CHROMOSOME STUDIES IN ASTERACEAE FROM THE UNITED STATES, MEXICO, THE WEST INDIES, AND SOUTH AMERICA¹

DAVID J. KEIL, MELISSA A. LUCKOW, AND DONALD J. PINKAVA

Biological Sciences Department, California Polytechnic State University, San Luis Obispo, California 93407; Department of Botany, University of Texas, Austin, Texas 78712; Department of Botany and Microbiology, Arizona State University, Tempe, Arizona 85287

ABSTRACT

Chromosome counts of Asteraceae are reported from Mexico, the United States, the West Indies, Peru, and Bolivia. First counts are reported for 27 species, eight infraspecific taxa, and three interspecific hybrids in *Brickellia*, *Chrysanthellum*, *Cirsium*, *Egletes*, *Erigeron*, *Flaveria*, *Gnaphalium*, *Heterotheca*, *Hieracium*, *Hymenothrix*, *Koanophyllon*, *Layia*, *Lessingia*, *Pectis*, *Sclerocarpus*, *Stuessya*, *Tagetes* and *Wedelia*. Counts are also reported for 196 taxa or hybrids for which chromosome numbers have been published previously. Of these, nine are new numbers. Taxonomic implications of certain counts are discussed.

THIS PAPER is a continuation of studies (Keil and Stuessy, 1975, 1977; Keil and Pinkava, 1976, 1979, 1981; Keil, 1977; Pinkava and Keil, 1977) on chromosome numbers in Asteraceae. 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 are available and can provide insights into relationships and patterns of evolution. 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 [4–6 chloroform : 3 ethanol : 1 glacial acetic acid, v:v:v]. Florets were stained in either iron-acetocarmine or Snow's stain (Snow, 1963) and anthers or whole florets were squashed in a drop of Hoyer's medium in a modification of the methods of Beeks (1955). Chromosome counts and meiotic behavior were ascertained from

meiotic microsporocytes and were documented by camera lucida or free-hand drawings. Voucher specimens, microslides, and drawings are deposited at ASU and OBI. Percent pollen stainability, based on 500 grain samples stained in aniline blue in lactophenol, was calculated for some plants.

RESULTS—The chromosome counts obtained are listed in Table 1. First counts are reported for 27 species, eight infraspecific taxa, and three interspecific hybrids; counts are also reported for 196 additional taxa or hybrids for which counts have been published previously. Eight of these are new numbers.

DISCUSSION—As in previous papers, the discussion is restricted to first or new counts or significant comments. The sequence of Table 1 and the accompanying commentary is alphabetical by tribe.

Astereae—Our report of $2n = 9_{II}$ for *Egletes prostrata* and the only previous report for the genus, $n = 27$ for *E. viscosa* (L.) Less. var. *dissecta* Shinnars (Keil and Stuessy, 1977), support a base number of $x = 9$ for the genus.

Our first report of $2n = 9_{II}$ for *Erigeron bellioides* is in accord with the established base number, $x = 9$, for *Erigeron*. The head morphology of this diminutive plant, however, suggests that it might better be placed into *Conyza*, which has the same base number. Cronquist (1943) listed the following features as diagnostic for *Conyza*: "Central hermaphrodite flowers few; pistillate flowers numerous, with filiform corollas; ligules, if present, inconspicuous, shorter than the tubes and scarcely if at all exceeding the pappus." The heads

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TABLE 1. Chromosome counts of Asteraceae. Symbols: * Indicates first report for a taxon or hybrid combination. ** Indicates previously unreported chromosome count for a taxon. Abbreviations of collectors: MGK = Malcolm G. McLeod, Timothy Gaskin and David Keil; K = David Keil; KB = David Keil and Peter Bretting; KL = David Keil and Melissa Luckow; KLL = David Keil, Melissa Luckow and David Luckow; KPr = David Keil and George R. Proctor; L = Elinor Lehto; MK = Malcolm G. McLeod and David Keil; MMK = Malcolm G. McLeod, Henry G. Meyer and David Keil; P = Donald J. Pinkava

Tribe Taxon or hybrid combination	Chromosome count	Location and voucher
ANTHEMIDEAE		
<i>Achillea millefolium</i> L.	$2n = 18_{II}$	UNITED STATES: Virginia: Smyth Co.: White Top Mtn, K12820 pop. (OBI)
<i>Artemisia californica</i> Less.	$2n = 9_{II}$	UNITED STATES: California: Kern Co.: Blue-stone Ridge below Orchard Peak, MGK11846 (OBI)
ASTEREAE		
<i>Acamptopappus sphaerocephalus</i> (H. & G.) A. Gray	$2n = 9_{II}$	UNITED STATES: California: Los Angeles Co.: 5 mi W of San Bernardino Co. line on Rt 138, K11894 pop. (OBI)
<i>Astranthium condimentum</i> DeJong	$2n = 3_{II}$	MEXICO: Michoacán: Rt 37, 3 mi S of jct with Rt 15, KL15167 (OBI)
<i>Chrysopsis pilosa</i> Nutt.	$2n = 4_{II}$	UNITED STATES: North Carolina: Cumberland Co.: Fort Bragg, K11650 (ASU)
<i>Chrysothamnus nauseosus</i> (Pall.) Britt. ssp. <i>hololeuca</i> (A. Gray) Hall & Clem.	$2n = 9_{II}$	UNITED STATES: California: Los Angeles Co.: 5 mi W of San Bernardino Co. line on Rt 138, K11895 pop. (OBI)
<i>Chrysothamnus viscidiflorus</i> (Hook.) Nutt.	$2n = 9_{II}$	UNITED STATES: Wyoming: Natrona Co.: Alcova, K12870 (OBI)
<i>Conyza canadensis</i> (L.) Cronq.	$n = 9$	UNITED STATES: Arizona: Maricopa Co.: McDowell Mtns, Lane 1737 (ASU); California: Monterey Co.: 6 mi N of Castroville, K10945 (OBI, ASU); Montana: Carbon Co.: Devil's Canyon area, R. K. Brown 491-1 (ASU)
<i>Conyza filaginoides</i> (DC.) Heiron.	$2n = 9_{II}$	MEXICO: México: 4.5 mi W of Santa María del Monte, KL15413A (OBI)
<i>Conyza</i> aff. <i>sophiifolia</i> H.B.K.	$n = 9$	MEXICO: Durango: Rt 40, 19.5 mi E of La Ciudad, P13399 (ASU)
<i>Corethrogyne flaginifolia</i> (H. & A.) Nutt. var. <i>robusta</i> Greene	$2n = 5_{II}$	UNITED STATES: California: San Luis Obispo Co.: Morro Bay, MMK11856 (OBI)
* <i>Egletes prostrata</i> (Sw.) Ktze.	$2n = 9_{II}$	ANTIGUA AND BARBUDA: Antigua: St. George's Parish: Windthorpes Bay, K16554 pop. (OBI)
<i>Ericameria arborescens</i> (A. Gray) Greene	$2n = 9_{II}$	UNITED STATES: California: San Luis Obispo Co.: Cuesta Grade, K11855 pop. (OBI)
* <i>Erigeron bellioides</i> DC.	$2n = 9_{II}$	PUERTO RICO: Isla de Cabra, K16503 pop. (OBI)
<i>Erigeron divergens</i> T. & G.	$2n = 3x = 27$	UNITED STATES: Arizona: Santa Cruz Co.: Arizona Rt 289 S of Peña Blanca Lake, L20379 (ASU) [pollen stainability 23.8%; macropollen and micropollen present]; Yavapai Co.: I-17, 0.5 mi N of Sunset Point, L19918 (ASU) [pollen stainability 16.4%; macropollen and micropollen present]
<i>Erigeron flagellaris</i> A. Gray	$2n = 9_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, K11516 (ASU)
* <i>Erigeron foliosus</i> Nutt. var. <i>blochmaniae</i> (Greene) Hall	$2n = 9_{II}$	UNITED STATES: California: San Luis Obispo Co.: Montaña de Oro State Park, MMK11861 (OBI)
<i>Erigeron formosissimus</i> Greene var. <i>formosissimus</i>	$2n = 9_{II}$	UNITED STATES: Arizona: Coconino Co.: Mt. Elden, K11515 (ASU)
<i>Erigeron platyphyllus</i> Greene	$2n = 9_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, P13718 (ASU); West Fork, Oak Creek L20218 (ASU)
<i>Erigeron strigosus</i> Muhl.	$2n = 9_{II}$	UNITED STATES: Virginia: Smyth Co.: White Top Mtn K12823 (OBI)
	$2n = 3x = 27$	UNITED STATES: North Carolina: Cumberland Co.: Fort Bragg, K11636 (ASU). Pollen stain-

TABLE 1. *Continued*

Tribe Taxon or hybrid combination	Chromosome count	Location and voucher
		ability 25.9%; macropollen and micropollen present
<i>Grindelia inuloides</i> Willd.	$2n = 6_{II}$	MEXICO: Jalisco: Ajijic, <i>KL15602</i> (OBI)
<i>Grindelia procera</i> Greene	$2n = 10_{II} + 1_{IV} + 2$ fragments	UNITED STATES: California: Kern Co.: Blue-stone Ridge below Orchard Peak, <i>MGK11842</i> (OBI)
<i>Gundlachia corymbosa</i> (Urb.) Britt.	$2n = 9_{II}$	ANTIGUA AND BARBUDA: Barbuda: along sand road to Palmetto Pt, <i>K16562A</i> (OBI)
<i>Gutierrezia californica</i> (DC.) T. & G.	$2n = 8_{II}$	UNITED STATES: California: Kern Co.: Keck Rd, 4.3 mi SE of jct with Baker Rd and Twisselman Rd, <i>MGK11839</i> (OBI)
<i>Gutierrezia wrightii</i> A. Gray	$2n = 4_{II}$	UNITED STATES: ARIZONA: Santa Cruz Co.: 2.7 mi from Lochiel-Nogales Rd on Patagonia Rd, <i>K12598A</i> (OBI)
<i>Gymnosperma glutinosum</i> (Spreng.) Less.	$2n = 8_{II}$	MEXICO: Puebla: 14.2 mi SE of Acatlán, <i>KL15482</i> (OBI)
<i>Heterotheca echioides</i> (Benth.) Shinnery	$2n = 9_{II}$	UNITED STATES: California: Monterey Co.: along Carmel Valley Rd 18 mi NW of Arroyo Seco Rd, <i>K11949</i> (ASU, OBI)
<i>Heterotheca grandiflora</i> Nutt.	$n = 9$	UNITED STATES: California: Monterey Co.: 4 mi N of Castroville, <i>K10953</i> (ASU); San Luis Obispo Co.: Hazard Canyon, Montaña de Oro State Park, <i>K10977A</i> (ASU)
<i>Heterotheca fulcrata</i> (Greene) Shinnery var. <i>fulcrata</i>	$n = 18$	UNITED STATES: New Mexico: Sandoval Co.: 4 mi N of San Ysidro, <i>K10882</i> pro parte (ASU)
<i>Heterotheca</i> aff. <i>fulcrata</i> (Greene) Shinnery	$n = 9$	UNITED STATES: Arizona: Coconino Co.: Grand Canyon, rd to Pt Imperial, <i>K11715</i> (ASU); Coconino Co.: Oak Creek Canyon, <i>K11760</i> (ASU)
<i>Heterotheca inuloides</i> Cass.	$2n = 9_{II}$	MEXICO: Oaxaca: 31.3 mi S of Cuicatlán, <i>KL15574</i> pop. (OBI)
<i>Heterotheca latifolia</i> Buckl. var. <i>latifolia</i>	$n = 9$	UNITED STATES: North Carolina: Cumberland Co.: Ft. Bragg Military Reservation, <i>K11609</i> (ASU); Texas: Big Thicket area, Village Creek, <i>Somers & Keil 10592</i> (ASU)
<i>Heterotheca mexicana</i> Harms ex Turner	$2n = 9_{II}$	MEXICO: Durango: 5 mi N of Durango, <i>Pinkava et al. 13432</i> pop. (ASU)
** <i>Heterotheca mucronata</i> Harms ex Turner	$2n = 9_{II}$	MEXICO: Zacatecas, road above Concepción del Oro, <i>Pinkava et al. 13486</i> pop. (ASU)
<i>Heterotheca villosa</i> (Pursh) Shinnery var. <i>foliosa</i> (Nutt.) Harms	$n = 9$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>Pinkava et al. 13756</i> pop. (ASU)
	$n = 18$	UNITED STATES: Texas: Culberson Co.: Lobos, <i>Reeves & Pinkava 13170</i> (ASU); Arizona: Yavapai Co.: Rt 179, 5.6 mi N of jct I-17, <i>P13897</i> (ASU, OBI)
<i>Heterotheca villosa</i> (Pursh) Shinnery var. <i>pedunculata</i> (Greene) Harms ex Sample	$2n = 9_{II}$	UNITED STATES: Arizona: Apache Co.: 9.5 mi SE of Eager, <i>Pinkava et al. 12689</i> (ASU)
<i>Heterotheca villosa</i> (Pursh) Shinnery var. <i>villosa</i>	$n = 18$	UNITED STATES: Utah: Grand Co.: Arches National Park, <i>K10854</i> pop. (ASU) [some cells with lagging chromosomes at anaphase I, some bridges and micronuclei]; Wyoming: Albany Co.: I-80 at Buford exit, <i>K10911</i> (ASU)
* <i>Heterotheca villosa</i> (Pursh) Shinnery × <i>H. fulcrata</i> (Greene) Shinnery	$2n = 3x = 9_{III}$	UNITED STATES: New Mexico: Catron Co.: Rt 180, 2 mi S of San Francisco River near Luna, <i>Pinkava et al. 12752</i> pop. (ASU)
<i>Heterotheca</i> aff. <i>viscida</i> (A. Gray) Harms	$2n = 9_{II}$	UNITED STATES: Arizona: Maricopa Co.: Just S of Canyon Lake on Apache Trail, <i>K11336A</i> (ASU)
** <i>Lessingia germanorum</i> Cham. var. <i>glandulifera</i> (A. Gray) J. T. Howell	$2n = 5_{II} + 1_I$	UNITED STATES: California: Kern Co.: 3.2 mi SE of jct of Keck and Twisselman Rds, <i>MGK11841-1</i> (OBI)

TABLE 1. *Continued*

Tribe Taxon or hybrid combination	Chromosome count	Location and voucher
* <i>Lessingia nemaclada</i> Greene var. <i>albiflora</i> (Eastw.) J. T. Howell	$2n = 5_{II}$	UNITED STATES: California: Kern Co.: Blue-stone Ridge below Orchard Peak, <i>MGK11845</i> (OBI)
<i>Machaeranthera canescens</i> (Pursh) A. Gray	$2n = 4_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>P13711</i> (ASU), <i>P13712</i> (ASU)
<i>Machaeranthera brevilingulata</i> (Hemsl.) Turner	$2n = 9_{II}$	UNITED STATES: New Mexico: Hidalgo Co.: 10 mi S of Hachita, <i>KLL13425A</i> (OBI)
<i>Machaeranthera gracilis</i> (Nutt.) Shinnery	$2n = 2_{II} + 1_I$	UNITED STATES: Arizona: Pima Co.: Molino Basin, Santa Catalina Mtns, <i>K12561</i> pop. (OBI)
<i>Machaeranthera tanacetifolia</i> (H.B.K.) Nees	$2n = 4_{II}$	UNITED STATES: Arizona: Pima Co.: Santa Catalina Mtns, <i>K12551A</i> (OBI)
<i>Machaeranthera tephrodes</i> (A. Gray) Greene	$2n = 5_{II}$	UNITED STATES: Arizona: Pima Co.: Molino Basin, Santa Catalina Mtns, <i>K12555</i> (OBI)
<i>Pityopsis graminifolia</i> (Michx.) Nutt. var. <i>latifolia</i> (Fern.) Semple & Bowers	$2n = 18_{II}$	UNITED STATES: North Carolina: Cumberland Co.: Ft. Bragg Military Reservation, <i>K11609</i> (ASU)
<i>Solidago confinis</i> A. Gray	$2n = 9_{II}$	UNITED STATES: California: San Luis Obispo Co.: Montaña de Oro State Park, <i>K11875</i> pop. (OBI)
<i>Solidago missouriensis</i> Nutt.	$2n = 9_{II}$	UNITED STATES: Nebraska: Dawes Co.: 12 mi S of Crawford, <i>K12855</i> (OBI); Wyoming: Albany Co.: I-80 at Buford exit, <i>K10906</i> (ASU)
<i>Solidago multiradiata</i> Ait.	$2n = 9_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>K11547</i> (ASU)
<i>Solidago odora</i> Ait.	$2n = 9_{II}$	UNITED STATES: North Carolina: Cumberland Co.: Fort Bragg, <i>K11664</i> (ASU)
* <i>Solidago patula</i> Muhl. ex Willd. var. <i>strictula</i> T. & G.	$2n = 9_{II}$	UNITED STATES: North Carolina: Cumberland Co.: Fort Bragg, <i>K11681A</i> (ASU)
<i>Solidago sparsiflora</i> A. Gray	$2n = 9_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>P13715</i> (ASU); Santa Cruz Co.: Peña Blanca Lake, <i>K11029</i> (ASU); Yavapai Co.: Peeple's Valley, <i>K11457</i> (ASU)
<i>Solidago wrightii</i> A. Gray	$2n = 9_{II}$	UNITED STATES: Arizona: Maricopa Co.: US 60 2.6 mi E of Queen Creek Tunnel, <i>L18903</i> (ASU); Pima Co.: Molino Basin, Santa Catalina Mtns, <i>K12560</i> (OBI)
<i>Xanthocephalum gymnospermoides</i> (A. Gray) Benth. var. <i>gymnospermoides</i>	$2n = 6_{II}$	UNITED STATES: Arizona: 2 mi N of Elgin, <i>KLL13499A</i> (OBI)
CARDUEAE		
* <i>Cirsium occidentale</i> (Nutt.) Jeps. var. <i>compactum</i> Hoover	$2n = 15_{II}$	UNITED STATES: California: San Luis Obispo Co.: N of San Simeon on Hwy 1, <i>K11942</i> (OBI)
<i>Cirsium occidentale</i> (Nutt.) Jeps. var. <i>occidentale</i>	$2n = 15_{II}$	UNITED STATES: California: Monterey Co.: 2 mi N of Arroyo Seco Rd on Carmel Rd, <i>K11951</i> (OBI)
EUPATORIEAE		
<i>Ageratina adenophora</i> (Spreng.) King & Robinson	$2n = 3x = 51_I$	UNITED STATES: California: Monterey Co.: 37 mi N of San Luis Obispo Co. line on Rt 1, <i>K11948</i> (OBI)
<i>Agertina herbacea</i> (A. Gray) King & Robinson	$2n = 17_{II}$	UNITED STATES: Arizona: Cochise Co.: Montezuma Pass, Huachuca Mtns, <i>K13525</i> pop. (OBI); Coconino Co.: Schnebly Hill Rd. <i>L20245</i> (ASU)
<i>Ageratum conyzoides</i> L.	$2n = 20_{II}$	MARTINIQUE: ca. 6 km W of Gros Morne, <i>K16537</i> pop. (OBI)
<i>Ageratum corymbosum</i> Zuccag.	$2n = 10_{II}$	MEXICO: Sinaloa: 4 mi N of Badiraguato, <i>KL15042</i> (OBI); Michoacán: Rt 37, 3 mi S of jct with Rt 15, <i>KL15175</i> (OBI)
<i>Brickellia betonicifolia</i> A. Gray	$2n = 9_{II}$	UNITED STATES: Arizona: Pima Co.: Madera Canyon, Santa Rita Mtns, <i>K12573</i> pop. (OBI)
* <i>Brickellia chenopodina</i> (Greene ex Woot. & Standl.) B. L. Robins.	$2n = 9_{II}$	UNITED STATES: New Mexico: Hidalgo Co.: 6 mi W of Antelope Wells, <i>KLL13436</i> pop. (OBI)

TABLE 1. *Continued*

Tribe Taxon or hybrid combination	Chromosome count	Location and voucher
<i>Brickellia grandiflora</i> (Hook.) Nutt.	$2n = 9_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>P13710</i> (ASU), <i>P13753</i> (ASU)
* <i>Koanophyllon villosum</i> (Sw.) King & Robinson	$2n = 10_{II}$	JAMAICA: Hanover Parish: 7 mi E of Lucea, <i>K16392</i> pop. (OBI)
<i>Liatris squarrosa</i> (L.) Michx.	$n = 10$	UNITED STATES: North Carolina: Cumberland Co.: Fort Bragg, <i>K11697</i> (ASU)
<i>Mikania micrantha</i> Kunth	$2n = 19_{II}$	JAMAICA: Westmoreland Parish: Negril, <i>K16403A</i> (OBI)
<i>Mikania scandens</i> (L.) Willd.	$2n = 18_{II}$	UNITED STATES: North Carolina: Cumberland Co.: Fort Bragg, <i>K11635</i> (ASU)
<i>Piqueria trinervia</i> Cav.	$2n = 12_{II}$	MEXICO: Michoacán: Rt 37, 3 mi S of jct with Rt 15, <i>KL15173A</i> (OBI); México: 4.5 mi W of Santa María del Monte, <i>KL15425</i> (OBI)
HELIANTHEAE		
<i>Acanthospermum australe</i> (Loefling) Kuntze	$2n = 11_{II}$	UNITED STATES: North Carolina: Cumberland Co.: Fort Bragg, <i>K11599</i> (ASU)
<i>Achyropappus anthemoides</i> H.B.K.	$n = 10$	MEXICO: México: 4.5 mi W of Santa María del Monte on Rt 1, <i>KL15420</i> pop. (OBI)
<i>Acmella brachyglossa</i> Cass.	$2n = 39_{II}$	MARTINIQUE: ca. 6 km W of Gros Morne, <i>K16535</i> pop. (OBI)
<i>Acmella oppositifolia</i> (Lam.) R. K. Jansen var. <i>oppositifolia</i>	$2n = 26_{II}$	MEXICO: México: 4.5 mi W of Santa María del Monte on Rt 1, <i>KL15409</i> pop. (OBI); Michoacán: 1.1 mi W Villamar, <i>KL15152</i> (OBI)
<i>Ambrosia confertiflora</i> DC.	$2n = 54_{II}$	UNITED STATES: Arizona: Pima Co.: 3 mi W of Tracy, <i>K11807</i> (ASU)
<i>Bahia dissecta</i> (A. Gray) Britton	$2n = 3x = 36$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>P13691</i> (ASU). Meiosis very irregular; multivalents present; pollen diads rather than tetrads formed; many anthers without sporogenous tissue or with only small bits of sporogenous tissue
<i>Baileya multiradiata</i> H. & G.	$n = 16$	UNITED STATES: Arizona: Cochise Co.: 21.9 mi N of Pomerene, <i>P10969</i> (ASU); Maricopa Co.: Crater Mtns, <i>P10025</i> (ASU); 4 mi S of Salt River on Jackrabbit-Rainbow Rd, <i>Sundell 269-1, -2, -4</i> (ASU); Pima Co.: Rt 386, 0.5 mi S of jct Rt 86, <i>P10726</i> (ASU); Pinal Co.: 8.1 mi S of Oracle, <i>P11014</i> (ASU); Yuma Co.: I-8 at Spot Rd exit, <i>P10112</i> , <i>10113</i> (ASU); 4.1 mi N of Alamo Crossing, <i>P10295</i> (ASU); 13 mi N of Wenden, <i>P10353</i> (ASU)
	$2n = 16_{II} + 2_{II}S$	UNITED STATES: Arizona: Maricopa Co.: 4 mi S of Salt River on Jackrabbit-Rainbow Rd., <i>Sundell 269-5</i> (ASU)
<i>Baileya pauciradiata</i> H. & G.	$2n = 16_{II}$	UNITED STATES: Arizona: Yuma Co.: Arizona Western College, <i>P10103-1, -2</i> (ASU); California: Riverside Co.: W of Blythe, <i>K11933 A, B</i> (OBI)
<i>Baileya pleniradiata</i> H. & G.	$n = 16$	MEXICO: Baja California: Rosario, <i>P11173</i> (ASU); UNITED STATES: Arizona: Maricopa Co.: White Tank Mtns, <i>L17634</i> (ASU); Sierra Estrella Mtns, <i>P10115A, B</i> (ASU)
<i>Bidens aequisquama</i> (Fern.) Sherff	$2n = 36_{II}$	MEXICO: Michoacán: Rt 37, 3 mi S of jct with Rt 15, <i>KL15176</i> (OBI)
<i>Bidens alba</i> (L.) DC. var. <i>radiata</i> (Sch. Bip.) Ballard	$n = 24$	UNITED STATES: Florida: along US 41 18 mi W of jct with Florida Turnpike, <i>K16478A</i> (OBI)
** <i>Bidens bipinnata</i> L.	$n = 11$	MEXICO: Morelos: 5.8 mi N of Tlaltizapán, <i>KL15459</i> (OBI)
<i>Bidens cynapifolia</i> H.B.K.	$2n = 12_{II}$	JAMAICA: St. Andrew's Parish: Beverley Hills above Kingston, <i>KB16413</i> (OBI)
<i>Bidens odorata</i> Cav. var. <i>calicicola</i> (Greenm.) Ballard	$2n = 12_{II}$	MEXICO: Coahuila: rd past San Antonio, ca. 30 mi E of jct Rt 57, <i>P13752</i> (ASU)
<i>Bidens odorata</i> Cav. aff. var. <i>chilpancingensis</i> Ballard	$2n = 12_{II}$	MEXICO: Guerrero, 8.3 mi N of Taxco, <i>KL15348</i> (OBI)

TABLE 1. *Continued*

Tribe Taxon or hybrid combination	Chromosome count	Location and voucher
<i>Bidens odorata</i> Cav. var. <i>oaxacensis</i> Ballard	$2n = 12_{II}$	MEXICO: Oaxaca: 13.1 mi S of Cuicatlán, <i>KL15578A</i> (OBI)
<i>Bidens pilosa</i> L. var. <i>pilosa</i>	$2n = 36_{II}$	MEXICO: Michoacán: Jiquilpan, <i>KL15188</i> (OBI); UNITED STATES: California: San Luis Obispo Co.: California Polytechnic State University campus, <i>K11870</i> (OBI)
** <i>Bidens serrulata</i> (Poir.) Desf.	$2n = 10_{II}$	MEXICO: Oaxaca: 8 mi NW of Tamazulapan, <i>KL15501</i> (OBI)
<i>Bidens triplinervia</i> H.B.K.	$2n = 24_{II}$	MEXICO: México—Michoacán border on Rt 15, <i>KL15600</i> (OBI)
<i>Calea ternifolia</i> Kunth. var. <i>ternifolia</i>	$n = 18$	MEXICO: Guerrero: 2.5 mi S of Xolapa, <i>KL15313</i> (OBI)
<i>Chaenactis carphoclinia</i> A. Gray	$2n = 8_{II}$	UNITED STATES: Arizona: La Paz Co.: I-10 at Tom Wells Rd, <i>K11937</i> pop. (OBI)
<i>Chaenactis glabriuscula</i> DC. var. <i>lanosa</i> (DC.) Hall	$2n = 6_{II}$	UNITED STATES: California: San Luis Obispo Co.: S of Shandon, <i>K11953A</i> (OBI)
<i>Chaenactis stevioides</i> H. & A.	$n = 5$	UNITED STATES: Arizona: Maricopa Co.: White Tank Mtns, <i>K11203</i> (ASU)
	$2n = 5_{II}$	Yavapai Co.: jct Castle Creek Rd and rd to I-17, <i>L19745</i> (ASU); Lake Pleasant Regional Park, <i>L19715</i> (ASU)
<i>Chaenactis xantiana</i> A. Gray	$2n = 5_{II}$	UNITED STATES: California: Los Angeles Co.: 5 mi W of San Bernardino Co. line on Rt 138, <i>K11889</i> pop. (OBI)
	$2n = 6_{II}$	San Luis Obispo Co.: S of Shandon, <i>K11954A</i> (OBI)
<i>Chrysanthellum indicum</i> DC. var. <i>mexicanum</i> (Greenm.) Turner	$2n = 8_{II}$	MEXICO: Nayarit: 9 mi E of turnoff to Compostela on Hwy 200, <i>KL15082</i> pop. (OBI)
* <i>Chrysanthellum michoacanum</i> B. L. Turner	$2n = 9_{II}$	MEXICO: Michoacán: 4.5 mi S of Apatzingán, <i>KL15237</i> (OBI)
<i>Chrysanthellum involutum</i> P. G. Wilson	$2n = 8_{II}$	MEXICO: Guerrero: 5.6 mi E of turnoff to Arcevia on Rt 51, <i>KL15368</i> (OBI)
<i>Coreopsis bigelovii</i> (A. Gray) Hall	$2n = 12_{II}$	UNITED STATES: California: San Luis Obispo Co.: S of Shandon, <i>K11952A</i> (OBI)
<i>Coreopsis californica</i> (Nutt.) H. K. Sharsm. var. <i>californica</i>	$n = 12$	UNITED STATES: California: Los Angeles Co.: 5 mi W of San Bernardino Co. line on Rt 138, <i>K11891</i> pop. (OBI)
** <i>Cosmos caudatus</i> H.B.K.	$2n = 12_{II}$	MEXICO: Michoacán: 7.2 mi SE of Huetamo, <i>KL15396</i> (OBI)
<i>Desmanthodium fruticosum</i> Greenm.	$2n = 18_{II}$	MEXICO: Guerrero: Rt 95 to Cuernavaca, 7 mi S of jct with Rt 55 to Toluca, <i>KL15356</i> (OBI)
<i>Dugaldia hoopesii</i> (A. Gray) Rydb.	$2n = 15_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>K11528A</i> (ASU), <i>K11571</i> (ASU)
<i>Eriophyllum lanosum</i> A. Gray	$n = 4$	UNITED STATES: Arizona: Maricopa Co.: Usery Mtns, <i>L17552M</i> (ASU)
	$2n = 4_{II}$	Yavapai Co.: jct Castle Creek Rd and rd to I-17, <i>L19744</i> (ASU)
* <i>Flaveria angustifolia</i> (Cav.) Pers.	$2n = 18_{II}$	MEXICO: Puebla: 5.5 mi NW of Puebla—Oaxaca border on Rt 190, <i>KL15487</i> (OBI)
<i>Flaveria linearis</i> Lag.	$2n = 18_{II}$	UNITED STATES: Florida: Palm Beach Co.: along Florida Turnpike at Lakeworth Plaza, <i>K16494</i> pop. (OBI)
<i>Florestina pedata</i> (Cav.) Cass.	$2n = 10_{II}$	MEXICO: Puebla: 4.2 mi SE of Izúcar de Matamoros, <i>KL15469</i> (OBI); Guerrero: 7.9 mi N of Chilpancingo, <i>KL15320</i> (OBI); Guerrero: 7.1 mi E of Teloloapan, <i>KL15366A</i> (OBI)
	** $2n = 11_{II}$	MEXICO: Michoacán: 4.2 mi S of Nueva Italia, <i>KL15214</i> pop. (OBI)
<i>Galinsoga parviflora</i> Cav. var. <i>parviflora</i>	$2n = 8_{II}$	MEXICO: México: 4.5 mi W of Santa María del Monte on Rt 1, <i>KL15410A</i> (OBI)
<i>Galinsoga parviflora</i> Cav. var. <i>semicalva</i> A. Gray	$2n = 16_{II}$	UNITED STATES: Arizona: Santa Cruz Co.: Santa Rita Mtns, 13.3 mi E of Amado on road to Mt. Hopkins, <i>Keil & Pinkava 18504</i> (OBI)

TABLE 1. *Continued*

Tribe Taxon or hybrid combination	Chromosome count	Location and voucher
<i>Helenium puberulum</i> DC.	$2n = 29_{II}$	UNITED STATES: California: San Luis Obispo Co.: 2 mi E of Orcutt Rd on Moretti Canyon Rd, <i>K11811</i> (OBI)
<i>Helianthus annuus</i> L.	$n = 17$	UNITED STATES: Arizona: Gila Co.: 6.1 mi SW of Seneca, <i>L18927</i> (ASU); Wyoming: Bighorn Co.: Yellowtail Lake, <i>R. K. Brown 498-1</i> (ASU)
<i>Helianthus ciliaris</i> DC.	$n = 34$	UNITED STATES: Texas: Culberson Co.: Lobo, <i>P13167</i> (ASU)
<i>Helianthus debilis</i> Nutt.	$2n = 17_{II}$	UNITED STATES: Florida: Martin Co.: ca. 1 mi S of Jonathan Dickinson State Park along US 1, <i>K16497</i> pop. (OBI)
<i>Heliomeris hispida</i> (A. Gray) Blake	$2n = 8_{II}$	MEXICO: Sonora: Sierra de los Ajos, WNW of Esqueda, <i>KLL13588A</i> (OBI)
<i>Heliomeris multiflora</i> Nutt. var. <i>nevadensis</i> (A. Nels.) Yates	$2n = 8_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>P13706</i> (ASU)
<i>Heliopsis annua</i> Hemsl.	$2n = 14_{II}$	MEXICO: Michoacán: 1.1 mi W of Villemar, <i>KL15147</i> (OBI)
<i>Hemizonia luzulifolia</i> DC. ssp. <i>rudis</i> (Benth.) Keck	$2n = 14_{II}$	UNITED STATES: California: Kern Co.: Blue-stone Ridge below Orchard Peak, <i>MGK11844</i> (OBI)
<i>Hemizonia pungens</i> (H. & A.) T. & G. ssp. <i>pungens</i>	$2n = 9_{II}$	UNITED STATES: California: Kern Co.: Blue-stone Ridge below Orchard Peak, <i>MGK11850</i> (OBI)
<i>Holocarpha heermannii</i> (Greene) Keck	$2n = 6_{II}$	UNITED STATES: California: Kern Co.: Blue-stone Ridge below Orchard Peak, <i>MGK11848</i> (OBI)
* <i>Hymenothrix palmeri</i> A. Gray	$2n = 12_{II}$	MEXICO: Chihuahua: 2 mi E of Colonia Pacheco, <i>KLL13348B</i> (ASU, OBI)
<i>Hymenoxys richardsonii</i> (Hook.) Cock- erell	$2n = 15_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>P13702</i> (ASU)
<i>Lagascea mollis</i> Cav.	$n = 17$	ANTIGUA AND BARBUDA: Antigua: St. John's Parish: 1 mi SE of St Johns, <i>K16551</i> pop. (OBI)
<i>Lagophylla ramosissima</i> Nutt.	$2n = 7_{II}$	UNITED STATES: California: San Luis Obispo Co.: 2 mi E of Orcutt Rd along Moretti Canyon Rd, <i>K11812</i> (ASU, OBI)
<i>Layia glandulosa</i> (Hook.) H. & A. var. <i>lutea</i> (Keck) Hoover	$2n = 8_{II}$	UNITED STATES: California: San Luis Obispo Co.: S of Shandon, <i>K11955</i> (OBI)
<i>Layia platyglossa</i> (F. & M.) A. Gray	$2n = 6_{II}$	UNITED STATES: California: San Luis Obispo Co.: S of Shandon, <i>K11956</i> pop. (OBI)
<i>Melampodium divaricatum</i> (Rich. in Pers.)	$n = 12$	MEXICO: Michoacán: Rt 37, 3 mi S of jct with Rt 15, <i>KL15182</i> (OBI)
<i>Melampodium gracile</i> Less.	$2n = 9_{II}$	MEXICO: Morelos: 5.8 mi N of Tlaltizapán on rd to Cuautla, <i>KL15461-1</i> pop. (OBI)
<i>Melampodium pilosum</i> Stuessy	$2n = 9_{II} + 1_{III}$	MEXICO: Guerrero: 4.8 mi SW of Coyuca de Catalan, <i>KL15403</i> pop. (OBI)
<i>Melanthera aspera</i> (Jacq.) Small	$2n = 15_{II}$	DOMINICAN REPUBLIC: Distrito Nacional: Santo, <i>KPr16425</i> pop. (OBI)
<i>Millieria quinqueflora</i> L.	$2n = 15_{II}$	MEXICO: Michoacán: 11.5 mi E of Jiquilpan, <i>KL15145A</i> (OBI)
<i>Montanoa tomentosa</i> Cerv.	$2n = 19_{II} + 1_{S}$	MEXICO: Oaxaca: 7.3 mi NW of Totolapan, <i>KL15534</i> (OBI)
<i>Otopappus imbricatus</i> (Sch. Bip.) S. F. Blake	$2n = 16_{II}$	MEXICO: Guerrero: 8.3 mi N of Taxco, <i>KL15345</i> pop. (OBI)
<i>Palafoxia arida</i> Turner & Morris var. <i>arida</i>	$2n = 12_{II}$	UNITED STATES: Arizona: La Paz Co.: I-10 at Tom Wells Rd, <i>K11941</i> pop. (OBI); California: Riverside Co.: E of Indio, <i>K11878</i> (OBI); Riverside Co.: 37 mi E of Chiriaco Summit, <i>K11927</i> pop. (OBI)
<i>Palafoxia linearis</i> (Cav.) Lag. var. <i>linearis</i>	$2n = 12_{II}$	MEXICO: Sinaloa: 9 mi NW of El Dorado, <i>KL15057</i> (OBI)
<i>Perymenium macrocephalum</i> Greenm.	$2n = 15_{II}$	MEXICO: Guerrero: 13 mi N of Zumpango del Río, <i>KL15329</i> (OBI)

TABLE 1. *Continued*

Tribe Taxon or hybrid combination	Chromosome count	Location and voucher
<i>Perymenium mendezii</i> DC. var. <i>mendezii</i>	$3n = \text{ca. } 45$	MEXICO: Oaxaca: 8 mi NW of Tamazulapan, <i>KL15504</i> (OBI)
<i>Psilostrophe sparsiflora</i> (A. Gray) A. Nels.	$n = 16$	UNITED STATES: Utah: Wayne Co.: Capital Reef National Park, <i>K10835</i> (ASU)
<i>Psilostrophe tagetina</i> (Nutt.) Greene	$n = 16$	UNITED STATES: New Mexico: Torrance Co.: 7 mi E of Willard, <i>K10727</i> (ASU); Texas: El Paso Co.: I-10 at Clint turnoff, <i>P13000</i> (ASU)
	$2n = 16_{II} + 1 \text{ s}$	UNITED STATES: Arizona: Cochise Co.: 2.5 mi W of Portal, <i>K8508-1</i> (ASU; counted by R. C. Brown)
<i>Schkuhria anthemoidea</i> (DC.) Coult. var. <i>anthemoidea</i>	$2n = 10_{II}$	MEXICO: Nayarit: 7 mi NE of turnoff to Compostelo on Hwy 200, <i>KL15086</i> (OBI); Oaxaca: 8 mi NW of Tamazulapan, <i>KL15505</i> (OBI)
* <i>Schkuhria anthemoidea</i> (DC.) Coult. forma <i>flava</i> (Rydb.) Heiser	$2n = 10_{II}$	MEXICO: Oaxaca: 8 mi NW of Tamazulapan, <i>KL15506</i> (OBI)
<i>Schkuhria anthemoidea</i> (DC.) Coult. var. <i>wislizenii</i> (A. Gray) Heiser	$2n = 20_{II}$	MEXICO: Michoacán: Rt 37, 3 mi S of jct with Rt 15, <i>KL15183</i> (OBI)
<i>Sclerocarpus divaricatus</i> (Benth.) Benth. & Hook. ex Hemsl.	$2n = 11_{II}$	MEXICO: Colima: 4 mi NW of jct Hwys 200 and 110, <i>KL15135</i> (OBI); Guerrero: 7.8 mi NW of Petatlán, <i>KL15291</i> (OBI)
* <i>Sclerocarpus papposus</i> (Greenm.) Fed-dema	$2n = 13_{II}$	MEXICO: Morelos: 5.8 mi N of Tlaltizapán, <i>KL15458</i> (OBI)
<i>Sclerocarpus uniserialis</i> (Hook.) Benth.	$2n = 12_{II}$	MEXICO: Michoacán: 0.2 mi W of Cuatros Caminos, <i>KL15234</i> (OBI); Puebla: 10.1 mi W of Puebla-Oaxaca border on Rt 190, <i>KL15486</i> (OBI)
** <i>Silphium compositum</i> Michx. $\times$ (?) <i>S. asteriscus</i> Ell.	$2n = 7_{II} + 1_{I}$	UNITED STATES: North Carolina: Cumberland Co.: Fort Bragg, <i>K11632</i> (ASU). Pollen stainability 3.8%; macropollen and micropollen present
<i>Simsia lagasciformis</i> DC.	$2n = 17_{II}$	MEXICO: Guerrero: 15 mi N of Zumpango del Río, <i>KL15419</i> (OBI)
<i>Spilanthes urens</i> Jacq.	$n = 16$	MEXICO: Jalisco: Puerto Vallarta, <i>KL15103</i> (OBI) JAMAICA: St. James Parish: Montego Bay, <i>K16388</i> pop. (OBI)
* <i>Stuessya michoacana</i> Turner & Davies	$2n = 17_{II}$	MEXICO: Michoacán: 6 mi S of Gabriel Zamora, <i>KL15212</i> (OBI)
<i>Stuessya perennans</i> Turner & Davies	$2n = 17_{II}$	MEXICO: Guerrero: 5.6 mi W of turnoff to La Union on Rt 200, <i>KL15286</i> (OBI)
<i>Thelesperma megapotamicum</i> (Spreng.) Kuntze	$2n = 22_{II}$	UNITED STATES: Arizona: Pima Co.: Luckow 633 (OBI)
<i>Tithonia pedunculata</i> Cronq.	$2n = 17_{II}$	MEXICO: Oaxaca: 9.8 mi NW of El Coyula on Rt 190, <i>KL15544</i> (OBI)
<i>Trichoptilium incisum</i> (A. Gray) A. Gray	$2n = 13_{II}$	UNITED STATES: California: Riverside Co.: Cactus City rest area along I-10, <i>K11929</i> pop. (OBI)
<i>Tridax coronopifolia</i> (H.B.K.) Hemsl.	$2n = 9_{II}$	MEXICO: Guerrero: 7.8 mi NW of Petatlán, <i>KL15292</i> (OBI)
<i>Tridax platyphylla</i> B. L. Robins.	$2n = 9_{II}$	MEXICO: Michoacán: 11.6 mi N of Nuevo Centro, <i>KL15258</i> (OBI); Guerrero: 2.1 mi N of Río Mezcala on Rt 95, <i>KL15335</i> (OBI)
<i>Verbesina encelioides</i> (Cav.) A. Gray ssp. <i>encelioides</i>	$2n = 17_{II}$	DOMINICAN REPUBLIC: Monte Christi Province: S of Monte Christi along road to Dajabón, <i>KPr16432</i> pop. (OBI)
<i>Viguiera grammatoglossa</i> DC.	$2n = 17_{II}$	MEXICO: Oaxaca: 7.7 mi W of Tamazulapan, <i>KL15511</i> (OBI)
<i>Viguiera microcephala</i> Greenm.	$2n = 12_{II}$	MEXICO: Oaxaca: 12 mi SE of Totolapan, <i>KL15540</i> (OBI)
* <i>Wedelia calycina</i> L. C. Rich.	$n = 24$	ANTIGUA AND BARBUDA: Antigua: St. Paul's Parish: Falmouth Harbour, <i>K16549</i> pop. (OBI)
* <i>Wedelia</i> aff. <i>ehrenbergii</i> Schlecht.	$2n = 24_{II}$	DOMINICAN REPUBLIC: Dajabón Province: Santiago de la Cruz, <i>KPr16441</i> (OBI)
* <i>Wedelia reticulata</i> DC.	$n = 14$	DOMINICAN REPUBLIC: Puerto Plata Province: S of Imbert, <i>K16427</i> pop. (OBI)

TABLE 1. *Continued*

Tribe Taxon or hybrid combination	Chromosome count	Location and voucher
<i>*Wedelia</i> sp. nov.	$2n = 22_{II}$	MEXICO: Michoacán: 16.3 mi S of Uruapan, <i>KL15201</i> (OBI)
<i>Zinnia angustifolia</i> H.B.K.	$n = 11$	MEXICO: Jalisco: 8 mi N of El Tuito, <i>KL15110</i> (OBI)
<i>Zinnia palmeri</i> A. Gray in S. Wats.	$2n = 12_{II}$	MEXICO: Jalisco: Puerto Vallarta, <i>KL15102</i> (OBI)
**Zinnia tenella B. L. Robins.	$2n = 10_{II}$	MEXICO: Michoacán: 7.4 mi N of Nuevo Centro, <i>KL15260</i> (OBI)
INULEAE		
<i>*Gnaphalium californicum</i> DC.	$2n = 14_{II}$	UNITED STATES: California: San Luis Obispo Co.: See Canyon, <i>K11835</i> (OBI)
<i>Gnaphalium canescens</i> DC.	$2n = 14_{II}$	UNITED STATES: Arizona: Pima Co.: Madera Canyon, Santa Rita Mtns, <i>K12577</i> pop. (OBI)
<i>Gnaphalium exilifolium</i> A. Nels.	$2n = 7_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>P13697</i> (ASU)
<i>Gnaphalium leucocephalum</i> A. Gray	$2n = 14_{II}$	UNITED STATES: Arizona: Pima Co.: Santa Catalina Mtns, <i>K12562</i> (OBI)
<i>Gnaphalium palustre</i> Nutt.	$2n = 7_{II}$	UNITED STATES: California: San Luis Obispo Co.: Lopez Lake, <i>K13661A</i> (OBI)
<i>Pluchea odorata</i> (L.) Cass.	$2n = 10_{II}$	ANTIGUA AND BARBUDA: Antigua: St. George's Parish: between Coolidge Airport and St. George's Church <i>K16557</i> pop. (OBI)
<i>Pluchea symphytifolia</i> (Mill.) Gillis	$2n = 10_{II}$	ANTIGUA AND BARBUDA: Antigua: St. George's Parish: between Coolidge Airport and St. George's Church <i>K16556</i> pop. (OBI)
LACTUCEAE		
<i>Agoseris aurantiaca</i> (Hook.) Greene	$2n = 17_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>P13768</i> pop. (ASU)
<i>Agoseris glauca</i> (Pursh) D. Dietr.	$2n = 18_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>K11527A</i> (ASU)
<i>Agoseris grandiflora</i> (Nutt.) Greene	$2n = 9_{II}$	UNITED STATES: California: San Luis Obispo Co.: See Canyon, <i>K11834</i> (OBI)
<i>Hieracium gronovii</i> L.	$2n = 9_{II}$	UNITED STATES: North Carolina: Cumberland Co.: Fort Bragg, <i>K11640</i> (ASU), <i>K11656</i> (ASU)
<i>*Hieracium pringlei</i> A. Gray	$2n = 9_{II}$	MEXICO: Michoacán: Rt 37, 10 mi S of jct with Rt 15, <i>KL15190</i> (OBI)
<i>Hypochoeris radicata</i> L.	$2n = 4_{II}$	UNITED STATES: North Carolina: Cumberland Co.: Fort Bragg, <i>K11621</i> pop. (ASU)
<i>Lactuca saligna</i> L.	$2n = 9_{II}$	UNITED STATES: California: San Luis Obispo Co.: 2.3 mi N of Righetti Rd on Orcutt Rd, <i>K11809</i> (OBI)
<i>Malacothrix incana</i> (Nutt.) T. & G.	$2n = 7_{II}$	UNITED STATES: California: San Luis Obispo Co.: Montaña de Oro State Park, <i>MMK11860</i> (OBI)
<i>Microseris heterocarpa</i> (Nutt.) Chambers	$2n = 18_{II}$	UNITED STATES: California: Riverside Co.: Alberthill Jct along Hwy 71, <i>MK12967</i> pop. (OBI)
<i>Pinaropappus roseus</i> (Less.) Less.	$2n = 16_{II} + 1_{IV}$	MEXICO: Oaxaca: 7.7 mi SE of Tamazulapan on Rt 190, <i>KL15510</i> (OBI)
<i>Pyrrophappus carolinianus</i> (Walt.) DC. var. <i>carolinianus</i>	$2n = 6_{II}$	UNITED STATES: North Carolina: Cumberland Co.: Fort Bragg, <i>K11637</i> (ASU)
<i>Stephanomeria cichoriacea</i> A. Gray	$2n = 8_{II}$	UNITED STATES: California: San Luis Obispo Co.: Prefumo Canyon, <i>K11832</i> (OBI)
<i>Stephanomeria thurberi</i> A. Gray	$2n = 32$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>P13755</i> (ASU). $2n = 11_{II} + 1_{IV} + 1_{VI}$; multivalents vary from cell to cell; some cells with univalents
<i>Tragopodon dubius</i> Scop.	$n = 6$	UNITED STATES: Arizona: Apache Co.: Green's Mountain Rd, 4.8 mi S of jct with Rt 60, <i>P11513</i> (ASU); Coconino Co.: Flagstaff, Cedar Dr. near municipal watertower, <i>R. K. Brown 215-2, -3; 229-1, -7; 416-4; 428-8</i> (all ASU);

TABLE 1. *Continued*

Tribe Taxon or hybrid combination	Chromosome count	Location and voucher
		Flagstaff, Rt 180 NW of Plaza Mall, <i>L17780</i> (ASU); Lindburg Spring Road, Rt 89A, <i>L17735-6</i> (ASU); Lake Mary, <i>L17765-1</i> (ASU); Gila Co.: Rt 60-77, ca. 26 mi N of Globe, <i>R. K. Brown 610-2</i> (ASU); Kohl's Ranch, Rt 260, <i>R. K. Brown 700-1, -4</i> (ASU); Greenlee Co.: 13 mi S of Strayhorse campground, <i>P11288</i> (ASU); Navajo Co.: Woodland Rd. and Rt 260, Lake-side, <i>R. K. Brown 608</i> (ASU); Yavapai Co.: Prescott, <i>R. K. Brown 234-1</i> (ASU); 2 mi E of Prescott Community College, Rt 69, <i>R. K. Brown 699-1, -3</i> (ASU)
<i>Tragopogon mirus</i> Owenbey	$n = 12$	UNITED STATES: Arizona: Flagstaff, Rt 180 NW of Plaza Mall, <i>R. K. Brown 425-2, -4, -31; 427-3</i> (all ASU); Flagstaff, Cedar Dr., near municipal watertower, <i>R. K. Brown 214-1; 227-4, -5, -6; 390-4-1, -6</i> (yellow-flowered form); <i>391-1; 418-2</i> (aberrant capitulum; 86.4% pollen stainability) (all ASU)
<i>Tragopogon porrifolius</i> L.	$n = 6$	UNITED STATES: Arizona: Coconino Co.: Flagstaff, near municipal watertower, <i>R. K. Brown 216-1, -2; 230-1</i> (ASU)
SENECIONEAE		
<i>Senecio blochmaniae</i> Greene	$2n = 20_{II}$	UNITED STATES: California: San Luis Obispo Co.: Morro Bay, <i>MMK11857</i> (OBI)
<i>Senecio douglasii</i> DC. var. <i>monoensis</i> (Greene) Jeps.	$2n = 20_{II}$	UNITED STATES: Arizona: Yavapai Co.: I-17, 0.5 mi N of Sunset Point, <i>L19930</i> (ASU)
<i>Senecio eremophilus</i> Rich. var. <i>macdougalii</i> (Heller) Cronq.	$2n = 20_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>P13730</i> (ASU), <i>P13778</i> (ASU)
<i>Senecio lemmonii</i> A. Gray	$2n = 20_{II}$	UNITED STATES: Arizona: Maricopa Co.: White Tank Mtns, <i>K11190</i> (ASU)
<i>Senecio multicapitatus</i> Greenm.	$2n = 20_{II}$	UNITED STATES: Arizona: Coconino Co.: San Francisco Peaks, <i>P13714</i> (ASU)
<i>Senecio vulgaris</i> L.	$2n = 20_{II}$	UNITED STATES: Arizona: Maricopa Co.: Metro-center, Phoenix, <i>K11325</i> (ASU)
TAGETEAE		
<i>Dyssodia papposa</i> (Vent.) Hitch.	$2n = 13_{II}$	BOLIVIA: Chuquisaca: 12 km NE of Sucre, <i>Canne 2767</i> (OBI); MEXICO: México: 4.5 mi W of Santa María del Monte, <i>KL15411</i> (OBI)
<i>Dyssodia decipiens</i> (Bartling) M. C. Johnston & B. L. Turner	$2n = 13_{II}$	MEXICO: Oaxaca: 2.1 mi SE of Mazatlán, <i>KL15531</i> (OBI)
<i>Dyssodia taetiflora</i> Lag.	$2n = 13_{II}$	MEXICO: Guerrero: 8.3 mi N of Taxco, <i>KL15344</i> (OBI)
* <i>Pectis canescens</i> H.B.K.	$2n = 12_{II}$	MEXICO: Guerrero: 4.3 mi SE of jct with Rt 200 on rd to Barra Vieja, <i>KL15302A</i> , pop. (OBI)
* <i>Pectis carthusianorum</i> Less.	$2n = 24_{II}$	DOMINICAN REPUBLIC: Distrito Nacional: Jardín Botánico Nacional, <i>KPr16421 A.D</i> (OBI)
<i>Pectis cylindrica</i> (Fern.) Rydb.	$2n = 24_{II}$	MEXICO: Sinaloa: 0.3 mi W of Las Cascabeles, <i>KL15052</i> pop. (OBI); Sonora: 15.4 mi N of turn-off to Bahia Kino on Hwy 15, <i>KL15001</i> pop. (OBI)
* <i>Pectis decemcarinata</i> McVaugh	$2n = 12_{II}$	MEXICO: Michoacán: 4.2 m N of Nueva Italia, <i>KL15216A,B,C</i> (OBI); 5.5 mi N of Nueva Italia, <i>KL15229</i> pop. (OBI); Cuatros Caminos, <i>KL15232</i> pop. (OBI); 2.3 mi S of Apatzingán, <i>KL15236A</i> (OBI); 7.2 mi S of Apatzingán <i>KL15238</i> pop. (OBI); 1.5 mi N of Santa Ana Amatlán, <i>KL15240</i> pop. (OBI); 3 mi W of Apatzingán, <i>KL15241C,D,F,G</i> (OBI); 8.9 mi N of Nuevo Centro, <i>KL15259A</i> (OBI)
<i>Pectis depressa</i> Fern.	$2n = 12_{II}$	MEXICO: Guerrero: 7.8 mi NW of Petatlán,

TABLE 1. *Continued*

Tribe Taxon or hybrid combination	Chromosome count	Location and voucher
<i>*Pectis diffusa</i> Hook. & Arn.	$2n = 12_{II}$	KL15290A,C (OBI); 4.1 mi NW of Petatlán, KL15293A,B (OBI); 8 mi S of Acapulco on rd to Barra Vieja, KL15300 pop. (OBI); El Bejuco, KL15307A,B (OBI)
<i>*Pectis elongata</i> H.B.K. var. <i>floribunda</i> (A. Rich.) Keil	$2n = 12_{II}$	MEXICO: Jalisco: N of Guadalajara on Rt 54, KL15631A,B,D (OBI)
<i>*Pectis elongata</i> H.B.K. var. <i>floribunda</i> (A. Rich.) Keil $\times$ <i>P. humifusa</i> Sw.	$2n = 4x = 48$	DOMINICAN REPUBLIC: El Siebo Prov.: 5 km S of Hato Mayor, KPr16442A,C (OBI); JAMAICA: Hanover Parish: 7 mi E of Lucea, K16390 pop. (OBI); Hanover Parish: 2 mi E of Lucea, K16405A (OBI); MARTINIQUE: 2 mi E of Trois Islets, K16522 pop. (OBI); 22 km NE of Marin, K16525 pop. (OBI); at turnoff to St. Anne along rd from Marin to Salines, K16526 pop. (OBI); PUERTO RICO: 4.5 mi W of Coamo, K16518A,B (OBI); 1.5 mi NE of Rincón, K16505A (OBI); 3 mi SSE of Rincón, K16508A (OBI)
<i>*Pectis elongata</i> H.B.K. var. <i>floribunda</i> (A. Rich.) Keil $\times$ <i>P. linearis</i> Llave	$2n = 24$	MARTINIQUE: 22 km NE of Marin, K16524C (OBI). Meiosis is very irregular (e.g., $1_{IV} + 5_{II} + 34_i$)
<i>*Pectis exserta</i> McVaugh	$2n = 12_{II}$	PUERTO RICO: 1.5 mi NE of Rincón, K16507 (OBI). Some cells have apparently normal meiosis; others at metaphase I have univalents or early disjunction; some anaphase I cells have a bridge + a fragment
<i>Pectis filipes</i> H. & G. ex A. Gray var. <i>subnuda</i> Fern.	$2n = 12_{II}$	MEXICO: Jalisco: 4 mi N of Río Tomatlán on Hwy 200, KL15117B,C; 1 mi S of Río San Nicolas on Hwy 200, KL15119A,B,D,E (OBI); 3 mi from Playa la Fortuna, KL15120A,B,C (OBI); Barra de Navidad, KL15126A,B,C (OBI)
<i>Pectis</i> $\times$ <i>floridana</i> Keil (<i>P. glaucescens</i> (Cass.) Keil $\times$ <i>P. prostrata</i> Cav.)	$2n = 3x = 36$	UNITED STATES: Arizona: Pima Co.: Santa Catalina Mtns, K12552 pop. (OBI); Santa Cruz Co.: 5 mi from jct with Lochiel-Nogales Rd on rd from Patagonia, K12597 pop. (OBI)
<i>Pectis glaucescens</i> (Cass.) Keil	$2n = 24_{II}$	UNITED STATES: Florida: Dade Co.: US 41, W of Florida Turnpike, K16476B (OBI); Collier Co.: 6 mi SE of Royal Palm Hammock, K16488A,C,D (OBI). Meiosis is very irregular with a variable number of I's, II's, III's, and IV's
<i>*Pectis humifusa</i> Sw.	$2n = 36_{II}$	DOMINICAN REPUBLIC: Distrito Nacional: Santo Domingo, Jardín Botánico Nacional, KPr16420 pop. (OBI), 16422 pop. (OBI); JAMAICA: St. Elizabeth Parish: 1 mi N of Mountainside, K16426 pop. (OBI); UNITED STATES: Florida: Collier Co.: 6 mi SE of Royal Palm Hammock, K16487 A,B (OBI) Dade Co.: US 41 18 mi W of Florida Turnpike, K16475A,B,C (OBI); US 41 4 mi W of Shark Valley K16481 pop. (OBI); US 41 3 mi E of Monroe Station, K16482 pop. (OBI); US 41 0.5 mi W of Carnestown, K16484 pop. (OBI); Martin Co., 5.5 mi N of Hobe Sound, K16501 pop. (OBI); Palm Beach Co.: Florida Turnpike at Lakeworth Service Plaza, K16501 pop. (OBI)
		ANTIGUA AND BARBUDA: Antigua: St. Paul's Parish: Falmouth Harbour, K16548C,D,E (OBI); St. George's Parish: Windthorpe's Bay, K16552 pop. (OBI); MARTINIQUE: Salines, K16527 pop. (OBI); 4 km N of Vauclin, K16530 pop. (OBI); PUERTO RICO: Isla de Cabra, K16502A,C (OBI)

TABLE 1. *Continued*

Tribe Taxon or hybrid combination	Chromosome count	Location and voucher
<i>Pectis imberbis</i> A. Gray	$2n = 12_{II}$	UNITED STATES: Arizona: Cochise Co.: S end of Canelo Hills, <i>KL13533</i> (OBI)
** <i>Pectis latisquama</i> Sch. Bip. ex Greenm.	$2n = 72$	MEXICO: Puebla: Tepeala, <i>KL15593</i> pop. (OBI); 3.9 mi SE of Amazoc, <i>KL15594A,C,D</i> (OBI). Meiosis is nearly normal with mostly bivalent pairing and a variable number of univalents
<i>Pectis leavenworthii</i> Standl.	$2n = 12_{II}$	MEXICO: Michoacán: 5 mi N of Gabriel Zamora, <i>KL15209</i> pop. (OBI); 2.6 mi N of Gabriel Zamora, <i>KL15225</i> pop. (OBI); 2.3 mi S of Apatzingán, <i>KL15236B</i> (OBI); Nueva Italia, <i>KL15231</i> pop. (OBI)
<i>Pectis linearifolia</i> Urban	$2n = 24_{II}$	UNITED STATES: Florida: Martin Co.: 5.5 mi N of Hobe Sound, <i>K16500A</i> , pop. (OBI)
* <i>Pectis linearis</i> Llave	$2n = 12_{II}$	MEXICO: Oaxaca: 14.7 mi W of Nilttepec, <i>KL15558</i> pop. (OBI); PUERTO RICO: 1.5 mi NE of Rincón, <i>K16506A,B</i> (OBI)
* <i>Pectis linifolia</i> L. var. <i>hirtella</i> S. F. Blake	$2n = 12_{II}$	MEXICO: Michoacán: 7 mi W of Cuatros Caminos, <i>KL15217A,B,C</i> (OBI); 8 mi S Cuatros Caminos, <i>KL15248</i> pop. (OBI)
<i>Pectis linifolia</i> L. var. <i>linifolia</i>	$2n = 12_{II}$	MEXICO: Oaxaca: 3 mi NW of Totolapan, <i>KL15535</i> pop. (OBI); 15.1 mi SE of Totolapan, <i>KL15542</i> pop. (OBI); PERU: Lambayeque: 28 km W of Olmos, <i>Dillon 1721</i> progeny (OBI); PUERTO RICO: 4.4 mi SE of Boqueron, <i>K16509A,B,C,D</i> (OBI); 1 mi W of Ensenada, <i>K16514A,B</i> (OBI)
<i>Pectis multiflosculosa</i> (DC.) Sch. Bip.	$2n = 36_{II}$	MEXICO: Colima: beach 3 mi SE of turnoff to Cuyutlán, <i>KL15132A,B,C,D</i> (OBI); Michoacán: Playa Azul, <i>KL15283A,C</i> (OBI); Sinaloa: Playa la Queta N of La Cruz, <i>KL15059A,B</i> (OBI); 9 mi NW of El Dorado, <i>KL15056C,G</i> (OBI)
<i>Pectis papposa</i> H. & G. ex A. Gray var. <i>papposa</i>	$2n = 12_{II}$	UNITED STATES: Arizona: Maricopa Co.: I-10 at Maricopa Rd exit, <i>K12546A</i> (OBI)
<i>Pectis prostrata</i> Cav.	$2n = 12_{II}$	DOMINICAN REPUBLIC: Distrito Nacional: Santo Domingo, <i>K16424</i> pop. (OBI); MEXICO: Jalisco: Puerto Vallarta, <i>KL15101A</i> (OBI); 17 mi S of El Tuito, <i>KL15115</i> pop. (OBI); 4 mi N of Río Tomatlán on Hwy 200, <i>KL15118</i> pop. (OBI); Ajijic, <i>KL15612A</i> (OBI); México: 5.6 mi S of Ixtapan de la Sal, <i>KL15434A</i> (OBI); Oaxaca: 12.1 mi SE of Totolapan, <i>KL15541</i> pop. (OBI); PUERTO RICO: Boqueron, <i>K16513A,B</i> (OBI); Guayama, <i>K16520A</i> (OBI); 12 mi E of Guayama, <i>K16521A</i> (OBI); UNITED STATES: Florida: Dade Co.: along US 41 18 mi W of Florida Turnpike, <i>K16474A</i> (OBI); Collier Co.: 6 mi E of Royal Palm Hammock, <i>K16486A</i> (OBI); Collier Co.: 7 mi NW of Royal Palm Hammock, <i>K16490A</i> (OBI)
<i>Pectis purpurea</i> Brandegees var. <i>sonorae</i> Keil	$2n = 12_{II}$	MEXICO: Sinaloa: 0.3 mi W of Las Cascabeles, <i>KL15051</i> pop. (OBI)
* <i>Pectis schaffneri</i> Sch. Bip. ex Fern.	$2n = 12_{II}$	MEXICO: Oaxaca: on Rt 190, 5.8 mi SE of jct with Rt 125, <i>KL15494</i> pop. (OBI); on Rt 190, 8.3 mi SE of jct with Rt 125, <i>KL15497</i> pop. (OBI); 0.8 mi SE of turnoff to Mitla on Rt 190, <i>KL15527</i> pop. (OBI)
<i>Pectis saturejoides</i> (Mill.) Sch. Bip.	$2n = 12_{II}$	MEXICO: Oaxaca: 11.4 mi NE of Juchitlán de Zaragoza, <i>KL15556A,B,C</i> ; Salina Cruz, <i>KL15567A,B</i> (OBI)
* <i>Pectis sessiliflora</i> (Less.) Sch. Bip.	$2n = 24_{II}$	BOLIVIA: Chuquisaca: Sucre, <i>Canne 2777</i> (OBI)
* <i>Pectis tenuicaulis</i> Urban	$2n = 12_{II}$	ANTIGUA AND BARBUDA: Barbuda: Codrington, <i>K16558A</i> (OBI); along sand rd to Palmetto Pt., <i>K16564A</i> , pop. (OBI); JAMAICA: Hanover

TABLE 1. *Continued*

Tribe Taxon or hybrid combination	Chromosome count	Location and voucher
		Parish: 3.5 mi W of Lucea, <i>K16399</i> pop. (OBI); 6 mi W of Lucea, <i>K16400A</i> (OBI); 1.8 mi SW of Green Island, <i>K16401</i> pop. (OBI); St. Andrew's Parish: Beverley Hills above Kingston, <i>KB16411A</i> (OBI); St. James' Parish: Montego Bay, <i>K16386B,C,D</i> (OBI); DOMINICAN REPUBLIC: La Altagracia Province: Boca de Yuma, <i>KPr16447A,B,C</i> (OBI)
<i>Pectis uniaristata</i> DC. var. <i>jangadensis</i> (S. Moore) Keil	$2n = 12_{II}$	MEXICO: Jalisco: 10.1 mi E of Magdalena, <i>KL15635A,B</i> (OBI); Michoacán: 16.3 mi S of Uruapan, <i>KL15196</i> pop. (OBI)
* <i>Pectis uniaristata</i> DC. var. <i>uniaristata</i>	$2n = 12_{II}$	MEXICO: México: 4 mi W of jct with Rt 134 on rd to Luvianos, <i>KL15427B,C</i> (OBI); 3.6 mi NE of Tejupilco, <i>KL15429B</i> (OBI); Michoacán: 8 mi S of Cuatro Caminos, <i>KL15247A,B,D</i> (OBI); 4 mi N of Pte. El Guayabito on Rt 37, <i>KL15276A</i> (OBI) (bridge + fragment)
* <i>Pectis vollmeri</i> Wiggins	$2n = 12_{II}$	MEXICO: Baja California Sur: 9.5 mi S of Santa Rosalia, <i>Keil et al.</i> , 16626 (OBI)
<i>Porophyllum</i> sp.	$2n = 12_{II}$	MEXICO: Oaxaca: Rt 190, 3.3 mi SE of Rt 125 to Tehuacán, <i>KL15490</i> pop. (OBI); Puebla: 12 mi SE of Acatlán, <i>KL15479</i> (OBI)
* <i>Tagetes coronopifolia</i> Willd.	$n = 12$	MEXICO: México: 5 mi E of Valle de Brava, <i>KL15423</i> pop. (OBI)
<i>Tagetes lemmonii</i> A. Gray	$2n = 12_{II}$	UNITED STATES: Arizona: Santa Cruz Co.: 10 mi from Patagonia on Harshaw Rd, <i>K12596</i> (OBI)
<i>Tagetes lucida</i> Cav.	$2n = 11_{II}$	MEXICO: Guerrero: Rt 95, 4.8 mi S of jct with Rt 55, <i>KL15353A</i> (OBI)
	$2n = 8_{II} + 3_{III}$	Jalisco: 18 mi N of Tamazula, <i>KL15143</i> (OBI). The III's fail to segregate at anaphase I and form several (up to 6) micronuclei at telophase I
<i>Tagetes tenuifolia</i> Cav.	$2n = 12_{II}$	MEXICO: México: 5.6 mi S of Ixtapan de Sal on Rt 55, <i>KL15435</i> pop. (OBI); Oaxaca: 8 mi NW of Tamazulapan on Rt 190, <i>KL15502A</i> (OBI)
VERNONIEAE		
<i>Elephantopus mollis</i> H.B.K.	$2n = 11_{II}$	DOMINICAN REPUBLIC: La Vega Province: 17.5 km S of La Vega, <i>K16488A</i> (OBI)
<i>Elephantopus spicatus</i> Juss. ex Aubl.	$2n = 13_{II}$	DOMINICAN REPUBLIC: La Altagracia Province: Boca de Yuma, <i>K16445</i> pop. (OBI)
<i>Vernonia acaulis</i> (Walt.) Gleason	$n = 18$	UNITED STATES: North Carolina: Cumberland Co.: Fort Bragg, <i>K11652A</i> (ASU)
<i>Vernonia cinerea</i> (L.) Less.	$2n = 9_{II}$	JAMAICA: Hanover Parish: 1.8 mi SW of Green Island, <i>K16402A</i> (OBI)

of *E. bellioides* are in accordance with all of these features.

Our reports for *Heterotheca* accord well with the established base of $x = 9$ for the genus (Semple, 1977; Semple, Bloc, and Heiman, 1980). Our count of $2n = 9_{II}$ for *H. mucronata* is the first report at the diploid level for this taxon; a tetraploid count of $2n = 18_{II}$ was published in the protologue of this species (Turner, 1984). The count of $2n = 3x = 9_{III}$ for *H. villosa* $\times$ *H. fulcrata* is the first report for this hybrid combination and probably represents

a cross between a tetraploid *H. villosa* (variety not determined) and a diploid *H. fulcrata*. *Heterotheca villosa* is known at both the diploid and tetraploid levels (Semple, 1977), whereas all reports to date for *H. fulcrata* are diploids. Semple (1977) reported a triploid in the closely related *H. horrida* (Rydb.) Harms.

Cardueae—*Cirsium occidentale* var. *compactum* is a rare taxon limited to a narrow coastal strip of San Luis Obispo County, California. Our first report of $2n = 15_{II}$ for this

taxon indicates that it is cytologically similar to the more widespread var. *occidentale*.

Eupatorieae—Our first reports for *Brickellia chenopodina* ($2n = 9_{II}$) and $2n = 10_{II}$ for *Koanophyllum villosum* (*Eupatorium villosum* Sw.) are in accordance with the established base numbers, $x = 9$ and $x = 10$, respectively, for these genera (King et al., 1976).

Heliantheae—Chromosome counts of $2n = 36$ (or $n = 18$) have been reported previously for *Bahia dissecta* by several authors. The three species of *Bahia* most similar to *B. dissecta* and the closely related genus, *Hymenothrix*, all have chromosome counts of $n = 12$. Ellison (1964), in an attempt to explain the anomalous $n = 18$ of *B. dissecta*, speculated that *Bahia* has a base of $x = 4$, and that *Bahia dissecta* somehow originated by hybridization between a triploid ($3x = 12$) and a hexaploid ($6x = 24$). However, neither the hypothesized triploid nor any diploid ($2x = 8$) species based on the putative $x = 4$ are known in *Bahia*. We believe that a much simpler explanation for the 36 chromosomes of *B. dissecta* is that this species is a stabilized apomictic triploid ($3n = 3x = 36$). A base of $x = 12$ is supported by counts of the close relatives of *B. dissecta*. Apomixis is supported by the fact that despite only a small amount of sporogenous tissue in the anthers [sometimes it is entirely absent!], abnormal diad pollen, and very irregular meiosis, *B. dissecta*, nonetheless, has a high seed set. Strother (1977) noted a similar phenomenon in triploid populations of *Thymophylla* [*Dyssodia*] *tenuiloba*.

Previously reported chromosome counts for *Chrysanthellum* support a base of $x = 8$ (Turner et al., 1979). Our report of $2n = 9_{II}$ for *C. michoacanum* indicates either that dysploidy has been a factor in the evolution of the genus or the presence of a supernumary bivalent.

Cosmos caudatus has been reported previously as a tetraploid ($n = 24$), by Turner and Irwin (1960), Turner and King (1964), and Melchert (1968). McVaugh (1984) noted that although this species commonly has ray ligules 1–1.5 cm long, plants from the Nueva Galicia region of westcentral Mexico (where our vouchers were collected) commonly have ligules 2–3 cm long. The diploid ($n = 12$) condition of the long-rayed plant is an indication that these plants should be further investigated to determine whether they are taxonomically distinct from the short-rayed tetraploids.

Powell (1978) reported that chromosome counts are known from all but three species of

Flaveria. Our first report of $n = 18$ for *F. angustifolia* accounts for one of the remaining species. This count is in accord with the base of $x = 18$ for the genus.

Previously reported chromosome counts have indicated that *Florestina* is dibasic with $x = 10$ and 12 (Turner, 1963). Turner considered *F. latifolia* (DC.) Rydb. ($n = 12$) and *F. platyphylla* to be very closely related on morphological grounds. Our first report for *F. platyphylla* ($n = 12$) supports this relationship. All previous reports for other species of *Florestina* have been $n = 10$. Our count of $n = 11$ from a single population of *F. pedata* is the first report of this chromosome number for the genus.

Galinsoga parviflora var. *parviflora*, a widespread taxon, is apparently a diploid ($n = 8$) throughout its range. Canne (1983) reported a tetraploid count ($n = 16$) for a collection of *Galinsoga parviflora* var. *semicalva* from northwestern Chihuahua. Our report for var. *semicalva* (also $n = 16$) is from southeastern Arizona ca. 300 km to the northwest. This evidence suggests that the count reported by Canne is not an isolated occurrence and that the tetraploids may have a significant range.

Our count of $2n = 12_{II}$ for *Hymenothrix palmeri*, the first report for this wholly Mexican species, accords well with the base of $x = 12$ established for species occurring in the United States. This species appears to be geographically isolated from the hybrid complex involving *H. wislizenii* A. Gray ($n = 12$), *H. wrightii* A. Gray ($n = 12$), and *H. loomisii* S. F. Blake ($n = 24$) currently under investigation (Clark, Keil, and Pinkava, 1978; Pinkava and Keil, 1986).

Chromosome counts of $n = 11$, 12, 14, and 18 have been reported previously for species of *Sclerocarpus* (Robinson et al., 1981). Our count of $2n = 13_{II}$ for *S. papposus* is the first report of this number for the genus. *Sclerocarpus* was placed by Stuessy (1977) in subtribe Verbesininae in which the majority of genera have base numbers of $x = 15$, 16 or 17. Robinson (1981) placed *Sclerocarpus* in the Helianthinae (defined differently than by Stuessy) in which the majority of genera have a base of $x = 17$. If either placement is correct, the dysploid series of chromosome numbers in *Sclerocarpus* is apparently reductional.

Interspecific hybridization is well-known in *Silphium* ($x = 7$) both in the field and under experimental conditions (Fisher, 1959; Settle and Fisher, 1972). The count reported here ($2n = 7_{II} + 1$) probably represents a second-generation hybrid or backcross. At anaphase I

the univalent either lags at the metaphase plane and at telophase I forms a micronucleus, or is incorporated into one of the principal daughter nuclei. The very low pollen stainability and the presence of micro- and macropollen indicate that this plant is highly sterile.

Stuessya, a genus of three species, was described by Turner and Davies (1980) from southcentral Mexico. They reported that *Stuessya perennans* has a chromosome number of $n = 17$. Our reports of $n = 17$ for both *S. perennans* and for *S. michoacana* support $x = 17$ as the base for this genus. McVaugh (1984) did not recognize *Stuessya* as distinct from *Viguiera*, which also has a base of $x = 17$. Further research on the systematics of *Viguiera* will be required to determine whether *Stuessya* is worthy of recognition.

The count of $2n = 22_{II}$ for *Wedelia* sp. (Keil and Luckow 15201) represents an apparently undescribed taxon (J. Strother, personal communication). *Wedelia* is a cytologically complex genus with an apparent aneuploid series of base numbers ranging from $x = 10$ to $x = 15$ and a complicated combination of polyploid and further aneuploid changes. There is considerable doubt as to the precise circumscription of the genus (McVaugh, 1984). The questions of whether *Wedelia*, as traditionally defined, is a monophyletic taxon and what its relationship is to *Aspilula* and some other helianthoid genera are being investigated (J. Strother, personal communication).

Inuleae—Our first report ($2n = 14_{II}$) for *Gnaphalium californicum* indicates that this species, like many other native North American members of the genus, is a tetraploid, on the well-established base of $x = 7$ for subtribe Gnaphalinae (Merxmüller et al., 1977).

Lactuceae—*Tragopogon mirus* and *T. miscellus* Owenbey, spontaneous amphidiploid hybrids derived from Eurasian parental taxa in western North America (Owenbey, 1950) were both reported to occur in Arizona by Brown and Schaack (1972). A biosystematic investigation of the Arizona species of *Tragopogon* (Brown, 1974) resulted in a reinterpretation of the findings of Brown and Schaack. Capitula of F_1 generation, allotetraploid *Tragopogon mirus* (*T. dubius* Scop. $\times$ *T. porrifolius* L.) exhibit bicolored ligules (distally pale to dark violet-purple and proximally pale lemon-yellow), similar to the corresponding, somewhat sterile diploid hybrids (percent pollen stainability = 48.7 ± 15.0 , $N = 8$ individuals), but with much larger heads and a greater number of florets (Brown, 1974). In F_2 and

subsequent generations of *T. mirus*, ligule coloration is variable, sometimes with all completely pale lemon-yellow ligules as in *Brown 390-6* and *Schaack 479* (tentatively reported as *T. miscellus* by Brown and Schaack, 1972). However, this yellow-flowered form of *T. mirus* differs from *T. miscellus* (*T. dubius* $\times$ *T. pratensis* L., $4x$) by lacking the effects of the genome of *T. pratensis* (and also *T. miscellus*), namely leaf apices strongly reflexed and curled (not slightly deflexed or straight as in *T. mirus*), leaf bases well crisped (not flat), bases of phyllaries with purple margins (not with green or greenish yellow margins), and the *T. pratensis* flavonoid profile (Brown, 1974). Furthermore, *T. pratensis* is rare in Arizona and very distant from the Flagstaff population of *T. mirus*. *Tragopogon miscellus* is not known from Arizona.

Tageteae—Counts of $n = 12$, 24 , and 36 for various species of *Pectis* support the well-established base of $x = 12$ for this genus (Keil, 1977). Over half of the species of *Pectis* have now been counted. Euploid levels that have been documented include $2x$, $3x$, $4x$, $6x$, and $8x$ (Keil, 1977, 1984). Except for the presence of a variable number of small supernumerary chromosomes in a few individuals of *Pectis angustifolia* Torr., *P. papposa*, and their hybrids (Keil, 1977), dysploid changes have not been documented in this genus.

The proportion of polyploid species of *Pectis* in the West Indies and peninsular Florida is apparently considerably higher than in the mainland areas of North America. This is possibly the result of dispersal of facultatively autogamous species from mainland areas to insular locations followed by hybridization and allopolyploidy. The ability of various species in the West Indies and Florida to hybridize in nature is documented here by three different hybrid combinations. Retention of facultative autogamy in polyploidized hybrids would allow them to establish insular populations without being swamped by gene flow from established parental taxa.

Pectis latisquama was previously reported by Powell and Turner (1963) to be a tetraploid ($n = \text{ca. } 24$). Our counts of $2n = 72$ indicate that this species has a hexaploid race as well. No morphological characters have been discovered that distinguish the tetraploids (as represented by *King 3557*, the voucher for Powell and Turner's report) and the hexaploids. Another perennial species, *Pectis longipes* A. Gray, has two chromosomal races which are also morphologically very similar (Luckow, 1983) but the races differ in the odor of their

essential oils. Unlike *P. longipes*, however, *P. latisquama* lacks scented oils.

The sterile triploid hybrid, *Pectis* × *floridana* between *Pectis prostrata* (2x) and *P. glaucescens* (4x) is morphologically very similar to *P. linearifolia* (4x), and hybrid individuals have been misidentified as the latter taxon (Keil, 1987). The triploid hybrid and *P. linearifolia* differ, however, in several minor morphological features, and it is unlikely that this resemblance is more than coincidental.

The undetermined species of *Porophyllum* for which we are reporting a count of $2n = 12_{II}$ is apparently a part of the complex of cultivated and wild species of this genus discussed by Bretting and Hernández (1982). These plants do not correspond precisely with any of the species included by Johnson (1969) in his treatment of *Porophyllum*. They most closely resemble *P. filifolium* A. Gray but are annual instead of perennial. The ethnobotanical study of Bretting and Hernández indicates that the species of this genus in southern Mexico are in need of further taxonomic investigation.

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