

NEW TAXA AND NEW COMBINATIONS IN *THELESPERMA*  
(ASTERACEAE: COREOPSIDEAE) FROM MÉXICO

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ABSTRACT

*Bidens muelleri* Sherff and *Bidens muelleri* var. *graminiformis* Sherff are transferred to *Thelesperma*, the latter as a distinct species, *T. graminiformis* comb. nov. A hexaploid phase of *T. simplicifolium* A. Gray from Nuevo León and southernmost Coahuila is described as *T. simplicifolium* var. *macrocarpum* var. nov.; and *T. ramosius* S.F. Blake is transferred to the *T. megapotamicum* (Spreng.) O. Ktze. species complex as *T. megapotamicum* var. *ramosius* comb. nov.

KEY WORDS: Asteraceae, Coreopsideae, *Thelesperma*, *Bidens*. México.

The main purpose of this publication is to legalize several new names in *Thelesperma* so they may be used in the author's treatment of this genus in the soon to be published Asteraceae of México (Turner & Nesom, in prep). More detailed morphological, chromosomal, flavonoid, and distributional data will be published elsewhere.

*Bidens muelleri* Sherff includes two geographically/morphologically diverse elements, var. *muelleri* - a very easily recognized dwarf, yellow rayed, caespitose perennial (Figure 1) that is endemic to the rock strewn, windswept alpine meadow atop Cerro Potosí, a 3650 meter promontory above Galeana, Nuevo León, México; and var. *graminiformis* Sherff - a taller, more robust taxon with longer leaves, longer narrower leaf segments, and longer stouter lateral branches and peduncles (Figure 2) found in open meadows (3 sites, 2800-3030 m) on the forested flanks of Peña Nevada, a mountain complex on the Nuevo León - Tamaulipas border. The sites of these two taxa are separated by approximately 115 kilometers.

In the very brief comments which accompanied the original description of this species, Sherff (1937) noted that the dried capitula of *Bidens muelleri* "offer an illusory resemblance to South American species of *Coreopsis*," but then

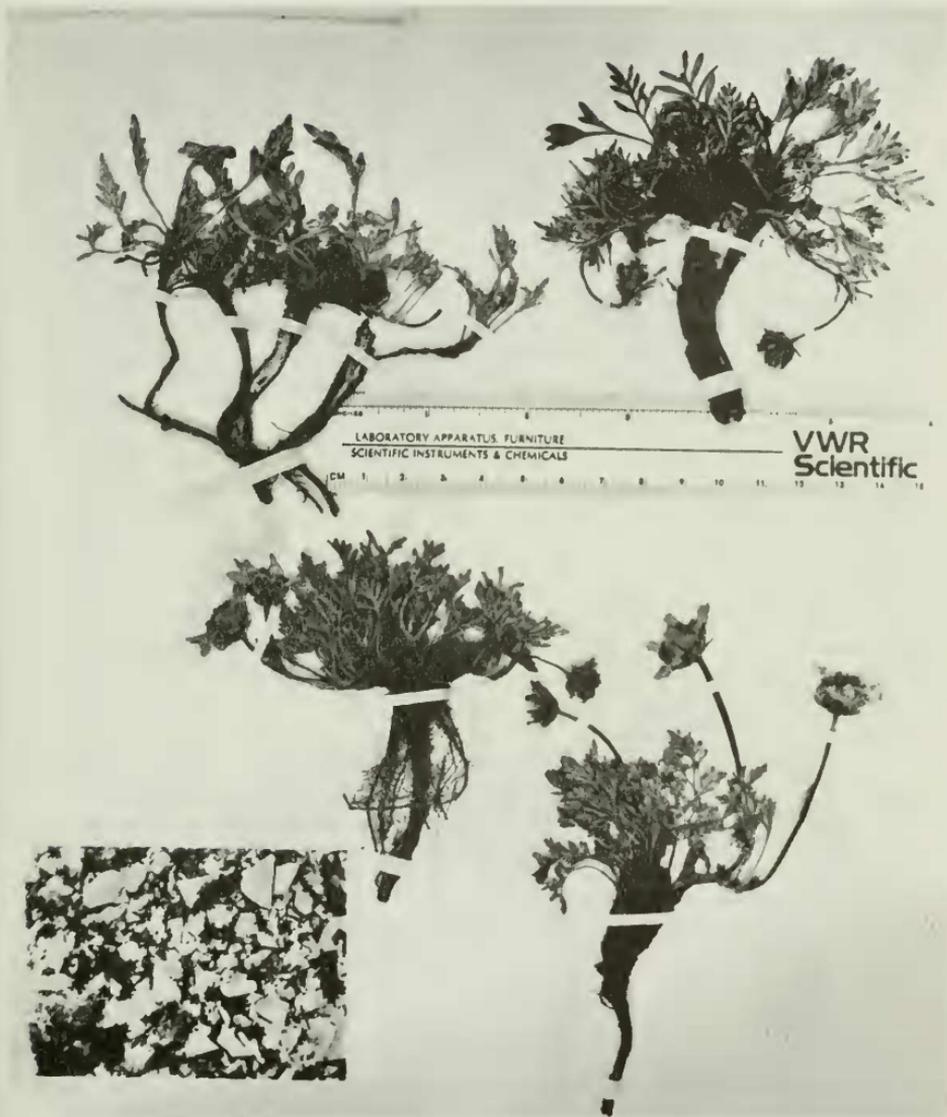


Figure 1. Herbarium specimen of *Thelesperma muelleri*, R.A. Schneider, et al. 940 (F).



Figure 2. Herbarium specimen of *Thelesperma graminiformis*, Stanford, Lauber, & Taylor 2510 (US).

suggested that its closest affinities were probably with *Bidens anthemoides* (DC.) Sherff, *B. andicola* H.B.K., and *B. triplinervia* H.B.K. var. *macranthra* (Wedd.) Sherff. While no specific reasons were given for this assessment, like *B. muelleri*, these particular species of *Bidens* (though much larger) are all prostrate to decumbent perennials with several stems radiating from a central rootstock, highly pinnatisect leaves, and showy yellow rayed heads that are borne on upturned naked peduncles. In short, *B. muelleri* was positioned in *Bidens* largely on the basis of the "apparent" gross morphological similarity, not because of any specific technical features.

Having studied *Thelesperma* (Melchert 1963, 1966) my initial reaction upon viewing the type of var. *graminiformis* was that, except for its nonconnate inner involucre bracts, it looked overall much more like a diminutive *Thelesperma subnudum* A. Gray than any Mexican *Bidens*. More importantly, subsequent examination of a series of *graminiformis* isotypes not available to Sherff, revealed *B. muelleri* to have short, rather squat, incurved, dorsally rounded, somewhat verrucose wrinkled achenes (Figure 3) that are strikingly similar to those of *Thelesperma subaequale* S.F. Blake (a taller, rather slender, *T. simplicifolium* A. Gray-like species found in the mountains of nearby central and western Coahuila); not linear tetragonal achenes with 3 longitudinal ribs per face (2 corner and 1 medial, each), as in the above noted *Bidens* species to which *B. muelleri* was supposedly related. While it is true that a few Mexican species of *Bidens* have small clavate achenes (e.g., *B. mollifolia* Sherff and *B. clavatus* Ballard), close examination of these highly modified achenes always reveals vestiges of the above noted longitudinal ribs, particularly so on their inner surfaces. No such ribs occur on the somewhat concave inner surfaces of *graminiformis* achenes (nor on any other *Thelesperma*).

Additional evidence supporting the transfer of *Bidens muelleri* to *Thelesperma* (S.E.M. of achenes, disc floret morphology, flavonoid chemistry, and inner involucre bract connation pattern) will be presented elsewhere in a paper redefining *Thelesperma*. In Sherff's defense, however, it must be noted that *Thelesperma* was one of the few genera of the Coreopsidinae that he did not monograph or revise personally, the treatment of this genus for the North American Flora being provided by Alexander (1955) who, in turn, had no reason to examine "*Bidens*" *muelleri*.

***Thelesperma graminiformis* (Sherff) Melchert, comb. nov.** BASIONYM: *Bidens muelleri* Sherff var. *graminiformis* Sherff, Brittonia 14:173. 1962. MÉXICO. Tamaulipas: en route to Peña Nevada out of Hermosa, 16 Jul 1949, Stanford, Lauber & Taylor 2510 (HOLOTYPE: US!; Isotypes: MICH!, TEX! [isotypes not seen by Sherff]).

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Nuevo León: Mpio. Zaragoza, ridge top and rocky meadow on N side of northernmost peak of Peña

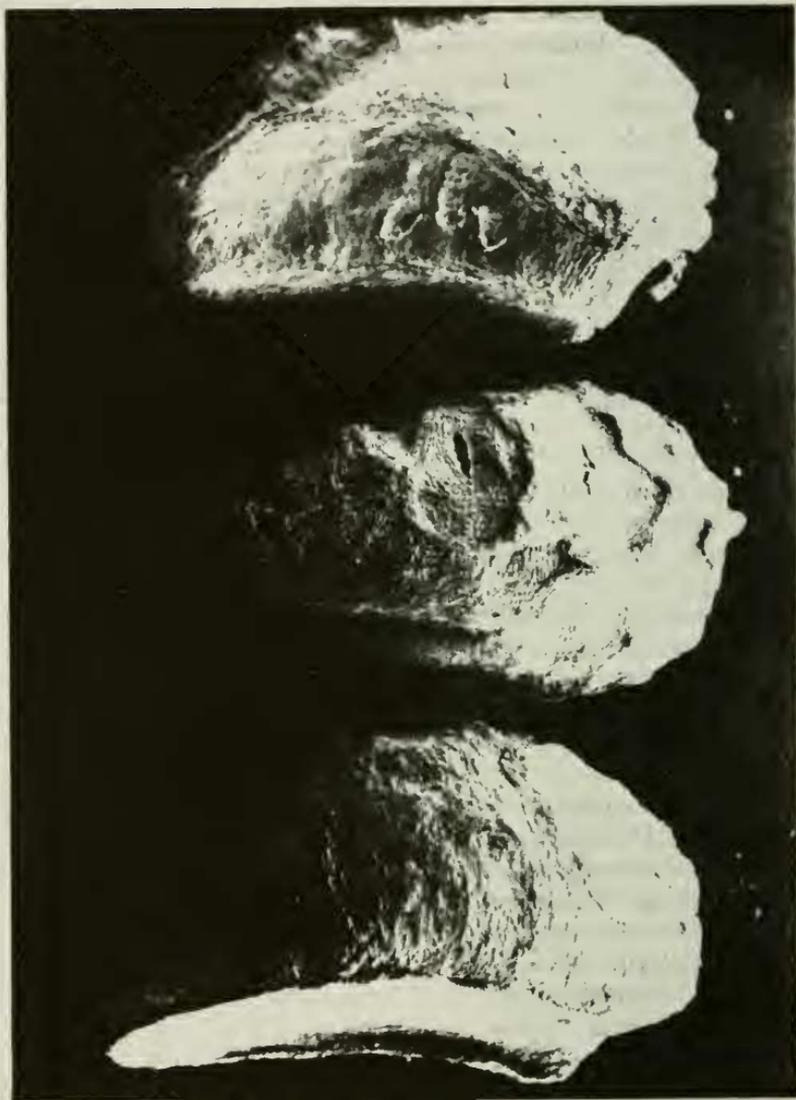


Figure 3. Achenes of *Thelesperma graminiformis*, Stanford, Lauber, & Taylor 2510 (MICH).

Nevada complex, up and S on foot trail from Puerto Pinos (at jct to Joya de San Diego on road from San Antonio de Peña Nevada to Zaragoza, 24° 47' N, 99° 53' W), common in local area of open meadow, 3130 m, 25 Aug 1989, *Guy Nesom, et al. 7139* (TEX); District Dr. Arroyo, Puerto San Onfre, glade in pine forest, 2860 m, 30 May 1978, *G.B. Hinton 17346* (TEX).

The above noted specimens from Nuevo León, both of which were collected subsequent to Sherff's description of var. *graminiformis*, are morphologically very similar to the type. Though unquestionably very closely related to *T. muelleri*, the fact that var. *graminiformis* is isolated on Peña Nevada, ca. 115 km southeast of Cerro Potosí (the only site for *T. muelleri*), and is easily distinguished morphologically, argues for its recognition at the species level.

In contrast to *Bidens muelleri*, the type of var. *graminiformis* contains relatively mature achenes. Although Sherff described the achenes in considerable detail, he inexplicably did so without any phylogenetic comment whatsoever (again, as already noted, he was unfamiliar with *Thelesperma*).

***Thelesperma muelleri* (Sherff) Melchert, comb. nov.** BASIONYM: *Bidens muelleri* Sherff, Field Mus. Publ. Bot. 16:645. 1937. MÉXICO. Nuevo León: abundant in meadow above timberline, peak of Cerro Potosí, Galeana, 21 Jul 1935, *C.H. Mueller 2267* (HOLOTYPE: F!; Isotypes: GH!, MICH! [isotypes not seen by Sherff]).

SPECIMENS EXAMINED (all topotypes): MÉXICO. Nuevo León: Cerro Potosí: 26 Jul 1934, *C.H. & M.T. Mueller 1253* (F, GH, MICH); 20 Jul 1938, *Schneider (and students) 940* (GH, MICH, MO, NY); 1 Jul 1959, *Beaman 2650* (GH, MSC, US); 26 Jun 1960, *Beaman 3345* (GH, MSC); 20 Jun 1972, *Chiang, Wendt, & Johnston 8053* (TEX).

Despite the fact that the population of *Thelesperma muelleri* atop Cerro Potosí has been sampled frequently in recent years (perhaps too often) mature achenes are still unavailable. Submature achenes found on *Schneider, et al. 940* (NY) are similar in size and form to those of *T. graminiformis* (at a similar stage of development). Viewed in an evolutionary sense, it probably represents a dwarf form of *T. graminiformis*. The chromosome number of *T. muelleri* is  $n=11$  (Beaman, *et al.* 1962); that of *T. graminiformis* is unknown.

***Thelesperma megapotamicum* (Spreng.) O. Ktze. var. ramosius** (S.F. Blake) Melchert, comb. nov. BASIONYM: *Thelesperma ramosius* S.F. Blake, Proc. Biol. Soc. Washington 54:20. 1941. MÉXICO. Coahuila: 1 mi S Hermanas, 22-24 Aug 1938, *I.M. Johnston 7059* HOLOTYPE: GH!; Isotype: US!).

*Thelesperma megapotamicum*, an easily recognized, discoid, perennial *Thelesperma* with a disjunct distribution in North and South America (Melchert 1963), includes diploid ( $n=11$ ) and tetraploid ( $n=22$ ) populations. For the

most part, the chromosomal races segregate geographically: diploids occurring on the grasslands of Wyoming and Nebraska, southward through the panhandle of Texas (and disjunctly in Argentina and Uruguay); and tetraploids in the more arid regions of southern Texas and northern México (Coahuila, Chihuahua, and Durango). Both chromosome races occur in the trans-Pecos area of Texas (seemingly in random fashion). Although the plants from México and SW Texas tend to be bushier (have more stems from the base) than their counterparts from more mesic portions of the United States, there is as yet no *sure way* to distinguish the diploids and tetraploids morphologically.

The new combination, *Thelesperma megapotamicum* var. *ramosius* is used here to highlight a geographically restricted series of generally depauperate, small headed, diploid ( $n=11$ ), *T. megapotamicum*-like plants that occur on gypsum soils immediately south of Hermanas, Coahuila, México. In brief, these plants are in all respects similar to *T. megapotamicum* except that they have: (1) unusually slender stems that diverge somewhat at the base before turning upward; (2) notably smaller heads (these only 8-9 mm wide at full anthesis); (3) shorter inner involucral bracts (these ca. 5.0 mm long); and (4) very slender peduncles (these mostly 0.5 mm wide at midpeduncle).

ADDITIONAL SPECIMENS EXAMINED (all topotypes): MÉXICO. Coahuila: 1 mi S of Estación Hermanas, perennial in gypsum, common along roadside, and beneath shrubs, 3 Apr 1970, *Turner 6005* (TEX); same general location, 11 Apr 1970, *Turner 6038* (TEX); 20 May 1972, *Powell & Turner 2259* (TEX); *Powell & Turner 2264* (TEX).

Turner (pers. comm.) has examined this taxon in the field on several occasions. In his opinion, *Thelesperma ramosius* is probably nothing more than a localized gypseous ecotype of *T. megapotamicum*. However, since the chromosome number of *ramosius* is  $n=11$ , not  $n=22$  as in all other Mexican populations of *T. megapotamicum* examined to date, it is provisionally retained here as a separate varietal taxon. More extended chromosomal sampling and experimental study is clearly in order.

*Thelesperma simplicifolium* A. Gray var. *macrocarpum* Melchert, *var. nov.* TYPE: MÉXICO. Nuevo León: Route 60, immediately W of the junction with the road to Galeana, plants rather frequent in rocky terrain along roadside (wooded, high mountain plateau), 9 Sep 1967, *Melchert, Crawford, & Averett 67-3* (HOLOTYPE: TEX!; Isotypes: IA!, MEXU!).

*T. simplicifoliae* A. Gray typicae similis sed acheniis majoribus (4.5-5.5 mm longis vs. 3.0-4.5 mm) clavatis vel ovalibus (vs. subteretibus vel subclavatis), et numero chromosomatum parium  $n=30$  (vs. parium 10, 11, 12, vel 20).

ADDITIONAL SPECIMENS EXAMINED: MÉXICO. Coahuila: Route 54, km 318-319, SW of Saltillo along roadside by railroad tracks, 7 Oct 1971,

Melchert, Ballard, & Hart 71-27 (IA); Route 57, ca. 17 mi SE of Saltillo, 0.6 mi off highway on road to Los Liros, with *T. megapotamicum*, thin gypsum soil along roadside, 7 Oct 1971, Melchert, Ballard, & Hart 71-33 (IA, TEX). Nuevo León: Route 60, 2.5 mi E of the junction with road to Galeana, plants few along roadside in rocky gravel (wooded mountain plateau), 9 Sep 1967, Melchert, Crawford, & Averett 67-1A (IA, TEX); Galeana-Dr. Arroyo Highway, 29-30.2 mi S of junction with route 60, rather common in gravel and clay along top of roadside ledge, 10 Sep 1967, Melchert, Crawford, & Averett 67-10 (IA); 27 mi N of Dr. Arroyo on road to Galeana, plants only along steep, dry, clay roadside in area of desert scrub with *Juniperus* and *Yucca*, 10 Sep 1967, Melchert, Crawford, & Averett 67-12 (IA).

*Thelesperma simplicifolium* is a morphologically homogeneous, but chromosomally diverse, species (really a polyploid complex, [Melchert 1966]) from central and western Texas, Coahuila, and Nuevo León. The name var. *macrocarpum* is proposed here to highlight a newly discovered hexaploid race ( $n=30$  pairs, Melchert, unpubl.) of this species which appears to have a rather limited distribution in southernmost Coahuila and adjacent Nuevo León. This hexaploid race proved to have the most robust *achenies* in the species, indeed in all of *Thelesperma* (Figure 4), several in each fruiting capitulum measuring 4.0-5.2 mm long by 2.0-3.0 mm wide (vs. 3.2-4.0[4.5] mm long and 1.0-1.7 mm wide in var. *simplicifolium* [Figure 5]). Additionally, they tend to be bushier, have slightly larger flowering heads (to 3.5 cm across the expanded ligules) and slightly larger disc floret corollas (to 5.5 mm long).

Since hexaploids are unknown elsewhere in the species (chromosome counts of  $n=10$ , 11, and 22 have been established for numerous Texas populations [Melchert 1966], and single counts of  $n=12$  and 20 from NW México [J. Graham & M.C. Johnston 4216], and NE Coahuila, [Henrickson & Lee 16126], respectively [both TEX]) it is likely that var. *macrocarpum* will ultimately prove to be a distinct, albeit cryptic, species. However, given the high degree of infraspecific polyploidy found in most of the perennial species of *Thelesperma* (Melchert 1963), until additional populations of *T. simplicifolium* from central and northern Coahuila are sampled thoroughly, it seems prudent to retain the hexaploids within the species, hence its recognition as a variety at the present time.

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Figure 4. Achenes of *Thelesperma simplicifolium* var. *simplicifolium*, 12X.



Figure 5. Achenes of *Thelesperma simplicifolium* var. *macrocarpum*, 12X.

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