

CHROMOSOME COUNTS OF COMPOSITAE FROM THE UNITED STATES AND MEXICO¹

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A B S T R A C T

Chromosome counts are reported for 126 taxa representing 122 species and 61 genera of Compositae. First reports include two genera, *Stylocline* ($n = 14$) and *Chromolepis* ($n = 19$), 17 species, two infraspecific taxa, and one interspecific hybrid. Five additional taxa have chromosome numbers differing from previously published accounts. *Carminatia* is reinstated to generic status.

THIS is the second in a series of studies documenting chromosome numbers of Compositae of the United States and Mexico (cf. Keil and Pinkava, 1976). Vouchered chromosome counts represent both hitherto unreported taxa and taxa for which counts have been published previously. The former counts serve to increase the number of taxa for which cytological data is available and can provide insights into evolutionary relationships. The latter counts provide information about variation in chromosome complements and broaden the geographical sample of the various taxa.

METHODS—Immature capitula were killed and fixed in modified Carnoy's fixative [4(or 6) chloroform:3 ethanol:1 glacial acetic acid, v:v]. Florets were stained in iron-acetocarmine and were squashed in a drop of Hoyer's medium in modification of methods by Beeks (1955). Chromosome counts and behavior were ascertained from meiotic microsporocytes unless otherwise noted and were documented by camera lucida drawings. Voucher specimens, microslides and drawings are deposited in ASU. Percent pollen stainability, based on 200-grain samples stained in aniline blue in lactophenol, was calculated for some plants.

RESULTS—In this study 206 counts are reported for 61 genera, 122 species, one interspecific hybrid, and three additional infraspecific taxa (Table 1). The counts of $n = 19$ for *Chromolepis heterophylla* and $n = 14$ for *Stylocline gnaphalioides*, and *S. micropoides* represent first re-

ports for the respective genera. Our counts for 17 species, two infraspecific taxa and one interspecific hybrid are first reports. Five additional taxa have chromosome numbers differing from previously published accounts. In the following discussion, commentary is restricted to those cases for which it is necessary to add to the material in Table 1 or to provide information regarding their taxonomic or evolutionary significance.

DISCUSSION—VERNONIEAE—*Vernonia* × *georgiana* is a diploid hybrid between *V. acaulis* (Walt.) Gleason ($n = 18$) and *V. angustifolia* Michx. ($n = 18$) (Jones, 1967). Although Jones was successful in synthesizing this hybrid, he did not obtain a chromosome count. He suggested, however, that it would be a diploid with $n = 18$ and would have normal meiosis. Our first report for *V. × georgiana* bears out Jones' prediction.

ASTEREAE—Beaman (1957) reported that only two genera of Astereae are known to have apomictic species, *Erigeron* and *Townsendia*. Meiosis is extremely irregular in apomictic forms of both genera. *Achaetogeron chihuahuensis* ($3n = 27$, $4n = 36$) has meiotic irregularities comparable to those reported by Keil and Pinkava (1976) for nearby apomictic populations of *Erigeron divergens* T. & G. (also $3n = 27$, $4n = 36$). Despite the irregular meiosis and low pollen stainability, *A. chihuahuensis* forms full achenes, apparently apomictically. The apomictic mechanism is unknown for this species.

The generic placement of *A. chihuahuensis* is questionable. Blake (1940), Kittell (1941), and McDougall (1973) all noted the close similarity between *A. chihuahuensis* and *E. divergens*. *Erigeron* and *Achaetogeron* are said to differ primarily by the presence or absence of a setose pap-pus, respectively (Cronquist, 1947). One of our voucher specimens of *Achaetogeron chihuahuensis* (L19146A) has achenes bearing one or two fragile capillary bristles in addition to a low crown.

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TABLE 1. *Chromosome counts of Compositae. Voucher specimens are deposited at ASU*

Taxon	Chromosome count	Location and voucher
VERNONIEAE		
* <i>Vernonia</i> × <i>georgiana</i> Bartlett	2n = 18 _{II}	NC: Cumberland Co.: Ft. Bragg, K11653. ^a
EUPATORIEAE		
<i>Brickellia atractyloides</i> A. Gray	2n = 9 _{II}	AZ: Yavapai Co.: Lake Pleasant Regional Park, L19726.
<i>Brickellia coulteri</i> A. Gray	2n = 9 _{II}	MEXICO: SON.: 5 mi SE of Sonoita, L19253.
* <i>Brickellia urolepis</i> Blake	2n = 9 _{II}	AZ: Maricopa Co.: White Tank Mts Regional Park, K11183.
<i>Stevia berlandieri</i> A. Gray var. <i>berlandieri</i>	2n = 12 _{II}	MEXICO: COAH.: Sierra de la Madera, Cañon Hacienda, P13677.
<i>Stevia salicifolia</i> Cav. var. <i>stenophylla</i> (A. Gray) B. L. Robins.	2n = 12 _{II}	MEXICO: COAH.: E of San Antonio, P13571.
		MEXICO: ZAC.: E of Concepción del Oro, P13487.
ASTEREAE		
<i>Acamptopappus schockleyi</i> A. Gray	2n = 9 _{II}	NV: Clark Co.: NW of Las Vegas, L19846, L19850.
<i>Acamptopappus sphaerocephalus</i> (H. & G.) A. Gray	2n = 9 _{II}	AZ: Maricopa Co.: McDowell Mts Regional Park, ML1933.
* <i>Achaetogeron chihuahuensis</i> Larsen ex Blake	3n = 27 _I	AZ: Apache Co.: W of Green's Peak, L19169.
	4n = 36 _I	AZ: Apache Co.: Carnero Lake, L19146A (17.3). ^b
* <i>Aster lemmonii</i> A. Gray	2n = 5 _{II}	MEXICO: CHIH.: W of La Junta, P13256.
* <i>Aster paternus</i> Cronq.	2n = 9 _{II}	NC: Cumberland Co.: Ft. Bragg, K11602.
* <i>Aster tortifolius</i> Michx.	2n = 9 _{II}	NC: Cumberland Co.: Ft. Bragg, K11629.
<i>Astranthium beamannii</i> De Jong	2n = 12 _{II}	MEXICO: COAH.: E of San Antonio, P13563.
<i>Astranthium orthopodum</i> (B. L. Robins. & Fern.) Larsen	2n = 3 _{II}	MEXICO: DGO.: NW of Durango, P13442.
<i>Baccharis salicifolia</i> (R. & P.) Pers. (= <i>B. glutinosa</i> Pers.)	2n = 9 _{II}	AZ: Maricopa Co.: McDowell Mts Regional Park, ML1114, 1739.
* <i>Ericameria diffusa</i> Benth. (= <i>Haplopappus sonoriensis</i> (A. Gray) Blake)	2n = 9 _{II}	MEXICO: SIN.: SSW of El Gato, L19637; WNW of Huatabampo, L19640.
<i>Ericameria ericoides</i> (Less.) Jeps.	2n = 9 _{II}	CA: San Luis Obispo Co.: Montana del Oro State Park, K10983.
<i>Erigeron divergens</i> T. & G. var. <i>divergens</i>	3n = 27 _I	AZ: Maricopa Co.: just S of Canyon Lake, K11335A; Pima Co.: Santa Catalina Mts, K11355; Pinal Co.: 30 mi NW of Tucson, Leithliter 324, 325.
<i>Erigeron lobatus</i> A. Nels.	+4n = 36 _I	AZ: Maricopa Co.: just S of Canyon Lake K11334A, B.
<i>Erigeron neomexicanus</i> A. Gray	2n = 18 _{II}	AZ: Cochise Co.: Chiricahua Mts, R948.
* <i>Erigeron oxyphyllus</i> Greene	2n = 9 _{II}	AZ: Maricopa Co.: White Tank Mts Regional Park K11199A, B.
<i>Grindelia aphanactis</i> Rydb.	2n = 12 _{II}	AZ: Yavapai Co.: SE of Mayer, K11442.
<i>Grindelia arizonica</i> A. Gray	2n = 6 _{II}	AZ: Navajo Co.: Show Low, P12341.
<i>Grindelia grandiflora</i> Hook.	2n = 6 _{II}	MEXICO: COAH.: Muzquiz, P13009.
* <i>Grindelia greenmanii</i> Steyerl.	2n = 6 _{II}	MEXICO: COAH.: E of San Antonio, P13570.
<i>Grindelia latifolia</i> Kell. ssp. <i>latifolia</i>	2n = 12 _{II}	CA: Monterey Co.: N of Castroville, K10948.
<i>Grindelia latifolia</i> Kell. ssp. <i>platyphylla</i> (Greene) Keck	2n = 12 _{II}	CA: Monterey Co.: N of Castroville, K10950.
<i>Grindelia oxylepis</i> Greene var. <i>eligulata</i> Steyerl.	2n = 6 _{II} + 1 _B	MEXICO: N.L.: NW of San Roberto, P13557.
* <i>Grindelia squarrosa</i> (Pursh) Dunal var. <i>serrulata</i> (Rydb.) Steyerl.	2n = 6 _{II}	UT: Wayne Co.: N of Hanksville, K10845. WY: Albany Co.: I-80 at Buford exit, K10909.
<i>Gutierrezia sarothrae</i> (Pursh) Britt. & Rusby	2n = 4 _{II}	AZ: Maricopa Co.: Glendale, K11384.
<i>Gutierrezia serotina</i> Greene	2n = 4 _{II}	AZ: Pima Co.: near base of Santa Catalina Mts, K11357A, B.
<i>Gymnosperma glutinosum</i> (Spreng.) Less.	2n = 8 _{II}	MEXICO: S.L.P.: ESE of Salinas, P13524; ZAC.: W of Concepcion del Oro, P13488. AZ: Pima Co.: Organ Pipe Cactus National Mon., L19225.

TABLE 1. Continued

Taxon	Chromosome count	Location and voucher
<i>Haplopappus goodingii</i> (A. Nels.) Munz & Johnst.	$2n = 4_{II}$ $+2n = 8_{II}$	AZ: Maricopa Co.: McDowell Mts Regional Park, <i>ML940</i> . AZ: Maricopa Co.: just S of Canyon Lake, <i>K11340</i> .
<i>Haplopappus gracilis</i> (Nutt.) A. Gray	$2n = 2_{II}$	AZ: Maricopa Co.: just S of Canyon Lake, <i>K11342A, B, C</i> ; just N of Wickenburg, <i>K11459</i> ; Navajo Co.: NE of Carrizo, <i>L18946</i> ; Santa Cruz Co.: W of I-19 on Ruby Rd, <i>K11036A</i> .
	$2n = 2_{II} + 1_B$	NM: Catron Co.: near Luna, <i>P12756</i> .
	$2n = 1_{II} + 1_{III}$	AZ: Gila Co.: SW of Seneca, <i>L18935A</i> .
	$2n = 3_{II}$	AZ: Maricopa Co.: E of Queen Creek Tunnel, <i>L18912</i> .
<i>Haplopappus ravenii</i> R. C. Jackson	$2n = 4_{II}$	AZ: Yavapai Co.: 1.5 mi W of Cleator, <i>K11386A</i> ; NW of Mayer, <i>K11439A, B</i> .
<i>Haplopappus spinulosus</i> (Pursh) DC. ssp. <i>australis</i> (Greene) Hall	$2n = 4_{II}$	NM: Sandoval Co.: Albuquerque, <i>K10725</i> .
<i>Haplopappus spinulosus</i> (Pursh) DC. ssp. <i>australis</i> (Greene) Hall intermediate to ssp. <i>scabrellus</i> (Greene) Hall	$2n = 4_{II}$ $+2n = 5_{II}$	MEXICO: COAH.: Cuatro Ciénegas Basin, <i>P10413-2</i> . MEXICO: COAH.: Cuatro Ciénegas Basin, <i>P10413-1</i> .
<i>Haplopappus spinulosus</i> (Pursh) DC. ssp. <i>scabrellus</i> (Greene) Hall	$2n = 8_{II}$	MEXICO: CHIH.: 82 mi N of Chihuahua City, <i>P13228A, B</i> .
* <i>Haplopappus venetus</i> (H.B.K.) Blake ssp. <i>furfuraceus</i> (Greene) Hall	$2n = 12_{II}$	MEXICO: BAJA C.: 19 mi S of San Vicente, <i>P9020</i> .
<i>Haplopappus venetus</i> (H.B.K.) Blake ssp. <i>vernonioides</i> (Nutt.) Hall	$2n = 6_{II}$	CA: San Luis Obispo Co.: Turri Rd, <i>McLeod 1246</i> .
* <i>Haplopappus</i> sp. ^c	$2n = 4_{II}$	AZ: Pima Co.: N of Ajo, <i>K10997</i> ; 11 mi W of Quijotoa, <i>K11000</i> ; base of Santa Catalina Mts, <i>K11358B, C</i> .
* <i>Heterotheca leptoglossa</i> DC.	$2n = 9_{II}$	MEXICO: SIN.: 11 mi NE of Choix, <i>L19519</i> .
<i>Machaeranthera arida</i> Turner & Horne	$2n = 5_{II}$	AZ: Maricopa Co.: I-10 at Maricopa Rd, <i>K11134</i> ; Pima Co.: I-19 at Papago Rd, <i>K11091A, B</i> ; 25 mi N of Quijotoa, <i>P10781</i> ; Yuma Co.: Alamo State Park, <i>P10314</i> .
<i>Machaeranthera bigelovii</i> (A. Gray) Greene	$2n = 4_{II}$	AZ: Maricopa Co.: E of Queen Creek Tunnel, <i>L18904</i> ; Yavapai Co.: 6.5 mi W of Cleator, <i>K11388</i> . WY: Albany Co.: I-80 at Buford exit, <i>K10908</i> .
<i>Machaeranthera boltoniae</i> (Greene) Turner & Horne	$2n = 4_{II}$	MEXICO: SIN.: between Navjoa and Los Mochis, <i>L19510</i> . AZ: Apache Co.: Little Mormon Lake, <i>L19111A</i> .
<i>Machaeranthera</i> aff. <i>canescens</i> Pursh	$2n = 4_{II}$	AZ: Mohave Co.: Rte 93 S of Chico Mine Rd, <i>P11963</i> .
<i>Machaeranthera grindelioides</i> (Nutt.) Shinnery	$2n = 4_{II}$	UT: Wayne Co.: Cainville Wash, <i>K10844</i> .
<i>Machaeranthera gypsophila</i> Turner	$2n = 4_{II}$	MEXICO: COAH.: Cuatro Ciénegas Basin, <i>P10511B, 13103A</i> .
<i>Machaeranthera linearis</i> Greene	$2n = 4_{II}$	AZ: Apache Co.: 30 mi E of Holbrook, <i>K11130</i> .
<i>Machaeranthera restiformis</i> Turner	$2n = 4_{II}$	MEXICO: COAH.: Cuatro Ciénegas Basin, <i>P13101</i> .
<i>Machaeranthera tagetina</i> Greene	$2n = 4_{II}$	AZ: Santa Cruz Co.: W of Peña Blanca Lake, <i>K11069</i> .
	$2n = 4_{II} + 2_B$	AZ: Santa Cruz Co.: Peña Blanca Lake, <i>K11032A</i> .
<i>Machaeranthera tanacetifolia</i> (H.B.K.) Nees	$2n = 4_{II}$	NM: Doña Ana Co.: Jornada Experiment Station, <i>Nash 145</i> . UT: Wayne Co.: Cainville Wash, <i>K10841</i> .
<i>Machaeranthera tephrodes</i> (A. Gray) Greene	$2n = 4_{II}$	AZ: Maricopa Co.: Tempe, <i>K11380</i> ; Yavapai Co.: NW of Mayer, <i>K11438</i> .
<i>Machaeranthera tortifolia</i> (T. & G.) Cronq. & Keck	$2n = 6_{II}$	CA: Inyo Co.: Death Valley, <i>L19812</i> .
<i>Pyrrocoma crocea</i> (A. Gray) Greene	$2n = 12^d$	AZ: Apache Co.: S of Sheep Crossing, <i>P11575</i> .

TABLE 1. *Continued*

Taxon	Chromosome count	Location and voucher
INULEAE		
* <i>Evax multicaulis</i> DC.	2n = 13 _{II}	AZ: Maricopa Co.: McDowell Mts Regional Park, <i>ML1117</i> .
<i>Filago arizonica</i> A. Gray	2n = 14 _{II}	AZ: Maricopa Co.: Thunderbird Regional Park, <i>K11222</i> ; McDowell Mts Regional Park, <i>ML1118</i> ; N of Scottsdale, <i>L19702</i> .
** <i>Stylocline gnaphalioides</i> Nutt.	2n = 14 _{II}	AZ: Maricopa Co.: N of Scottsdale, <i>L19699</i> .
* <i>Stylocline micropoides</i> A. Gray	2n = 14 _{II}	AZ: Yavapai Co.: Lake Pleasant Regional Park, <i>L19734</i> .
HELIANTHEAE		
<i>Bebbia juncea</i> (Benth.) Greene	2n = 9 _{II}	AZ: Maricopa Co.: just S of Canyon Lake, <i>K11344</i> ; Thunderbird Regional Park, <i>K11292</i> .
<i>Berlandiera lyrata</i> Benth. var. <i>lyrata</i>	2n = 15 _{II}	MEXICO: CHIH.: E of Nuevaventura, <i>P13226</i> ; S of Villa Matamoros, <i>P13383</i> . DGO.: E of El Palmito, <i>P13385</i> ; N of Durango, <i>P13386</i> .
<i>Chaenactis artemisiifolia</i> (H. & G.) A. Gray	2n = 8 _{II}	MEXICO: BAJA C.: N of Guerro Negro, <i>R4697</i> .
<i>Chaenactis glabriuscula</i> DC.	2n = 5 _{II}	MEXICO: BAJA C.: 54 mi S of El Rosario, <i>P12186</i> .
<i>Chaenactis lacera</i> Greene	2n = 8 _{II}	MEXICO: BAJA C.: 14 mi E of turnoff to El Arco, <i>P12295</i> .
** <i>Chromolepis heterophylla</i> Benth.	2n = 19 _{II}	MEXICO: DGO.: E of La Ciudad, <i>P13411</i> .
<i>Coreocarpus arizonicus</i> (A. Gray) Blake	2n = 12 _{II}	AZ: Pima Co., Santa Catalina Mts, <i>K11354A</i> .
<i>Cosmos sulphureus</i> Cav. var. <i>sulphureus</i>	2n = 12 _{II}	MEXICO: SIN.: 11 mi NE of Choix, <i>L19520</i> .
<i>Dicoria canescens</i> A. Gray	2n = 18 _{II}	AZ: Maricopa Co.: Tempe, <i>Sundell C-2</i> .
<i>Dicranocarpus parviflorus</i> A. Gray	2n = 10 _{II}	MEXICO: COAH.: S of Cuatro Ciénegas Basin, <i>P13664</i> . S.L.P.: Huizache Jctn, <i>P13535</i> .
<i>Dugaldia hoopesii</i> (A. Gray) Rydb.	2n = 15 _{II}	AZ: Cochise Co.: Chiricahua Mts, <i>R919</i> .
<i>Eclipta alba</i> (L.) Hassk.	2n = 11 _{II}	AZ: Maricopa Co.: Tempe, <i>Sundell C-1</i> .
<i>Encelia farinosa</i> A. Gray var. <i>farinosa</i>	2n = 18 _{II}	AZ: Maricopa Co.: White Tank Mts Regional Park, <i>K11186</i> .
<i>Encelia frutescens</i> (A. Gray) A. Gray var. <i>frutescens</i>	2n = 18 _{II}	MEXICO: SON.: 3 mi E of Altar, <i>L19268</i> . AZ: Pinal Co.: SE of Eloy, <i>L19683</i> .
<i>Encelia halimifolia</i> Cav.	2n = 18 _{II}	MEXICO: SIN.: WNW of Huatabampito, <i>L19643</i> .
<i>Geraea canescens</i> T. & G.	2n = 18 _{II}	AZ: Yuma Co.: E of Tule Well, <i>Engard 906</i> .
<i>Helianthella mexicana</i> A. Gray	2n = 15 _{II} + 2 _{IIIB}	MEXICO: COAH.: Sierra de la Madera, Cañón Hacienda, <i>P13675</i> .
<i>Helianthella quinquenervis</i> (Hook.) A. Gray	2n = 15 _{II}	AZ: Apache Co.: Green's Mtn, <i>P11529</i> .
<i>Heliopsis parvifolia</i> A. Gray	2n = 14 _{II}	AZ: Cochise Co.: Chiricahua Mts, <i>R935</i> .
<i>Hymenoclea salsola</i> T. & G. var. <i>pentalepis</i> (Rydb.) L. Bens.	2n = 18 _{II}	AZ: Maricopa Co.: McDowell Mts Regional Park, <i>ML1903</i> .
<i>Hymenopappus filifolius</i> Hook. var. <i>lugens</i> (Greene) Jeps.	2n = 17 _{II}	AZ: Santa Cruz Co.: Huachuca Mts, <i>K11369</i> ; Yavapai Co.: 4.6 mi SE of Crown King, <i>K11408</i> .
<i>Hymenoxys acaulis</i> (Pursh) K. F. Parker var. <i>arizonica</i> K. F. Parker	2n = 15 _{II}	UT: Wayne Co.: Capital Reef National Park, <i>K10836</i> .
<i>Hymenoxys cooperi</i> (A. Gray) Cockerell	2n = 15 _{II}	AZ: Coconino Co.: 10 mi E of Jacob Lake, <i>K10815</i> ; S of Sedona, <i>P11097B</i> . UT: Washington Co.: Rockville, <i>K10824</i> .
<i>Hymenoxys insignis</i> (A. Gray) Cockerell	2n = 15 _{II}	MEXICO: COAH.: E of San Antonio, <i>P13573</i> .
<i>Hymenoxys odorata</i> DC.	2n = 11 _{II}	AZ: Pima Co.: 25 mi N of Quijotoa, <i>P10778</i> . NM: Doña Ana Co.: Jornada Experiment Station, <i>Nash 150</i> .
<i>Hymenoxys quinquesquamata</i> Rydb.	2n = 15 _{II}	MEXICO: COAH.: N of Guadalupe Victoria, <i>P13478</i> .
<i>Hymenoxys rusbyi</i> (A. Gray) Cockerell	2n = 15 _{II}	AZ: Cochise Co.: Huachuca Mts, <i>R884</i> .
	2n = 15 _{II}	NM: Catron Co.: San Francisco Mts, <i>P12450</i> .

TABLE 1. Continued

Taxon	Chromosome count	Location and voucher
<i>Lagascea decipiens</i> Hemsl.	2n = 17 _{II}	MEXICO: SIN.: NW of Culiacan, L19610. SON.: 100 mi E of Hermosillo, L19335.
<i>Lasthenia chrysostoma</i> (F. & M.) Greene	2n = 8 _{II}	AZ: Maricopa Co.: S of Canyon Lake, B375A; McDowell Mts Regional Park, ML1037, 1078.
	2n = 8 _{II} + 1 _I	AZ: Maricopa Co.: McDowell Mts Regional Park, ML1034.
<i>Layia glandulosa</i> (Hook.) H. & A.	2n = 16 _{II}	AZ: Yavapai Co.: SW of Lake Pleasant Regional Park, L19738.
<i>Melampodium leucanthum</i> T. & G.	2n = 8 _{II}	AZ: Maricopa Co.: McDowell Mts Regional Park, ML1072.
	2n = 10 _{II}	AZ: Maricopa Co.: McDowell Mts Regional Park, ML1082, 1083, 1102; just S of Canyon Lake, K11328A.
<i>Parthenice mollis</i> A. Gray	2n = 18 _{II}	MEXICO: SON.: 8 mi N of Hermosillo, L19350.
<i>Pericome caudata</i> A. Gray	2n = 18 _{II}	NM: Valencia Co.: E of Grants, K11121A.
<i>Perityle californica</i> Benth.	2n = 13 _{II}	MEXICO: SON.: San Carlos, B368.
<i>Perityle cochisensis</i> (Niles) Powell	2n = 17 _{II}	AZ: Cochise Co.: Chiricahua National Monument, R4248A.
<i>Perityle crassifolia</i> Brandeg. var. <i>robusta</i> (Rydb.) Everly	2n = 18 _{II}	MEXICO: BAJA C.: 10 mi W of Rosarito, R4741.
<i>Perityle emoryi</i> Torr.	2n = ca. 50 _{II}	AZ: Maricopa Co.: McDowell Mts Regional Park, ML896.
	2n = 51 _{II} ^o	AZ: Maricopa Co.: White Tank Mts Regional Park, K11184.
<i>Perityle leptoglossa</i> H. & G.	2n = 17 _{II}	MEXICO: SON.: 22 mi of Hermosillo, L19295; Bahia de San Carlos, L19468.
<i>Perityle turneri</i> Powell	2n = 17 _{II}	MEXICO: DGO.: W of La Ciudad, P13422.
<i>Plummera ambigens</i> Blake	2n = 15 _{II}	AZ: Graham Co.: Pinaleno Mts, R3875A, B, C; 3876A, B.
<i>Plummera floribunda</i> A. Gray	2n = 15 _{II}	AZ: Cochise Co.: Chiricahua National Monument, R3133A, G; 3284A, E; 3658B; 3663A, B; 3958A, B; 4146.
<i>Ratibida columnaris</i> (Sims) D. Don	2n = 14 _{II}	AZ: Apache Co.: S of Nutrioso, R679.
<i>Rudbeckia laciniata</i> L.	2n = 19 _{II}	MT: Stillwater Co.: above Beehive, RKB466-4.
<i>Sanvitalia abertii</i> A. Gray	2n = 11 _{II}	AZ: Apache Co.: 9.5 mi SE of Eager, P12691.
<i>Sartwellia mexicana</i> A. Gray	2n = 18 _{II} + 2 _I	MEXICO: N.L.: E of San Roberto, P13543.
<i>Trichoptilium incisum</i> A. Gray	2n = 13 _{II}	AZ: Yuma Co.: W of Tule Well, Engard 911.
<i>Verbesina encelioides</i> (Cav.) Benth. & Hook.	2n = 17 _{II}	AZ: Navajo Co.: NE of Carrizo, L18942.
<i>Verbesina longifolia</i> A. Gray	2n = 17 _{II}	AZ: Cochise Co.: Huachuca Mts, R844; Chiricahua Mts, R957.
<i>Verbesina serrata</i> Cav. var. <i>amphichlora</i> Rob. & Greenm.	2n = 17 _{II}	MEXICO: DGO.: 9 mi SE of Santiago Papasquiario, P9396.
<i>Viguiera deltoidea</i> A. Gray var. <i>parishii</i> (Greene) Vasey & Rose	2n = 18 _{II}	MEXICO: SON.: 5 mi SE of Sonoita, L19254, 19255. AZ: Maricopa Co.: White Tank Mts Regional Park, L11198; McDowell Mts Regional Park, ML1796; just S of Canyon Lake, K11337.
	+3n = 18 _{III} ^f	AZ: Maricopa Co.: White Tank Mts Regional Park, K11189 (15.5).
<i>Xanthium strumarium</i> L.	2n = 18 _{II}	AZ: Maricopa Co.: Tempe, Sundell C-4; Yavapai Co.: SE of Mayer, K11443.
TAGETEAE		
<i>Dyssodia porophylla</i> (Cav.) Cav. ssp. <i>cancellata</i> (Cass.) Strother var. <i>cancellata</i>	2n = 13 _{II}	MEXICO: SIN.: 16 mi NE of Choix, L19590.
<i>Dyssodia porophylloides</i> A. Gray	2n = 13 _{II}	AZ: Maricopa Co.: White Tank Mts Regional Park, K11188; N of Apache Jctn, K11352.
<i>Nicolletia edwardsii</i> A. Gray	2n = 10 _{II}	MEXICO: COAH.: S of Cuatro Ciénegas Basin, P13663.
<i>Nicolletia trifida</i> Rydb.	2n = 10 _{II}	MEXICO: BAJA C.: 30 mi S of Santa Rosalia, P12239.
* <i>Pectis linifolia</i> L. var. <i>linifolia</i>	2n = 12 _{II}	AZ: Pima Co.: Organ Pipe Cactus National Monument, K11787.
<i>Porophyllum gracile</i> Benth.	2n = 24 _{II}	AZ: Maricopa Co.: White Tank Mts Regional Park, K11197; just S of Canyon Lake, K11339.

TABLE 1. *Continued*

Taxon	Chromosome count	Location and voucher
<i>Tagetes lucida</i> Cav.	2n = 11 _{II}	MEXICO: COAH.: E of San Antonio, <i>P13576</i> .
<i>Tagetes subulata</i> Cav.	2n = 12 _{II}	MEXICO: SIN.: 16 mi NE of Choix, <i>L19591</i> .
CYNAREAE		
<i>Cirsium arizonicum</i> (A. Gray) Petrak	2n = 15 _{II}	AZ: Yavapai Co.: 2 mi NE of Crown King, <i>K11392B</i> .
<i>Cirsium coloradense</i> (Rydb.) Cockerell ex Daniels	2n = 17 _{II}	CO: Elbert Co.: W of Matheson, <i>K10693B</i> . ^g
<i>Cirsium flodmanii</i> (Rydb.) Arthur	2n = 12 _{II}	CO: San Juan Co.: S of Engineer Pass, <i>Leithliter 264</i> .
<i>Cirsium undulatum</i> (Nutt.) Spreng.	+2n = 12 _{II} 2n = 13 _{II}	UT: Wayne Co.: Capital Reef National Park, <i>K10838</i> . ^g CO: La Plata Co.: 10 mi E of Durango, <i>K10876</i> . ^g
MUTISIEAE		
* <i>Acourtia nana</i> (A. Gray) Reveal & King	2n = 27 _{II}	AZ: Yavapai Co.: US 93, 36 mi SW of Mohave Co. line, <i>P11930</i> .
<i>Acourtia thurberi</i> (A. Gray) Reveal & King	2n = 54 ^f	AZ: Santa Cruz Co.: W of I-19 on Ruby Rd, <i>K11034</i> .
<i>Acourtia wrightii</i> (A. Gray) Reveal & King	2n = 27 _{II}	AZ: Maricopa Co.: just S of Canyon Lake, <i>K11341</i> ; Yavapai Co.: 23 mi SW of Mohave Co. line, <i>P11938</i> .
<i>Trixis californica</i> Kell.	2n = 27 _{II}	AZ: Maricopa Co.: San Domingo Wash, <i>P10139</i> ; White Tank Mts Regional Park, <i>K11187</i> ; N of Apache Jctn, <i>K11349</i> ; Thunderbird Regional Park, <i>K11237</i> . ^h

* First report for a species, interspecific hybrid or infraspecific taxon.

** First report for a genus.

+ New count for this taxon.

^a Abbreviations for names of principal collectors: K = David J. Keil, L = Elinor Lehto, ML = Meredith Lane, P = Donald J. Pinkava, B = Richard K. Brown, R = Timothy Reeves.

^b Values in parentheses represent percent pollen stainability.

^c R. C. Jackson has indicated (pers. comm.) that this taxon represents an undescribed species of *Haplopappus* section *Blepharadon*.

^d Somatic count determined from pre-meiotic cells of immature floret.

^e Some cells with an anaphase I bridge plus fragment.

^f Meiosis irregular; with uni-, bi- and trivalent formation.

^g Specimen determined by R. C. Gardner (OSU).

^h Some cells with univalents.

The plants of *A. chihuahuensis* do differ from *E. divergens* in having slightly fistulose peduncles, larger heads, and more conic receptacles. We do not feel that these plants are conspecific, but we do feel rather strongly that they are congeneric.

The entire genus *Achaetogeron* ($x = 9$) needs to be critically investigated to determine if there is justification for maintaining it as distinct from *Erigeron* (also $x = 9$). Within *Erigeron* as currently recognized there is considerable variation in pappus structure. Reduction or loss of pappus is a rather common phenomenon in Compositae and often occurs independently in different phylogenetic lines within a genus. The generic boundaries between *Achaetogeron* and *Erigeron* have become so blurred that Shinnors (1946) concluded, on the one hand, that they could not be kept distinct and a year later (Shinnors, 1947) described an epappose species of *Erigeron* (*E. mimegletes*) from Texas. McVaugh (1972), on the other hand, reported on a pappose species of *Achaetogeron* (*A. subacaulis*) from Aquascalientes, Mexico.

INULEAE—Our counts of $n = 14$ for *Stylocline gnaphalioides* and *S. micropoides*, the first counts for the genus, are consistent with other chromosome numbers known in subtribe Filagininae. Three other genera of the subtribe all appear to share the primitive base of $x = 7$: *Evax*, $x = 7$, 13 (Federov, 1969; Keil and Pinkava, 1976), *Filago*, $x = 14$ (Federov, 1969; Powell, Kyhos, and Raven, 1974; Keil and Pinkava, 1976), and *Psilocarphus*, $x = 14$ (Powell et al., 1974). Only one other genus of the subtribe, *Gymnarrhena* ($x = 10$), has been reported to date (Murin and Chaudhri, 1970). The Filagininae is apparently similar to some of the larger subtribes of Inuleae in having multiple base numbers.

HELIANTHEAE—*Chromolepis* is a monotypic genus assigned by Bentham (1883) to a position in subtribe Verbesininae (= Helianthinae, Solbrig, 1963) next to *Balsamorhiza*. Our first count ($n = 19$) for *Chromolepis* adds cytological evidence in support of Bentham's decision. Both *Balsamorhiza* and its close relative, *Wyethia*, also have a base of $x = 19$ (Weber, 1946).

CORRECTIONS—Two chromosome counts in our first report (Keil and Pinkava, 1976) are corrected as follows: *Aphanostaphus skirrhobasis* (DC.) Trel. var. *skirrhobasis* is $2n = 3_{II}$ (K10891); *Carminatia tenuiflora* DC. is $2n = 10_{II}$ (K11080). The latter count negates our arguments for combining *Brickellia* and *Carminatia*. *Carminatia* is

to be reinstated to generic status and our two new combinations are to be placed in synonymy. Further, King and Robinson (1972) are fully justified in separating the two genera in Nueva Galicia, Mexico, utilizing characters as they had proposed. We thank Drs. B. L. Turner, University of Texas, Austin, and R. M. King, U.S. National Herbarium for calling attention to the errors, respectively.

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