

Key to *Heterotheca* of New Mexico, based on Guy Nesom's treatment of *Heterotheca* section *Chrysanthae* (Phytoneuron 2020-68). Written by Patrick J. Alexander, 10-24 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; mid-cauline leaves sessile or petiolate, either the base of the blade or the base of the petiole auriculate-clasping; pappus absent on ray flowers, present on disk flowers ..... *Heterotheca subaxillaris*  
 Found in various more or less mesic habitats in west-central to southwestern New Mexico, in sandy habitats of eastern New Mexico, and at scattered sites in between. The lowest cauline leaves, often senesced by flowering, are petiolate with the base of the petiole auriculate-clasping and the blade ovate, 1-1.5 times longer than wide. The middle cauline leaves are sessile and auriculate-clasping at base, oblong to narrowly ovate, 2-4 times longer than wide, sometimes narrowed toward in the basal quarter or so between the auricles and the main body of the blade. The distal cauline leaves are sessile, ovate, cordate to auriculate-clasping at base. Some treatments separate *Heterotheca psammophila* and *Heterotheca subaxillaris* based on features of the leaves. While plants seem to vary somewhat in how far up the stem transition points between the three leaf morphologies described above occur, I don't think separating species is tenable.
- 1 Plants perennial; mid-cauline leaves sessile or petiolate but never auriculate-clasping; pappus present on both ray and disk flowers
  - 2 Leaves prominently glandular; eglandular pubescence often present as well, but sparser than the glands and not at all obscuring them; leaves green
    - 3 Stems eglandular, with dimorphic, 2-storied pubescence: an overstory of long, spreading trichomes and an understory of much shorter spreading, ascending, or sometimes loosely appressed trichomes
      - 4 At least some of the heads usually subtended by leaflike bracts; eglandular pubescence of the leaf surfaces hirsutulous to hirsute, or (rarely) absent; larger cauline leaves usually oblanceolate ..... *Heterotheca paniculata*  
 This species resembles *Heterotheca hirsutissima* and apparently grades into it. It is usually a more sprawling plant of rocky sites, while *Heterotheca hirsutissima* is more hemispherical and more often in loamy to gravelly soils. The cauline leaves are often weakly conduplicate and  $\pm$  contorted. The dimorphic pubescence of the stems in both this species and *Heterotheca hirsutissima* becomes  $\pm$  monomorphic on the peduncles.
      - 4 None of the heads subtended by leaflike bracts (occasionally one or two linear bracts are present, these not much larger than the outer phyllaries); eglandular pubescence of the leaf surfaces loosely strigose to hispid-strigose; larger cauline leaves usually obovate to elliptic ..... *Heterotheca hirsutissima*  
 In its typical form the leaves of this species are loosely strigose and a little grayish, glandular but not conspicuously so. Nesom mentions a collection from El Malpais, Cibola County with "the habit of *Heterotheca hirsutissima* but atypical vestiture—densely glandular with reduced non-glandular vestiture". Plants fitting that description seem to be found occasionally throughout the range of the species and can be difficult to distinguish from *Heterotheca paniculata*.
    - 3 Stems glandular and strigillose to hirsute with  $\pm$  monomorphic, eglandular pubescence; much longer, spreading trichomes absent or very sparse
      - 5 Eglandular pubescence hirsutulous to hirsute, sometimes very sparse
        - 6 Plants stipitate-glandular throughout; heads not subtended by leafy bracts ..... *Heterotheca viscida*  
 A plant of southwestern New Mexico and one of the most easily recognizable *Heterotheca* in the state. It does not appear to intergrade with any of the others, though occasional plants of *Heterotheca arizonica* with poorly developed bracts might cause confusion.
        - 6 Plants generally sessile-glandular, or if stipitate-glandular in part then at least the phyllaries sessile-glandular; heads subtended by leafy bracts
          - 7 Bracts subtending the heads elliptic to ovate, much longer than the phyllaries; bracts usually with only a few long, spreading cilia on the basal margins, or these absent; plants of the Sacramento Mountains / Sierra Blanca area, and Salinas Peak ..... *Heterotheca cryptocephala*  
 As the name suggests, the heads are usually  $\pm$  obscured by the bracts. The typical form of this species is very distinctive, but occasional plants are intermediate between it and *Heterotheca sierrablancensis*. There may also be intermediates with *Heterotheca fulcrata* along southern or lower elevation margins of the range of *Heterotheca cryptocephala*.
          - 7 Bracts subtending the heads linear-lanceolate to narrowly elliptic, a little shorter to a little longer than the phyllaries, prominently ciliate for most of their lengths; plants of southwestern New Mexico ..... *Heterotheca arizonica*  
 This species is uncommon in the state. Nesom cites 6 collections, SEINet produces one more. With the exception of one from near the Plains of San Agustin, these are in the Florida Mountains and westward.
  - 5 Eglandular pubescence strigillose, strigose, or hispid-strigose
    - 8 Plants hispid-strigose, on the eastern plains ..... *Heterotheca scabrifolia*

It is not clear if this species is truly present in the state. Nesom cites two questionable records in Union and Roosevelt counties, indicating he has not seen either. In Oklahoma, primarily around the Wichita Mountains, there is a form of this species that is prominently pustulose-hispid and has a dense whorl of long, linear bracts subtending each head. The typical form on the plains is hispido-strigose and has 0–2 bracts subtending each head.

8 Plants strigillose or strigose, in the western half of the state

9 Heads ebracteate; leaves sparsely strigose, rarely ciliate; plants bushy with many long, mostly unbranched stems; leaves many but widely spaced, small, usually oblanceolate, 2–4 mm wide ..... *Heterotheca polothrix*

A distinctive slickrock plant, peripheral in northwestern New Mexico, more common to the west. There are occasional plants that appear intermediate between this species and *Heterotheca hirsutissima*, but confusion in identifying this species is otherwise unlikely. Plants in / near New Mexico seem to have strigose pubescence on both the stems and leaves, but pubescence of the stem varies across the range of this species.

9 Some or all of the heads usually subtended by large, leafy bracts; leaves strigillose, usually some of the leaves or bracts sparsely but conspicuously long-ciliate; plants few-stemmed, not bushy; leaves large, oblanceolate, 4–10 mm wide ..... *Heterotheca nitidula*

Though usually included with the prominently bracted plants of *Heterotheca fulcrata* s.l., the bracts do not seem to be a reliable feature of this species, at least in plants I have seen in New Mexico. There may be a single leafy bract immediately subtending the head & exceeding the phyllaries, or the cauline leaves may simply diminish in size up the stem, the uppermost relatively small & narrow, a few mm to 1 cm below the head. When present, the subtending bracts are usually prominently ciliate. The strigillose pubescence of the leaf surfaces is usually sparse enough to place these plants in my first lead of couplet 2. Sometimes the eglandular pubescence is a little denser and the glandular pubescence sparser, so *Heterotheca nitidula* is found under the second lead as well.

2 Leaves usually glandular, but inconspicuously so; eglandular pubescence more abundant than the glands and generally obscuring them to some degree; leaves usually grayish to silver

10 Leaves silvery, linear to narrowly oblanceolate; plants of the eastern plains

5 Plants caespitose; leaf surfaces strigose with long, straight, pustulose-based hairs; leaves of the distal stems and peduncles usually oblanceolate to linear-oblanceolate, usually spreading at base and bent upward about midlength, usually ciliate toward the base or along the entire margin, the cilia stiffly spreading ..... *Heterotheca angustifolia*

Nesom indicates that the leaf margins of both this and *Heterotheca scabrifolia* are revolute, and uses this feature in keys. I cannot recognize this feature reliably enough to use it for identification.

5 Plants rhizomatous, forming colonies; leaf surfaces sericeous, the hairs thin, silky and usually somewhat flexuous; stems usually without any long, spreading hairs; leaves of the distal stems and peduncles usually linear, sometimes linear-oblanceolate, usually ascending at base and ± straight or gently recurved near the apex, usually eciliate or sparsely ciliate basally, the cilia often somewhat ascending ..... *Heterotheca canescens*

This species appears to be consistently distinct from *Heterotheca angustifolia*, but when the rhizomatous habit is not obvious the differences between the two can be subtle and may require familiarity with both species.

10 Plants not as above; either the leaves not silvery, or broader, or plants not on the eastern plains

11 Some or all of the heads subtended by leafy bracts equalling or exceeding the phyllaries

12 Plants forming low mounds; bracts and distal cauline leaves oblanceolate, bases long-attenuate; plants alpine or subalpine ..... *Heterotheca pumila*  
Apparently rare in New Mexico. Nesom cites a single specimen from the Culebra Range, Taos County.

12 Plants more upright; bracts and distal cauline leaves ± elliptic, bases rounded to cuneate; plants often montane but neither alpine nor subalpine

13 Stems and leaves strigillose, excepting occasional spreading trichomes on the stems and a few marginal cilia on the leaves; bracts 0 or 1; plants of west-central New Mexico ..... *Heterotheca nitidula*

Although I do not like to rely on capitular bracts for this species at couplet 11, neither do I wish for it to appear in triplicate. *Heterotheca nitidula* is easily recognizable once its acquaintance has been made, so I hope the reader comes to know it first by plants that key more easily.

13 Stems and leaves usually hirsutulous to hirsute-villous, or occasionally loosely strigose; bracts 1–3; plants of south-central New Mexico and along the southern edge of the state ..... *Heterotheca fulcrata*

This is one of the more easily recognizable *Heterotheca*, found in the southern mountains of the state. There may be some intermediates between it and *Heterotheca cryptocephala*.

11 Heads not subtended by leafy bracts; occasionally with a lone, linear bract not much larger than the outer phyllaries

14 Plants ± silvery; both stems and leaves densely strigose; leaf surfaces either eglandular or the glands obscured

15 Plants tall (usually > 40 cm); stems erect to ascending; inflorescences corymboid, with many heads on spreading branches ..... *Heterotheca zionensis*

This species is found primarily in the southern third of the state and along the western edge, but is also common around Santa Fe. Both the Santa Fe population and those in southern New Mexico are typically on roadsides and in other disturbed areas.. Nesom suggests that at least the Santa Fe population is likely introduced. Plants can become quite large and robust, reaching 150-200 cm under good conditions. The leaves are typically elliptic to oblong and often widely spreading in the basal half, but bent to become nearly ascending in the distal half. The stems often have a sparse overstory of long, spreading trichomes above the dense, strigose understory.

- 15 Plants short (usually > 40 cm); plants usually more or less rhizomatous or decumbent, often forming low mounds or loose mats with the stems ascending to erect distally; inflorescences with few heads, these mostly on long, erect or strongly ascending peduncles ..... *Heterotheca pedunculata*

This species is found in the northern third of the state from montane woodlands to subalpine or alpine habitats. It becomes more mound-forming at higher elevations.

- 14 Plants generally grayish, occasionally greenish; stems and leaves loosely strigose to hispid-strigose or hirsute; usually at least the adaxial leaf surfaces evidently glandular, the glands only partially obscured

- 16 Plants usually many-stemmed and  $\pm$  hemispherical, at least the outer stems widely spreading to sprawling; stem pubescence dimorphic, 2-storied, with a sparser overstory of very long, spreading trichomes and a denser, hirsutulous to hispid-strigose or loosely strigose understory ..... *Heterotheca hirsutissima*

This species is found in a variety of habitats across the northern two-thirds of the state and is probably the most widely abundant *Heterotheca* in New Mexico. Nesom discusses several unusual forms that may be encountered, although the 2-storied pubescence should help clarify otherwise ambiguous plants. Plants can, occasionally, have linear, inconspicuous bracts subtending some of the heads. The cauline leaves are often bent upward, sometimes contorted.

- 16 Plants few-stemmed, stems erect or ascending; stem pubescence hispid-strigose to hirsute, not dimorphic although occasionally with a few longer, spreading trichomes

- 17 Leaves loosely strigose to hispid-strigose on the surfaces; leaf apices broadly rounded and prominently apiculate; plants of low elevations, rocky areas in southeastern New Mexico..... *Heterotheca loboensis*

This species is most likely to be confused with *Heterotheca zionensis*. It is apparently rare in New Mexico; Nesom cites a single specimen in southwestern Chaves County.

- 17 Leaves finely and usually densely strigose on the surfaces; leaf apices rounded to acute, not or indistinctly apiculate; plants of the montane arc from the Capitan Mountains south to the Guadalupe Mountains

..... *Heterotheca sierrablancensis*

This species is most similar to *Heterotheca hirsutissima*, but the ranges of the two do not overlap. *Heterotheca sierrablancensis* is endemic to roughly the same area as *Heterotheca cryptocephala* and, although in their typical forms the two can hardly be confused, occasional plants may be intermediate between them.