

MISCELLANEOUS CHROMOSOME NUMBERS: TEXAS PLANT SPECIES

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ABSTRACT

Chromosome numbers are reported for 43 collections of flowering plant species in Texas; 26 species in 21 genera and 10 families are represented. First reports are presented for seven taxa: *Xanthisma gracile*, $2n = 3 \text{ II}$; *Heliotropium molle*, $2n = 10\text{-}14 \text{ II}$; *Stanleya pinnata* var. *texana*, $2n = 14 \text{ II}$; *Hermannia texana*, $2n = \text{ca. } 12 \text{ II}$ (or $12 \text{ II} + 1 \text{ I}$ or fragment, or 13 II); *Aloysia gratissima*, $2n = \text{ca. } 54$ (North America); *A. macrostachya*, $2n = 9 \text{ II}$; *A. wrightii*, $2n = 27 \text{ II}$. *Phytologia* 92(1): 96-102 (April, 2010).

KEY WORDS: Chromosome numbers, *Aloysia*, *Heliotropium*, *Hermannia*, *Stanleya*, *Xanthisma*, Texas species

Flower buds, fixed in modified Carnoy's Solution (4:3:1), and voucher specimens were obtained during general collecting activities in Texas during the years 2005-2009. Standard squash techniques (Turner

and Johnston, 1961) were used to obtain meiotic chromosome counts. Meiotic preparations for most of the species were evaluated by the first two authors, some of them by all three authors. Chromosome numbers obtained for most taxa listed below correspond with previous reports, as determined from the various chromosome number indexes and other literature. Voucher specimens are housed at SRSC and/or TEX-LL. Symbols and abbreviations: II, bivalents in meiotic configurations; I, univalent; III, trivalent; IV, quadrivalent; frag; fragment; *AMP*, A. M. Powell; *SAP*, Shirley A. Powell; *BLT*, B. L. Turner.

RESULTS AND DISCUSSION

ASTERACEAE

Erigeron tenuis Torr. & A. Gray

Bastrop Co., Bastrop State Park, *BLT* s.n., $2n = \text{ca. } 9 \text{ II}$ (possibly 8 II = 2 or 3 round I's or frags.).

Grindelia nuda Alph. Wood var. ***nuda***.

Hansford Co., ca. 0.8 km W of Gruver, *BLT* 26-32, $2n = 6 \text{ II}$.

Haploesthes greggii A. Gray

Brewster Co., ca. 93 km S of Alpine along hwy 118, then 1 mi w along Agua Fria road, *BLT* 25-144, $2n = 18 \text{ II}$.

Hymenopappus flavescens var. ***canotomentosus*** A. Gray

Jeff Davis Co., westernmost part, 13 km E of Culberson Co. line along hwy 90, *BLT* 25-112, $2n = 17 \text{ II}$.

Pecos Co., 4.8 km S of Iraan, *BLT* 25-83, $2n = 17 \text{ II}$.

Hymenoxys odorata DC.

Brewster Co., ca. 95 km S of Alpine, *BLT* 7-1, $2n = 11 \text{ II}$.

Pecos Co., Sheffield cemetery, ca. 1.6 km W of town, *BLT* 7-2, $2n = 11 \text{ II}$.

Sutton Co., E outskirts of Sonora, *BLT* 7-16, $2n = 12$.

Sanderson and Strother (1973) reported counts of $2n = 11 \text{ II}$, 12 II , and 14 II from Texas populations of *Hymenoxys odorata*. All of the $n = 12$ plants were reportedly from near Del Rio in Val Verde County; the $n = 12$ collection from Sutton County extends the range of the aneuploid populations.

Senecio riddellii Torr. & A. Gray

Brewster Co., 12 km S of Alpine along hwy 118, *S. F. Weyerts* 16, $2n = 20 \text{ II}$.

Symphotrichum expansum (Poepp. & Spreng.) G. L. Nesom

Brewster Co., ca. 14 km SE of Alpine, *AMP* and *SAP* 6827, **2n = 5 II.**

Thelesperma burridgeanum (Regel) S. F. Blake

Frio Co., red sandy soil along hwy, *BLT* 7-8, **2n = 10 II.**

As reviewed by Melchert (1963), but unpublished, the species was previously found to have $2n = 10 \text{ II}$.

Thelesperma longipes A. Gray

Schleicher Co., western part, where hwy 90 enters Crockett Co., *BLT* 25-63, **2n = 20 II.**

Thelesperma megapotamicum (Spreng.) Kuntze var.
megapotamicum

Brewster Co., ca. 96 km S of Alpine along hwy 118, *BLT* 25-141,
2n = 44 (18 II, 2 IV).

The count is consistent with previous reports (Melchert, 1963; Greer and Powell, 1999) for both *T. megapotamicum* var. *megapotamicum* and the "rayed form" var. *ambiguum* (A. Gray) Shinnery which was also present at the site ca. 96 km S of Alpine.

Townsendia texensis Larsen

Potter Co., ca. 55 km NNE of Amarillo along hwy 136, *BLT* 26-45,
2n = 9 II.

Xanthisma gracile (Nutt.) D. R. Morgan & R. L. Hartm.

Brewster Co., ca. 14 km SE of Alpine, *AMP* and *SAP* 6829, **2n = 2 II;**
2n = 3 II.

Buds were obtained from a cluster of 3-4 morphologically identical plants with stems intermingled. One head of buds yielded a clear count of $2n = 3 \text{ II}$, a first record of this chromosome number for the species in Texas. Examination of another head from the same collection resulted in a count of $2n = 2 \text{ II}$, typical for the species. The circumstance of three-paired and two-paired cytological races in the same small population is similar to that described by Jackson (1965) for this species [as *Haplopappus gracilis* (Nutt.) A. Gray] in south-central Arizona.

Xanthisma spinulosum (Pursh) D. R. Morgan & R. L. Hartm. var.
spinulosum.

Hansford Co., ca. 0.8 km W of Gruver, *BLT* 26-33, **2n = 4 II.**

BORAGINACEAE

Heliotropium molle (Torr.) I. M. Johnston.

Brewster Co., ca. 93 km S of Alpine along hwy 118, *BLT* 25-151,
2n = 10-14 II.

Albeit equivocal, this is a first report for the species; the meiotic configurations, small, dim-staining chromosomes, were difficult to interpret; possibly the count should be 12 or 13 II because related taxa, such as *H. curassivicum*, possess $2n = 13$ pairs.

BRASSICACEAE

Stanleya pinnata var. **texana** B. L. Turner

Brewster Co., ca. 93 km S of Alpine (at type locality), *BLT 25-145*,

$2n = 14$ II.

This is a first report for var. *texana*; *S. pinnata* (Pursh) Britton var. *pinnata* was previously reported as $2n = 14$ II (Rollins and Rudenberg, 1977).

Streptanthus carinatus C. Wright ex A. Gray

Jeff Davis Co., along FM 2017, ca. 17 km S of hwy 90, *BLT & M.*

Terry 25-1, **$2n = 14$ II.**

COMMELINACEAE

Tradescantia pedicellata Celarier

Gillespie Co., 30 km N of Fredericksburg, *BLT 26-21*, **$2n = 6$ II +**

1 centric frag.

The single, round fragment was consistently present in meiotic configurations, often near the end of one of the bivalents in a satellite-like position; the only other count for this seldom collected species has been that of Celarier (1965), who reported observations similar to our own.

FABACEAE

Dalea glaberrima S. Watson

El Paso Co., eastern part, where I-10 crosses into Hudspeth Co., *BLT 25-101*, **$2n = 7$ II.**

Dalea glaberrima is synonymous with *D. lanata* var. *terminalis* (M. E. Jones) Barneby, as treated by Turner (2006). Previous counts for the genus have all been on a base number of $x = 7$.

Hoffmannseggia glauca (Ortega) Eifert

Brewster Co., ca. 93 km S of Alpine, *BLT 25-148*, **$2n = \text{ca. } 12$ II.**

Meiotic configurations exhibited irregularities, including some possible multivalents, and two laggards at anaphase I.

KRAMERIACEAE**Krameria grayi** Rose & PainterHudspeth Co., central part of Van Horn Mountains, *BLT & M. Terry, s. n.*, **2n = ca. 6 II.****LAMIACEAE****Warnockia scutellarioides** (Engelm. & A. Gray) M. W. TurnerWilliamson Co., just NW of Round Rock, *Matt Turner 121*,**2n = ca. 10-11 II.**Turner (1996) previously reported $n = 10$ and $n = ca. 10$ for the species.**POLEMONIACEAE****Phlox drummondii** var. **mcallisteri** WherryGillespie Co., 30 km mi N of Fredericksburg, *BLT 26-26*, **2n = 7 II.****STERCULIACEAE****Hermannia texana** A. GrayUvalde Co., 30 km mi NE of Brackettville *BLT 26-6*, **2n = ca. 12 II (or 12 II = 1 I or frag.; or 13 II).**

This is a first report for the species; interpretation of meiotic configurations was equivocal because of heteromorphic bivalents, possible multivalents (i.e., 1-2 III's), and 1-2 I's, as suggested above.

VERBENACEAE**Aloysia gratissima** (Gillies & Hook.) Tronc.Brewster Co., Alpine, *BLT s. n.*, **2n = ca. 48-54.**Brewster Co., 8 km W of Alpine, *BLT s. n.*, **2n = ca. 54.**Brewster Co., Alpine, Sul Ross campus, *B. L. Turner s. n.*, **2n = ca. 54.**Crockett Co., ca. 5 km E of Sheffield, *BLT 26-28*, **2n = ca. 54.**Gillespie Co., 30 km N of Fredericksburg, *BLT 26-19*, **2n = ca. 54.**Kinney Co., ca. 5 km NE of Brackettville, *BLT 26-2*, **2n = ca. 70-72.**Kinney Co., ca. 19 km NE of Brackettville, *BLT 26-3*, **2n = ca. 54.**Llano Co., 16 km S of Llano along hwy 16, *BLT 26-23*, **2n = ca. 54.**Mason Co., 12 km E of Mason, *BLT 26-24*, **2n = ca. 54.**Presidio Co., Pinto Canyon, *M. Terry 0908-2006*, **2n = ca. 54.**Travis Co., Austin, just E of Zilker Park, *BLT 26-14*, **2n = ca. 54.**Travis Co., Austin, Univ. of Texas campus, near Turtle Ponds, *S. J. Siedo 729*, **2n = ca. 48-54.**

Uvalde Co., 16 km S of Camp Wood, *BLT* 26-23, $2n = \text{ca. } 54$.

Val Verde Co., 17.2 km E of Del Rio, *BLT* 26-25, $2n = \text{ca. } 50-54$.

Aloysia macrostachya (Torr.) Moldenke

Travis Co., Austin, Univ. of Texas campus, near Green House, *S. J. Siedo* 840, $2n = 9 \text{ II}$.

Aloysia wrightii A. Heller ex Abrams

Val Verde Co., 17.2 km E of Del Rio, *BLT* 26-26, $2n = 27 \text{ II}$.

As reviewed by Siedo (2006), where pertinent literature is cited, the base chromosome number of *Aloysia* Palau is $x = 9$, first suggested with the (1943) count of $2n = 36$ for the South American *A. citriodora* Palau. Subsequent published counts for the genus (year in parentheses), all South American, were: $2n = 18 \text{ II}$ (1946), *A. ligustrina* (Lag.) Small (cultivated, identified as this species, but instead probably *A. lycioides* as construed by Siedo); $2n = \text{ca. } 72$ (1961), *A. scorodonioides* (Kunth) Moldenke; $2n = 18 \text{ II}$ (1972), *A. lycioides* Cham.; $2n = 54$ (1998), *A. gratissima*; $2n = 54$ (1998), *A. polystachya*; $2n=36$ (1998).

The first documented counts for North American populations of *Aloysia* are listed above (present paper). *Aloysia wrightii* is apparently hexaploid, as inferred by the single count of $2n = 27 \text{ II}$. *Aloysia gratissima* is mostly hexaploid, as suggested by the 13 counts, each approximately $2n = 54$; this is consistent with the one previous South American report for the amphotropical, *A. gratissima*. One North American count for *A. gratissima* from Kinney County was octoploid, $2n = \text{ca. } 70-72$. Our report for *A. macrostachya*, $2n = 9 \text{ II}$, is apparently the first to document the presumed base number for the genus. Meiosis in *A. gratissima* was always seemingly irregular, with bivalents, multivalents, univalents, laggards, and subsequent micronuclei; chromosomes were relatively small and dim-staining.

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LITERATURE CITED

- Celarier, R. P. 1956. *Tradescantia pedicellata* Celarier. Field & Laboratory 24: 6.
- Greer, L. F. and A. M. Powell. 1999. Documented chromosome numbers 1999:1. Chromosome numbers and pollen diameter variation in *Thelesperma* (Asteraceae). Sida 18: 909-925.
- Jackson, R. C. 1965. A cytogenetic study of a three-paired race of *Haplopappus gracilis*. Amer. J. Bot. 52: 946-953.
- Melchert, T. E. 1963. Systematics of the genus *Thelesperma* (a cytotaxonomic and chemotaxonomic study). Ph. D. dissertation, The University of Texas, Austin.
- Rollins, R. C. and L. Rudenberg. 1977. Chromosome numbers of Cruciferae III. Contr. Gray Herb. 207: 101-116.
- Sanderson, S. C. and J. L. Strother. 1973. The origin and aneuploidy in *Hymenoxys odorata*. Nature (London) New Biology 242: 220-221.
- Siedo, S. J. 2006. Systematics of *Aloysia* (Verbenaceae). Ph. D. dissertation, The University of Texas, Austin.
- Turner, B. L. 2006. *Dalea austrotexana* (Fabaceae), a new species from southernmost Texas. Phytologia 88: 288-291.
- Turner, B. L. and M. C. Johnston. 1961. Chromosome numbers in the Compositae. III. Certain Mexican species. Brittonia 13: 64-69.
- Turner, M. W. 1996. Systematic study of the genus *Brazoria* (Lamiaceae), and *Warnockia* (Lamiaceae), a new genus from Texas. Pl. Syst. Evol. 203: 65-82.