUTIONS TO AN ILLINOIS FLORA No. 4.
COMPOSITAE II. (TRIBE HELIANTHEAE, PART I—
DYSSODIA, HELENIUM, GAILLARDIA,
HYMENOXYIS, HYMENOPAPPUS, AND POLYMNIA).

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ABSTRACT.—A key to the 23 Illinois genera of the tribe Heliantheae and keys, descriptions, and distributional maps for the Illinois species of *Dyssodia*, *Helenium*, *Gaillardia*, *Hymenoxys*, *Hymenopappus*, and *Polymnia* are given.

This is the second of a series on the Compositae in Illinois. The first, treatment of the tribe Vernoniaeae, as been published previously (Wunderlin, 1968).

This study includes only a key to the Illinois genera of the tribe Heliantheae and a treatment of the first six genera, *Dyssodia*, *Helenium*, *Gaillardia*, *Hymenoxys*, *Hymenopappus*, and *Polymnia*, in Illinois. Treatments of the other genera in the tribe will follow in subsequent publications. The magnitude of this tribe as well as the desirability of making the works available without too much delay has made it desirable to publish it in several parts.

The tribe Heliantheae is characterized by having opposite (rarely alternate or whorled) leaves, preponderately radiate heads, the style-branches usually hispidulous and with the stigmatic lines poorly defined, and the anther bases obtuse or sagittate (rarely caudate).

The tribe Helenieae has been traditionally distinguished from the Heliantheae by a single technical character, the absence of chaff on the receptacle. This character is not always clear-cut; e.g., *Gaillardia* has a bristly rather than a naked receptacle. The tribe Helenieae is now considered by most Compositae specialists as an artificial taxonomic group. The subtribes of the Helenieae apparently have been derived independently from the Heliantheae

in several different lines. Therefore, the Helenieae should not be considered as a separate tribe but should be included in the Heliantheae as has been done in this treatment. The subtribe Ambrosiinae has become adapted to wind pollination and differs from the rest of the Compositae in its much reduced corollas and free or nearly free anthers. This group might justifiably be considered as a separate tribe or even a separate family as it has been treated by several other authors. However, the Melampodinae furnishes a good series of transitional forms between the typical Heliantheae and the less modified genera, e.g., *Iva*, of the Ambrosiinae. Thus the Ambrosiinae are treated as part of the Heliantheae as is more customary.

The Heliantheae in Illinois is composed of 23 genera of which three, *Gaillardia*, *Cosmos*, and *Galinsoga*, have been introduced. *Gaillardia* is from the west, *Cosmos* is from the southern United States, and *Galinsoga* is from the tropics. Several species of other genera have been introduced or are adventive in Illinois.

The distributional maps are based upon specimens housed in the following herbaria: Eastern Illinois University, the Field Museum of Natural History, the Illinois Natural History Survey, the Illinois State Museum, the Missouri Botanical Garden, Southern Illinois University, the University of Illinois, and Western Illinois University.

The author is grateful to the curators of the herbaria used in this study for allowing him to study their specimens. The author also gratefully acknowledges Dr. James R. Wells, Cranbrook Institute of Science, Bloomfield Hills, Michigan, for his assistance and com-

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SYSTEMATIC TREATMENT

Key to the Illinois Genera of the Tribe Heliantheae

(This key is admittedly partially technical so that each genus is keyed out only once. A strictly artificial key would result in many genera being keyed out in several places and would be greatly increased in size and complexity.)

1. Heads with ligulate or discoid flowers; corolla regularly developed.
 2. Receptacle without chaff (merely bristly in *Gaillardia*).
 3. Inner phyllaries united at base, glandular-dotted. 1. *Dyssodia*
 3. Inner phyllaries free at base, not glandular-dotted.
 4. Phyllaries herbaceous; heads radiate.
 5. Plants with leafy stems.
 6. Leaves decurrent on stem or, if not, then linear-filiform. 2. *Helenium*
 6. Leaves not decurrent on stem nor linear-filiform. 3. *Gaillardia*
 5. Plants scapose. 4. *Hymenoxys*
 4. Phyllaries petaloid, scarious; heads discoid. 5. *Hymenopappus*
 2. Receptacle definitely with chaff.
 7. Disc-flowers sterile (styles undivided, ovary reduced).
 8. Cypselas* thick, scarcely flattened. 6. *Polymnia*
 8. Cypselas compressed dorso-ventrally.
 9. Flowers yellow, in large corymbose-panicled heads. . 7. *Silphium*
 9. Flowers white, in small corymbose heads. 8. *Parthenium*
 7. Disc-flowers fertile (styles divided, ovary normal sized).
 10. Cypselas turbinate, 5-angled. 9. *Galinsoga*
 10. Cypselas flat, 4-angled, or, if 5-angled, then subterete and linear.
 11. Ligules persistent on cypselas, chartaceous. . . . 10. *Heliopsis*
 11. Ligules promptly deciduous or absent.
 12. Cypselas compressed dorso-ventrally (terete in *Bidens beckii*, an aquatic with filiform-dissected leaves); phyllaries dimorphic.
 13. Pappus of 2 short teeth or awns, barbed upward or smooth, or a mere border, or absent; cypselas wing-margined (except *C. tinctoria*). 11. *Coreopsis*
 13. Pappus of 2-6 awns or teeth, these barbed or hispid, usually retrorsely (rarely smooth or absent); cypselas not wing-margined.
 14. Cypselas beaked. 12. *Cosmos*
 14. Cypselas not beaked. 13. *Bidens*
 12. Cypselas scarcely flattened or sometimes compressed laterally; phyllaries not dimorphic.
 15. Heads discoid, appearing gray because of black-tipped anthers. 14. *Melanthera*

- 15. Heads radiate (inconspicuously in *Eclipta*), not gray.
 - 16. Heads small, with short white ligules subequal to phyllaries; receptacle chaff bristleform; small weak annuals with short-stalked axillary heads..... 15. *Eclipta*
 - 16. Heads large, with yellow or pink to purple ligules much longer than phyllaries; receptacle chaff broader; stout perennials, biennials, or sometimes annuals with peduncled or terminal heads
 - 17. Receptacle conical or columnar (if conical, then leaves not decurrent).
 - 18. Cypselas compressed laterally..... 16. *Ratibida*
 - 18. Cypselas 4-angled.
 - 19. Flowers yellow (or mottled with brown)..... 17. *Rudbeckia*
 - 19. Flowers pink to purple (in ours)..... 18. *Echinacea*
 - 17. Receptacle flat to convex (rarely conical in *Verbesina*).
 - 20. Leaves decurrent on stem; cypselas compressed laterally; pappus of 2-3 persistent awns..... 19. *Verbesina*
 - 20. Leaves not decurrent on stem; cypselas 3- to 4-angled; pappus of 2-4 caducous scales..... 20. *Helianthus*
 - 1. Heads without ligulate flowers; pistillate flowers without corolla or with corolla reduced to a tube or ring around base of style; staminate flowers with regularly developed corolla.
 - 21. Heads all alike; pistillate flowers few, marginal; staminate flowers many, central; involucre of few rounded phyllaries . 21. *Iva*
 - 21. Heads of two kinds, pistillate with tuberculate or bur-like involucre.
 - 22. Staminate involucre with united phyllaries..... 22. *Ambrosia*
 - 22. Staminate involucre with distinct phyllaries..... 23. *Xanthium*
- *Characteristic fruit of the Compositae. Similar to an achene but bicarpellate rather than unicarpellate and formed from an inferior ovary with adherent floral tissues on outside wall.

1. DYSSODIA Cav., Anal. Cienc. Nat. 6:334. 1802.
Willdenowia Cav., Ic. 1:61. 1791.
Boebera Willd., Sp. Pl. 3:2125. 1804.
Schlechtendalia Willd., Sp. Pl. 3:2125. 1804, non Less., 1830.
Adenophyllum Pers., Syn. Pl. 2:458. 1807.
Thymophylla Lag., Gen. & Sp. Nov. 25. 1816.
Hymenatherum Cass., Bull. Soc. Philom. 1817:12. 1817.
Clomenocoma Cass., Dict. Sci. Nat. 9:416. 1817.

Lebetina Cass., Dict. Sci. Nat. 25:395. 1822.
Rosilla Less., Syn. Gen. Comp. 245. 1832.
Syncephalantha Bartl., Ind. Sem. Hort. Goett. 6.1836, ex Linnaea 12:80. 1838.
Gnaphaliopsis DC., Prodr. 7:258. 1838.
Lowellia Gray, Mem. Amer. Acad. II. 4:89. 1849.
Aciphyllaea (DC.) Gray, Mem. Amer. Acad. II. 4:91. 1849.
Comaclinium Scheidw. & Planch. ex Planch., Fl. Seres 8:19. 1852.

Urbinnella Greenman, Proc. Amer. Acad. Arts 39:117. 1903.

Gymnolaena (DC.) Rydb., N. Amer. Fl. 34:160. 1915.

Boeberastrum (Gray) Rydb., N. Amer. Fl. 34:161. 1915.

Trichaeolepis Rydb., N. Amer. Fl. 34:170. 1915.

Dyssodiopsis (Gray) Rydb., N. Amer. Fl. 34:170. 1915.

Annual or perennial herbs; leaves opposite or alternate, entire to pinnately dissected, glandular-dotted. Heads several, terminal, radiate or rarely discoid; involucre in one or two series, conspicuously glandular-dotted, inner united at base or above; receptacle flat or nearly so, naked or nearly so; ray-flowers pistillate, fertile, ligule yellow or orange; disc-flowers numerous, perfect; anthers narrow at base; style-branches flattened, truncate, or with elongate pubescent appendages; pappus of 10-20 scales, each divided to middle or below into several bristles or entire. Cypselas narrow, substrate.

The genus *Dyssodia* consists of about 40 species native to the western hemisphere. It is represented in Illinois by the following single species.

1. *DYSSODIA PAPPUSA* (Vent.) Hitchc., Trans. Acad. St. Louis 5:503. 1891.

Tagetes papposa Vent., Descr. Cels. pl. 36. 1802.

Boebera chrysanthemoides Willd., Sp. Pl. 3:2125. 1804.

Tagetes pumila Willd., Sp. Pl. 3:2126. 1804, pro syn.

Boebera glandulosa (Cav.) Pers., Syn. Pl. 2:459. 1807, nom nud.

Dyssodia chrysanthemoides (Willd.) Lag., Gen. et Sp. Nov. 29. 1816.

Dyssodia fastigiata DC., Prodr. 5:640. 1836, non *D. fastigiata* HBK., 1820.

Dyssodia chrysanthemifolia Steud., Nom. Bot. II. 2:660. 1841.

Boebera papposa (Vent.) Rydb., in Britton, Man. Fl. N. States & Canada 1012. 1901.

Boebera ciliosa Rydb., N. Amer. Fl. 34:168. 1915.

Boebera roseata Rydb., N. Amer. Fl. 34:169. 1915.

Dyssodia ciliosa (Rydb.) Standl., Field Mus. Pub. Bot. 4:299. 1929.

Dyssodia roseata (Rydb.) Gentry., Los Pastizales de Durango 331. 1957.

Much branched, ill-scented annual; stems 0.5-4.0 dm tall, puberulent to glabrous; leaves opposite, 2-5 cm long, pinnatifid or bipinnatifid into linear or filiform segments. Heads sessile or subsessile, numerous; involucre campanulate, 6-8 mm high, biseriate, outer phyllaries linear, subherbaceous, two-thirds or as long as

the wider more chartaceous inner, inner phyllaries united at base, with conspicuous elliptic glandular dots; ray-flowers few, ligules oval, inconspicuous, erect, up to 1.5 mm long; pappus scales divided to near base into 5-10 bristles, about 3 mm long. Cypselas subangled, compressed, about 3 mm long, pubescent. $2n = 26$ (Smith, 1964).

Dyssodia papposa occurs from Ohio to Montana, south to Arizona and Louisiana and is adventive north and east of this range. It occurs infrequently along roadsides and in fields throughout Illinois (Fig. 1). It flowers from September to October.

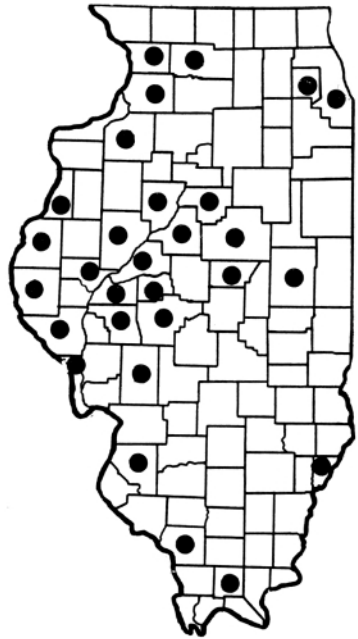


FIGURE 1. Distribution of *Dyssodia papposa* in Illinois.

2. *HELENIMUM* L., Sp. Pl. 886. 1753. *Helenia* L., Gen. Pl. ed. 5. 377. 1754. *Brassavola* Adans., Fam. 2:127. 1763.

Actinea Juss., Ann. Mus. Paris 2:425. 1803.

Mesodetra Raf., Fl. Ludov. 141. 1817.

Leptopoda Nutt., Gen. N. Amer. Pl. 2:174. 1818.

Leptophora Raf., Am. Mo. Mag. Crit. Rev. 4:195. 1819.

Tetrodus Cass., Dict. Sci. Nat. 55:264. 1828.

Dugaldia Cass., Dict. Sci. Nat. 55:270. 1828.

Hecubaea DC., Prodr. 5:665. 1836.
Amblyolepis DC., Prodr. 5:667. 1836.
Leptocarpa Raf. ex Endl. Gen 1383.
 1841, pro syn.

Oxylepis Benth., Pl. Hartw. 87. 1841.
Expeletopsis Schultz-Bip. ex Benth. &
 Hook., Gen. 2:414. 1873.

Heleniastrum (Vaillant) Kuntze, Rev.
 Gen. 341. 1891.

Annual or perennial herbs; leaves alternate, impressed-punctuate, usually decurrent. Heads corymbiform or solitary, radiate, rarely discoid; involucre in 2-3 series, subequal or the inner shorter, narrow, herbaceous or subherbaceous, soon deflexed, outer sometimes joined at base; receptacle convex to ovoid or conic, naked; ray-flowers pistillate or sterile, yellow or occasionally purplish at base, ligule cuneate, 3- to 4-lobate, few; disc-flowers perfect, yellow or purple, numerous; anthers minutely auriculate or sagittate; style-branches flattened, tips dilated, subtruncate, penicillate; pappus scarious, hyaline, often awn-tipped scales. Cypselas 4- to 5-angled, with as many intermediate ribs, pubescent or glabrous.

The genus *Helenium* consists of about 40 species native to the western hemisphere with three species occurring in Illinois.

The pappus characters given for the species are variable. These often unusual variations are not considered to be of taxonomic importance.

Key to the Illinois Species of *Helenium*

1. Leaves linear to linear-filiform, not decurrent. 1. *H. amarum*
1. Leaves linear-lanceolate to ovate, decurrent.
 2. Disc depressed-globose; disc-flowers yellow. 2. *H. autumnale*
 2. Disc globose; disc-flowers purplish. 3. *H. flexuosum*

1. HELENIUM AMARUM (Raf.) Rock, Rhodora 59:131. 1957.

Galardia amarum Raf., Fl. Ludov. 69. 1817.

Helenium tenuifolium Nutt., Jour. Acad. Phila. 7:66. 1834.

Heleniastrum tenuifolium (Nutt.) Kuntze, Rev. Gen. 342. 1891.

Erect annuals; stems up to 5 cm tall, glabrous or nearly so; leaves linear to linear-filiform, entire, 1-8 cm long, 1-2 mm wide, not decurrent, glabrous. Heads corymbose; phyllaries linear, punctate, herbaceous, soon deflexed; disc depressed-globose, 0.5-1.0 cm in diameter; ray-flowers 5-10, pistillate, yellow, ligule 0.5-1.0 cm long, 3-logate; disc-flowers yellow; pappus ovate to obovate, hyaline, with awn as long as body. Cypselas about 1

mm long, hispid on angles. $2n = 30$ (Turner & Ellison, 1960; Jackson, 1962).

Helenium amarum occurs from Virginia south to Florida, west to Texas, and north to Kansas and Missouri. It is occasionally introduced or adventive elsewhere. It is frequent in fields and waste ground in southern Illinois, extending north to Pike and Champaign counties (Fig. 2). It flowers from August to October.

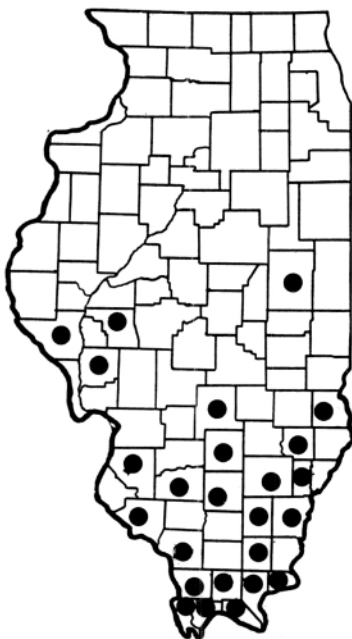


FIGURE 2. Distribution of *Helenium amarum* in Illinois.

2. HELENIUM AUTUMNALE L., Sp. Pl. 886. 1753, non Gray, 1857.

Helenium latifolium Mill., Gard. Dict. ed. 8. *Helenium* no. 2. 1768.

Helenia autumnalis (L.) Hill, Hort. Kew. 6. 1769.

Helenium pubescens Ait., Hort. Kew. 3:227. 1789, non H. & A., 1838.

Helenium canaliculatum Lam., Jour. Hist. Nat. 2:213. 1792.

Helenia decurrens Moench, Meth. 598. 1794.

Helenium longifolium Smith, in Rees, Cycl. 17: *Helenium* no. 2. 1811.

Helenium pumilum Willd., Enum. Suppl. 60. 1813.

Helenium altissimum Link, Ind. Sem. Berol. 1840:21. 1840. nom. nud.

Helenium commutatum Link, Ind. Sem. Berol. 1840:21. 1840, nom. nud.

Helenium parviflorum Nutt., Trans. Amer. Phil. Soc. II. 7:384. 1841.

Helenium autumnale L. var. *canaliculatum* (Lam.) T.&G., Fl. N. Amer. 2:284. 1843.

Heleniastrum autumnale (L.) Kuntze, Rev. Gen. 342. 1891.

Heleniastrum parviflorum (Nutt.) Kuntze, Rev. Gen. 342. 1891.

Helenium autumnale L. var. *pubescens* (Ait.) Britton, Mem. Torr. Club 5:339. 1894.

Helenium altissimum Link ex Rydb., N. Amer. Fl. 34:126. 1915.

Helenium huronense Britton ex Rydb., N. Amer. Fl. 34:127. 1915, nom. nud.

Helenium autumnale L. var. *parviflorum* (Nutt.) Fern., Rhodora 45:492. 1943.

Erect perennials; stems up to 1.5 m tall, glabrous or finely strigose or puberulent; leaves linear-lanceolate to elliptical, acute, narrowed to sessile or subsessile base, decurrent along stem, 4-16 cm long, 0.5-5.5 cm wide, serrate to subentire, glabrous or occasionally puberulent. Heads corymbose; phyllaries lanceolate-subulate, strigose or puberulent, soon deflexed; disc depressed-globose, 1-2 cm in diameter; ray-flowers 10-20, pistillate or occasionally neutral, yellow, ligule 0.5-1.5 cm long, 3- to 4-lobate; disc-flowers yellow; pappus ovate to lanceolate, with awn up to 1 mm long. Cypselas about 1.5 mm long, hispid on ribs. $2n = 34$ (Janaki-Ammal, 1945).

Helenium autumnale occurs from Quebec, south to Florida, west to Arizona, and north to British Columbia. It is common in wet meadows and along ditches, streams, and ponds throughout Illinois (Fig. 3). It flowers from August to October.

A number of varieties are recognized by various authors. These are believed by the author to be variations within a polymorphic species and merit no taxonomic segregation.

3. HELENIUM FLEXUOSUM Raf., New Fl. N. Amer. 81. 1838.

Helenium quadridentatum Hook., Comp. Bot. Mag. 1:98. 1835, non Labill, 1792.

Helenium dichotomum Raf., New Fl. N. Amer. 81. 1838.

Helenium nudiflorum Nutt., Trans. Amer. Phil. Soc. II. 7:384. 1841.

Helenium micranthum Nutt., Trans. Amer. Phil. Soc. II. 7:385. 1841.

Leptopoda brachypoda T.&G., Fl. N. Amer. 2:388. 1842.

Helenium purpureum Hale ex T.&G., Fl. N. Amer. 2:388. 1842, pro syn.

Leptopoda brachypoda T.&G., var. B T.&G., Fl. N. Amer. 2:388. 1842.

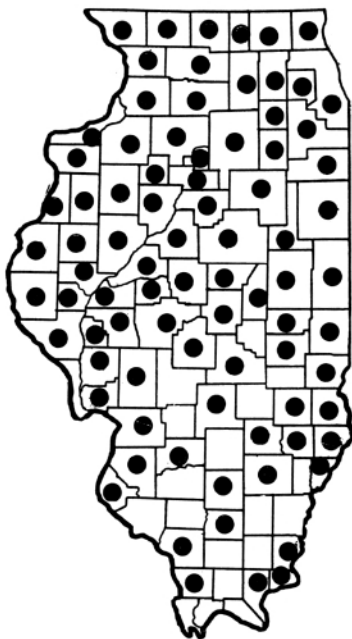


FIGURE 3. Distribution of *Helenium autumnale* in Illinois.

Helenium atropurpureum Kth. & Bouche, Ind. Sem. Hort. Berol. Anno 1845, Collectorum 12. 1845.

Helenium atropurpureum Kth. & Bouche var. *grandicephalum* Lemaire, Ill. Hort. 10:375. 1863.

Helenium brachypoda (T.&G.) A. Wood, Am. Bot. Fl. 182. 1870.

Helenium seminariense Featherman, La. Univ. Rep. 1870:74. 1871.

Helenium nudiflorum Nutt. var. *purpurea* (Hale ex T.&G.) Gray, Proc. Amer. Acad. Arts 9:203. 1871.

Heleniastrum nudiflorum (Nutt.) Kuntze, Rev. Gen. 342. 1891.

Helenium polyphyllum Small, Fl. S. E. U.S. 1291. 1903.

Helenium floridanum Fern., Rhodora 45:494. 1943.

Helenium godfreyi Fern., Rhodora 45:494. 1943.

Erect perennials; stem up to 1 m tall, subpuberulent; leaves oblong to linear-lanceolate, entire or subentire, sessile, decurrent along stem, 3-12 cm long, 0.5-2.0 cm wide. Heads corymbose; phyllaries lanceolate to linear-lanceolate, puberulent, soon deflexed; disc globose, 6-14 mm in diameter; ray-flowers 10-20, neutral, yellow or sometimes purplish; pappus

rate to lanceolate, with awn up to 0.5 mm long. Cypselas about 1 mm long, hispid. $2n = 28$ (Turner, 1959; Jackson, 1962).

Helenium flexuosum occurs from New England, south to Florida, west to Texas, and north to Michigan. It is local along roadsides, in meadows, and in pastures in Illinois but is more common in the southern one-half of the state (Fig. 4). It flowers from June to September.

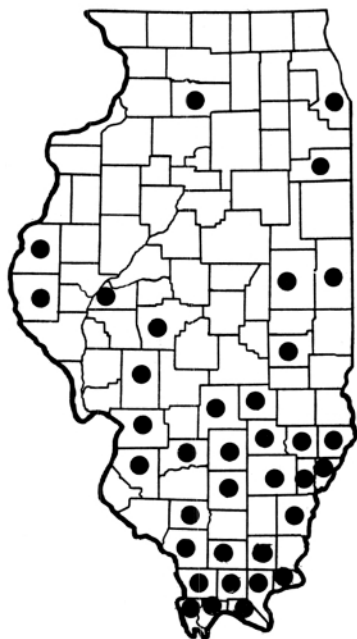


FIGURE 4. Distribution of *Helenium flexuosum* in Illinois.

1. GAILLARDIA Foug., Mem. Acad. Sci. Paris 1786:5. 1788.
 Gaillardia Foug., Obs. Phys. 29:55. 1786. sine sp.
 Gaillardia Lam., Encyc. 2:590. 1788.
 Helonaea Buchoz ex Lam., Encyc. 2:590. pro syn.
 Virgilia L'Her., Virgilia 1788.
 Colantherus Raf., Amer. Mo. Mag. 2:268. 1818.
 Centheria Spreng., Syst. 3:356. 1826.
 Prostylis Less., Syn. Comp. 239. 1832.
 Gassizia Gray & Engelm. ex Gray, Proc. Amer. Acad. Arts 1:49. 1847, non Chav., 1830.
 Annual, biennial, or perennial herbs, rely suffruticose at base. Leaves alternate or basal, entire to pinnatifid. Heads

radiate or discoid; phyllaries in 2-3 series, ovate to lanceolate, at least upper reflexed in fruit; receptacle convex to subglobose, alveolate, usually fimbriate, fimbriae soft and short conic to stiff and spine-like; ray-flowers usually neutral, often wanting; ligules, if present, broad, cuneate or flabelliform, deeply 3-lobed, yellow and/or purple; disc-flowers bisexual and fertile, 5-lobate; anthers auriculate at base; style-branches with glabrous and short to hispidulous and filiform appendages; pappus of about 6- to 10-awned scales. Cypselas broadly obpyramidal, wholly or partly covered by long stiff, ascending hairs.

The genus *Gaillardia* consists of about 12 species native to western North America. The genus is represented in Illinois by *G. pulchella* Foug., an escape from cultivation. *Gaillardia aestivalis* (Walt.) Rock (= *G. lutea* Greene; *G. lanceolata* Michx.) has been attributed to Illinois by Biddulph (1944) on the basis of a single specimen collected by Otto Kuntze supposedly near Cairo, Alexander County. The Kuntze specimen deposited in the herbarium of the New York Botanical Garden has the following on its label: "*G. lanceolata* 2868, 9/9/74" (in one handwriting) "2868, Cairo U. St." (in a second handwriting). Kuntze (Rev. Gen. 339. 1891) states the following: "*Gaillardia lanceolata* Michx. U. St.: Cairo, Miss." Thus there is no mention of Illinois either on the label of Kuntze's specimen or in his publication although Biddulph specifically cites it from Cairo, Alexander County, Illinois. If the species was once in Illinois it has not been collected since 1874 although on the other hand, it may never have been collected in Illinois at all but at some other location. In view of the uncertain occurrence of *G. aestivalis* in Illinois, the author has chosen not to include it in this treatment.

1. GAILLARDIA PULCHELLA Foug., Mem. Acad. Sci. Paris 1786:5. 1788.
Gaillardia bicolor Lam., Encyc. 2:590. 1788, pro syn.
Virgilia heliodes L'Her., Virgilia. 1788.
Gaillardia lobata Buckl., Prod. Acad. Phila. 1861:459. 1862.

Branched annual herbs; stems 2-6 dm tall; striate, short-hirsute with ascending hairs; lower leaves oblanceolate, 4-8 cm long, 0.5-2.0 cm wide, bluntly toothed or lobed, short-petiolate, upper leaves oblong-lanceolate, 2-6 cm long, 0.5-1.5 cm wide, acute, base sessile, often somewhat clasping, densely hispid beneath, sparsely long pubescent above. Heads terminal, 3-6 cm wide; peduncles 5-15 cm long; phyllaries lanceolate, long-acuminate, herbaceous with chartaceous bases, hirsute

and ciliate above; receptacle fimbriatae subulate, stiff, longer than achenes; ray-flowers neutral, ligules 1-2 cm long, 3-lobate, yellow with purple base or wholly purple; disc-flowers yellow below, purple above; pappus of lanceolate scales 5-6 mm long, gradually tapering into an awn equaling body. Cypselas 2.0-2.5 mm long, densely hirsute. $2n = 34$ (Biddulph, 1944, Stoutamire, 1955, 1958, 1960); $2n = 36$ (Biddulph, 1944).

Gaillardia pulchella occurs naturally in dry sandy prairies and openings from Colorado and New Mexico, east to Minnesota, Nebraska, Missouri, and Louisiana and as an escape along roadsides and in waste ground east to the Atlantic states. It occurs as an escape locally throughout Illinois (Fig. 5). It flowers from June to July.

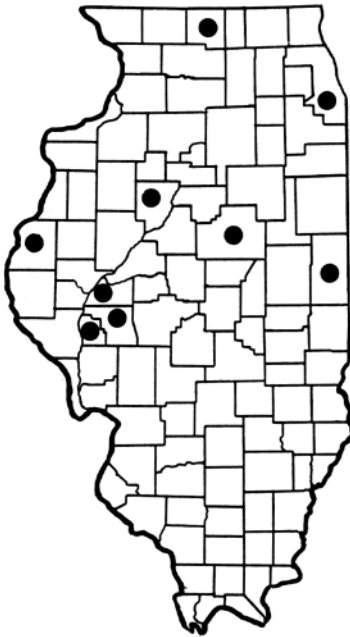


FIGURE 5. Distribution of *Gaillardia pulchella* in Illinois.

4. HYMENOXYSS Cass., Diet. Sci. Nat. 55:278. 1828.

Actinella Nutt., Gen. 2:113. 1818, in part, non Pers., 1807.

Pieradenia Hook., Fl. Bor.-Am. 1:317. 1833.

Phileozera Buckl., Proc. Acad. Phila. 1861:459. 1862.

Tetraneuris Greene, Pittonia 3:265. 1898.

Rydbergia Greene, Pittonia 3:270. 1898
Maddougalia A. Heller, Bull. Torrey Cl. 25:629. 1898.

Plateilema (Gray) Cockerell, Bull. Torr. Club 31:462. 1904.

Aromatic annual or perennial herb leaves alternate or all basal (ours), ent or occasionally pinnately lobed. Head solitary or few, radiate; involucre 2-3-seriate, subequal or slightly imbricate appressed, herbaceous but often scarious margined; receptacle hemispherical conic, naked; disc-flowers perfect, fertile ray-flowers 10-20 pistillate, yellow; athers entire or sagittate at base; style branches flattened, truncate, penicillate pappus of 5-12 hyaline, often aristate scales. Cypselas turbinate, mostly 5-angled, villous or sericeous.

The genus *Hymenoxys* consists of about 15 species native to the western hemisphere and is represented in Illinois by the following single taxon.

1. HYMENOXYSS ACAULIS (Pursh) Parker var. GLABRA (Gray) Park. Madroño 10:159. 1950.

Actinella scaposa (DC.) Nutt. var. *glabra* Gray, Man. Bot. ed. 5. 263. 1867.

Actinella acaulis (Pursh) Nutt. var. *glabra* (Gray) Gray, Syn. Fl. 2:345. 1884.

Tetraneuris herbacea Greene, Pittonia 3:268. 1898.

Actinea herbacea (Greene) B. L. Robinson Rhodora 10:68. 1908.

Actinea acaulis (Pursh) Spreng. var. *glabra* (Gray) Cronquist, Rhodora 47:40. 1945.

Perennial scapose herbs; stems 0.5-2 cm tall; leaves narrowly to broadly lanceolate, 1-8 cm long, 1.5-10.0 mm wide; villous when young, soon glabrate, strongly punctate. Head solitary, 3.5-4.0 cm wide; involucre pubescent to subglabrate 7-8 mm high; phyllaries broadly rounded; ligules 5-20 mm long, yellow; pappus ovate, acute or obtuse, about 2 mm long. Cypselas turbinate, about 3 mm long. Chromosome number unknown.

Hymenoxys acaulis var. *glabra* is very rare and occurs in dry, gravelly bank, stony fields, limestone hills, sandy fields and prairies, only in Mason and Wood Counties, Illinois (Fig. 6), Ottawa County, Ohio, and southern Ontario, Canada. flowers from May to July.

5. HYMENOPAPPUS L'Her., Hymenop. 1. 1788.

Rothia Lam., Jour. Nat. Hist. Paris 1:1792, non Schreber, 1791, nec Borhaus, 1792; nec Pers., 1807.

Biennial or perennial scapose to leaf-stemmed herbs; leaves alternate, pinnatifid or bipinnatifid to rarely simple, produced upwards. Heads several to nume



FIGURE 6. Distribution of *Hymenoxys acaulis* var. *glabra* in Illinois.

us in a corymbiform panicle, radiate or iscoïd; involucre 2- to 3-seriate, inner usually with broad, scarious, petaloid, yellowish or whitish tips, outer herbaceous; receptacle convex or nearly flat, naked or rarely with chaff; ray-flowers, when present, pistillate, fertile, ligules white; disc-flowers perfect, lobes reflexed, yellow or whitish (rarely purple); anthers cordate-sagittate at base; style branches attenuated, with obtuse, papillose appendages; pappus of 12-22 linear to ovate, obtuse, membranous or hyaline scales (rarely wanting). Cypselas turbinate, 4-angled, often striate.

The genus *Hymenopappus* consists of about 15 species native to North America and is represented in Illinois by the following single species.

HYMENOPAPPUS SCABIOSAEUS
L'Her., *Hymenop.* 1. 1788.

Lothia carolinensis Lam., *Jour. Hist. Nat. Paris* 1:17. 1792.

Hymenopappus laxiflorus L'Her., DC. *Prodr.* 5:658. 1836, pro syn.

Hymenopappus carolinensis (Lam.) Porter, *Mem. Torrey Club* 5:338. 1894.

Biennial herbs; stems 3-15 dm tall, occose-tomentose, becoming glabrate below, villous above; leaves pinnatifid or bipinnatifid, subsersistently floccose-to-

mentose below, glabrate above, lower 8-25 cm long, 3-12 cm wide, reduced upwards. Heads several to numerous in open corymbiform inflorescences, 7-12 mm wide; involucre, 7-15 mm high; phyllaries broad, scarious, petaloid white or yellowish; disc-flowers 5-lobed, lobes reflexed, half as long as tube or longer, tube stipitate-glandular, white or yellowish; pappus of 14-18 hyaline obovate scales, up to 1 mm long. Cypselas turbinate, 3.5-5.0 mm long, 4-angled, striate, hirsute principally on angles. $2n = 34$ (Raven & Kyhos, 1961).

Hymenopappus scabiosaeus occurs from Florida to Texas, north to South Carolina, Indiana, Illinois, and Kansas. It is rare in Illinois, known only from Cass, Iroquois, Kankakee, and Mason counties (Fig. 7) where it occurs in open sandy woods and prairies. It flowers from May to June.

6. POLYMNIA L., *Sp. Pl.* 2:926. 1753.

Alymnia Neck., *Elem. Bot.* 1:31. 1790.

Polyniastrum Lam., *Tabl. Enc. t.* 712. 1797.

Smallanthus Mackenz., in Small, *Man. S.E. Fl.* 1406. 1933.

Erect perennial herbs (ours); stems to 3 m tall; leaves opposite, pinnately or palmately veined, sessile or petiolate. Heads paniced corymbs, radiate, involu-



FIGURE 7. Distribution of *Hymenopappus scabiosaeus* in Illinois.

cre subfoliaceous, receptacle flat to convex; ray-flowers pistillate, ligule 2-3-lobate to entire, sometimes wanting, white or yellow; disc-flowers staminate, yellow; pappus wanting. Cypselas obovoid or spherical, slightly flattened laterally or 3- to 5-angled.

The genus *Polymnia* consists of approximately 20 species native to the western hemisphere with two species occurring in Illinois.

Key to the Illinois Species of

Polymnia

1. Leaves pinnately lobed; cypselas 3-angled, not striate. 1. *P. canadensis*

1. Leaves palmately lobed; cypselas slightly flattened laterally, striate. 2. *P. uvedalia*

1. POLYMNIA CANADENSIS L., Sp. Pl. 2:926. 1753.

Polymnia variabilis Poir, Enc. Meth. 5:505. 1804.

Polymnia canadensis L. var. *discoidea* Gray, Gray's Lessons in Bot. & Veg. Physio. 248. 1881.

Polymnia canadensis L. var. *radiata* Gray, Syn. Fl. N. Am. 1:238. 1884.

Polymnia radiata (Gray) Small, Fl. S.E. U.S. 1340. 1903.

Osteospermum canadense (L.) House, Bull. N.Y. State Mus. 243:63. 1923.

Polymnia canadensis L. f. *radiata* (Gray) Fassett, Rhodora 34:96. 1932.

Erect perennial herbs; stems 0.5-1.5 m tall, glandular-pubescent; lower leaves deeply pinnately lobed, up to 4 cm long, 3 cm wide, petiolate, upper triangular-ovate, entire to 3- to 5-lobed, smaller, petiolate. Heads in paniced corymbs, phyllaries 4-6, glandular-pubescent, sub-ovate; ray-flowers 4-6, white or pale yellow, wanting or up to 1.5 cm long, 3-lobate, paleae ovate to ovate-lanceolate; disc-flowers white or pale yellow, paleae elliptic to oblanceolate, nearly equaling disc-flowers. Cypselas asymmetrically obovoid, 3-angled, not striate, 3-4 mm long, about 2-3 mm wide, dark brown to black. $2n = 30$ (Wells, 1965).

Polymnia canadensis occurs from New England, Ontario, and Minnesota, south to Oklahoma, Louisiana, and Georgia. It is common in moist woods throughout Illinois (Fig. 8). It flowers from June to November.

Intraspecific categories based on ligule length of the ray-flowers have been named. The author, like Wells (1965), has chosen to treat these as variants of the species.

2. POLYMNIA UVEDALIA (L.) L., Sp. Pl. ed. 2. 2:1303. 1764.

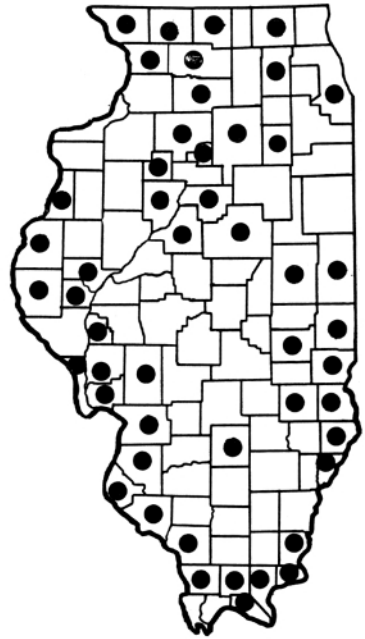


FIGURE 8. Distribution of *Polymnia canadensis* in Illinois.

Osteospermum uvedalia L., Sp. Pl. 2:926. 1753.

Polymnia macrophylla Raf., Fl. Ludov. 70. 1817.

Polymniastrum uvedalia (L.) Small, in Small and Carter, Fl. Lancaster Co. 302. 1913.

Polymnia uvedalia (L.) L. var. *genuina* Blake, Rhodora 19:47. 1917.

Polymnia uvedalia (L.) L. var. *densipila* Blake, Rhodora 19:48. 1917.

Polymnia uvedalia (L.) L. var. *floridana* Blake, Rhodora 19:48. 1917.

Smallanthus uvedalia (L.) Mack., in Small Man. S.E. Fl. 1406. 1933.

Erect perennial herbs; stems up to 3 m tall, glabrous to densely glandular-pubescent; lower leaves deeply palmately 3- to 5-lobed, to 7 cm long, 4 cm wide, sessile or with winged petioles, upper leaves ovate, entire or toothed, sessile. Heads in paniced-corymbs, phyllaries 4-6, 20 mm long, ovate to ovate-lanceolate; ray-flowers 7-13, yellow, ligule about 3 cm long, paleae ovate, acuminate; disc-flowers yellow, paleae lanceolate. Cypselas asymmetrically obovoid, laterally compressed, striate, 5-6 mm long, 3-4 mm wide. $2n = 32$ (Wells, 1965).

Polymnia uvedalis occurs from Ne

England west to Missouri, south to Texas and Florida. It has recently been introduced into Bermuda (probably between 1883 and 1904 or 1905, cf. Wells, 1965). It is found in rich woods and is uncommon in southern Illinois (Fig. 9). It flowers from July to September.

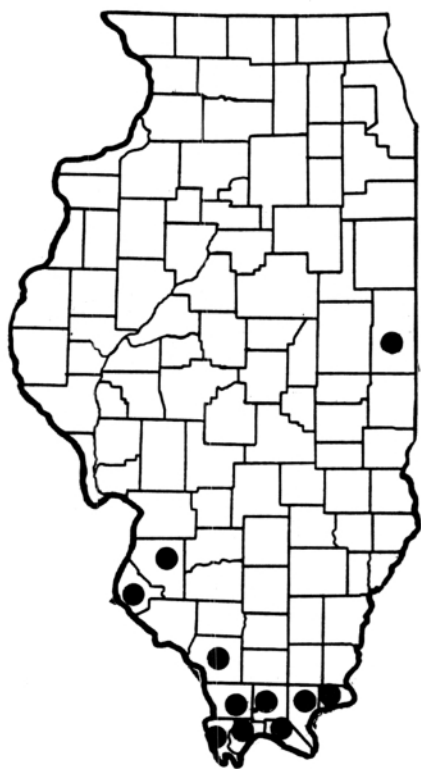


FIGURE 9. Distribution of *Polymnia wedalia* in Illinois.

The three varieties proposed by Blake (1917) and recognized by some authors are differentiated primarily on peduncle vestiture as well as geographical distribution. Because of the broad overlap in their ranges and the lack of clear-cut distinctions among them, the author does not treat these variations as varietal entities

of the species. This treatment of the species is also now advocated by Wells (pers. comm.).

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