



***Polystemma canisferum* (Apocynaceae, Asclepiadoideae): a distinctive new gonoloboid milkweed vine from Sonora, Mexico**

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Abstract

A new species from Sonora, *Polystemma canisferum* (Apocynaceae, Asclepiadoideae, Gonolobinae), is described. *Polystemma* is a segregate of *Matelea* consisting of species that possess hairs that are filled with a crystalline substance at maturity, filiform or fleshy corona appendages, and fusiform fruits. The new species shares these characters but is distinguished by its unique, narrowly tubular-campanulate green corolla. Images and a distribution map are included.

Key words: Gonolobinae, *Matelea*, new species, taxonomy

Introduction

Polystemma Decaisne (1844: 602) is presently known as a genus of three species: *P. viridiflorum* Decaisne (1844: 602), *P. guatemalense* (Schlechter) W. D. Stevens (2005: 618), and *P. mirandae* Lozada-Pérez (2010: 429). Segregation of *Polystemma* from *Matelea* Aublet (1775: 277) is incomplete, and the genus will consist of at least 18 species pending taxonomic revision that will entail additional transfers (Stevens *et al.* 2001; Stevens 2005, 2009). When it was erected, *Polystemma* accommodated the single species, *P. viridiflorum*, but the genus was later subsumed into *Matelea* (along with some 20 others) by Woodson (1941) due to a perceived lack of discrete variation in floral characters. As noted by Stevens (2005), *Polystemma* is characterized by a suite of distinctive characters (i.e., long, fusiform, smooth, and mottled follicles; glandular trichomes with crystalline inclusions; filiform corona appendages) that are each rare or absent in the remainder of *Matelea sensu lato* and not found in combination outside of *Polystemma sensu* Stevens (2005; Stevens unpubl.). Phylogenetic work has demonstrated the polyphyly of *Matelea sensu lato* (Krings *et al.* 2008; Parks 2008), but has found support for *Polystemma sensu* Stevens (Parks 2008; McDonnell unpubl.).

Materials and Methods

A distinctive new species of *Matelea sensu lato* was discovered and collected in southern Sonora, Mexico by Phil Jenkins, Victor Steinmann, and Mark Fishbein of the University of Arizona in August 1994, while conducting field work for the revision of Howard Scott Gentry's Rio Mayo Plants (Gentry 1942; Martin *et al.* 1998). A second specimen was collected later that summer some 70 km to the south by Tom Van Devender of the Arizona-Sonora Desert Museum. The specimens were considered by Fishbein (1998) to represent an undescribed species of *Matelea* with affinity to *M. producta* (Torrey) Woodson (1941: 230), a species that shares superficially similar follicles and corolla shape, but otherwise lacks the distinctive characteristics of *Polystemma*. Subsequent collections of mature follicles by Van Devender and Ana Lilia Reina Guerrero provided seed from which Fishbein grew plants to flowering, and which supplied ample material for morphological study by the authors, confirming the placement of the new species in *Polystemma*.

Most measurements of floral and vegetative characters were made from herbarium specimens and rehydrated flowers using Olympus® cellSens Entry 1.6 imaging software and an Olympus® SZX10 dissecting microscope outfitted with an Olympus® SC30 CMOS color camera. Some measurements of digital images were made using ImageJ software 1.48v (Rasband, 1997–2014).

Taxonomic Treatment

Polystemma canisferum McDonnell & Fishbein, *sp. nov.*, Figs. 1–3.

Type:—MEXICO. Sonora: Mpio. de Alamos: East-Northeast of Los Camotes along Los Tanques-Las Chinacas road, 27.28°N 108.83°W, elev. 290 m, 18 August 1994. *P. Jenkins, M. Fishbein, and V. Steinmann 94-59* (holotype: OKLA!, isotype: MEXU!).

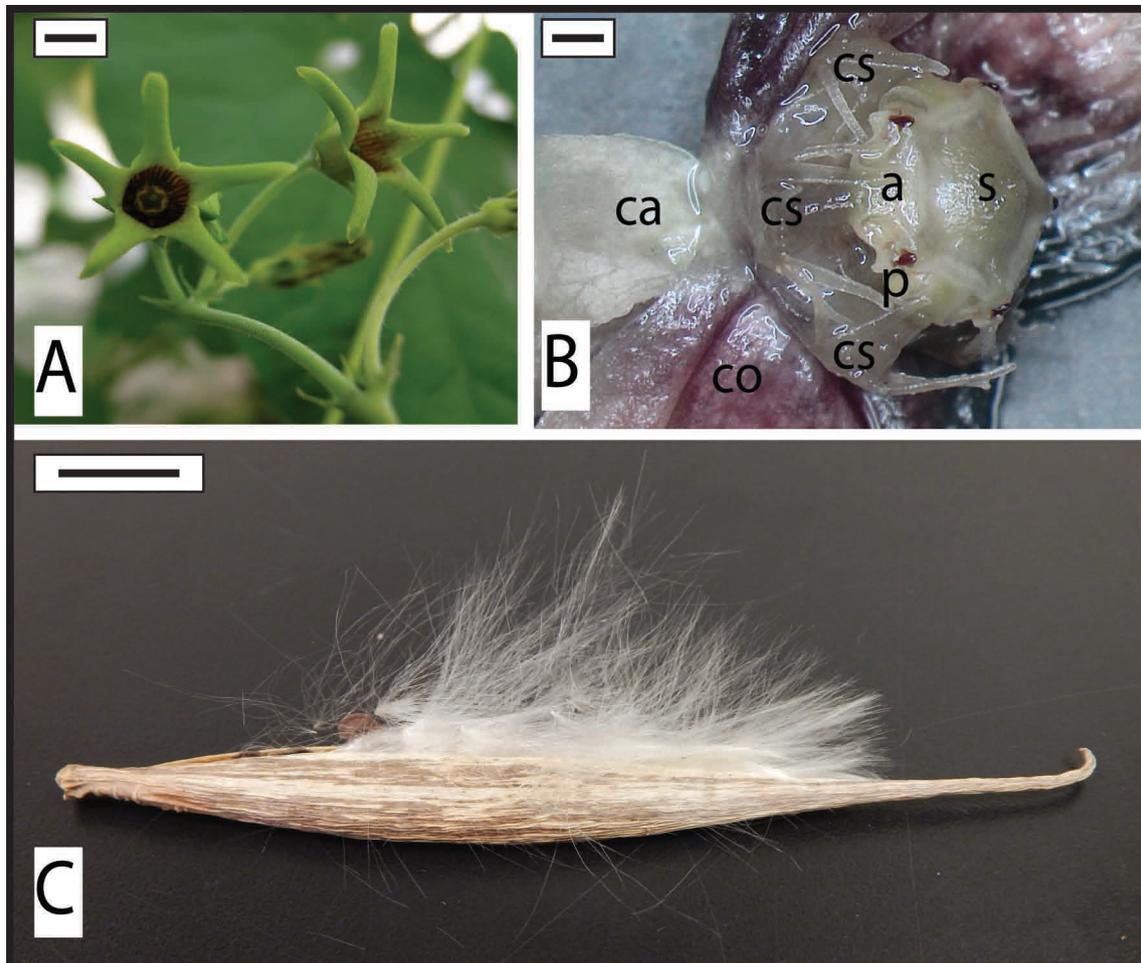


FIGURE 1. Flowers and fruit of *Polystemma canisferum* McDonnell & Fishbein. A) Flowers of plant grown from seed of *Van Devender 2005-150* from El Seguro, Sonora (vouchered by *Fishbein 6260*), scale = 0.2 cm. B) Dissected flower from *Fishbein 6600* (grown from seed of *Reina 2005-50* from Loma Maderista, Sonora) showing calyx (ca), corolla (co), corona segments (cs), corpusculum of pollinium (p), anther (a), and style head (s), scale = 500 μ m. C) Follicle from *Van Devender 2005-150*, scale = 2.5 cm.

Herbaceous perennial vine similar to other species of *Polystemma* in many vegetative aspects, but *P. canisferum* has somewhat smaller leaves with acuminate apices and bases with narrow sinuses. This species is distinctive by its small, narrowly campanulate-tubular, green corollas and corona segments with appendages in two series, the outer series with three linear appendages, the central one ornamented with three to five small lobes and the inner series with two linear appendages.

Description:—Plants perennial twining vines with fissured cork at base, usually with multiple stems from a thickened taproot, all vegetative parts covered with a mix of glandular hairs to 0.05 mm and eglandular hairs 0.4–0.55 mm long. Leaves with petioles 1.5–4.1 cm long, blades narrowly ovate to deltoid, occasionally ovate, 3.0–9.3 cm long, 1.8–4.5 cm wide; bases cordate, the sinus deep to nearly obsolete, apices acute to acuminate, margins entire; adaxial surfaces moderately hirsute and with 3–6 elongated conical colleters, yellow to brown, some falling off with age; abaxial surfaces hirsute, with glandular hairs abundant on and near veins; venation pinnipalmate. Inflorescences one per node, racemiform, extra-axillary, with 2–6 flowers, 2.9–14 cm long; peduncles 1.3–5.8 cm long, indument a mix of glandular and eglandular hairs; bracts elliptic, usually 2 subtending each flower, 2.5–4.0 mm long, hirsute, deciduous; pedicels 0.5–2.3 cm long, indument a mix of glandular and eglandular hairs. Flowers with calyces rotate-campanulate,

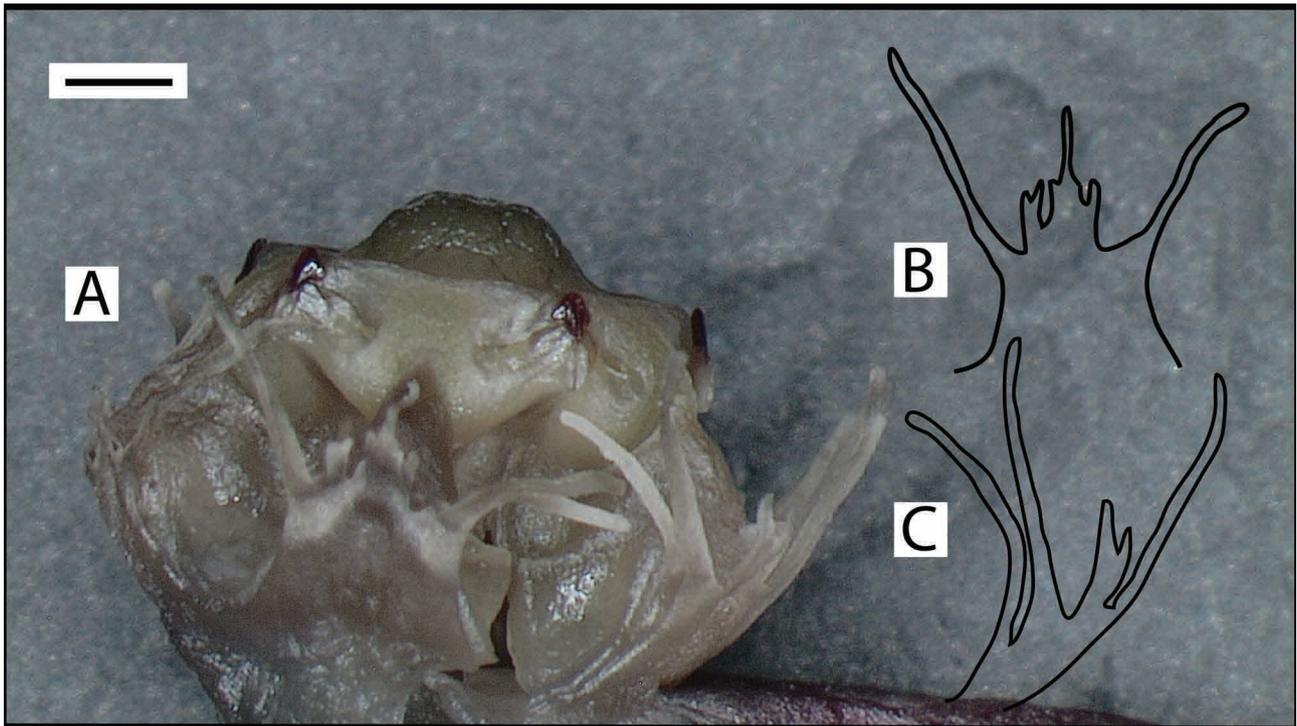


FIGURE 2. Gynostegium and corona of *Polystemma canisferum* McDonnell & Fishbein from *Fishbein 6600*. A) Gynostegium and corona with calyx and corolla removed. B) Outline of one corona segment viewed from abaxial side showing only outer appendages. C) Outline of one corona segment viewed from oblique lateral perspective showing inner and outer appendages. Scale bar = 500 μ m.

lobes elliptic, 2.5–4.0 mm long, 1.5–2.0 mm wide; adaxial surface glabrous with 2 ovoid colleters at the base of each lobe, flanking the sinus, 0.3 mm long; abaxial surface hirsute; corollas tubular-campanulate at anthesis, aestivation dextrorsely contorted in bud, green with purple to maroon striations within the tube and dark green reticulations on the lobes adaxially, 5.0–14.0 mm in diameter, the tube 2.5–6.5 mm long; glabrous adaxially, short hirsutulous abaxially; the corolla lobes oblong, spreading to ascending with reflexed margins, 3.0–6.4 mm long, hirsutulous abaxially and glabrous adaxially; corona of 5 united segments, each with more or less filiform appendages in 2 series, the outer series with 3 linear appendages, the central one ornamented with 3–5 small, irregular flanking lobes, the inner series with 2 linear appendages, glabrous, yellow-green, arising at the junction of the gynostegial column and the corolla and fused to the sides of the gynostegium; staminal column approximately 1.8 mm in height; anthers deltoid with short, broadly rounded apical appendages, anther wings narrow, chartaceous; pollinia yellow, oval, with a large excavated portion near the top abaxial surface, 0.5 mm long, 0.35 mm wide; translator arms 0.11–0.15 mm long, deltoid; corpusculum dark reddish brown, rhombic, 0.2 mm long, 0.2 mm wide; ovary 1.0–1.1 mm tall, smooth, style 0.5 mm tall, style head exposed, apex convex. Fruits fusiform follicles with purplish-brown and whitish striations at maturity (green and white when immature), 10.5–13.5 cm long, 1.1–1.3 cm wide, smooth, glabrous. Seeds oval to ovate, 50–100+ per fruit, brown, 5.5–7.0 mm long, 0.25–0.3 mm wide, smooth to slightly rugose, margins remotely crenate, with 10–20 uneven teeth at distal end; comas micropylar, white, 3.1–3.3 cm long.

Etymology:—The specific epithet refers to the hirsute indument that stands tall as the hairs on a wild dog.

Distribution and Phenology:—*Polystemma canisferum* has been found at scattered locations in central and southern Sonora, from east of Hermosillo to southwest of Alamos, primarily in thorn scrub (Fig. 4). These sites are in the foothills and plains west of the Sierra Madre Occidental. It is not common and all collections have been made from isolated plants. From the meager available data, *P. canisferum* is known to flower in August and to produce mature fruit in March and August. No pollinators or other faunal associates are known.

Conservation Status:—Per IUCN (2014), *Polystemma canisferum* fulfills criterion Vulnerable D1, largely due to the very restricted distribution of isolated plants from only four localities, in moderately- to well-collected regions of Sonora. Fewer than 1,000 plants are known to exist in the wild, there are fewer than five populations known, and some of the localities are in areas that are susceptible to threats from anthropogenic activity (e.g., on roadsides).

Discussion and comparison to relatives:—*Polystemma canisferum* differs from all other species of *Polystemma sensu* Stevens (2005; Stevens unpubl.) primarily by its small, tubular-campanulate corollas that are relatively narrow



FIGURE 3. Holotype of *Polystemma canisferum* McDonnell & Fishbein (*Jenkins 94-59*) from Los Camotes, Sonora. (OKLA!)

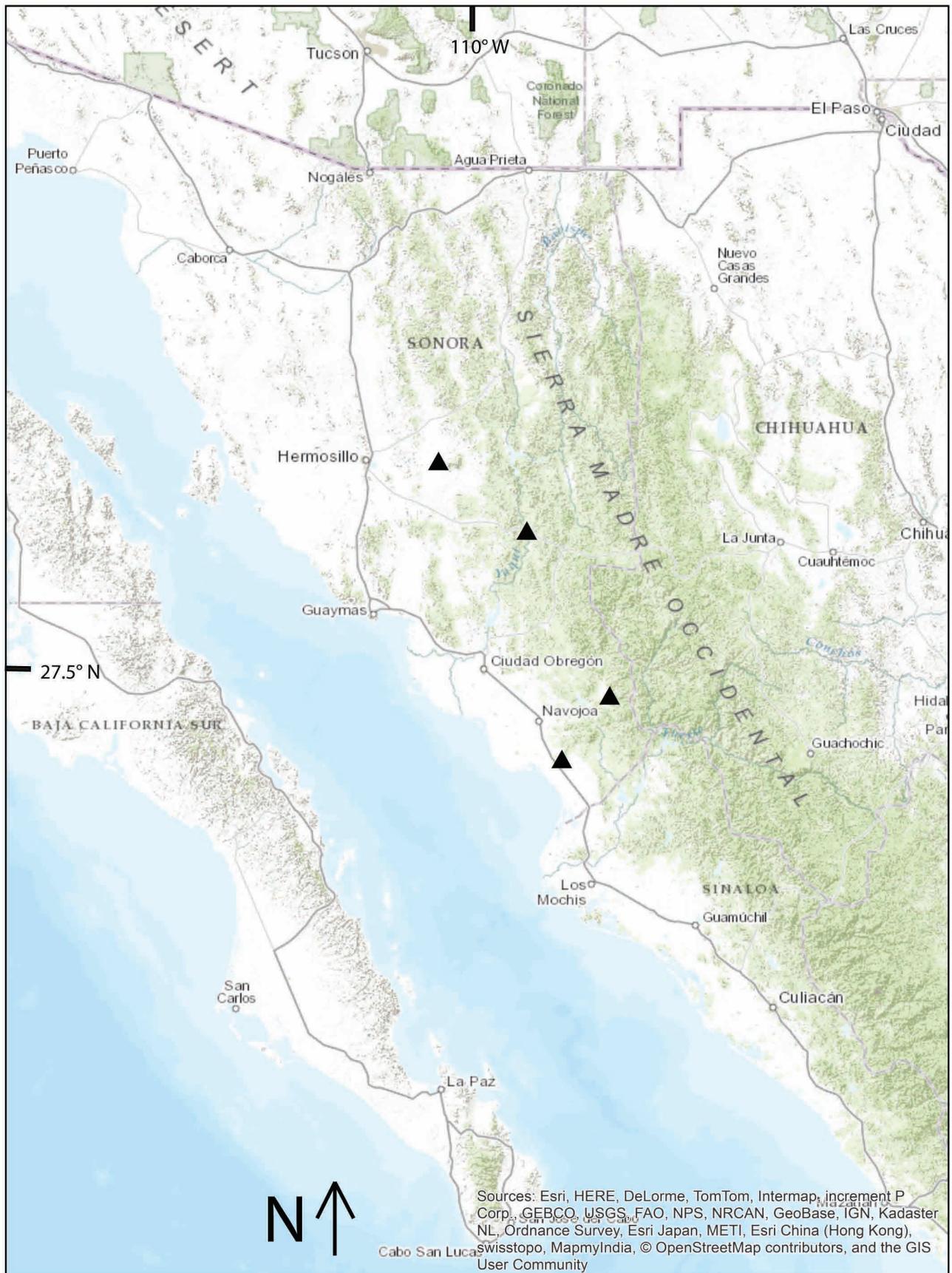


FIGURE 4. Distribution map of *Polystemma canisferum* McDonnell & Fishbein in Sonora, Mexico. Collection sites illustrated with black triangles.

and slender (Fig. 1A). The corolla of *P. viridiflorum* is broadly campanulate and in *P. mirandae* the corolla has a campanulate-rotate shape. Furthermore, while a corona of segments with filiform appendages is also found in other species of *Polystemma*, variation is present especially with respect to the middle lobe of each corona segment. In *P. canisferum* the middle lobe is ornamented with three to five smaller lobes (Fig. 2A, B). The middle lobe of *P. viridiflorum* corona segments are entire with no smaller lobes and in *P. mirandae* the middle lobe is ornamented with twelve smaller lobes. Other Sonoran species that will likely be transferred to *Polystemma* are different in that the coronas are fleshy and the segments are not filiform. These include *Matelea cordifolia* (A. Gray) Woodson (1941: 222), *M. petiolaris* (A. Gray) Woodson (1941: 223), *M. quercetorum* (Standley) W.D. Stevens (1983: 405), *M. tristiflora* (Standley) Woodson (1941: 223), and possibly other, undescribed entities. None have small, tubular-campanulate, green corollas, though the presumably distantly related *M. producta* occurs in Sonora and has superficially similar corollas and fruits.

Accessions obtained from two seed sources produced flowers differing in corolla length. Seeds collected near Tonichi (*Reina 2004-50*) yielded flowers with relatively long corollas (to 1.3 cm long, measured from *Fishbein 6266, 6600*), whereas those from the southern end of the Sierra Mazatán (*Van Devender 2005-150*) yielded flowers with relatively short corollas (to 0.6 cm long, measured from *Fishbein 6260*). In the absence of a broader set of specimens for study, no taxonomic status is accorded these variants.

Paratypes:—**MEXICO, SONORA. Mpio. de Navojoa**: Teachive, 26.78°N 109.25°W, elev. 75 m, 12 September 1994, *Van Devender 94-668* (OKLA). **Mpio. de Soyopa**: Loma Maderista, 3.5 km south of Tonichi, W side Río Yaqui, 28.5668°N 109.5577°W, elev. 190 m, 3 March 2004, *Reina 2004-50* (OKLA), *Fishbein 6266* (OKLA, grown from seed); *Fishbein 6600* (OKLA, grown from seed). **Mpio. de Ures**: 1.3 km north of El Seguro, southwest of Rancho Viejo, flats south of Cerro La Posta, south Sierra Mazatán, 29.1050°N 110.3321°W, elev. 466 m, 12 March 2005, *Van Devender, Reina & Loyola 2005-150* (OKLA, USON); *Fishbein 6260* (OKLA, grown from seed).

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