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COUNTS FROM WESTERN TEXAS,
MOSTLY TRANS-PECOS CACTI

A. Michael Powell

Herbarium
Sul Ross State University
Alpine, Texas 79832, U.S.A.

James F. Weedin

Department of Science
Community College of Aurora
Aurora, Colorado 80011, U.S.A.

ABSTRACT

Sixty-four chromosome counts are reported for 27 taxa, mostly of western Texas, and most of them are opuntioid cacti (51 counts) of the Trans-Pecos region. Meiotic configurations suggest that Jeff Davis and Presidio county populations of *O. davisii* are triploid. Among the *Opuntia* reports are 11 diploid and two tetraploid counts attributed to *O. macrocentra*, and seven counts documenting a tetraploid taxon here referred to *O. mackensenii* var. *minor*. Three meiotic and two pollen stainability observations indicate that at least some plants of *O. schottii* var. *schottii* are partially or completely sterile.

RESUMEN

Se publican sesenta y cuatro recuentos cromosómicos de 27 taxa, la mayoría del Oeste de Texas, y la mayoría de ellos son cactus opuntioides (51 recuentos) de la región de Trans-Pecos. Las configuraciones meióticas sugieren que las poblaciones de los condados de Jeff Davis y Presidio de *O. davisii* son triploides. Entre los recuentos de *Opuntia* 11 son diploides y dos tetraploides atribuidos a *O. macrocentra*, y siete recuentos que documentan un taxon tetraploide los referimos aquí a *O. mackensenii* var. *minor*. Tres observaciones meióticas y dos tinciones de polen indican que al menos algunas plantas de *O. schottii* var. *schottii* son parcial o completamente estériles.

Most of the chromosome counts presented below are the product of long-term investigations of Cactaceae in Trans-Pecos Texas and adjacent areas (cf. Weedin & Powell 1978; Powell & Weedin 2001; 2004). Two counts are from New Mexico, and one is from Colorado. Meiotic chromosome numbers were determined by the first author, following the techniques in Turner and Johnston (1961). The two pollen stainability tests with flowers of *O. schottii* were conducted after crushing anthers in Cotton Blue in lactophenol (Powell et al. 1991). For Cactaceae, buds were obtained from plants in the field, or buds were ultimately secured from cultivated stem cuttings. Miscellaneous counts of the non-cactus taxa were initiated by the respective collectors of voucher specimens, from field-collected buds, and verified by the first author. Amy Causey-Slover collected and contributed the buds of *Opuntia davisii* and *O. tunicata* (with M. Rodriguez). We thank G. Kliem-Pendley and S. Tripp for the non-cactus counts. We are grateful to L. Hedges, G. Raun, G. Kliem-Pendley, P. Griffith, B. L. Turner, S.A. Powell, J. Brady, D. Ferguson, and P. Manning for providing cactus plants, buds, or *Opuntia*

stem cuttings; P. Manning also nurtured and helped to relocate living vouchers. Herbarium specimen vouchers are at SRSC. An asterisk (*) denotes chromosome counts also listed in Pendley (2001).

Asteraceae

- Berlandiera lyrata* Benth., $2n = 15$ II. Brewster Co.: Alpine, G.M. Kliem 283; S. Tripp 12.
Engelmannia peristenia (Raf.) Goodman & C. A. Lawson, $2n = 9$ II. Brewster Co.: Alpine, S. Tripp 1.
Xanthisma spinulosum (Pursh) D. R. Morgan & R. L. Hartm. var. *spinulosum*, $2n = 4$ II. Brewster Co.: Alpine, S. Tripp 3; Alpine, Old Mosley Lane main gate off hyw. 90, G.M. Kliem 246.
Psilostrophe tagetina (Nutt.) Greene, $2n = 16$ II. Brewster Co.: Alpine, S. Tripp 8.
Senecio flaccidus Less., $2n = 20$ II. Brewster Co.: Lizard Mt. Ranch, W of Alpine, G.M. Kliem 313.

Cactaceae

- Ancistrocactus brevihamatus* (Engelm.) Britton & Rose var. *pallidus* A.D. Zimmerman ex A.M. Powell, $2n = 11$ II. Brewster Co.: Marathon, P.R. Manning 1016.
Ancistrocactus brevihamatus var. *brevihamatus*, $2n = 11$ II. Val Verde Co.: Devils River State Natural Area, L. Hedges s.n.
Echinocereus dasyacanthus Engelm., $2n = \text{ca. } 44$ (meiotic configurations show mostly II's, possibly some multivalents; also $2n = \text{ca. } 44$, somatic count by J.F. Weedin). Brewster Co.: Big Bend Natl. Park, W slopes of the Chisos Mts., below the Window, A.M. Powell and S.A. Powell 6307; plants in this population morphologically approach *E. pectinatus* (Scheidw.) Engelm. var. *ctenoides* (Engelm.) Weniger ex G. Frank, or *E. ctenoides* (Engelm.) Rumpler. So far as known, *E. pectinatus* is always diploid ($2n = 11$ II; Powell & Weedin 2004).
Opuntia atrispina Griffiths, $2n = 11$ II. Val Verde Co.: Pecos River high bridge, A.M. Powell and S.A. Powell 6246.
Opuntia cf. *atriispina* Griffiths, $2n = 11$ II. Val Verde Co.: Pecos River high bridge, A.M. Powell and S.A. Powell 6243; buds collected from more than one plant; meiocytes from one bud showed $2n = 11$ II; meiocytes from a second bud showed $2n = 22$ II.
Opuntia azurea Rose var. *diplopurpurea* A.M. Powell & J.F. Weedin, $2n = 11$ II. Presidio Co.: 17.5 km SE of Ruidosa, A.M. Powell and S.A. Powell 6295. Brewster Co.: Lizard Mt., W of Alpine, G. Kliem 385* (no voucher); Big Bend Natl. Park, Maxwell Road jct., A.M. Powell and M.P. Griffith 6310; Big Bend Natl. Park, Sotol Vista, A.M. Powell and M.P. Griffith 6311.
Opuntia azurea Rose var. *parva* A.M. Powell & J.F. Weedin, $2n = 11$ II. Brewster Co.: Big Bend Natl. Park, 6.5 km S on Maxwell Road, "Fins" of Fire Exhibit, G. Kliem 131*; 21.6 km S on Maxwell Road, G. Kliem 132* (no voucher); 136*; Black Gap, just inside N border, near paved road, G. Kliem 133*; Big Bend Natl. Park, K-Bar camping area, G. Kliem 143*.
Opuntia cf. *camanchica* Engelm. & J.M. Bigelow, $2n = 33$ II. Brewster Co.: Big Bend Natl. Park, Persimmon Gap, A.M. Powell and S.A. Powell 6080; $2n = \text{ca. } 66$ (meiotic configurations suggest numerous multivalents), Big Bend Natl. Park, Rattlesnake Mts., G.G. Raun 95-44; $2n = \text{ca. } 66$ (meiotic configurations indicate probable multivalents). Val Verde Co.: Pecos River high bridge, A.M. Powell and S.A. Powell 6247.
Opuntia camanchica Engelm. & J.M. Bigelow, $2n = \text{ca. } 33$ II. Hudspeth Co.: N of Sierra Blanca, A.M. Powell and S.A. Powell 6238.
Opuntia cymochila Engelm. & J.M. Bigelow, $2n = \text{ca. } 66$ (meiotic configurations suggest numerous multivalents). COLORADO. Arapahoe Co.: J.F. Weedin 1706; $2n = \text{ca. } 33$ II. TEXAS. Moore Co.: Cactus, J.F. Weedin 1671.
Opuntia davisii Engelm. & J.M. Bigelow, $2n = 22$ II. NEW MEXICO. Chaves Co.: Roswell, A. Causey 18. *Opuntia davisii*, $2n = \text{ca. } 33$ (meiotic configurations suggest II's, I's, and multivalents, as though $3x$; some tetrads with micronuclei). TEXAS. Jeff Davis Co.: just W of Fort Davis, A.

- Causey* 3. Presidio Co.: 4 km S of Marfa, A. Causey 9. Meiotic observations of *O. davisii* support a taxonomic distinction between populations in New Mexico and Trans-Pecos Texas (Powell & Weedon 2001, 2004). Amy Causey-Slover is studying the biology of *O. davisii*.
- Opuntia engelmannii* Salm-Dyck ex Engelm. var. *engelmannii* (cf. *O. valida* Griffiths, D.J. Ferguson, pers. comm.), $2n = 33$ II. Pecos Co.: 19.3 km WNW of Fort Stockton, A.M. Powell and S.A. Powell 6009.
- Opuntia engelmannii* var. *lindheimeri* (Engelm.) B.D. Parfitt & Pinkava, $2n = 33$ II. Uvalde Co.: ca. 1.6 km N of jct. of hwy 236 and 90, J.F. Weedon 1670.
- Opuntia mackensenii* Rose var. *mackensenii* (*O. gilvescens* Griffiths, D.J. Ferguson, pers. comm.), $2n = 22$ II. Terrell Co.: 6.5 km W of the Pecos River, along hwy 90, S. Lee 29.
- Opuntia* cf. *mackensenii* var. *mackensenii*, $2n =$ ca. 55 (meiotic configurations show possible II's, I's, and multivalents, 22-28 per pole in anaphase I; 5x). Terrell Co.: 25.8 km W of Sanderson near Longfellow, A.M. Powell and S.A. Powell 6220.
- Opuntia mackensenii* Rose var. *minor* (M.S. Anthony) A.M. Powell & J.F. Weedon, $2n = 22$ II. Presidio Co.: 1.62 km E of Marfa, A.M. Powell and S.A. Powell 6334. Pecos Co.: 22.5 km E of Fort Stockton, A.M. Powell and S.A. Powell 6318. Brewster Co.: 21 km E of Marathon, A.M. Powell and S.A. Powell 6326. Terrell Co.: 22.5 km W of Dryden, G.G. Raun 98-14b. Val Verde Co.: Langtry, A.M. Powell and S.A. Powell 6249; $2n =$ ca. 22 II. Ward Co.: 21 km S of Monahans, A.M. Powell and S.A. Powell 6316. Brewster Co.: Alpine, A.M. Powell and S.A. Powell 6050.
- Opuntia macrocentra* Engelm., $2n = 11$ II. Hudspeth Co.: W of Sierra Blanca, Lasca Road, J. Brady s.n.; ca. 13 km W of Sierra Blanca, M.P. Griffith 101; 102. Culberson Co.: ca. 4.8 km N of Van Horn, along hwy 54, P.R. Manning 2063; 2064; between the Delaware and Apache mts, along FM 2185, ca. 48 km N of Van Horn, G. Kliem 165*; 306*; 309*; 310*; 32 km N of Van Horn, along FM 2185, G. Kliem 307*; 312*.
- Opuntia macrocentra* Engelm., $2n = 22$ II. El Paso Co.: Fabens cemetery, J.F. Weedon 2177. Culberson Co.: 37 km N of Van Horn, along hwy 54, P.R. Manning 2069. The diploid ($2n = 11$ II) and tetraploid ($2n = 22$ II) counts here attributed to the purple prickly pear *O. macrocentra* provide additional distributional information about the two morphologically similar cytotypes (Powell & Weedon 2001; 2004). It appears that the tetraploids occur from southeast Arizona across southern New Mexico (Pinkava et al. 1992; 1998), into the Trans-Pecos in El Paso County (Pinkava et al. 1985), and in the northern halves of Hudspeth and Culberson counties (Powell & Weedon 2001). The diploids that most resemble *O. macrocentra* tetraploids appear to be confined to southern Hudspeth and Culberson counties, but may extend farther southeast into Pecos, Jeff Davis, Presidio, and Brewster counties, and even farther northwest into El Paso County or beyond. For the most part, the purple or purplish prickly pears in the Big Bend Region of Trans-Pecos Texas, sometimes included with *O. violacea* Engelm. (Benson 1982) or *O. macrocentra*, have recently been aligned with *O. azurea* Rose (Powell & Weedon 2004). The type locality for *O. macrocentra* is near El Paso.
- Opuntia phaeacantha* Engelm. var. *phaeacantha*, $2n =$ ca. 66 (meiotic observations indicate possible multivalents and I's). NEW MEXICO. Santa Fe Co.: E Cochiti Reservation near Santa Fe, type locality, D.J. Ferguson s.n.
- Opuntia polyacantha* Haw. var. *trichophora* (Engelm. & J.M. Bigelow) J.M. Coulter, $2n = 11$ II. Hudspeth Co.: S of Dell City, S. Lee II.
- Opuntia* (= *Grusonia*) *schottii* Engelm. var. *schottii*, $2n =$ ca. 44 (meiotic observations show possible multivalents). Brewster Co.: Heath Canyon, A.M. Powell and S.A. Powell 6152 (pollen stainability 47 %). Terrell Co.: Sanderson, G.G. Raun 98-40, no chromosome count possible, only abnormal meiocytes observed in anthers of flower buds. Val Verde Co.: Langtry, A.M. Powell and S.A. Powell 6248, no chromosome count possible, only abnormal meiocytes observed in poorly developed anthers (pollen stainability 0 %).

Opuntia strigil Engelm., $2n = 11$ II. Terrell Co.: 67 km E of Marathon, P.R. Manning 1064; W of Dryden, G.G. Raun 98-14a.

Opuntia tunicata (Lehm.) Pfeiff., $2n = 11$ II. Pecos Co.: Glass Mts., Gap Tank, A. Causey 28.

Opuntia sp., $2n = 11$ II. Brewster Co.: Big Bend Natl. Park, Boquillas overlook, A.M. Powell and S.A. Powell 6276 [same morphotype as that reported in Powell and Weedon (2001), as *Opuntia* sp., B.G. Hughes 800], suspected hybrid between *O. rufida* Engelm. and *O. azurea* var. *parva*.

Loasaceae

Cevallia sinuata Lag., $2n = 13$ II. Brewster Co.: Lizard Mt. Ranch W of Alpine, G.M. Kliem 249.

Solanaceae

Solanum elaeagnifolium Cav., $2n = 12$ II. Brewster Co.: Alpine, G.M. Kliem 245.

Solanum rostratum Dunal, $2n = 12$ II. Gillespie Co.: 50 km E of intersect. I-10 and hwy 290 between Fredricksburg and Junction, S. Tripp 5.

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