

Key to *Heterotheca* of the northern Great Plains: Illinois, Iowa, Minnesota, Nebraska, North Dakota, South Dakota, and Wisconsin. Based on Guy Nesom's treatment of *Heterotheca* section *Chrysanthae* (Phytoneuron 2020-68 & Phytoneuron 2020-67). Written by Patrick J. Alexander, 28-31 Jan 2022. My usage of the term "hispid-strigose" may benefit from a definition: having short, coarse trichomes that are \pm perpendicular from the leaf or stem surface at the base but curved antrorsely to become \pm parallel to the surface at the tip.

- 1 Plants annual or biennial; bases of cauline leaves auriculate-clasping; pappus absent on ray flowers, present on disk flowers
..... *Heterotheca subaxillaris*
This species is uncommon in Illinois, Iowa, and Nebraska. The proximal cauline leaves are usually petiolate, with ovate blades and the bases of the petioles auriculate-clasping. The distal cauline leaves are sessile, auriculate-clasping, and usually ovate.
- 1 Plants perennial; bases of cauline leaves not auriculate-clasping; pappus present on ray and disk flowers
 - 2 Leaf surfaces eglandular or inconspicuously glandular and the glands obscured beneath eglandular pubescence
 - 3 Heads on mostly leafless peduncles, > 2 cm above the uppermost leaves or bracts; leaves sparingly serrate or not
..... *Heterotheca camporum*
This species is relatively widespread in the eastern United States. It is found throughout Illinois and probably reaches the northwestern extent of its native range in the northwest corner of the state. It may be found sporadically elsewhere in the northern Great Plains, though. Both Sempel (in the Flora of North America treatment) and Nesom indicate that it is spreading along transportation corridors and sometimes becomes established beyond its native range. Serrate leaf margins are often given as the defining feature of *Heterotheca camporum*, but this is unreliable in Illinois. Plants to the south and east, *Heterotheca camporum* var. *glandulissima*, are densely glandular, \pm hispid, sometimes have bracts nearing or subtending the heads, and at least the larger cauline leaves are serrate. The plants in Illinois, *Heterotheca camporum* var. *camporum*, are more densely strigose, less glandular, less bracteate, with narrower and more entire leaves. These features become more pronounced as you move north in the state, and in northern Illinois the leaves are nearly linear, evenly strigose or almost sericeous, and only rarely serrate.
 - 3 Heads subtended by leafy bracts or on leafy peduncles, < 1 cm above the uppermost leaves or bracts; leaves entire
 - 4 Stems strigose, trichomes predominately ascending to appressed, sometimes with a sparser overstory of long, spreading trichomes
 - 5 Leaf surfaces finely to loosely strigose, the trichomes not stiff and pustulose-based; cauline leaves usually broadly oblanceolate and with rounded apices *Heterotheca villosa*
Prior to Nesom's revision, this has been treated as a very widespread, polymorphic species found throughout western North America and eastward through much of the Great Plains and Midwest. *Heterotheca villosa* sensu stricto is restricted to the northern Great Plains, and is found throughout the Dakotas, Nebraska, and western Minnesota. The heads are usually subtended by one or more broadly lanceolate to oblong bracts longer than the phyllaries. The difference in pubescence between this and *Heterotheca angustifolia* is easily recognizable once seen a few times.
 - 5 Leaf surfaces strigose with long, stiff, pustulose-based trichomes; cauline leaves usually narrowly oblanceolate, the apices acute *Heterotheca angustifolia*
Found throughout Nebraska, uncommon in South Dakota and the west edge of Iowa. The heads are usually ebracteate but may have small, oblanceolate, and usually prominently and stiffly ciliate bracts about as long as the phyllaries. This species is more silvery than *Heterotheca villosa*. Nesom describes this and *Heterotheca scabrifolia* as having narrowly revolute leaf margins, but I find that I cannot recognize this feature reliably in either species.
 - 4 Stems hirsutulous to hirsute, the trichomes spreading to deflexed
 - 6 Heads with >25 rays; involucre >13 mm wide on pressed plants; plants from western North Dakota eastward to western Wisconsin *Heterotheca ballardii*
Found throughout North Dakota, most of Minnesota, and in northeastern South Dakota. The heads are on longer peduncles, in a more open inflorescence, than those of *Heterotheca villosa*. Capitular bracts are usually present but relatively inconspicuous, usually similar in length to the phyllaries.
 - 6 Heads with <25 rays; involucre <13 mm wide on pressed plants; plants of western North and South Dakota
..... *Heterotheca hispida*
This species is very similar to *Heterotheca ballardii*. The two occur together in a narrow band of western North Dakota and may be difficult to distinguish in that area.
 - 2 Leaf surfaces conspicuously glandular, the glands at most partially obscured
 - 7 At least the larger cauline leaves sparingly serrate *Heterotheca camporum*
See above, first lead of couplet 3. The more glandular forms of this species are more reliably serrate.
 - 7 Cauline leaves entire
 - 8 Stems glandular, along with eglandular pubescence; heads often subtended by 1-3 leafy bracts
 - 9 Glandular pubescence of the stems stiffly hirsute *Heterotheca wisconsinensis*

This is a narrowly-distributed and distinctive species of the Central Sand Plains of Wisconsin. It has often been included in *Heterotheca villosa* but resembles some of the more hispid and glandular forms of *Heterotheca camporum* in the Ozark Mountains and on the Cumberland Plateau more than it does *Heterotheca villosa*.

9 Eglandular pubescence of the stems hispid-strigose *Heterotheca scabrifolia*

This species is peripheral in the area covered by this key, uncommon in southern Nebraska. The leaves are linear-oblong to oblanceolate. The heads are often subtended by several oblanceolate bracts, like the distal cauline leaves but smaller.

8 Stems eglandular, with dimorphic, 2-storied pubescence: a sparser overstory of long, spreading trichomes above a short, hirsutulous to hispid-strigose understory; heads not subtended by leafy bracts *Heterotheca hirsutissima*

This species is found primarily around the southern Rocky Mountains and reaches its northeastern extreme in western Nebraska. Plants have many heads per stem, in a corymboid inflorescence. Heads occasionally have a lone, linear bract not much larger than the outer phyllaries. The cauline leaves are mostly elliptic to oblong, loosely strigose to hispid-strigose on the surfaces.