



Two new species of *Paspalum* (Paniceae: Panicoideae: Poaceae), a preliminary checklist of the genus in Mexico, and the identity of *P. crinitum*

Dos especies nuevas de *Paspalum* (Poaceae: Panicoideae: Paniceae), una lista preliminar del género en México y la identidad de *P. crinitum*

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Abstract. Two new species of *Paspalum* from Mexico are described and illustrated and the identity of *P. crinitum* of the group *Livida* is discussed. The new species, *Paspalum chiapense* from Chiapas and *P. yecorae* from Sonora, belong to subgenera *Harpostachys* and *Paspalum* group *Paniculata*, respectively. A preliminary account of the 88 species (including the new ones) of the genus for Mexico is presented.

Key words: *Paspalum*, *chiapense*, *P. yecorae*, subgenus *Harpostachys*, *Paniculata*, *Livida*.

Resumen. Se describen e ilustran dos especies nuevas de *Paspalum* para México y se discute la identidad de *P. crinitum* del grupo *Livida*. Las nuevas especies, *P. chiapense* de Chiapas y *P. yecorae* de Sonora, pertenecen a los subgéneros *Harpostachys* y *Paspalum* grupo *Paniculata*, respectivamente. Se presenta una lista preliminar de las 88 especies del género para México incluyendo las aquí descritas.

Palabras clave: *Paspalum*, *chiapense*, *P. yecorae*, subgenus *Harpostachys*, *Paniculata*, *Livida*.

Introduction

Paspalum L., a primarily New World grass, is the second most diverse genus within the tribe Paniceae (Panicoideae, Poaceae) according to Clayton and Renvoize (1986). There is uncertainty about the number of species comprising the genus; Clayton and Renvoize (1986) reported 330 species worldwide, but the Kew online grass checklist (Clayton et al., 2006 onwards) reports 315 species. Zuloaga et al. (2003) reported 310 species in the Catalogue of the New World Grasses, whereas Zuloaga and Morrone (2005) mentioned 330 species, probably including the few species found in the Old World. The fluctuation of this number is the result of taxonomic and monographic studies, as well as the publication of new species accounts. A current estimate is 350 species that includes 22 species of the genus *Thrasya* Kunth, recently transferred to *Paspalum* (Denham, 2005) and species of the Old World.

Currently, *Paspalum* comprises 4 subgenera: *Anachyris* Nees, *Ceresia* Pers., *Harpostachys* (Trin.) S. Denham and *Paspalum* (Denham, 2005; Zuloaga and Morrone, 2005).

The first 3 subgenera account for 6, 25, and, 39 species, respectively (Morrone et al., 2000; Denham et al., 2002; Denham, 2005). The fourth subgenus, *Paspalum*, contains the remaining 280 species. This classification is based primarily on cladistic analyses of morphological data, but agrees with some molecular studies of a group of species of the genus (e.g. Denham, 2005; Essi and de Souza-Chies, 2007; Giussani et al. 2009). Previously, Nash (1912) divided the genus in 33 informal groups without providing descriptions or any discussion of his criteria. Later, Chase (1929) reworked these 33 groups into 2 subgenera, *Ceresia* (Pers.) Rchb. and *Paspalum*, the later with 27 informal groups and some species without affiliation. The species included in these groups are distributed throughout the Americas, but Chase (1929) included mostly North and Central America as well as the Caribbean Islands, excluding most of the South American species. Clayton and Renvoize (1986) cited Pilger's classification of the genus into 8 sections, some of which may correspond to the current classification. More recently, Zuloaga and Morrone (2005) recognized 28 groups and some ungrouped species for Austral South America from Chase's unpublished classification. Combining the classifications by Nash (1912), Chase (1929), Zuloaga and Morrone (2005), and Denham (2005) a total of 40 groups comprise the

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subgenus *Paspalum* with some unplaced species. The monophyletic nature of most groups still remains uncertain and the number may change when phylogenetic studies are undertaken and therefore the unplaced position of some species will be resolved.

In Mexico, the importance of *Paspalum* is considerable because it is the most diverse genus of the subfamily. Some species are important as forage, turfs for saline soils or as weeds (Avilés-Nova, et al. 2008). The first studies that included Mexican species are those of Nash (1912) and Chase (1929). Later, Guzmán and Santana (1987) published a treatment containing a key and descriptions for 71 species with 14 infraspecific taxa, synonymy, and distribution maps. A little more than a decade later, Beetle et al. (1999) produced a taxonomic treatment of 84 species of *Paspalum*. Zuloaga et al. (2003) published an update of the Catalogue of the New World Grasses (<http://mobot.mobot.org/W3T/Search/nwgc.html>) in which 86 species are reported. More recently, Dávila et al. (2006) listed 85 species and 4 infraspecific taxa; however, some species were not included. Although the last 3 recent studies report similar numbers of species, they are not necessarily the same species, due to recent nomenclatural changes in the taxonomy of the species, verification of the identity of the species as well as new described species. Furthermore, there is no current infrageneric classification that reflects all of the taxonomic changes that have occurred to date. The only study that includes the Mexican species within an infrageneric classification is that of Chase (1929), in which 52 species known at that time in 17 of the 27 groups are included.

As part of a revision of the genus for a regional flora, several inconsistencies within the species checklist of the genus for Mexico were found. Such inconsistencies were related to the true identity of some species. Therefore, in this study an updated species checklist under the current infrageneric classification of *Paspalum*, is presented. Finally, 2 new species are proposed, and a discussion of the identity of *P. crinitum*, which has been misunderstood in the past.

Materials and methods

Several grass collections from the following herbaria: MEXU (which includes the former COCA collection), IEB, and ENCB, were revised. Online databases from B, HUH, NY, MO, P, and US were reviewed (some of these databases provide images of types and of representative specimens), as well as the Global Biodiversity Information Facility (www.gbif.org), Catalogue of the New World

Grasses (<http://mobot.mobot.org/W3T/Search/nwgc.html>), and databases available from CONABIO (www.conabio.gob.mx). Also, the UNIBIO database (Unidad de Informática para la Biodiversidad of the Instituto de Biología, UNAM, <http://unibio.ibiologia.unam.mx>) was reviewed. A scanning electron microscope (JEOL-JSM-5310LV) was used to obtain images of the gold-coated fertile florets (fertile lemma and palea).

Results

Following the herbaria revision several misidentified specimens were found. Some specimens belong to 2 new species described herein and 1 particular species, *P. crinitum*, commonly misidentified, was analyzed. The 2 new species belong to the subgenera *Harpostachys* and *Paspalum* group *Paniculata*.

A final list of 88 accepted species of *Paspalum* for Mexico (Table 1) was obtained. This figure includes the 2 new species described in this paper and 1 species with 4 varieties. Table 1 includes a detailed distribution by state as well as regions outside Mexico. Online databases report several other species, but after their identities were verified, some turned out to be misidentifications. A few additional species cited for Mexico in the literature, were excluded because there are no specimens to support their presence in the country, and actually, these species do not occur in the country. Most of the species in the checklist have at least 1 specimen for each state deposited in the National Herbarium of Mexico (MEXU) or are represented by the type collection in other herbaria. Table 2 shows the number of species per state and shared species between regions (U.S.A., Central America, South America, and the Caribbean).

Finally, the descriptions of the 2 new species, as well as a redescription for *P. crinitum* with comments about its identity are presented.

Descriptions

Paspalum chiapense Sánchez-Ken, *sp. nov.* TYPE: MEXICO: Chiapas: Yanchilín, a 20 km al N de San Cristóbal de las Casas, *O. Téllez y W. Elisens 4614* (holotype: MEXU; isotype: MEXU) (Fig. 1).

Gramen perenne rhizomate brevissimo. Vaginae superiores quam internodia breviores, collo sparse piloso; laminae 10-15 cm longae; pedunculi 1-2 in vagina suprema; racemi 1-3 secus longitudinem axis; rhachis 0.7-1 mm

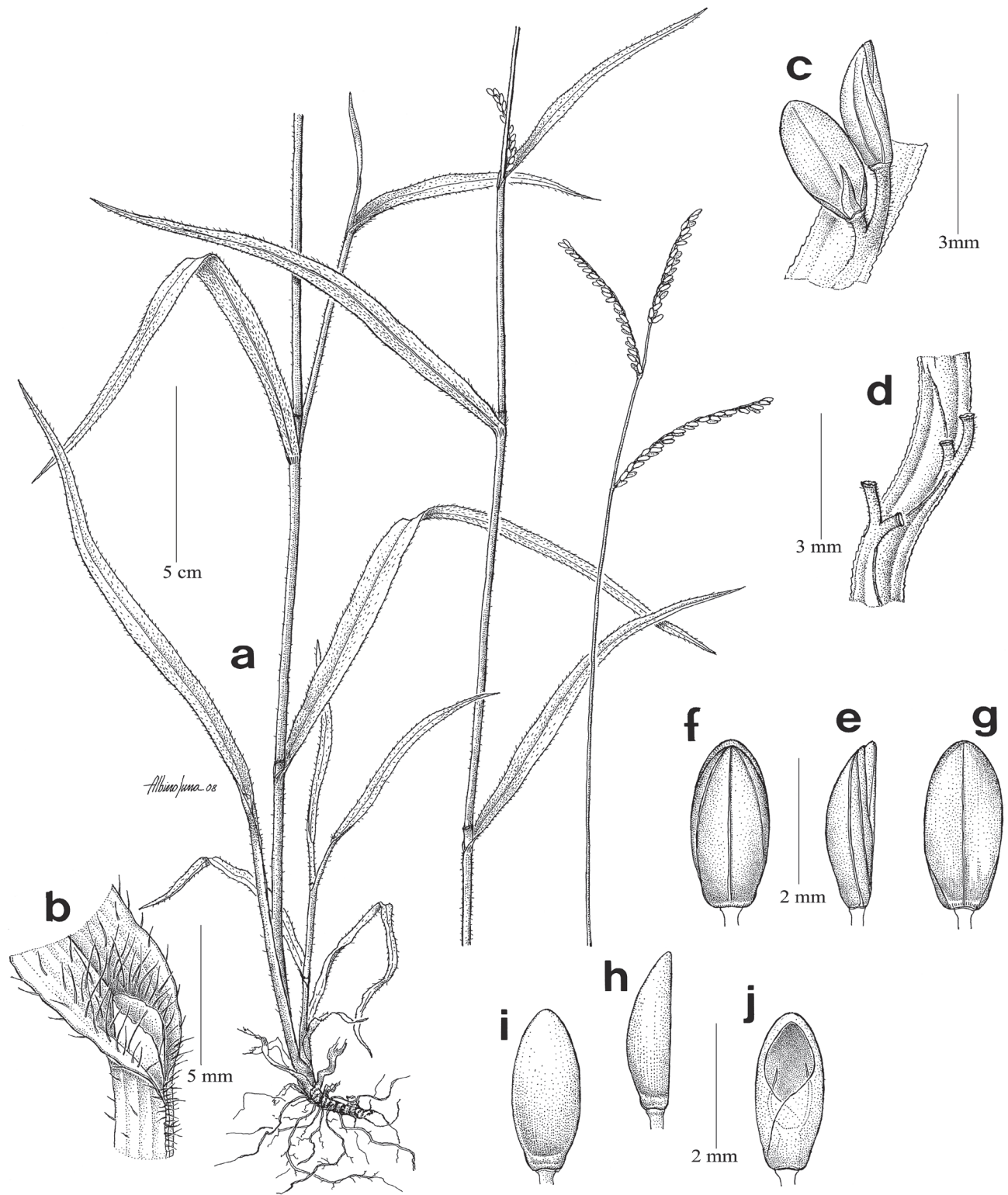


Figure 1. *Paspalum chiapense*. a, plant showing a basal and medium branching; b, ligular area; c, pair of spikelets; d, rachis; e, spikelet in lateral view; f, spikelet in dorsal view; g, spikelet in ventral view; h, fertile floret in lateral view; i, fertile lemma in dorsal view; j, fertile palea in ventral view. Illustration by Albino Luna.

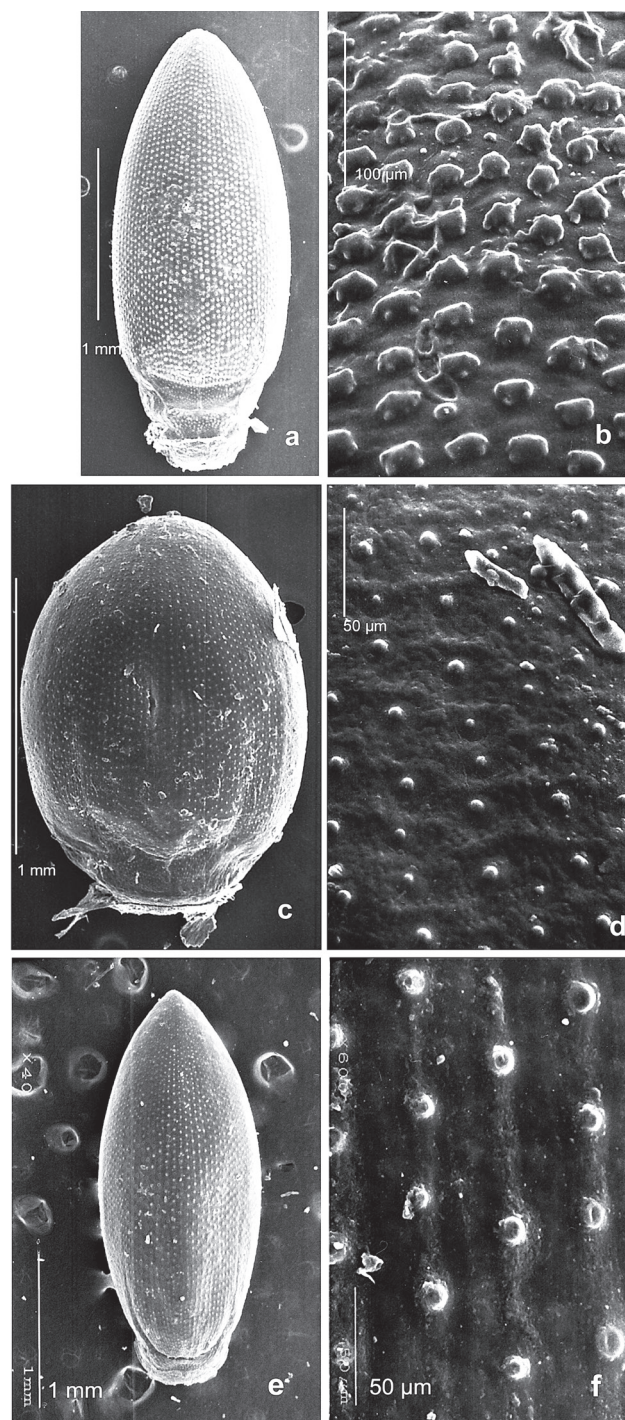


Figure 2. SEM photographs of the fertile floret of *Paspalum chiapense* (a. fertile floret; b. close up of the surface showing warty papillae); *P. yecorae* (c. fertile floret showing scattered microhairs; d. close up showing an almost even surface with minute blunt papillae and a flattened microhair), and *P. crinitum* (e. fertile floret; f. close up the fertile floret showing a shallowly ridged surface with simple papillae).

lata. Spiculae elliptico-oblongae, 2.6-2.8 mm longae, 1.1-1.3 mm latae, applanatae vel leviter concavo-convexae, glabrae. Gluma prima dimorpha, obsoleta ubi praesens in spicula superiore, in inferiore subulata, enervia vel 1-nervia; gluma secunda et lemma sterile 5-nervia. Palea sterilis nulla. Flosculus fertilis pallidus, minute papillosus, papillis 3-6 verrucis minutis instructis.

Plants perennial, slightly geniculate to erect, about 85 cm tall, branched above, fibrous, rhizomatous, the rhizome very short; internodes glabrous; nodes exposed, brown, with few and sparse hairs on the lower ones, becoming glabrous above. Lower sheaths longer than the internodes, overlapping, the upper ones shorter than the internodes, rounded to slightly keeled distally, margins ciliate, basal sheaths shortly hirsute toward the base, upper ones glabrous; ligules 1-1.8 mm long, membranous, glabrous, brownish; collar sparsely short pilose; blades lanceolate, 10-15 cm long, 6-8.3 mm wide, uppermost reduced in size, flat, base narrowed, glabrous to shortly hirsute, throat pilose, margins sparsely papillose-hirsute, apex attenuate. Inflorescence terminal and axillary; peduncles 1-2 in the uppermost sheath, glabrous; racemes 1-3, 3.3-7 cm long, along an axis, slightly curved; rachis 0.7-1 mm wide, flattened, with short lateral extensions, glabrous to scabrelous toward the apex, margins scabrous, terminating in a spikelet; pulvini sparsely short-hirtellous, dark brown; pedicels unequal, the longest up to 1.4 mm long, scabrous, spikelets paired, in 4 series. Spikelets elliptic-oblong, 2.6-2.8 mm long, 1.1-1.3 mm wide, plane to slightly concave-convex, apex rounded to slightly acute, not turgid, greenish with purple or brown blotches toward the tip, glabrous; first glume wanting dimorphic, when present in the superior spikelet rudimentary, broad, membranous, nerveless, obtuse, glabrous, centric or eccentric first glume in the inferior spikelet up to half as long as the spikelet, subulate, membranous, glabrous, nerveless to 1-nerved, eccentric; second glume slightly shorter than the spikelet, smooth, glabrous, 5-nerved, with a central vein and lateral veins proximate at the margins, apex membranous, brownish to purplish, margins golden-brown, sometimes with very few scattered short hairs; lower floret sterile; sterile lemma as long as the spikelet, plane to slightly concave, 5-nerved, with a central vein and lateral veins proximate at the margins, margins folded over the fertile floret; sterile palea wanting; upper floret slightly shorter than the spikelet, plane to slightly concave-convex, crustaceous, pale, minutely papillose, papillae with 3-6 tiny warts (Fig. 2); fertile palea slightly shorter than the fertile lemma leaving a small gap at the tip; lodicules 0.25-0.3 mm long; stamens 3; anthers 0.8-0.9 mm long. Caryopsis not seen.

Table 1. Species of *Paspalum* and their distributions in Mexico (abbreviated states between parentheses). Centr. Amer.= Central America, S. Amer. = South America, Car. = Caribbean

	<i>Species</i>	<i>Distribution</i>
1.	<i>P. acuminatum</i> Raddi	U.S.A., Mexico (Mich., Tab., Ver.), Centr. Amer., S. Amer., and Car.
2.	<i>P. acutum</i> Chase	Mexico (Ver.) and Centr. Amer.
3.	<i>P. adoperiens</i> (E. Fourn.) Chase	Mexico (Chis., Dgo., Oax., Sin., Ver.) and Centr. Amer.
4.	<i>P. affine</i> Steud.	Mexico (Chis., Hgo., Mex., Oax., Pue., Ver.) and Centr. Amer.
5.	<i>P. alcalinum</i> Mez	U.S.A., Mexico (S.L.P., Yuc.), Centr. Amer., and S. Amer.
6.	<i>P. arsenei</i> Chase	Mexico (Ags., Gto., Hgo., Jal., Mex., Mich., Mor., Pue., Ver., Zac.)
7.	<i>P. blodgettii</i> Chapm.	U.S.A., Mexico (Camp., Chis., Oax., Q.R., Tamps., Ver., Yuc.), Centr. Amer., and Car.
8.	<i>P. botterii</i> (E. Fourn.) Chase	U.S.A., Mexico (Camp., Chih., Chis., Col., Gro., Gto., Hgo., Jal., Mex., Mich., Mor., Nay., N.L., Oax., Pue., Qro., Q.R., S.L.P., Sin., Son., Tab., Tamps., Ver., Yuc.), Centr. Amer., S. Amer., and Car.
9.	<i>P. caespitosum</i> Flügge	U.S.A., Mexico (Camp., Chis., Qro., Q.R., Tab., Tamps., Ver., Yuc.), and Centr. Amer.
10.	<i>P. campylostachyum</i> (Hack.) S. Denham	Mexico (Chis., Oax., Pue., Tab.), Centr. Amer., and S. Amer.
11.	<i>P. candidum</i> (Humb. et Bonpl. ex Flügge) Kunth	Mexico (Chis., Hgo., Jal., Mich., Mor., Pue., Tab., Ver.), Centr. Amer., and S. Amer.
12.	<i>P. centrale</i> Chase	Mexico (Chis., Ver.) and Centr. Amer.
13.	<i>P. chiapense</i> Sánchez-Ken sp. nov.	Mexico (Chis.)
14.	<i>P. clavuliferum</i> C. Wright	Mexico (Camp., Chis., Col., Gro., Jal., Mich., Nay., Oax., Tamps., Yuc.), Centr. Amer., S. Amer., and Car.
15.	<i>P. conjugatum</i> P. J. Bergius	U.S.A., Mexico (Camp., Chis., Coah., Col., Dgo., Gro., Hgo., Jal., Mex., Mich., Mor., Nay., N.L., Oax., Pue., Qro., Q.R., S.L.P., Sin., Tab., Tamps., Ver., Yuc.), Centr. Amer., S. Amer., and Car.
16.	<i>P. conspersum</i> Schrad.	U.S.A., Mexico (Chis., Jal., Mex., Mich., Oax., Pue., Q.R., Tamps., Ver.), Centr. Amer., and S. Amer.
17.	<i>P. convexum</i> Humb. et Bonpl. ex Flügge	U.S.A., Mexico (Ags., Chis., Chih., Col., D.F., Dgo., Gto., Gro., Jal., Mex., Mich., Mor., Nay., Oax., Pue., Qro., Sin., Son., Tab., Ver., Zac.), Centr. Amer., S. Amer., and Car.
18.	<i>P. corcovadense</i> Raddi	Mexico (Chis., Oax., Tamps.?, Yuc.), Centr. Amer., and S. Amer.
19.	<i>P. coryphaeum</i> Trin.	U.S.A., Mexico (Yuc.), Centr. Amer., S. Amer., and Car.
20.	<i>P. costaricense</i> Mez	Mexico (Chis., Oax.) and Centr. Amer.
21.	<i>P. crinitum</i> Chase	Mexico (Coah., Dgo., Gto., Jal., Pue., S.L.P., Zac.)
22.	<i>P. cymbiforme</i> E. Fourn.	Mexico (Chis., Gro., Mex., Oax., Ver.) and Centr. Amer.
23.	<i>P. decumbens</i> Sw.	Mexico (Chis., Dgo., Ver.), Centr. Amer., S. Amer., and Car.

Table 1. Continues

	<i>Species</i>	<i>Distribution</i>
24.	<i>P. denticulatum</i> Trin.	U.S.A., Mexico (Chis., Coah., Col., D.F., Dgo., Gto., Gro., Hgo., Jal., Mex., Mich., Mor., Nay., N.L., Oax., Pue., Qro., S.L.P., Sin., Tab., Tamps., Ver., Zac.), Centr. Amer., S. Amer., and Car.
25.	<i>P. dilatatum</i> Poir.	U.S.A., Mexico (B.C., Chih., Chis., Coah., D.F., Hgo., Jal., Mex., Mich., N.L., Pue., Qro., S.L.P., Tamps., Tlax., Ver.), Centr. Amer., S. Amer., and Car.
26.	<i>P. distichum</i> L.	U.S.A., Mexico (Ags., B.C., B.C.S., Chis., Chih., Coah., Col., D.F., Dgo., Gro., Gto., Hgo., Jal., Mex., Mich., Mor., Nay., N.L., Oax., Pue., Qro., Q.R., S.L.P., Sin., Son., Tab., Tamps., Tlax., Ver., Zac.), Centr. Amer., S. Amer., and Car.
27.	<i>P. erectum</i> Chase	Mexico (Col., Gto., Jal., Mich.)
28.	<i>P. erianthum</i> Nees ex Trin.	Mexico (Chis., Gro., Oax.), Centr. Amer., and S. Amer.
29.	<i>P. fasciculatum</i> Willd. ex Flügge	Mexico (Camp., Chis., Jal., Nay., Oax., Q.R., Tab., Ver.), Centr. Amer., S. Amer., and Car.
30.	<i>P. fimbriatum</i> Kunth	U.S.A., Mexico (Camp., Mex., Q.R., Yuc.), Centr. Amer., S. Amer., and Car.
31.	<i>P. foliiforme</i> S. Denham	Mexico (Chis.), Centr. Amer., and S. Amer.
32.	<i>P. guayanerum</i> Beetle	Mexico (Nay., Sin., Son.)
33.	<i>P. hartwegianum</i> E. Fourn.	U.S.A. and Mexico (Gto., Gro., Jal., Mich., Mor., N.L., Oax., Qro., S.L.P., Son., Tamps., Ver., Yuc.), and Centr. Amer.
34.	<i>P. heterotrichon</i> Trin.	Mexico (Chis.), Centr. Amer., S. Amer., and Car.
35.	<i>P. hintonii</i> Chase	Mexico (Col., Gro., Jal., Mex., Mich., Nay., Oax.)
36.	<i>P. humboldtianum</i> Flügge	Mexico (Ags., Chis., Coah., Col., D.F., Dgo., Gto., Gro., Hgo., Jal., Mex., Mich., Mor., Nay., N.L., Oax., Pue., Qro., S.L.P., Sin., Son., Tamps., Ver., Zac.), Centr. Amer., and S. Amer.
37.	<i>P. intermedium</i> Munro ex Morong et Britton	U.S.A., Mexico (Chis., Jal., Mex., Ver.), Centr. Amer., and S. Amer.
38.	<i>P. jaliscanum</i> Chase	Mexico (Chis., Hgo., Jal., Mich., Oax., Zac.) and Centr. Amer.
39.	<i>P. lentiginosum</i> J. Presl	Mexico (Ags., Chis., Col., Dgo., Jal., Mich., Mor., Nay., Oax., Sin., Son., Ver.) and Centr. Amer.
40.	<i>P. leptachne</i> Chase	Mexico (Nay., Sin., Ver.)
41.	<i>P. ligulare</i> Nees	Mexico (Jal., Oax., Sin., Ver.), Centr. Amer., S. Amer., and Car.
42.	<i>P. lineare</i> Trin.	Mexico (Chis., Pue., Tab.), Centr. Amer., S. Amer., and Car.
43.	<i>P. longicuspe</i> Nash	Mexico (Chis., Gro., Jal., Nay., Oax., Sin.)
44.	<i>P. longum</i> Chase	Mexico (Col.)

Table 1. Continues

	<i>Species</i>	<i>Distribution</i>
45.	<i>P. luxurians</i> Guzmán et L. Rico	Mexico (Gto., Jal., Mex.)
46.	<i>P. malacophyllum</i> Trin.	U.S.A., Mexico (Chis., Qro., Q.R., S.L.P., Tab., Tamps., Ver., Yuc.), and S. Amer.
47.	<i>P. mayanum</i> Chase	Mexico (Camp., Yuc.)
48.	<i>P. melanospermum</i> Desv. ex Poir.	Mexico (Jal., Nay., Oax.), Centr. Amer., S. Amer., and Car.
49.	<i>P. microstachyum</i> J. Presl	Mexico (Nay., Tab., Ver.), Centr. Amer., and S. Amer.
50.	<i>P. millegrana</i> Schrad.	U.S.A., Mexico (Camp., Chis., Pue., Q.R., Tab., Tamps., Ver., Yuc.), Centr. Amer., S. Amer., and Car.
51.	<i>P. minus</i> E. Fourn.	U.S.A., Mexico (Chis., Gto., Mex., Mich., S.L.P., Tab., Tamps., Ver.), Centr. Amer., S. Amer., and Car.
52.	<i>P. monostachyum</i> Vasey	U.S.A. and Mexico (Ver.)
53.	<i>P. multicaule</i> Poir.	Mexico (Chis., Gro., Jal., Mex., Nay., Oax., Tab., Ver.), Centr. Amer., S. Amer., and Car.
54.	<i>P. nelsonii</i> Chase	Mexico (Chis., Jal., Nay.)
55.	<i>P. notatum</i> Alain ex Flügge	U.S.A., Mexico (Ags., Camp., Chis., Col., D.F., Dgo., Gto., Gro., Hgo., Jal., Mex., Mich., Mor., Nay., N.L., Oax., Pue., Qro., Q.R., S.L.P., Sin., Son., Tab., Tamps., Ver., Yuc., Zac.), Centr. Amer., S. Amer., and Car.
56.	<i>P. nutans</i> Lam.	Mexico (Chis., Q.R.), Centr. Amer., S. Amer., and Car.
57.	<i>P. orbiculatum</i> Poir.	Mexico (Chis., Gro., Oax., S.L.P., Tab., Ver.), Centr. Amer., S. Amer., and Car.
58.	<i>P. paniculatum</i> L.	U.S.A., Mexico (Ags., B.C.S., Camp., Chis., Col., Gro., Jal., Mex., Mich., Mor., Nay., Oax., Pue., Q.R., S.L.P., Sin., Son., Tab., Tamps., Ver., Yuc., Zac.), Centr. Amer., S. Amer., and Car.
59.	<i>P. paucispicatum</i> Chase	Mexico (B.C., Chih., D.F., Jal., Mex., N.L., Oax., Son., Tab.)
60.	<i>P. pectinatum</i> Nees ex Trin.	Mexico (Chis., Oax., Tab., Ver.), Centr. Amer., and S. Amer.
61.	<i>P. pilosum</i> Lam.	Mexico (Chis., Mex., Mich., Oax., Tab., Ver.), Centr. Amer., S. Amer., and Car.
62.	<i>P. plenum</i> Chase	Mexico (Chis., Col., Jal., Mex., Mor., Nay., Ver.), Centr. Amer., and S. Amer.
63.	<i>P. plicatulum</i> Michx.	U.S.A., Mexico (Ags., Camp., Chis., Chih., Col., Dgo., Gro., Gto., Hgo., Jal., Mex., Mich., Mor., Nay., Oax., Pue., Q.R., S.L.P., Sin., Tab., Tamps., Ver., Yuc., Zac.), Centr. Amer., S. Amer., and Car.
64.	<i>P. prostratum</i> Scribn. et Merr.	Mexico (Chis., D.F., Dgo., Gro., Gto., Hgo., Jal., Mex., Mich., Oax., Pue., Ver.) and S. Amer.
65.	<i>P. pubiflorum</i> Rupr. ex E. Fourn.	U.S.A., Mexico (Ags., B.C., B.C.S., Camp., Chih., Coah., Dgo., Gro., Gto., Hgo., Jal., Mex., Mich., Mor., N.L., Oax., Pue., Qro., S.L.P., Son., Tamps., Ver.), and Car.
66.	<i>P. pulchellum</i> Kunth	Mexico (Chis., Oax., Tab.), Centr. Amer., S. Amer., and Car.
67.	<i>P. pygmaeum</i> Hack.	Mexico (D.F., Dgo., Gro., Jal., Mich., Mor., Tlax., Ver.) and S. Amer.
68.	<i>P. repens</i> P. J. Bergius	U.S.A., Mexico (Chis., Tab., Ver.), Centr. Amer., S. Amer., and Car.

Table 1. Continues

	<i>Species</i>	<i>Distribution</i>
69.	<i>P. scrobiculatum</i> L.	U.S.A., Mexico (Jal.), Centr. Amer., S. Amer., Car., Old World
70.	<i>P. serpentinum</i> Hochst. ex Steud.	Mexico (Tab.), Centr. Amer., S. Amer., and Car.
71 ^a .	<i>P. setaceum</i> Michx. var. <i>ciliatifolium</i> (Michx.) Vasey	U.S.A., Mexico (Coah., Mex., N.L., S.L.P., Tab., Tamps., Ver.), Centr. Amer., S. Amer., and Car.
71b.	<i>P. setaceum</i> Michx. var. <i>psammophyllum</i> (Nash ex Hitchc.) D.J. Banks	U.S.A. and Mexico (Ver.)
71c.	<i>P. setaceum</i> Michx. var. <i>setaceum</i>	U.S.A. and Mexico (Tamps., Ver.)
71d.	<i>P. setaceum</i> Michx. var. <i>stramineum</i> (Nash) D.J. Banks	U.S.A. and Mexico (Chih., Dgo., Jal., Mex., N.L., Son., Tamps., Ver.)
72.	<i>P. sparsum</i> Chase	Mexico (Yuc.)
73.	<i>P. squamulatum</i> E. Fourn.	Mexico (B.C.S., Chis., Col., Dgo., Gro., Jal., Mex., Mich., Mor., Nay., Oax., Pue., Qro., S.L.P., Sin., Son., Tamps., Ver.) and Centr. Amer.
74.	<i>P. stellatum</i> Humb. et Bonpl. ex Flügge	Mexico (Chis., Oax.), Centr. Amer., S. Amer., and Car.
75.	<i>P. tenellum</i> Willd.	Mexico (Ags., Chis., D.F., Gro., Gto., Jal., Mex., Mich., Mor., Pue., Qro., Son., Ver., Zac.) Centr. Amer., and S. Amer.
76.	<i>P. tinctum</i> Chase	Mexico (D.F., Gro., Gto., Jal., Mex., Mich., Mor., Nay., Pue.) and Centr. Amer.
77.	<i>P. toluicense</i> R. Guzmán	Mexico (Mex.)
78.	<i>P. trachycoleon</i> Steud.	Mexico (Chis., Oax.), Centr. Amer., and S. Amer.
79.	<i>P. tumidum</i> Kuhlmann	Mexico (Chis., Col., Gro., Jal., Mex., Mich.), Centr. Amer., and S. Amer.
80.	<i>P. turriforme</i> R.W. Pohl	Mexico (Chis., Mich.) and Centr. Amer.
81.	<i>P. unispicatum</i> (Scribn. et Merr.) Nash	U.S.A., Mexico (Gro., Jal., Mor., N.L., Oax., Pue., S.L.P., Tamps., Ver.), Centr. Amer., S. Amer., and Car.
82.	<i>P. urvillei</i> Steud.	U.S.A., Mexico (Ags., B.C.S., Coah., Jal., Mex., Mich., Mor.), Centr. Amer., S. Amer., and Car.
83.	<i>P. vaginatum</i> Sw.	U.S.A., Mexico (B.C.S., Camp., Chis., Col., Gto., Jal., Mex., Mich., Nay., Oax., Pue., Qro., Q.R., S.L.P., Tab., Tamps., Ver., Yuc., Zac.), Centr. Amer., S. Amer., and Car.
84.	<i>P. variabile</i> (E. Fourn.) Nash	Mexico (Chis., Col., Hgo., Jal., Mich., Mor., Oax., Pue., Qro., Tamps., Ver.) and Centr. Amer.
85.	<i>P. virgatum</i> L.	U.S.A., Mexico (Camp., Chis., Col., Gro., Jal., Mex., Mich., Mor., Nay., Oax., Pue., Q.R., S.L.P., Tab., Tamps., Ver., Yuc.), Centr. Amer., S. Amer., and Car.
86.	<i>P. virletii</i> E. Fourn.	U.S.A. and Mexico (Hgo., N.L., Pue., Qro., S.L.P., Son., Tamps., Ver.)
87.	<i>P. wrightii</i> Hitchc. et Chase	U.S.A., Mexico (Camp., Tab., Yuc.), Centr. Amer., S. Amer., and Car.
88.	<i>P. yecorae</i> Sánchez-Ken n. sp.	Mexico (Son.)

Table 2. Number of species per state in Mexico, showing the number of endemic species and the number of species exclusive to the state or the region. The 6 states with the highest number of species are written in boldface. The last 4 lines show the total number of species that are shared between Mexico and the U.S.A., Central America, South America, and the Caribbean, respectively. The next column shows the number of endemic species of the region

	<i>Number of species</i>	<i>Endemic species</i>	<i>Species exclusive to the state or region</i>
Ags.	11	1	0
B.C.	4	1	0
B.C.S.	4	0	0
Camp.	16	1	0
Chih.	8	1	0
CHIS.	55	3	1
Coah.	9	1	0
Col.	20	3	1
Dgo.	16	1	0
D.F.	11	1	0
Gro.	26	2	0
Gto.	18	4	0
Hgo.	16	1	0
JAL.	43	8	0
MEX.	34	5	1
MICH.	34	3	0
Mor.	23	1	0
Nay.	25	5	0
N.L.	13	1	0
OAX.	42	3	0
Pue.	28	2	0
Qro.	18	0	0
Q.R.	15	0	0
S.L.P.	22	1	0
Sin.	16	3	0
Son.	15	3	1
Tab.	30	1	0
Tamps.	26	0	0
Tlax.	3	0	0
VER.	50	2	0
Yuc.	17	2	1
Zac.	15	2	0
Mexico	88*	16	16
Mex. and U.S.A.	31	3	
Mex. and C. Amer.	65	12	
Mex. and S. Amer.	54	3	
Mex. and Car.	37	0	

Table 3. Morphological differences and shared characters between *P. chiapense*, *P. pilosum* and *P. peckii*

<i>Character</i>	<i>P. pilosum</i>	<i>P. chiapense</i>	<i>P. peckii</i>
Culms	geniculate culms fibrous	geniculate to erect fibrous	erect succulent
Branching	above	above	below
Rhizomes	short	short	wanting
Nodes	exposed	exposed	covered
Sheaths	overlapping below shorter than internodes above	overlapping below shorter than internodes above	longer than internodes
Collar	glabrous to pilose	sparsely short pilose	sparsely pilose
Blades	4-16 cm long	10-15 cm long	10-34 cm long
Inflorescence	terminal and axillary	terminal and axillary	terminal and axillary
Peduncles on the uppermost sheath	1-4 glabrous	1-2 glabrous	1-2 glabrous to sparsely hispid?
Racemes	3 straight to slightly curved	1-3 slightly curved	1-2 curved
Rachis	0.8-1.5	0.7-1 mm	more than 1 mm
Spikelets	2.2-3 mm long 1.5-1.8 mm wide elliptic concave-convex turgid	2.6-2.8 mm long 1.1-1.3 mm wide elliptic-oblong plane to slightly concave-convex not turgid	2.7 mm long >1.5 mm wide elliptic to obovate concave to sulcate-convex turgid
First glume of upper spikelet	wanting to 1/6	wanting or rudimentary	wanting or less than 1/5
First glume of lower spikelet	lanceolate 1-3-veined	subulate 0-1-veined	triangular 0-1-veined
Second glume	minutely papillose	smooth	smooth
Lower floret	staminate	sterile	staminate –sterile
Sterile palea	present	wanting	present

Taxonomy summary

Distribution, habitat and phenology. This new species has a restricted distribution in Chiapas. It is found in pine-oak forest with open grass areas and at elevations between 1 600 to 1 700 m. Flowering occurs from September to November.

Etymology. The specific epithet refers to the state where the species is found.

Paratypes: MEXICO: Chiapas: Mpio. Jitotol, 10 km N of Jitotol, near Río Hondo, *D.E. Breedlove and G. Davidse 55139* (MEXU); near Colonia El Laurel, ca. 5 km N of Jitotol, *Davidse et al., 29622* (MEXU).

Remarks

This new species belongs to subgenus *Harpostachys*, according to Denham's (2005) circumscription, in which a dimorphic first glume is generally present in both spikelets of the pair, with terminal and axillary inflorescences, with 1-more peduncles coming from the uppermost sheath and usually although not always with a sterile palea. Within the subgenus, *P. chiapense* is more closely related to *P. pilosum* Lam. and *P. peckii* F. T. Hubb. Table 3 shows the morphological differences and shared characters between these species. The species closest to *P. chiapense* is *P. pilosum* Lam.; however, there are enough characters to separate them. The number of peduncles, number of racemes per inflorescence, the length of the racemes, shape, width and turgidness of the spikelets, the constancy of the presence of the first glume on the lower spikelet, the sexuality of the lower floret as well as the presence of the sterile palea are some features that allow such separation between both species. The morphology of the warty papillae (Figure 3) of the fertile lemma is similar in both species; however, the papillae in *P. pilosum* (Denham, 2005; Zuloaga and Morrone, 2005) are more congested than in *P. chiapense* and the warts are arranged in a more disorderly fashion in the new species than in *P. pilosum*.

Paspalum yecorae Sánchez-Ken, *sp. nov.* TYPE: MEXICO: Sonora: Mpio. Yécora; 4 km W of Agua Amarilla, 18.9 km W of Tepoca (Km 196 E of Hermosillo) on Mex 16, *A.L. Reina et al., 839* (holotype: MEXU) (Fig. 3).

Paspalo squamulato E. Fourn. affine. Gramen perenne, decumbens, ad medium ramificans. Vaginae laminaeque glabrae; laminae lineari-lanceolatae, 9-20 cm longae; pedunculus unus in quaque vagina; racemi 13 secus longitudinem axis; rhachis scabrella 0.5-0.6 mm lata.

Spiculae binatae, 1.5-1.6 mm longae, 1.1-1.2 mm latae, late ellipticae vel leviter obovatae, glabrae, plano-convexae, ex dilute brunneo pallide virides. Gluma prima nulla; gluma secunda quam lemma fertile 1 mm brevior, 5-nervia, glabra; lemma fertile pallidum, crustaceum, laeve, ut videtur longitudinaliter striatum, papillis minutis instructum.

Plants perennial, decumbent, ca. 80 cm tall, branching in the middle, rooting at lower nodes; internodes 6-7 cm long, more or less equal, compressed, glabrous; nodes dark brown, lower ones sparsely short hirsute, upper ones glabrous. Sheaths nearly as long as the internodes, the basal ones shredding, becoming slightly fibrous, glabrous, margins hyaline to golden brown; ligule 1.8-2.8 mm long, membranous, brownish; collar glabrous or with few hairs up to 2 mm long toward the sides; throat with sparse long hairs; blades linear-lanceolate, 9-20 cm long, 6-9 mm wide, flat, keeled, herbaceous, base rounded to cordate, apex attenuate, glabrous on both surfaces, margins scabrellous. Inflorescences ca. 10 cm long, terminal and axillary; 1 peduncle in the uppermost sheath, partially included; racemes 13, 1.5-4 cm long, decreasing in length upwards, ascending, arranged along an axis, the axis ca. 6 cm long, angular, glabrous; pulvini brown, sparsely pilose, hairs up to 2 mm long; rachis 0.5-0.6 mm wide, margins flattened, scabrellous, terminating in a spikelet; pedicels unequal, the longest up to 1 mm long, glabrous, spikelets in 4-series. Spikelets, 1.4-1.5 mm long, 1.1-1.2 mm wide, widely elliptic to slightly obovate, plane-convex, apex rounded to slightly acute, glabrous, pale green, slightly brown tinged; first glume wanting; second glume less than 1 mm shorter than the spikelet leaving the tip of the fertile floret exposed, smooth, glabrous, papery to membranous, 5-nerved, with a central vein and marginal lateral veins, these proximate, the outermost ones nearly incomplete; lower floret sterile; sterile lemma as long as the spikelet, flat, papery to membranous, smooth, glabrous, margins folded over the fertile floret, 3-5-veined, with a central vein and lateral veins proximate at the margins, the outermost sometimes incomplete; sterile palea wanting; fertile floret 1.4-1.5 mm long, 1.1-1.2 mm wide, slightly concave-convex, apex rounded, crustaceous, pale, smooth, longitudinally striate, with minute papillae (Fig. 2); lodicules ca. 0.3 mm long; stamens 3; anthers 0.8-0.9 mm long. Caryopsis not observed.

Taxonomy summary

Distribution, habitat and phenology. Known only from the type collection from Sonora. Found in tropical deciduous

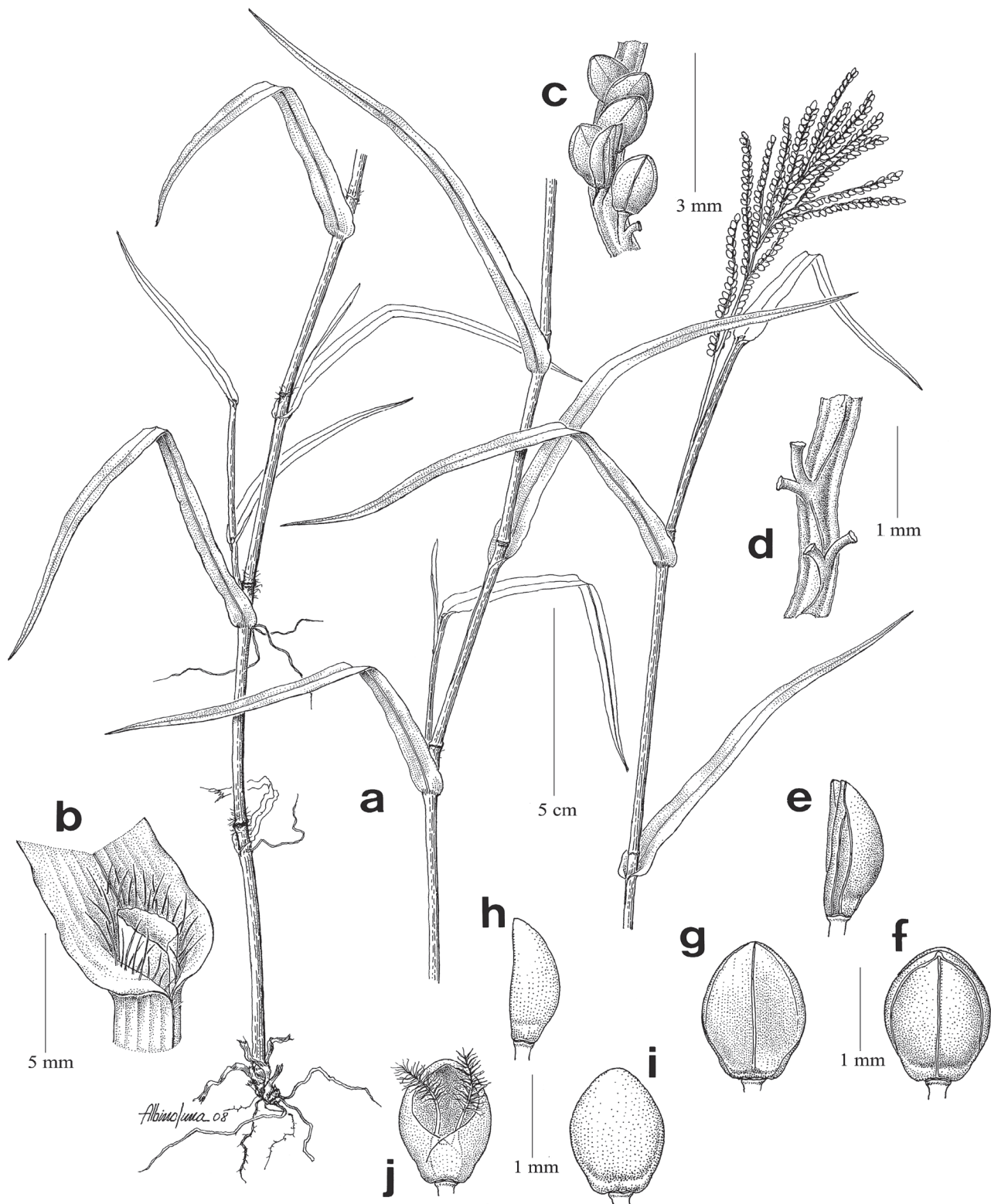


Figure 3. *Paspalum yecorae*. a, plant showing branching axis and rooting lower nodes; b, ligular area; c, pairs of spikelets; d, rachis; e, spikelet in lateral view; f, spikelet in dorsal view; g, spikelet in ventral view; h, fertile floret in lateral view; i, fertile lemma in dorsal view; j, fertile palea in ventral view. Illustration by Albino Luna.

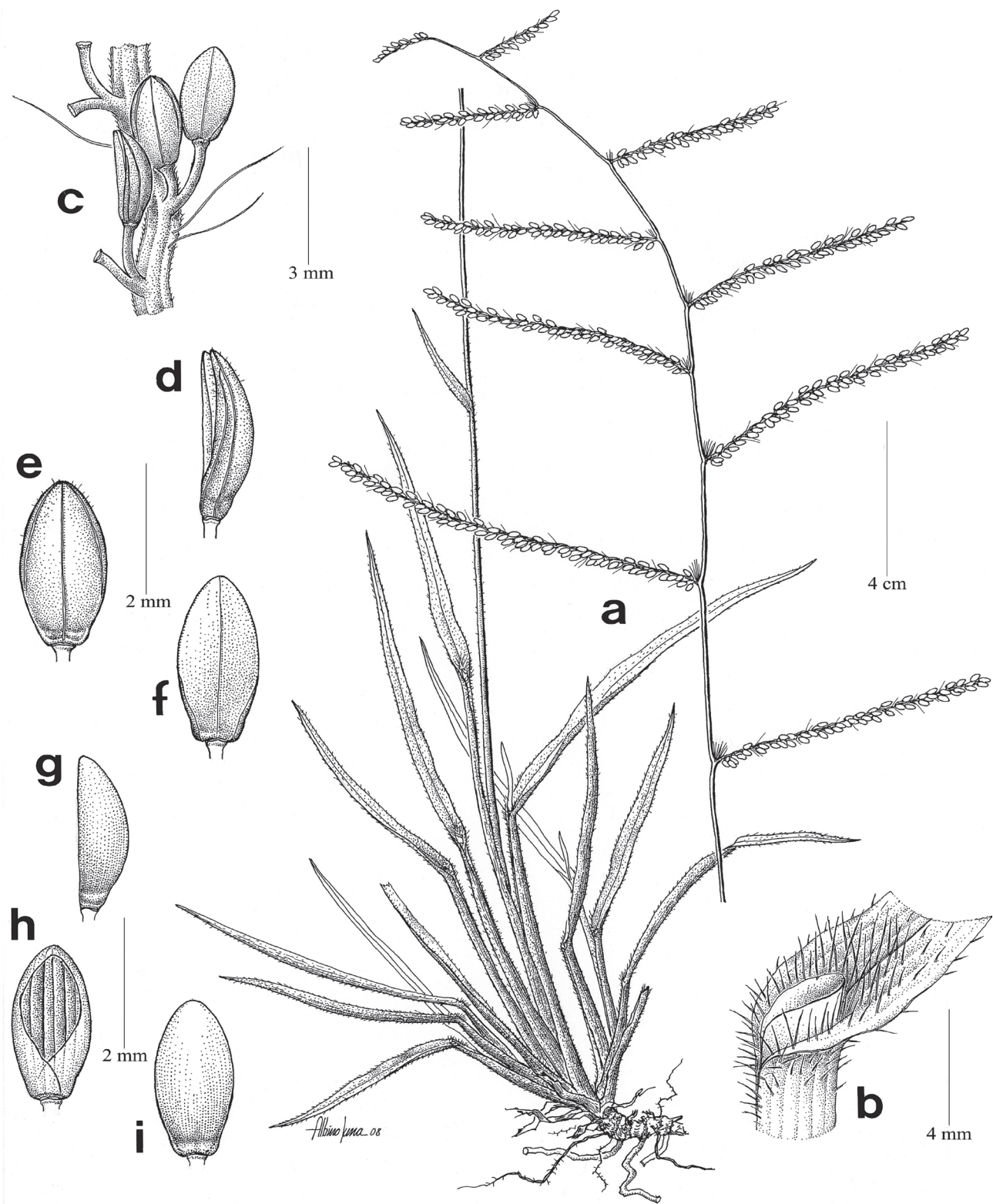


Figure 4. *Paspalum crinitum*. a, plant and inflorescence; b, ligular area; c, pair of spikelets and rachis; d, spikelet in lateral view; e, spikelet in dorsal view; f, spikelet in ventral view; g, fertile floret in lateral view; h, fertile palea showing anthers; i, fertile lemma. Illustration by Albino Luna.

Table 4. Morphological differences and shared characters between *P. yecorae*, *P. squamulatum* and *P. nesioties*

Character	<i>P. yecorae</i>	<i>P. squamulatum</i>	<i>P. nesioties</i>
Habit	ca. 80 cm decumbent	25-100 cm decumbent	25-120 cm erect
Branching	middle	below	middle
Rooting on lower nodes	yes	yes	no
Blades	9-20 cm	5-15	25-50 cm
Racemes	13	(2-) 3-13 (-15)	5-14
Rachis	0.5-0.6 mm wide	0.4-0.7 mm	ca. 0.8 mm
Spikelets	1.4-1.5 mm long 1.1-1.2 mm wide	1.7-2.1 mm long 1.2-1.5 mm wide	1.9-2 mm long ca. 1.5 mm wide
First glume	wanting	sometimes present	wanting
Second glume	scarcely 1 mm shorter than the fertile floret 5-veined papery to membranous	up to 2 mm shorter than the fertile floret 3-5 (-6)-veined very slightly coriaceous or firmer than membranous	scarcely covering the fertile floret 3-veined membranous
Sterile lemma	3-5-veined	3-veined	3-veined

forest and at elevations about 900 m. Flowering occurs in August.

Etymology. The specific epithet refers to the name of the locality where the species was collected.

Remarks

The publication of new taxa based on a single specimen may be questionable. However, the understanding and the constancy of the characters in the grasses in general including *Paspalum*, allow for the proposal of this new species.

Based on the grouping of the genus by Chase (1929) this new species belongs to group *Paniculata*, since the closest species are included in this group. The group, characterized by Chase (1929) included “tufted perennials with flat mostly pubescent blades, several to many slender racemes (or few in *P. squamulatum* E. Fourn.), and small hemispheric or broadly obovate turgid spikelets”. More recently, Zuloaga and Morrone (2005) redefined the group as “plants perennial, with culms many noded; blades flat and broad; inflorescence with many racemes; spikelets paired, small, obovate to elliptic, usually ferruginous; fertile floret pallid, shiny”. According to Chase (1929) there are 10 species in this group plus the new species described here (the South American species excluded).

Eight species have pubescent spikelets; and the remaining 3, *P. nesioties* Chase, *P. squamulatum*, and *P. yecorae*, have glabrous spikelets. The spikelets of *P. yecorae* look like a small version of *P. lentiginosum* J. Presl which has shortly papillose-pilose spikelets. It also differs from *P. nesioties* due to in the latter the plants are robust, the leaves and spikelets are much longer. There are other attributes (Table 4) that separate *P. nesioties* from the new species.

The other closest species with glabrous spikelets is *P. squamulatum*. Both species are similar but there are several characters that support the circumscription of the new species. The shorter spikelets (1.4-1.5 mm long), the first glume wanting, second glume and sterile lemma papery to membranous, second glume less than 1 mm shorter than the fertile floret, second glume 5-nerved, sterile lemma 3-5-nerved characterize *P. yecorae*. Whereas in *P. squamulatum* the spikelets are 1.7-2.1 mm long, the first glume is present in a few spikelets, the second glume and sterile lemma have a very slightly coriaceous texture and the nerves in the second glume are 3-5 and 3 in the sterile lemma.

The identity of *Paspalum crinitum*

Paspalum crinitum was classified within the *Livida* group by Chase (1929). The circumscription of the group was

and still remains very loose (“perennials with compressed culms; blades mostly flat; spikelets 2-3.1 mm long”) and even the same author mentioned that it was scarcely a natural group. The description of *P. crinitum* fits the definition of the group, but it could also be placed in other groups of the genus. In spite of the good original circumscription of the species, *P. crinitum* has been misidentified numerous times and often confused with other species, mostly with *P. arsenei* Chase or *P. tinctum* Chase. The morphology of the species is clearly different from the other species of the group. The pubescence of the sheaths, the very narrow rachis, and the length and width of the spikelets are the main characters which separate *P. crinitum* from the other species of the group. The illustration of the inflorescence and spikelets of the type in Chase (1929) fit very well the description of the species; however, the illustration is incomplete. The other existing illustration of the species (Beetle et al. 1999), does not agree with the description or with some of the cited specimens. Figure 4 shows an illustration made from an isotype deposited at MEXU.

The following key of the *Livida* group includes the original species studied by Chase (1929), excluding *P. mutabile* Chase which probably represents other species.

Paspalum crinitum Chase, Contr. U.S. Natl. Herb. 17: 237. 1913. TYPE: MEXICO: San Luis Potosi: Hacienda de Angostura, C.G. Pringle 3755 (holotype: US-824361!;

isotypes: AC, ARIZ!, B, ENCB!, GOET, MA!, MEXU!, MO-5114653, MO-2977056, MSC, MU-93549!, NY-00414135!, NY-00414137!, S, TAES!, P, W!) Figure 4.

Plants perennial, 40-80 cm tall, caespitose, short rhizomatous, with a knotty base, roots thick; internodes glabrous; nodes glabrous. Sheaths longer than the internodes, overlapping, densely to sparsely papillose-hirsute from the base to apex, keeled above; ligule 0.7-2 mm long, membranous, glabrous; collar papillose-hirsute, the hairs as in the sheaths; blades 6-11 (-15) cm long, the longest leaf-blades usually present in mature culms, reduced in the inflorescence internode, 2.5-4 mm wide, linear-lanceolate, papillose-hirsute on both surfaces, throat with long hairs, glaucous, more or less rigid, margins with long papillose hairs, base attenuate, apex acuminate-acute. Inflorescence 10-22 cm long, terminal; peduncle excluded, glabrous; axis glabrous; racemes 4-11, 1.5-11 cm long, decreasing in length from the base to apex, alternate, straight to slightly curved, the basal ones sometimes rebranched with short racemes, divergent, pulvini long-pilose; rachis 0.4-0.6 mm wide, flattened, glabrous, margins scabrous, generally with sparse long hairs, ending into a spikelet, spikelets loose due to long pedicels; pedicels 1-2 mm long, glabrous, curved. Spikelets 2.4-2.9 mm long, 1.2-1.4 mm wide, up to 0.7 mm thick, narrowly elliptic, sometimes slightly obovate, paired, sometimes the primary reduced, plane-convex, not plump, apex rounded to slightly acute,

Key for Chase’s (1929) *Livida* group.

- 1. Second glume and sterile lemma 3-veined.
 - 2. Sheaths densely to scarcely papillose-hirsute; rachis 0.4-0.5 mm wide; spikelets narrowly elliptic to slightly obovate, 1.2-1.4 mm wide, apex rounded to slightly acute; pedicels 1-2 mm long *P. crinitum*
 - 2. Sheaths glabrous; rachis 1.5-2 mm wide; spikelets obovate to elliptic-obovate, 1.3-1.8 mm wide, apex acute or apiculate; pedicels up to 1.5 mm long (but in *P. tinctum* spikelets 2.8-3 mm long and more than 1.4 mm wide).
 - 3. Spikelets 2-2.5 mm long, 1.3-1.5 mm wide, apiculate; second glume glabrous or sometimes with few sparse hairs on the margins at the apex; sterile lemma glabrous *P. denticulatum*
 - 3. Spikelets 2.8-3 mm long, more than 1.5 mm wide, acute; second glume softly pubescent to rarely glabrous; sterile lemma glabrous to sparsely softly pubescent *P. tinctum*
- 1. Second glume and sterile lemma 3-5-veined.
 - 4. Spikelets elliptic, apiculate, 1.3-11.5 mm wide *P. hartwegianum*
 - 4. Spikelets obovate to elliptic-obovate, apex acute to rounded, more than 1.5 mm wide.
 - 5. Spikelets plump or turgid, usually more than 1 mm thick; fertile floret pale. *P. pubiflorum*
 - 5. Spikelets plane-convex not plump or turgid, less than 1 mm thick; fertile floret olivaceous *P. arsenei*

greenish, sometimes purple tinged; first glume wanting; second glume as long as the spikelet, sometimes slightly exceeding the fertile floret, 3-nerved, glabrous between the nerves, sparsely minutely pilose on the margins and lateral veins; sterile lemma glabrous, 3-veined, margins covered by the second glume; fertile floret 2.3-2.7 mm long, 1.3-1.4 mm wide, narrowly elliptic, finely longitudinally papillose, the papillae simple (Figure 3), glabrous, pallid; anthers 1.8-1.9 mm long. Caryopsis not observed.

Taxonomy summary

Distribution, habitat and phenology. *Paspalum crinitum* is a rare species that has not been collected extensively. The species was described from specimens of the states of Coahuila, Jalisco, Puebla and San Luis Potosi (Chase, 1929). Specimens from all the states except Jalisco and Puebla were verified. The webpage GBIF (Global Biodiversity Information Facility) has records of the species from Coahuila, Durango, Guanajuato, Jalisco,

Mexico, Michoacan, Nuevo Leon, Puebla, San Luis Potosi, Veracruz and Zacatecas. Dávila et al. (2004, 2006) cited the same states as GBIF except for Veracruz and Zacatecas. Some cited specimens from IEB and ENCB herbaria, were misidentifications or were not located. Herrera and Peterson (pers. comm.) in a manuscript of the Grasses of Zacatecas cited the specimens deposited in ENCB, which were non existent. If the identity of the specimens from GBIF is accepted, the distribution range of the species would seem geographically connected; however, as it was mentioned beforehand, some specimens were in fact misidentified. *Habitat.* Moist or flooded ground and alkaline meadows and at elevations from 990 to 1900 m. Flowering occurs from May to October.

Specimens examined. MEXICO. **Coahuila:** 3 mi N of Parras de la Fuente, *F. W. Gould 11551* (ENCB, US); along a stream below Chorros Hwy 57, 25 km S of Saltillo at the Rancho Recreación El Chorro, *S. L. Hatch et al., 4591* (ENCB); At Chojo [Chorro] Grande, 27 mi SE of Saltillo, *E. Palmer 338* (US, cited in Chase, 1929). **Guanajuato:** 8 km E de Yuriria, sobre la carretera a Salvatierra, *J. Rzedowski 40309* (IEB, MEXU); 17 km S de Dolores

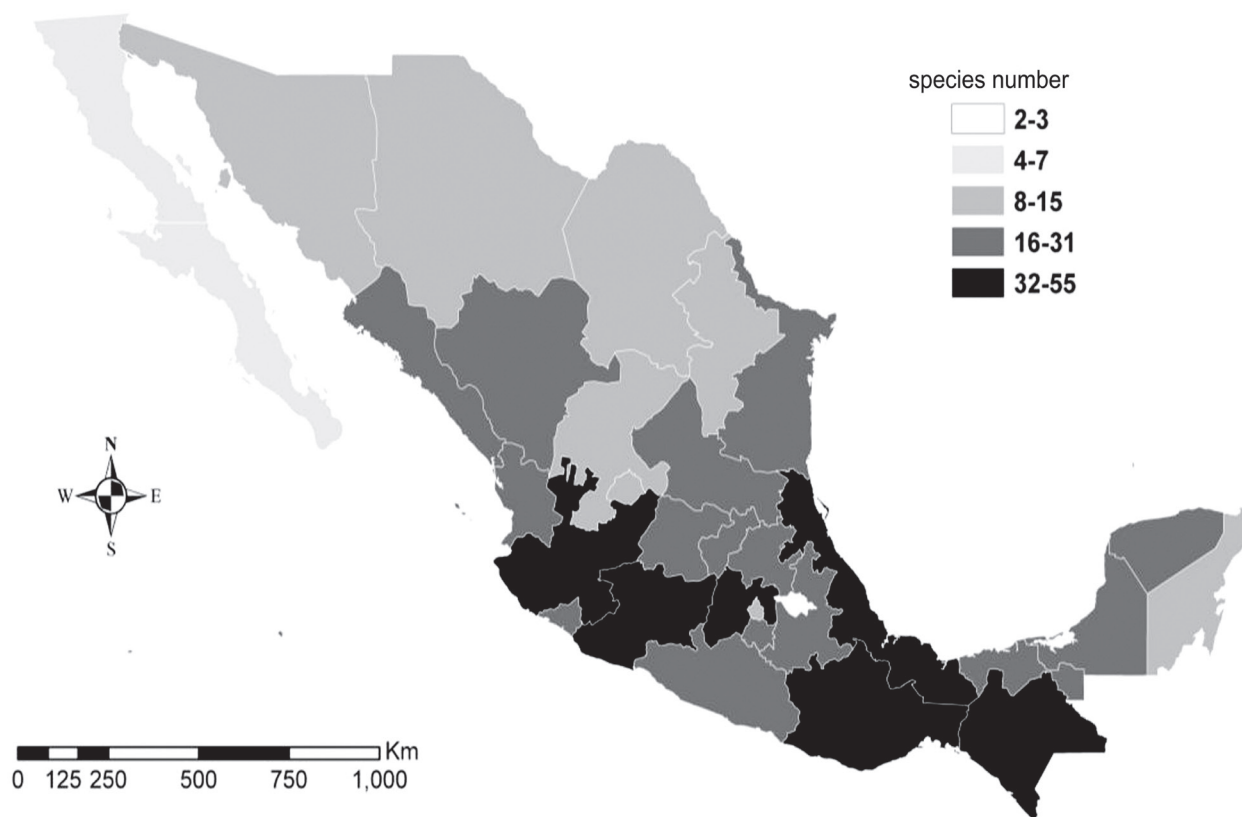


Figure 5. Distribution of *Paspalum* species. The states with major diversity filled with black (32 to 55 species) grading to white (2 to 3 species) to the states with the poorest diversity. The number of species only represents species level, excluding varieties.

Hidalgo, sobre la carretera a San Miguel de Allende, *J. Rzedowski 41078* (IEB, MEXU). **Jalisco** Orozco, *A. S. Hitchcock 7382* (MICH, US, cited by Chase, 1929 and McVaugh, 1983). **Puebla**: vicinity of Puebla, *B. Aibet s.n.*, in 1911 (US, cited Chase, 1929); Rancho Posadas, *Arsène 1604* (cited by Chase, 1929), *2284* (MO, US, cited by Chase, 1929); without locality, *Nicolas s.n.* in 1900 (cited by Chase in Hitchcock, 1913). **San Luis Potosí**: San Bartolo, cerca de La Laguneta, Mpio. Río Verde, *J. Rzedowski 5817* (ENCB); ± 3 km al NNE de la Media

Luna, cerca de Río Verde, *F. Takaki s.n.* (ENCB); Media Luna ± 12 km al SW de Río Verde, *F. Takaki s.n.* (ENCB).

Discussion

The genus *Paspalum* is widely distributed in Mexico and is present in all states, although there are some states that are more diverse than others. Table 2 shows the states

Table 5. Adaptation of the classification of *Paspalum* from Chase (1929), Denham (2005) and Zuloaga and Morrone (2005) to include the Mexican species. Subgenera are boldface. Groups in the subgenus *Paspalum* are numbered 1-22. Number of species for Mexico in parentheses

Subgenus	Group	Species
<i>Anachyris</i> (1)		<i>P. malacophyllum</i>
<i>Ceresia</i> (6)		<i>P. cymbiforme</i> , <i>heterotrichon</i> , <i>humboldtianum</i> , <i>P. pectinatum</i> , <i>P. stellatum</i> , <i>P. trachycholeon</i>
<i>Harpostachys</i> (12)		<i>P. adoperiens</i> , <i>P. botterii</i> , <i>P. campylostachyum</i> , <i>P. chiapense</i> , <i>P. decumbens</i> , <i>P. foliiforme</i> , <i>P. hintonii</i> , <i>P. monostachyum</i> , <i>P. nutans</i> , <i>P. pilosum</i> , <i>P. unispicatum</i> , <i>P. variabile</i>
<i>Paspalum</i> (70)	1. Caespitosa (4)	<i>P. blodgettii</i> , <i>P. caespitosum</i> , <i>P. ligulare</i> (?), <i>P. mayanum</i>
	2. Conjutata (1)	<i>P. conjugatum</i>
	3. Corcovadensia (6)	<i>P. affine</i> , <i>P. corcovadense</i> , <i>P. costaricense</i> , <i>P. jaliscanum</i> , <i>P. tenellum</i> <i>P. virletii</i>
	4. Crassa (1)	<i>P. tumidum</i>
	5. Dilatata (2)	<i>P. dilatatum</i> , <i>P. urvillei</i>
	6. Dissecta (3)	<i>P. acuminatum</i> , <i>P. longicuspe</i> , <i>P. repens</i>
	7. Disticha (3)	<i>P. distichum</i> , <i>P. paucispicatum</i> , <i>P. vaginatum</i>
	8. Eriantha (1)	<i>P. erianthum</i>
	9. Fasciculata (1)	<i>P. fasciculatum</i>
	10. Fimbriata (1)	<i>P. fimbriatum</i>
	11. Laevia (1)	<i>P. erectum</i>

Table 5. Continues

Subgenus	Group	Species
	12. Livida (7)	<i>P. alcalinum</i> , <i>P. arsenei</i> , <i>P. crinitum</i> , <i>P. denticulatum</i> , <i>P. hartwegianum</i> , <i>P. pubiflorum</i> , <i>P. tinctum</i>
	13. Notata (5)	<i>P. lineare</i> , <i>P. notatum</i> , <i>P. minus</i> , <i>P. serpentinum</i> , <i>P. toluense</i>
	14. Orbiculata (1)	<i>P. orbiculatum</i>
	15. Paniculata (5)	<i>P. lentiginosum</i> , <i>P. paniculatum</i> , <i>P. sparsum</i> , <i>P. squamulatum</i> , <i>P. yecorae</i>
	16. Parviflora (4)	<i>P. clavuliferum</i> , <i>P. guayanerum</i> , <i>P. microstachyum</i> , <i>P. multicaule</i>
	17. Plicatula (7)	<i>P. centrale</i> , <i>P. convexum</i> , <i>P. leptachne</i> , <i>P. melanospermum</i> , <i>P. plicatulum</i> , <i>P. scrobiculatum</i> , <i>P. wrightii</i>
	18. Pulchella (1)	<i>P. pulchellum</i>
	19. Quadrifaria (4)	<i>P. coryphaeum</i> , <i>P. intermedium</i> , <i>P. longum</i> , <i>P. plenum</i>
	20. Racemosa (3)	<i>P. candidum</i> , <i>P. prostratum</i> , <i>P. pygmaeum</i>
	21. Setacea (1)	<i>P. setacea</i> var. <i>ciliatifolium</i> , <i>P. setacea</i> var. <i>psammophyllum</i> , <i>P. setaceum</i> var. <i>setaceum</i> , <i>P. setaceum</i> var. <i>stramineum</i>
	22. Virgata (7)	<i>P. acutum</i> , <i>P. conspersum</i> , <i>P. luxurians</i> , <i>P. millegrana</i> , <i>P. nelsonii</i> , <i>P. turriiforme</i> , <i>P. virgatum</i>

with the number of species (no infraspecific levels included here) in Mexico and the number of species shared between regions such as the United States of America, Central America, South America, and the Caribbean. The third and fourth columns represent endemic and geographically restricted species for each state or region. Figure 5 shows the distribution map of the diversity of *Paspalum* in Mexico. The genus *Paspalum* is most diverse in the states of Chiapas (55 species), Veracruz (50 species), Jalisco (43 species), Oaxaca (42 species), Mexico and Michoacan (34 species each) (Table 2). The states with the lowest diversity are Coahuila (9 species), Baja California and Chihuahua (8 species each), and Tlaxcala (3 species). Of the total number of species, 16 (about 18 %) occur only in Mexico and 5 are restricted to the type locality. However, the species richness per state does not necessarily imply a high number of endemic species. The state with the highest number of Mexican endemic species is Jalisco (8), but none of them are exclusive to the state as they are also shared with other states. Chiapas holds the highest diversity of *Paspalum* species, but only has 3 endemic species. Of the states with the highest number of species of *Paspalum*, only Jalisco, Oaxaca, Mexico, and Michoacan have been reported as the states with the highest number of endemic species in the Poaceae family (Dávila et al., 2004), but not necessarily in that order.

Comparing the high diversity of *Paspalum* in Mexico

with the southern and northern regions, it is clear that Mexico holds a higher number of species. Mexico with 88 species is richer than Central America (from Belize and Guatemala to Panama) and North America with 74 and 43 species respectively. Mexico and Central America share about 65 species, whereas 31 to 32 are shared with North America. Adding all the species from North America to Central America, there is a total of 104 which represents nearly a third of the genus diversity. Combining the infrageneric classifications by Chase (1929), Zuloaga and Morrone (2005), and Denham (2005), a preliminary classification of the 88 species of *Paspalum* for Mexico (Table 5), is presented. The 4 subgenera are represented in Mexico with at least 1 species, with 1 for *Anachyris*, 6 for *Ceresia*, 12 for *Harpostachys*, and 69 for *Paspalum*. From the current 40 recognized groups in *Paspalum*, there are 22 groups represented in Mexico which are as follows *Caespitosa* (4), *Conjugata* (1), *Corcovadensia* (6), *Crassa* (1), *Dilatata* (2), *Dissecta* (3), *Disticha* (3), *Eriantha* (1), *Fasciculata* (1), *Fimbriata* (1), *Laevia* (1), *Livida* (7), *Notata* (5), *Orbiculata* (1), *Paniculata* (5), *Parviflora* (4), *Plicatula* (7), *Pulchella* (1), *Quadrifaria* (4), *Racemosa* (3), *Setacea* (1), and *Virgata* (7), with the number of species between parentheses. After placing the species in the corresponding group, it was noticed that some groups may not be as natural as suggested by Chase (1929) and F. Zuloaga (pers. comm.). However, the monophyletic nature

of the groups will be addressed as phylogenetic studies are carried out using the groups as starting hypotheses.

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