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The Texas Species of Dyssodia (Compositae)

Marshall C. Johnston

The genus *Dyssodia* is an American group of tagetineous composites with perhaps forty species in North and Central America and several more in South America. About half are subtropical and half warm-temperate in preference, though at least two reach the cool temperate parts of the continents. The genus is represented in Texas by 14 species, one of these by two varieties.

I aim: (1) to distinguish by key the species of *Dyssodia* in Texas; (2) to map their Texas distribution as indicated by herbarium specimens; and (3) briefly, to indicate and discuss their relationships and nomenclature. Upwards of 2500 herbarium specimens have been examined.[1] Many of these were not collected in Texas; this over-all survey threw much taxonomic light on, and indeed was prerequisite to an adequate understanding of, the Texas members of the group.

Dyssodia here is used in the probably too wide sense of O. Hoffmann (1890) and subsequent modern workers, in lieu of a much-needed reëvaluation of taxa within the Tageteneae.[2] The uneven segregation of genera and species by Ryd-

[1]The specimens were those of the University of Texas Herbarium (TEX), Gray Herbarium (GH), Southern Methodist University Herbarium (SMU), Sul Ross State College Herbarium (SRSC), and Herbarium of the Instituto de Biologia at Chapultepec (MEXU). To the curators, directors, and staffs of those herbaria I am grateful.

[2]Such a reëvaluation is projected by the present writer. He urges all collectors to help build up herbarium stores for study. Western and southern Mexico is especially in need of collecting.

berg (1915), based mainly on technicalities of pappus-form, does not improve on the excellent but piecemeal treatments by Gray more than a half-century previously. Indeed, Gray's last generic treatment (1883) has not yet been improved upon, though his treatment of species shows an imperfect perception of affinities. My own studies lead me to a great deëmphasis of the significance, both on a generic and a specific level, of certain of the pappus modifications. From this deëmphasis follows, for instance, the present treatment of *D. aurea,* submerging in that species plants which at first were considered as generically distinct by Gray, and later maintained as specifically distinct by Gray, Robinson, and Rydberg. On the other hand, the characters of the involucre, largely linked with those of habit and foliage, have been found to be highly significant. The key will reflect this, since I have tried to use natural groupings within it.

Synonymy will be given here only when the treatment differs from that of Rydberg (1915). A fuller synonymy is given by that author.

The full geographic ranges of the taxa are outlined in the text. Ranges in Texas are indicated separately, on the maps.

An explanation of the character of the involucre in *Dyssodia* may facilitate use of the key. The involucre consists of two subequal alternate series of imbricate principal phyllaries, which in most, but not all, species are more or less united. The involucre of many species in addition has some outer, smaller, accessory phyllaries, which collectively constitute the calyculum.

KEY

1 Principal phyllaries of involucre free for more than half their length [annual herbs; involucre calyculate; leaves once or twice pinnately parted; pappus paleae multisetose] . . . . . 1. *Dyssodia papposa*
1 Principal phyllaries of involucre united for more than half their length (their margins in some species free, not connate, for more than half their length) (2)
2 Annuals or short-lived perennials, erect or diffusely spreading or even prostrate; leaves alternate or partly opposite, usually not rigid (at least not wiry), entire or dentate or few-lobed or in several species pinnatisect (3)
3 Annuals or short-lived perennials; involucre calyculate (but in *D. micropoides* obscured by pubescence) (4)
4 Accessory phyllaries calyculate, foliose, toothed or shortly subulately lobed laterally; margins of principal phyllaries free for more than half their length [erect herbs with more or less stout taproots and linear laciniate-dentate leaves] . . . . . 2. *Dyssodia tagetoides*
4 Accessory phyllaries entire, not foliose, toothed, nor lobed;

margins of principal phyllaries connate high up (these characters obscured by pubescence in *D. micropoides*) (5)
5 Plants woolly (densely floccose-lanate); leaves entire, spatulate; plants depressed or diffusely spreading from a slender taproot . . . . . 3. *Dyssodia micropoides*
5 Plants not densely woolly, often glabrous; leaves not spatulate [accessory phyllaries small, triangular-acuminate, often connate to the principal involucre] (6)
6 Pappus paleae 10, in two alternate series of 5 each, either all awnless or some of them 1-awned (7)
7 Inner 5 pappus paleae 1-awned from a bifid apex, outer 5 erose, awnless, short . 4. *Dyssodia Treculii*
7 All 10 pappus paleae awnless, erose, subequal, or the inner 5 slightly longer and occasionally 1 or 2 of them 1-awned . . . . . 5. *Dyssodia texana*
6 Pappus paleae 10, each 3-awned (8)
8 Plants erect or usually tending to spread diffusely; leaves more or less rigid, all pinnatisect into 7-11 subulate filiform setulose-mucronate divisions . . . . . 6. *Dyssodia tenuiloba*
8 Plants tending to be erect; leaves not at all rigid, either entire and linear or almost filiform or with 1-3 linear lobes, about 2.5 cm. long . 7. *Dyssodia Wrightii*
3 Slender annuals; calyculum absent (9)
9 Margins of principal phyllaries entirely connate; principal phyllaries truncate but with very short abruptly acuminate apices . . . . . An extralimital north-Mexican complex, perhaps all one species, including *D. tenuifolia* (Cass.) Loes., *D. Neaei* (DC.) Rob., & *D. diffusa* (Gray) Rob.
9 Margins of principal phyllaries free for about half their length [the involucre more or less fluted; pappus either of several short non-aristate paleae or of about 10 long multisetose paleae] . . . . . *Dyssodia aurea* (10)
10 Pappus of several short non-aristate paleae . . . . . 8a. *Dyssodia aurea* var. *aurea*
10 Pappus of about 10 long multisetose paleae . . . . . 8a. *Dyssodia aurea* var. *aurea*
2 Strong perennials, erect or somewhat diffusely spreading; leaves opposite, usually rigid or even wiry, entire or pinnatisect (11)
11 Leaves linear, entire or appearing so (or with small leaves appearing fascicled in the axile) [margins of the principal phyllaries connate high up] (12)
12 Plants shrubby from a woody base, not tomentose; pappus of more than ten paleae, each 3- or 5-setose; small leaves fascicled at the axils . . . . . 9. *Dyssdia acerosa*
12 Plants not so woody at base, rising from a thick tap root; whole plant canescent-tomentose including the peduncles; pappus of 10 paleae, each 3- or 5-setose; foliage not as in *D. acerosa* . . . . . 10. *Dyssodia tephroleuca*
11 Leaves pinnatisect, some with the 2 or 4 lateral lobes basal, but rarely do these appear fascicled in the axils (13)
13 Plants griseous-tomentose; leaves short; margins of principal phyllaries free for about half their length; the distal third or quarter of the principal phyllaries free and gradually tapered to a long-acuminate apex . . 11. *Dyssodia setifolia*
13 Plants glabrous or pubescent, sometimes griseous but not tomentose; leaves relatively longer; margins of principal phyllaries usually free for at least half their length, but in *D. Hartwegii* connate high up (14)
14 Involucre turbinate or sub-cylindric, usually about 4 mm. broad or less; margins of the principal phyllaries usually connate almost to the top; peduncles averaging less than 4 cm. long; pappus of 10 paleae, in 2 series of 5 paleae each,

alternate, the 5 inner paleae 1-awned from a bifid apex, the 5 outer paleae short, awnless . . 12. *Dyssodia Hartwegii*
14 Involucre deeply campanulate to hemispheric, usually at least 5 mm. broad; margins of the principal phyllaries free for more than half their length; peduncles averaging more than 5 cm. long; pappus of 10 paleae, in 2 series of 5 paleae each, alternate, the 5 inner paleae 1-awned from a bifid apex (sometimes appearing 3-awned) (15)
15 Outer pappus paleae short, awnless . . . . . 13. *Dyssodia pentachaeta*
15 Outer 5 pappus paleae 1-awned . 14. *Dyssodia Thurberi*

1. *Dyssodia papposa* (Vent.) Hitchc.

A common weedy annual, highly variable but almost uniformly so throughout its wide range: southern Ontario, to Montana, Arizona, and south in the highlands of Mexico to Jalisco and Oaxaca; adventive in Maine. The plants of the mountains of trans-Pecos Texas and Mexico may deserve recognition under the name *D. fastigiata* DC. (*Boebera roseata* Rydb.); but from my own field observations they appear to merit neither specific nor varietal status. *Dyssodia papposa* is more closely related to the typical *Dyssodia* of Mexico than any other Texas species.

2. *Dyssodia tagetoides* T.&G. Type collected in Texas, Drummond (type! GH).

This species is restricted to loamy calcareous soils in north-central Texas and south-central Oklahoma. It is quite uniform throughout its range. Though certainly a congener, its affinities within the genus are uncertain.

3. *Dyssodia micropoides* (DC.) Loes. Type was collected at Monterrey, Nuevo Leon, *Berlandier* (isotype! GH).
Bahia depressa M. E. Jones. syn. fide Blake, Contr. U.S. Natl. Herb. 29:133, 1945.

This distinctive species occurs exclusively on arid calcareous uplands, sometimes seemingly on bare limestone; it ranges from southwestern Texas to central Coahuila and central Nuevo Leon. Its affinities are uncertain.

4. *Dyssodia Treculii* (Gray) Rob. Type was collected in southeastern Texas, *Trecul* (type! GH).

This species in confined to dry calcareous soils near the Rio Grande in Texas, and ranges southwest to northern Nuevo Leon and northeastern Coahuila. It is closely related to *D. texana* and *D. tenuiloba*. See the remarks under those species.

5. *Dyssodia texana* Cory. Type was collected at Camp

Barkeley near Abilene, Taylor County, Texas, *Tolstead 7030* (type! GH; isotype! SMU).

A restricted endemic known only from arid calcareous soils in Tom Green, Runnels, and Taylor counties, Texas. *D. texana* is perhaps conspecific with *D. Treculii.* The two species are identical except for pappus-form. Their ranges are separated by more than 100 miles.

6. *Dyssodia tenuiloba* (DC.) Rob. Type was collected between Laredo and San Antonio, Texas, *Berlandier 2063* (isotype! GH).

D. tenuiloba is a fairly variable species ranging from northern Tamaulipas and northeastern Coahuila onto the Rio Grande plain of Texas and as far north as the Central Mineral Region in Llano and Burnet counties; near a line running from eastern Nueces County north through Goliad to Gonzales County it contacts *D. Wrightii,* and near this contact area may show some slight tendency to intergrade with that species.

D. texana, D. Treculii, D. tenuiloba, and *D. Wrightii* are more closely related to each other than to other species. In details of involucre they are very nearly identical; they

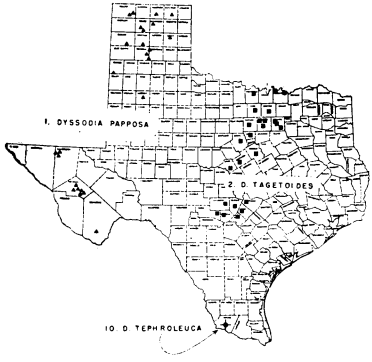
7. *Dyssodia Wrightii* (Gray) Rob. Type was collected in differ in pappus-form, and to some extent in habit.

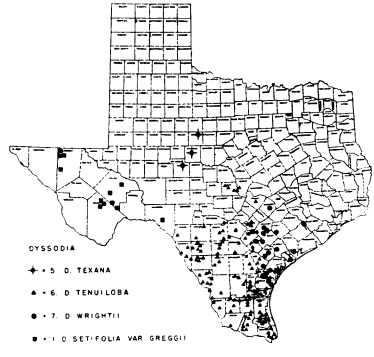
dry post-oak woods between the Rio Colorado and the 'Rio Guadalupe,' Texas, *Wright* (type! GH).

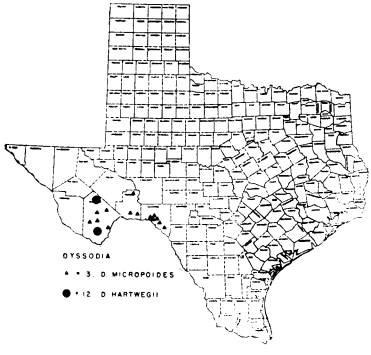
The species is restricted to sandy soils of the central part of the Texas coastal plain. See the discussion under *D. tenuiloba.*

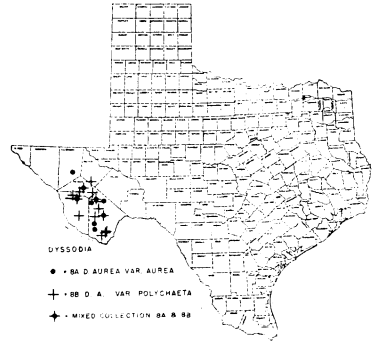
8a. *Dyssodia aurea* (Gray) A. Nels. var. *aurea.* Type was collected between Cold Spring and Upper Spring, west of Cimarron Creek, New Mexico, *Fendler* (type! GH). See the discussion under 8b. *D. aurea* var. *polychaeta.*

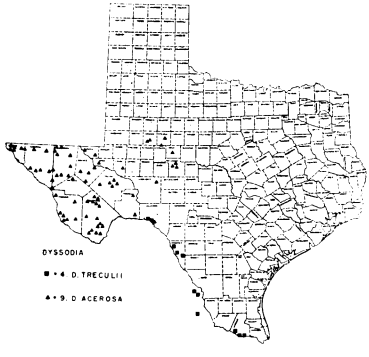
8b. *Dyssodia aurea* var. **polychaeta** (Gray) comb. n. *Hymenatherum polychaetum* Gray, Pl. Wright. 1:116. 1852. Type was collected in prairies at the pass of the Limpia, Jeff Davis County, Texas, *Wright 360 partim.* I was unable to locate a type in the GH material. Gray's No. 360 of Wright's collection, a single plant mounted on the same sheet as the type of var. *aurea,* is also var. *aurea.* No. 360, as Gray stated (l.c.), is a mixture of *aurea* and *polychaeta,* as received, and as distributed.

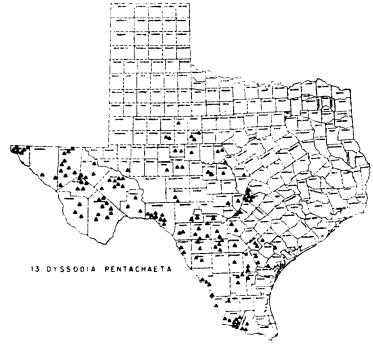

1. DYSSODIA PAPPOSA
2. D. TAGETOIDES
10. D. TEPHROLEUCA


DYSSODIA
5. D. TEXANA
6. D. TENUILOBA
7. D. WRIGHTII
11. D. SETIFOLIA VAR. GREGGII


DYSSODIA
3. D. MICROPOIDES
12. D. HARTWEGII


DYSSODIA
8A D. AUREA VAR. AUREA
8B D. A. VAR. POLYCHAETA
MIXED COLLECTION 8A & 8B


DYSSODIA
4. D. TRECULII
9. D. ACEROSA


13. DYSSODIA PENTACHAETA

Was the type of *polychaeta* distributed to, and is it now in, some other herbarium? At any rate, the description is not ambiguous; the application of the name is not in doubt.

Dyssodia aurea, a very uniform species, ranges from southern Colorado to Coahuila and Durango. It may be segregated into the two varieties indicated above. They overlap in range: var. *aurea* ranges from southern Colorado south to northern Chihuahua; var. *polychaeta* ranges from Durango and Coahuila north to southwestern New Mexico and to Jeff Davis and Reeves counties, Texas. As Gray pointed out, only the pappus-form serves to distinguish the two taxa. In the overlap area of their ranges, both pappus-types may occur in the same population.[3] No morphological intermediates have been seen. It seems likely that the pappus-form is not of specific value, and is probably controlled by one gene or one small gene-bloc.

9. *Dyssodia acerosa* DC. Type was collected in San Luis Potosi, *Berlandier 3340* (fragment of type! GH).

This is a uniform desert species, ranging from southern Utah, southern Nevada, and northern New Mexico, south to Zacatecas and Hidalgo. Its affinities are uncertain, other than that it is certainly a *Dyssodia,* sensu latissimo.

10. *Dyssodia tephroleuca* Blake. Type was collected 8 miles north of Rio Grande City, Starr County, Texas, *E. U. Clover 1825* (U.S. Natl. Herb., not seen).

This species is known only from the type collection, made in 1932. Recent field trips in the vicinity of the type locality have not turned up any further material.

11. *Dyssodia setifolia* (Lag.) Rob. Type was collected in Mexico.

The species as a whole occurs on arid calcareous uplands (rarely or never on igneous rocks) in the eastern Mexican highlands from Hidalgo, Queretaro, and Guanajuato north to central Nuevo Leon and Coahuila, and as far north as the Guadalupe Mountains of trans-Pecos Texas and New Mexico. It is a highly uniform species throughout its range in

[3]This is exemplified by the following mixed collections; (1) the type collection of var. *polychaeta*; (2) between Playas and the Copper Mines [in southern Grant County] New Mexico, *Wright 1243*, cited by Gray, *Pl. Wright.* 2:93, 1852, not located in GH material; (3) 2 miles within Presidio County, Texas, on the road from Valentine to Marfa, *L. C. Hinckley* 1633 (! GH, SMU, TEX); (4) Alpine, Brewster County, Texas, *Geo. Wm. Brown* 130 (! TEX); (5) Dog Flats, Brewster County, *O. E. Sperry* 1425 (! SRSC); (6) Colonia Diaz, northern Chihuahua, *E. W. Nelson* 6446 (! GH); and (7) 0.9 mile south of Candelaria, northern Chihuahua, *M. C. Johnston* 2739 (! TEX).

all respects but pappus-form. In the southernmost part of the range the pappus is often of 10 paleae in 2 alternating series of 5 each, the inner 5 paleae being 1-awned or some of them awnless like the outer 5. Northward, the awns are absent, and the paleae (by reduction and fusion) are fewer, until in the northern part of the range the pappus paleae are completely fused into a subentire cup in which individual paleae are no longer distinguishable. All the southern plants, with two or more paleae, fall into the typical variety *setifolia*. The northern plants, with cup-like pappus, including all those found in the United States, may be called

Dyssodia setifolia var. **Greggii** (Gray) comb. n. *Thymophylla Greggii* A. Gray. Pl. Fendl. 92. 1849. Type was collected in dry valley and upland near Buena Vista, Coahuila, *Gregg*, in 1847 (type! GH).

12. *Dyssodia Hartwegii* (Gray) Rob. Type was collected in Aguascalientes, *Hartweg 129* (type! GH). Gray's description was based, at least in part, on *Wright 364* from hills near El Paso, but the name was published as a synonym of a preempted Bentham name based on *Hartweg 129*. I am unable to locate *Wright 364* in GH material. Judging from the description, it may not be *D. Hartwegii*. Rydberg (1915:176) apparently considered *Wright 364* to be *Thymophylla gracilis* Rydb., the type of which is probably *D. pentachaeta*.

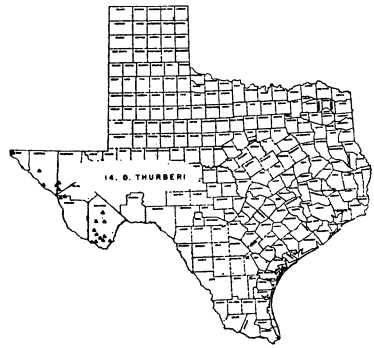
The species occurs in arid highlands, often on calcareous pockets in mostly igneous country, and it ranges from Aguascalientes north through Durango, western Coahuila, and Chihuahua, to the Chiricahua mountains of southeastern Arizona and the Glass and Chisos mountains of Brewster County, Texas. It is rare on the fringes of its range; I have seen only two specimens from Texas. *D. Hartwegii* is to be distinguished carefully from the closely related *D. pentachaeta*, extreme examples of which may have the margins of *some* of the principal phyllaries connate high up, simulating *D. Hartwegii* or *D. Treculii*.

13. *Dyssodia pentachaeta* (DC.) Rob. Type was collected near Monterrey, Nuevo Leon, *Berlandier 1382* (isotype! GH).

Hymenatherum Berlandieri DC. Type was collected between Santander and Victoria, Tamaulipas, *Berlandier 2253* (isotype! GH).

Thymophylla myriophylla Rydb. Type was collected at Laredo, Texas, *J. Reverchon 3982* (isotype! SMU). Other Rydbergian names are no doubt synonyms of *D. pentachaeta,* but I have not seen the types. *Thymophylla gracilis* Rydb. is based on *D. Griffiths 622* from Barstow, Ward County, Texas; plants answering to its description are not uncommon in southwestern United States. *T. villosula* Rydb. is based on a Wright collection from western Texas. *T. puberula* Rydb. is based on *Schaffner 328* (*754*) from San Luis Potosi; Rydberg reports it to occur in Texas, and I have seen Texas plants answering to its description. *T. canescens* Rydb., based on *Parry & Palmer 515* from San Luis Potosi, is probably also a synonym here. The holotypes of all these segregates are in the herbarium of the New York Botanical Garden.

Dyssodia pentachaeta occurs mainly on arid calcareous uplands, and ranges from Texas, southeastern New Mexico, and southern Arizona, south to Baja California, Chihuahua, Hidalgo, and Tamaulipas. It is quite variable, especially in indument and foliage-habit. In extreme examples the margins of some of the principal phyllaries on some heads are connate for more than half their length, but this is rarely or never the case on all heads of any one plant. The species is very closely related to *D. Thurberi,* and also fairly closely to *D. Hartwegii*; those three species and *D. Belenidium* are more closely related to each other than to other species.



14. *Dyssodia Thurberi* (Gray) A. Nels. Type was collected near El Paso, *Wright 1408* (type! GH).

This is a desert species, often found in dry gravelly washes and arroyos, but also on uplands, often calcareous.

It ranges from southern New Mexico, southern Nevada, and southeastern California to Chihuahua, Durango, Coahuila, and western Tamaulipas. *D. pentachaeta* and *D. Thurberi* are very closely related; their ranges overlap extensively, but are not entirely coextensive. *D. Thurberi* is not so variable as *D. pentachaeta.*

I can find no substantial characters to distinguish *D. Thurberi* from *D. Belenidium* (DC.) Macloskie. That species occurs in the arid temperate parts of South America. The only specimen I have seen of it is from Cacheuta, Dep. de Lujan, Argentina, *Palacios, Cuezzo, & Balegno 1789* (TEX). *D. Belenidium* is the older name, but I hesitate to submerge *D. Thurberi* in synonymy after having seen so little South American material. It is not improbable that the species is bicentric in distribution; the list of species known to inhabit the arid parts of both American continents is significantly long (Bray, 1900; Johnston, 1940).

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Theodor Hielscher, Early Texan Naturalist

S. W. Geiser

In Dr. Adolf E. Zucker's recent volume[1] on the political refugees of the German Revolution of 1848 in the United States, is printed a brief biographical sketch of Theodor Hielscher, teacher, editor, and naturalist, who lived the last 31 years of his life in Texas. Principally it was lived as that of a teacher in the well-remembered German-English School of San Antonio (1876-79), and as head of the public schools at Eagle Pass on the Rio Grande. Zucker's account (which is compiled from earlier fragmentary references found in the literature)[2] suffers the usual faults of such compilations, being a *mélange* of fact and fiction, with little regard to sequences. This is not in derogation of Zucker's general

[1] A. E. Zucker, *ed. The Forty-Eighters: Political Refugees of the German Revolution of 1848.* New York, Columbia University Press, 1950. [p. 304]
[2] Zucker cites as his authorities: F. I. Herriott, *Trans. Ill. Hist. Soc.*, 1928; Veit Valentin, *Geschichte der deutschen Revolution*, Berlin, 1930, [vol. 2, p. 578]; G. A. Zimmermann, *Deutsch in Amerika*, Chicago, 1892.