

ADDITIONAL DOCUMENTED CHROMOSOME NUMBER DETERMINATIONS IN *PAYSONIA* (BRASSICACEAE)

Andrew M. Salywon

Desert Botanical Garden
1201 N Galvin Parkway
Phoenix, Arizona 85008, U.S.A.
asalywon@dbg.org

Jon P. Rebman

San Diego Museum of
Natural History
P. O. Box 121390
San Diego, California 92112, U.S.A.

David A. Dierig

Bridgestone Americas Inc., Guayule Research Farm
4140 W. Harmon Rd., Eloy, Arizona 85131, U.S.A.

ABSTRACT

Thirteen meiotic chromosome number determinations are reported for seven species of *Paysonia* O'Kane & Al-Shehbaz (Brassicaceae). Our counts are in agreement with previous published numbers and we make new chromosome number reports for five counties.

KEY WORDS: meiotic chromosome number, *Lesquerella*, *Paysonia*, Brassicaceae

RESUMEN

Se aportan trece determinaciones meióticas del número cromosómico para siete especies de *Paysonia* O'Kane & Al-Shehbaz (Brassicaceae). Nuestros recuentos están de acuerdo con los publicados anteriormente y realizamos nuevos informes de números de cromosomas para cinco condados.

Research into new sources of industrial oilseed crops with high hydroxy fatty acid content led to the collection of wild seed, including species of *Paysonia* O'Kane & Al-Shehbaz (as *Lesquerella* S. Wats.), which were then grown out in greenhouses for germplasm evaluation as previously reported (Dierig et al. 1996; Salywon et al. 2005). In some cases, these greenhouse plants were also sampled to document the meiotic chromosomes of the wild collected accessions. There are eight species of *Paysonia* and the base chromosome numbers for the genus are $x = 7, 8, 9$ (O'Kane 2007). Herein, we report chromosome numbers for seven species.

MATERIALS AND METHODS

Flower buds were collected from cultivated plants established from wild seeds. The plants were grown in a greenhouse at the USDA-ARS, U.S. Water Conservation Laboratory in Phoenix, Arizona. Buds were killed and fixed in ethanol and glacial acetic acid (3:1). After 24 hours the buds were then rinsed with and transferred to 70% ethanol for storage at 4° C. Anthers were squashed in acetocarmine and mounted in Hoyer's medium (Beeks 1955). Meiotic chromosome number determinations were documented using a Nikon Labphot-2 compound microscope. Voucher specimens are deposited at the Arizona State University herbarium (ASU).

RESULTS AND DISCUSSION

All of 13 chromosome number determinations presented below for seven species of *Paysonia* are in agreement with previously published reports.

Paysonia auriculata (Engelm. & A. Gray) O'Kane & Al-Shehbaz. $2n = 8$ II. U.S.A. **Oklahoma. Blaine Co.:** 3 mi S of Watonga on Hwy 8 (14 552384E, 3961172N), 414 m, 19 Apr 1996, A. Salywon USDA-3011 (ASU224445).

Three previous counts have been reported—from Comanche, Grady (Rollins 1966) and Garfield counties, Oklahoma (Rollins & Rüdberg 1971). Ours is the first report from Blaine County.

Paysonia densipila (Rollins) O’Kane & Al-Shehbaz. $2n = 8$ II. U.S.A. Tennessee. Williamson Co.: on McDaniel W of Cox Rd. near jct. with Lamb (35°49’56”N, 86°41’59”W), 14 Apr 1995, J. Rebman & D. Dierig USDA-2893 (ASU204308); NW of College Grove; W of Alt. 31/Alt. 41 on McDaniel Rd. just past its jct. with Lamb Rd. (35°49’43”N, 86°41’50”W), 245 m, 14 Apr 1995, J. Rebman & D. Dierig USDA-2894 (ASU204296).

We add two counts to those of Rollins (1966) who reported 11 counts, seven from Tennessee (with three from Williamson County) and four from Alabama.

Paysonia grandiflora (Hook.) O’Kane & Al-Shehbaz. $2n = 9$ II. U.S.A. Texas. Dewitt Co.: E side of US 183, 3.9 road-mi N of jct. of US 183 & alt. US 77 N of Cuero & 8.2 road-mi S of jct. of US 183 & TX 111 at Hochheim (29°11.963’N, 97°17.667’W), 300 ft, 27 Mar 1994, C. Christy USDA-2240 (ASU233773). Gonzales Co.: N side of US 90a, 1.7 road-mi W of jct. of US 80 & 181/90a & 4.3 road-mi E of FM 1150, ca. 16 mi E of Seguin (29°31.821’N, 97°42.581’W), 500 ft, 28 Mar 1994, C. Christy USDA-2241 (ASU233777).

Five previous counts were reported from Austin (two counts), Dewitt, Gonzales, and Wilson counties, Texas (Rollins 1966), and another by Manton (1932) without provenance. We add two counts in support of the previous determinations.

Paysonia lasiocarpa (Hook. ex A. Gray) O’Kane & Al-Shehbaz. $2n = 7$ II. U.S.A. Texas. Dimmitt Co.: SW side of US 83, 6.8 road-mi SE of S jct. of US 83 & 277 at Carrizo Springs & at jct. of US 83 & FM 190 (28°27.199’N, 99°46.722’W), 565 ft, 26 Mar 1994, C. Christy 2220 (ASU233404). Duval Co.: FM 2295, 5.5–5.6 road-mi E of jct. of Rte. 16 and FM 2295 and 9.1 mi W of Rte. 359 at Benavides (27°35.272’N, 98°34.126’W), 450 ft, 26 Mar 1994, C. Christy 2228 (ASU233402). Jim Wells Co.: picnic area W side of US 281, 11.2 road-mi S of Alice (27°35.197’N, 98°05.604’W), 200 ft, 26 Mar 1994, C. Christy 2229 (ASU233401). Kleberg Co.: at jct. of TX 771 & Kleburg Co. Rd 11555, 0.4 road-mi W of Riviera Beach & Baffin Bay (27°17.361’N, 97°40.058’W), 20 ft, 27 Mar 1994, C. Christy 2230 (ASU233400).

Two counts have been reported, both from Texas, one from Cameron County (Rollins 1966) and one from Hidalgo County (Rollins & Rüdberg 1977). Our four counts are the first reported from Dimmitt, Duval, Jim Wells, and Kleberg counties.

Paysonia lescurii (A. Gray) O’Kane & Al-Shehbaz. $2n = 8$ II. U.S.A. Tennessee. Cheatham Co.: NW of Ashland City, Lock A Recreation Area (36°19’18”N, 87°13’17”W), 54 m, 16 Apr 1995, J. Rebman & D. Dierig, 2902 (ASU204300). Davidson Co.: N of Nashville; 3.6 mi N of jct. of I-24/I-65, just S of Old Hickory Blvd. (36°16’20”N, 86°7’41”W), 157 m, 16 Apr 1995, J. Rebman & D. Dierig 2898 (ASU204297).

Six previous counts have been reported, one from Cheatham, two from Davidson, one from Rutherford and two from Williamson counties (Rollins 1966). We add two counts—one each from Cheatham and Davidson counties.

Paysonia perforata (Rollins) O’Kane & Al-Shehbaz. $2n = 8$ II. U.S.A. Tennessee. Wilson Co.: W of Lebanon; 0.4 mi N of Rte. 70 on Hartman Dr. (36°13’33”N, 86°18’46”W), 212 m, 17 Apr 1995, J. Rebman & D. Dierig 2903 (ASU204298).

We add our one count to the two previous counts reported from Wilson County (Rollins 1966).

Paysonia stonensis (Rollins) O’Kane & Al-Shehbaz. $2n = 8$ II. U.S.A. Tennessee. Rutherford Co.: E Fork of Stones River off Old Jefferson Rd., U.S. Army Corps of Engineers’ land (35°57’45”N, 86°23’55”W), ca. 150 m, 14 Apr 1995, J. Rebman & D. Dierig 2892 (ASU204310).

Rollins (1966) reported one count from Rutherford County. To our knowledge, ours is just the second reported count for this species.

ACKNOWLEDGMENTS

We are grateful to Pernel Tomassi, who germinated the seed and expertly cared for the plants in the greenhouse and to the curators at ASU Herbarium. We thank Marc Baker and Barney Lipscomb for their comments that helped improve the manuscript. Fieldwork was supported by a grant to DD from the National Plant Germplasm System (NPGS) through the USDA-ARS, National Germplasm Resources Lab. The chromosome number determinations for this paper were done between 1995 and 2003, when all three authors were at

This document is intended for digital-device reading only.

Inquiries regarding distributable and open access versions may be directed to jbrit@brit.org.

USDA-ARS, U.S. Water Conservation Laboratory, Phoenix, Arizona 85040, U.S.A. We are grateful to USDA-ARS for supporting this work.

REFERENCES

- BEEKS, R.M. 1955. Improvements in the squash technique for plant chromosomes. *Aliso* 3:131–133.
- DIERIG, D.A., A.E. THOMPSON, J.P. REBMAN, R. KLEIMAN, & B.S. PHILLIPS. 1996. Collection and evaluation of new *Lesquerella* and *Physaria* germplasm. *Industr. Crops Prod.* 5:53–63.
- MANTON, I. 1932. Introduction to the genera cytology of the Cruciferae. *Ann. Bot.* 46:509–556.
- O'KANE, S. 2007. *Paysonia*. In: Flora of North America Editorial Committee, eds. *Flora of North America north of Mexico*. Oxford University Press, New York, U.S.A., and Oxford, U.K. 7:611–616.
- ROLLINS, R.C. 1966. Chromosome numbers of Cruciferae. *Contr. Gray Herb.* 197:43–65.
- ROLLINS, R.C. & L. RÜDENBERG. 1971. Chromosome numbers of Cruciferae. II. *Contr. Gray Herb.* 201:117–133.
- ROLLINS, R.C. & L. RÜDENBERG. 1977. Chromosome numbers of Cruciferae. III. *Contr. Gray Herb.* 207:101–116.
- SALYWON, A.M., D.A. DIERIG, J.P. REBMAN, & D. JASSO DE RODRIGUEZ. 2005. Evaluation of new *Lesquerella* and *Physaria* (Brassicaceae) oilseed germplasm. *Amer. J. Bot.* 92:53–62.