

## The North Texas Species of *Heterotheca*, Including *Chrysopsis* (Compositae)

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The species of *Chrysopsis* of the United States and Mexico fall into strikingly heterogeneous groups. One, with slender, parallel-veined leaves and sericeous pubescence (*C. graminifolia* and allies), was treated by Nuttall (the original author of *Chrysopsis* itself) under *Pityopsis*. Another, with shorter or broader net-veined leaves and long, soft pubescence (*C. gossypina* and allies) has traditionally been regarded as typical *Chrysopsis*. Species of both groups are characterized by having conspicuous rays, and double pappus in all florets. On the Pacific Coast occurs the small section *Ammodia*, comprising plants with rayless flower heads, outer pappus reduced or vestigial, and net-veined, hispid-pubescent leaves. In the Rocky Mountains, Great Basin, and Southwestern Desert is found a complex multitude of forms treated as typical *Chrysopsis*, with conspicuous rays, double pappus, and net-veined, hispid-pubescent leaves. In Mexico and the southern United States occurs still another group of species with conspicuous rays, double pappus (except in ray florets, where it is absent or only vestigial), and net-veined, hispid-pubescent leaves; these form the small genus *Heterotheca*. Rather inconsistently, while most botanists have consented to the merger of all but the last group under one genus (Fernald, for example, refers to *Pityopsis* as a "hardly worth-while genus"), none has been willing to take the further small and obvious step of adding the last group as well. Yet *Heterotheca* resembles most of the western species of *Chrysopsis* (including *Ammodia*) far more than any of these resemble species of the *Pityopsis* group. The sole distinction, absence of pappus in the ray florets of *Heterotheca*, is vitiated by its occasional presence in vestigial form in Mexican species (*vide* Gray and De Candolle), and by the partial reduction of pappus in *Ammodia*. It is a strange logic which decrees that reduction of pappus in ray florets shall require maintenance of a separate genus, while the much greater reduction involved in loss of ray florets altogether shall require only the recognition of a separate section, even

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though coupled with reduction of pappus in the remaining florets. Certainly if *Monoptilon* is made to include *Eremiastrum* (Hall, 1907), or *Gutierrezia* to include *Amphiachyris* (Blake, 1924), on the grounds that difference in pappus alone, where pappus is variable, should not require separation of genera, even conservative taxonomists should not be disturbed by a merger of *Heterotheca* and *Chrysopsis*. Probably the greatest deterrent to such a change is the fact that *Chrysopsis*, with numerous species, was given generic status later than the small genus *Heterotheca*. The prospect of a horde of new combinations on this account is not really the whole story. *Chrysopsis* has never been monographed, and even if retained, a revision must certainly involve a large number of name changes. Since nomenclatorial upsets are inevitable in any case, this last feeble objection to transferring *Chrysopsis* to *Heterotheca* in toto can be even more readily dismissed. The present paper deals primarily with those species to be included in a forthcoming flora of north-central Texas; some additional transfers for species outside this area are given at the end.

## KEY TO NORTH TEXAS SPECIES

- 1a. Leaf blades grass-like: linear-lanceolate, acute or acuminate, with prominent midrib and fainter parallel veins; stem and leaves silvery with closely appressed hairs.....*H. nervosa*
- 1b. Leaf blades not grass-like: linear-lanceolate to ovate, with divergent and branching side veins, or without evident side veins; stems with spreading or both spreading and appressed hairs, leaves green to gray with sparse or dense, soft or rough pubescence
  - 2a. Upper and middle stem leaves tapered to slender petiole-like bases, only the midrib prominent; summer- or fall-flowering perennials from woody crowns or stolons
    - 3a. Leaves of peduncles or ultimate flowering branchlets oblanceolate, 3-5 times as long as wide; leaves gray with dense soft pubescence .....*H. canescens*
    - 3b. Leaves of peduncles or ultimate flowering branchlets linear or linear-oblanceolate, 8-15 times as long as wide; leaves green, hispid-pubescent .....*H. stenophylla*
  - 2b. Middle and upper stem leaves little or not at all narrowed at base (may be constricted above base), slightly to strongly clasping; annuals or short-lived perennials from taproots, flowering spring to fall, or even in winter
    - 4a. Leaves all narrowly oblong to oblanceolate, sessile and slightly clasping, softly hairy or nearly smooth on both sides; upper leaves (at base of inflorescence)  $4\frac{1}{2}$ -8 times as long as wide  
 —*H. pilosa*
    - 4b. Leaves diverse: lowest (present in winter and spring, often absent from fall-flowering plants) conspicuously petioled, with oblong-oval blades and petiole usually enlarged and winged-clasping at base; upper leaves oblong-lanceolate to oval, sessile and clasping; leaf blades scabrous above, rather rough-pubescent with long spreading hairs beneath; upper leaves (at base of inflorescence)  $1\frac{1}{2}$ -4 times as long as wide.....*H. latifolia*

1. **HETEROTHECA nervosa** (Willd.) Shinners, comb. nov. *Erigeron nervosum* Willd., Sp. Pl. (ed. 4) 3 pt. 3: 1953. 1803. (Fide Fernald, 1942.) *Chrysopsis nervosa* (Willd.) Fernald, Rhodora 44: 471. 1942. Sandy soil, East Texas Pine Belt; known from Angelina, Harris, Jasper, Leon, Newton, Tyler, and Walker counties.

2. **HETEROTHECA canescens** (DC.) Shinners, comb. nov. *Aplopappus? canescens* DC., Prodr. 5: 349. 1836. *Chrysopsis canescens* (DC.) T.&G., Fl. N.A. 2: 256. 1842. (Not *C. canescens* DC., 1836.) *C. Berlandieri* Greene, Erythea 2: 96. 1894. On various soils, chiefly sandy or mixed sandy and silty or gravelly, from Tarrant, Somervell, and Travis counties westward.

3. **HETEROTHECA stenophylla** (Gray) Shinners, comb. nov. *Chrysopsis hispida* var. *stenophylla* Gray, Pl. Lindh. II (Journ. Bost. Nat. Hist. Soc. 6): 223. 1850. "On the Llano growing, from strong ligneous roots, in the crevices of smooth granite rocks." *C. stenophylla* (Gray) Greene, Erythea 2: 96. 1894. Less common than *H. canescens*, and slightly more western, occurring eastward only to Clay and Hays counties.

4. **HETEROTHECA pilosa** (Nutt.) Shinners, comb. nov. *Chrysopsis pilosa* Nutt., Journ. Phila. Acad. 7: 66-67. 1834. "The grassy plains of the Arkansas, collected by myself and since by Dr. Pitcher" (Pitcher specimen examined, Herb. Acad. Nat. Sci. Phila.). *Chrysopsis Nuttallii* Britton, Mem. Torr. Bot. Club 5: 316. 1894. A common annual weed of sandy open woods and fence-rows, west to Cooke and Montgomery counties.

5. **HETEROTHECA LATIFOLIA** Buckley, Proc. Acad. Nat. Sci. Phila. 13 (1861): 459. 1862. "Llano County." (Type examined in Herb. Acad. Nat. Sci. Phila.) A very common weed of sandy or sandy clay soils (rarely in silty or eroding clayey soils) nearly throughout the state. Essentially annual, living from spring to fall, or often winter annual, and frequently short-lived perennial, exhibiting a confusing diversity of leaf forms. Probably the southeastern representative of this species, long known as *H. subaxillaris*, is varietally distinct. Its leaves are scabrous beneath with short, thick-based, often sparse hairs, instead of the long, slender, rather dense hairs of the Texas plant. Final disposition of

the two cannot be made without an examination of the type of *Inula subaxillaris* Lam., at Paris, and a revision of *Heterotheca* (*sensu stricto*). It is probable that Lamarck's plant is not the one to which his epithet has been applied. A translation of critical parts of Lamarck's description, and a list of pertinent synonyms, is given below. One additional name, *Inula punctata* Muhl., Cat. p. 76, 1813 (listed as a synonym of *Chrysopsis* or *Heterotheca scabra* by Elliott and De Candolle), was a *nomen nudum* and can be disregarded.

INULA SUBAXILLARIS Lam., Encyl. Meth. Bot. 3: 259. 1799. Compared by its author with his *Inula glandulosa*, a plant doubtfully referred by Gray to *Chrysopsis gossypina*; distinguished from it "at first sight by its much smaller flowers, not arranged in an umbelliform corymb; by its peduncles hispid but not with stalked and viscid glands. ... Stem cylindrical, striate, branched and even somewhat paniced at summit, where it has short hairs which make it scabrous. Its leaves are alternate, sessile, lanceolate, slightly toothed, and scabrous on both sides, where they have short somewhat rough hairs. The peduncles are one-flowered, hispid, with several linear and narrow bracts; some are terminal and others arise from the axils of the upper leaves. ... The flowers are small, yellow, radiate, erect; they have the calyx imbricated, of narrow linear bracts, slightly villous, loose or slightly curved back at apex. This *Inula* grows in Carolina, Maryland, and perhaps other parts of North America. The pappus of the seeds is reddish." In the plant passing for *Heterotheca subaxillaris*, the peduncles are both hispid and glandular, with both sessile and stalked glands; the lower leaves are conspicuously petioled, the upper oblong-lanceolate, sessile and clasping. Cassini, in describing the genus *Heterotheca* (the generic diagnosis fortunately is unequivocal), did not see Lamarck's own plant, but another which had been identified as Lamarck's species. Nuttall and De Candolle both considered Lamarck's plant identical with *Chrysopsis divaricata* (Nutt.) Ell. (i.e. *Isopappus divaricatus* (Nutt.) T.&G., or *Haplopappus divaricatus* (Nutt.) Gray).

INULA SCABRA Pursh, Fl. Am. Sept. 2: 531. 1814. *Inula subaxillaris* Lam. is cited as synonym. Pursh's epithet is therefore illegitimate under Article 60 of the Rules of Nomenclature, outlawing such superfluous names.

*INULA SCABRA* Pursh, *sensu* Nutt., Gen. 2: 151. 1818. This name was certainly taken from Pursh, for it is not marked with the asterisk Nuttall used to distinguish his own species. Though no specific reference to Pursh is made under it, he says in the introduction to volume 1 (p. vii), "A brief Catalogue of the species is offered, which may be considered as supplementary to the recent and extensive Flora of North America by Frederick Pursh." Nuttall's citation of the occurrence of the plant in Georgia was merely supplementary information, not a statement of a type locality. Elliott, in transferring this to *Chrysopsis*, mentions both Pursh and Nuttall. De Candolle, in transferring it to *Heterotheca*, mentions only Nuttall and Elliott, omitting Pursh, the real author of the name.

*HETEROTHECA LAMARCKII* Cassini, Dict. des Sci. Nat. 21: 131. 1821? *Inula subaxillaris* is cited as synonym, and Lamarck's specimen must be regarded as the type of Cassini's species, despite the fact that Cassini based his description largely on other and probably specifically or generically different material.

*CHRYSOPSIS SCABRA* (Pursh) Ell., Sk. Bot. S.C. & Ga. 2: 339. 1823.

*HETEROTHECA SCABRA* ("Nutt.") DC., Prodr. 5: 317. 1836. The correct author citation of course is (Pursh) DC.

*CHRYSOPSIS LAMARCKII* (Cass.) Nutt., Trans. Amer. Philos. Soc. n.s. 7: 315. 1840.

*HETEROTHECA SUBAXILLARIS* (Lam.) Britton & Rusby, Trans. N.Y. Acad. Sci. 7: 10. 1887.

Despite the fact that the various authors were describing two or more different species, all the names go back ultimately to *Inula subaxillaris* Lam., and all must be placed in the synonymy of that species, whatever its true identity proves eventually to be. The first name clear of any such complication is Buckley's *Heterotheca latifolia*, and as already noted, this plant, primarily of Texas and Oklahoma, is perhaps to be regarded as varietally distinct from the plant of the Southeast. One more easterly collection of *H. latifolia* may be cited: 1.3 miles northeast of Epes, Greene Co., Alabama, sandy silt road fill, Tombigbee River bottoms, *Shinners 12717*, July 28, 1950.

## ADDITIONAL TRANSFERS

Without a revision of the enlarged genus, no complete list of necessary transfers from *Chrysopsis* to *Heterotheca* can be given. The following includes most of the Texas species, and a number of others of fairly clear identity.

**HETEROTHECA Breweri** (Gray) Shinners. *Chrysopsis Breweri* Gray, Proc. Amer. Acad. 6: 543. 1865.

**HETEROTHECA camporum** (Greene) Shinners, comb. nov. *Chrysopsis camporum* Greene, Pittonia 3: 88. 1896.

**HETEROTHECA echioides** (Benth.) Shinners, comb. nov. *Chrysopsis echioides* Benth., Bot. Voyage H.M.S. Sulphur p. 25. 1844.

**HETEROTHECA foliosa** (Nutt.) Shinners, comb. nov. *Chrysopsis foliosa* Nutt., Trans. Amer. Philos. Soc. n.s. 7: 316. 1840.

**HETEROTHECA fulcrata** (Greene) Shinners, comb. nov. *Chrysopsis fulcrata* Greene, Bull. Torr. Bot. Club 25: 119. 1898. "Collected at various places in the White Mountains and Organ Mountains at elevations of 6000 to 6500 feet (nos. 510, 511, 512)." LECTOTYPE (personally designated at the Greene Herbarium; the only cited specimen showing the root): Near Cherokee Bill's Spring, White Mountains, alt. 6300 ft., Lincoln Co., New Mexico, *E. O. Wooton*, 511, Aug. 21, 1897.

**HETEROTHECA gossypina** (Michx.) Shinners, comb. nov. *Inula gossypina* Michx., Fl. Bor. Am. 2: 122. 1803.

**HETEROTHECA graminifolia** (Michx.) Shinners, comb. nov. *Inula graminifolia* Michx., Fl. Bor. Am. 2: 122. 1803.

**HETEROTHECA mariana** (L.) Shinners, comb. nov. *Inula mariana* L., Sp. Pl. (ed. 2) 2: 1240. 1763.

**HETEROTHECA microcephala** (Small) Shinners, comb. nov. *Chrysopsis microcephala* Small, Fl. S.E. U.S. 1182 and 1339. 1903.

**HETEROTHECA oregona** (Nutt.) Shinners, comb. nov. *Ammodia oregona* Nutt., Trans. Amer. Philos. Soc. n.s. 7: 321-322. 1840.

**HETEROTHECA Rutteri** (Rothrock) Shinners, comb. nov. *Chrysopsis villosa* var. *Rutteri* Rothrock, Rept. U.S. Geogr. Surv. W. of 100th Merid. (Wheeler Rept.) 6: 142. 1878.

**HETEROTHECA sessiliflora** (Nutt.) Shinners, comb. nov. *Chrysopsis sessiliflora* Nutt., Gen. 2: 150. 1818.

**HETEROTHECA trichophylla** (Nutt.) Shinners, comb. nov. *Inula trichophylla* Nutt., Gen. 2: 150. 1818.

**HETEROTHECA villosa** (Pursh) Shinners, comb. nov. *Amellus villosus* Pursh, Fl. Am. Sept. 2: 564. 1814.

**HETEROTHECA wisconsinensis** (Shinners) Shinners, comb. nov. *Chrysopsis wisconsinensis* Shinners, Wrightia 1: 218-219. 1948.

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