

A new species of *Schizachyrium* (Poaceae-Andropogoneae) from Brazil

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A new Brazilian species, *Schizachyrium hatschbachii* Peichoto, is described and illustrated. It is restricted to southern Brazil, where it grows in grasslands. Diagnostic characters, description, detailed illustration and taxonomic comments are given. Its relationships with *S. gracilipes* and *S. microstachyum* ssp. *elongatum* are discussed. © 2006 The Linnean Society of London, *Botanical Journal of the Linnean Society*, 2006, 150, 495–501.

ADDITIONAL KEYWORDS: grasses – *Schizachyrium hatschbachii* – South America – systematics – taxonomy.

INTRODUCTION

Schizachyrium Nees is a genus of the tribe Andropogoneae Dumort., distributed in tropical and subtropical regions of America and Africa with approximately 50–60 species in the world (Clayton & Renvoize, 1986; Nicora & Rúgolo de Agrasar, 1987). *Schizachyrium* is represented in America by 30 species, 14 of which are cited for South America and 11 for Brazil (Renvoize, 1988; Zanin, 2001; Zuloaga *et al.*, 2003).

In this paper *Schizachyrium hatschbachii* Peichoto, a new species to science, is described and illustrated. It is close to *S. gracilipes* (Hack.) A. Camus and *S. microstachyum* ssp. *elongatum* (Hack.) Roseng., B.R. Arrill. & Izag.

MATERIAL AND METHODS

This study is based on the analysis of material in several American and European herbaria: BAA, C, CTES, K, MBM, MO, P and W (Holmgren, Holmgren & Barnett, 1990). Micromorphological features of the spikelet were observed by scanning electron microscopy. The spikelets were coated with gold palladium alloy and photographed using a scanning electronic microscope JEOL 5800 LV. Several diagnostic morphological characters of type material were photographed using an Olympus D-580 digital

camera. The observations were carried out on the following samples:

Schizachyrium gracilipes. PARAGUAY. Santa Bárbara, near Villa Rica, dans les prairies marecagenses, *Balansa* 278 (isotype G). BRAZIL. Parana: Ponta Grossa, 28.i.1946, Swallen 8298 (MO). 30.i.1946, Swallen 8362 (MO).

Schizachyrium hatschbachii. BRAZIL. Parana: Mun. Rio Branco do Sul, Curiola, 12.iii.1967, Hatschbach 16140 (holotype MBM). Ponta Grossa, 28.i.1946, Swallen 8337 (MO). Minas Gera. Mun. Ituiutaba, 1.ii.1947, Macedo 873 (MO). São Paulo: Mun. de Porto Ferreira, from Porto Ferreira, along the road to São Carlos, 23.iii.1965, Sendulsky 160 (MO).

Schizachyrium microstachyum ssp. *elongatum*: BRAZIL. Rio de Janeiro: Glaziou 2739 (syntype P). Minas Gerais: Serra do Cabral, c. 2 km west of Cantón, 8.iii.1970, Irwin *et al.* 27272 (MO).

DESCRIPTION OF THE NEW SPECIES

SCHIZACHYRIUM HATSCHBACHII PEICHOTO, **SP. NOV.**
(FIGS 1, 4–6, 9)

Type: BRAZIL. Parana: Mun. Rio Branco do Sul, Curiola, 12.iii.1967, Hatschbach 16140 (Holotype: MBM!; isotypes: C!, K!)

Diagnosis: *Schizachyrium hatschbachii* Peichoto, **sp. nov.** a *S. gracilipede* habitu robustiore, arista lon-

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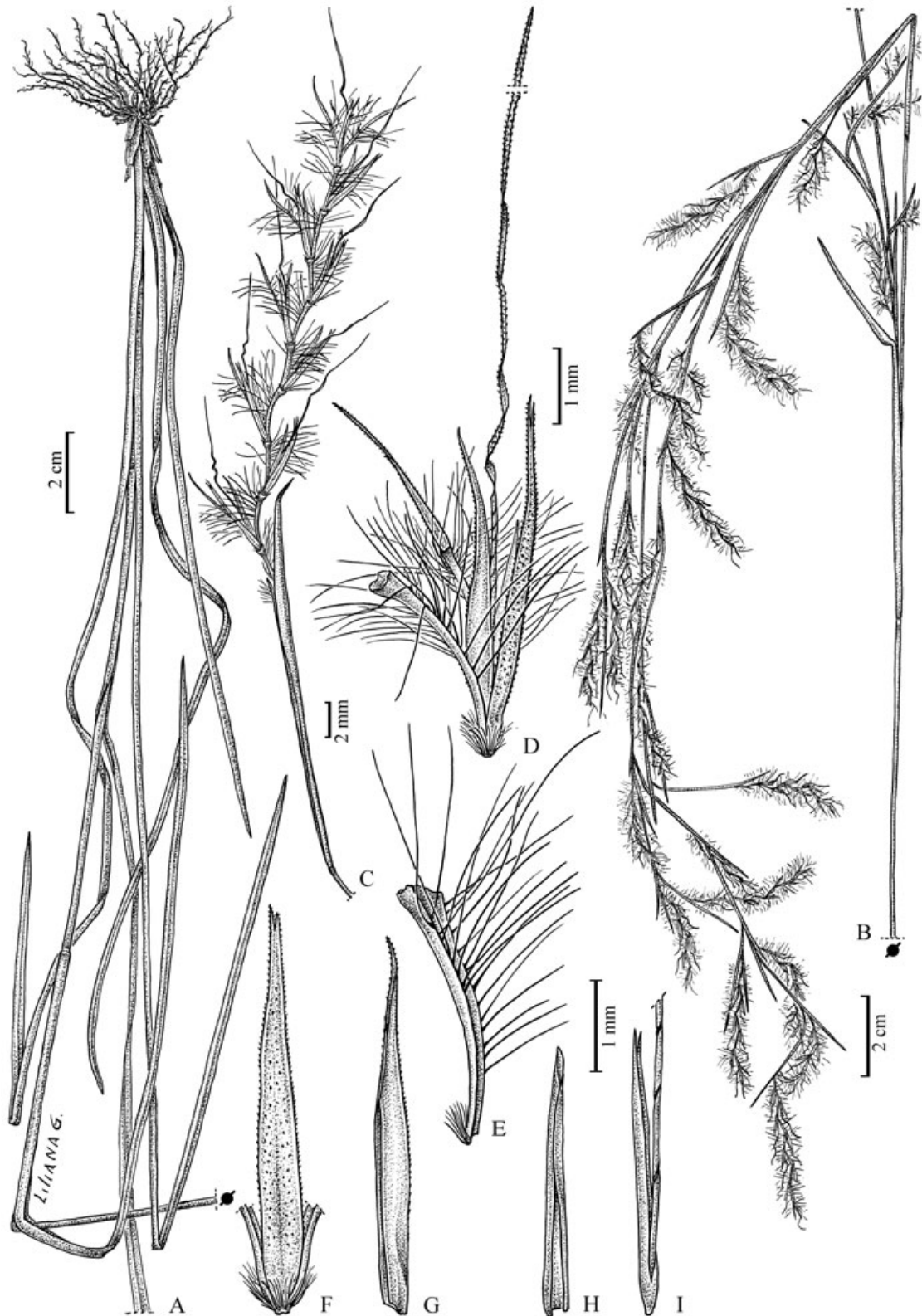
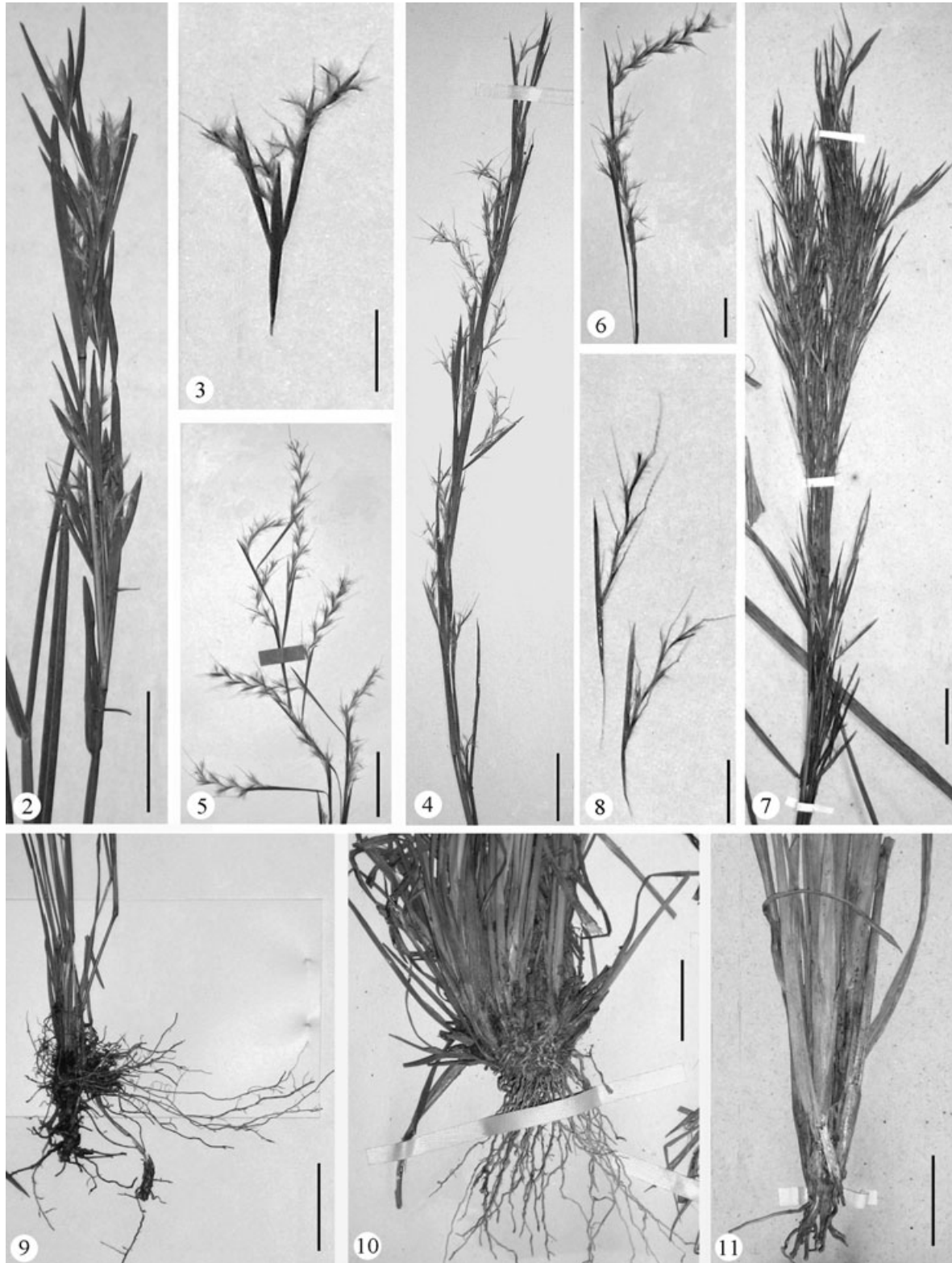


Figure 1. *Schizachyrium hatschbachii*. A, flowering culm, basal portion. B, flowering culm, apical portion. C, spiciform raceme. D, pair of spikelet and rachis internode. E, rachis internode. F, lower glume, dorsal view. G, upper glume, lateral view. H, sterile lemma, ventral view. I, fertile lemma, lateral view (the awn has been sectioned).



Figures 2–11. Digital photographs showing morphological differences. Figs 2, 3, 9. *S. gracilipes* (Balansa 278). Figs 4–6, 10. *S. hatschbachii* (Hatschbach 16140). Figs 7, 8, 11: *S. microstachyum* ssp. *elongatum* (Glaziou 2739). Figs 2, 4, 7: Compound inflorescence. Scale bar = 2 cm. Figs 3, 5–6, 8. Detailed view of the racemes. Scale bar = 1 cm. Figs 9–11: Basal portion of the plant. Scale bar = 2 cm.

giore (8–12 nec 6–8 mm) atque spatheolo longiore (25–40 nec 20 mm), callo piloso (nec glabro neque pilosusculo), spiculo sessili gluma inferiore apice acuminato-bimucronato (nec subacuto neque bifido), spiculo pedicellato sterili (nec fecundo) recedit; praeterea locos humidiores praefert.

Description: Perennial, caespitose, solid culms 100–150 cm long, 2–4.5 mm wide, glabrous, erect, branched at the upper nodes. Leaves cauline and basal, sheaths glabrous, keeled, shorter than the internodes (2/3 length of internodes); ligule membranous, 2 mm long; blades 30–150 (–170) × 2–4 mm, flat or conduplicate, apex acute or acuminate. Inflorescence an elongate, compound panicle of spatheate racemes. Spatheole 25–40 mm long, subconvolute; racemes 30–35 (–40) mm long of 8–11 pairs of spikelets, most parts exerted; peduncle 5–10 mm long. Rachis internodes 3–3.5 mm long, broad at the apex and narrowed at the base, coriaceous, scabrous, sparsely ciliate in both margins or one margin sparsely ciliate and the other short-haired. Callus short, pilose, stiff, hairs 0.7 mm long. Sessile spikelet: lower glume 4.5–5 × 0.5 mm, papiraceous, acuminate bimucronate apex, flat or slightly concave on the back, scabrous, with two submarginal nerves. Upper glume laterally compressed, slightly shorter than the lower one, keeled. Sterile lemma, membranous 3.2–3.5 mm long, hyaline; fertile lemma 3 mm long, hyaline, unnerved, awned from between two lobes 2.5 mm long, the awn 8–10 (–12) mm long, lower segment 4–4.5 mm long, twisted, reddish, the major part covered by the glumes, upper segment 4–5.5 mm long, scabrous. Palea lacking. Stamens 3, two 0.6 mm long and one 1–1.2 mm long, lodicules 0.5 mm long, plumose stigma 0.8 mm long. Caryopsis 2.5 mm long. Pedicellate spikelet: vestigial, neuter, pedicel 2.5 mm long, lower glume 2–3 mm long, aristate-mucronate apex, the awn 1.5–3 mm long.

Etymology: dedicated to Dr Gert Hatschbach, Director of the Herbarium, Botanical Museum of Curitiba, Parana, Brazil (MBM).

Distribution, habitat and ecology: restricted to southern Brazil, recorded for the states of Parana, São Paulo, Santa Catarina, Rio Grande do Sul, Minas Gerais and Rio de Janeiro. It lives in open 'campos', in prairies, it is very common in natural frequently dry grasslands in Parana State; also found in open rocky fields, < 2100 m a.s.l.

Specimens examined: BRAZIL. *Sellow s/n* (K). Catalogus Geographicus Plantarum, *s/f*, *Burchell 8735* (K). Minas Gerais: Barbacena, Serra Mantiqueira, 28.ii–3.iii.1925, *Chase 8673* (MO); São Julião, 10.iii.1891,

Glaziou 18653 (C, K, P, W); Mun. Ituiutaba, 1.ii.1947, *Macedo 873* (MO). Parana: 8 km north-east of the Parana-Santa Catarina border at the Rio Negro, 9.iii.1976, *Davidse et al. 11036* (K, MO); *Davidse et al. 11005* (K, MO); 13 km north-east of Atuba (just outside f. Curitiba) along Highway 116, 9.iii.1976, *Davidse et al. 10976* (K, MO); 17 km north of Castro, along Highway PR-11, iii.1976, *Davidse et al. 11389* (K, MO); Araucaria-Parana, 16.ii.1968, *Dombrowski 2922* (K, MBM); Curitiba, Capão da Imbuia, 13.ii.1975, *Dombrowski 5833* (K, MBM); 20.ii.1975, *Dombrowski 5904* (K, MBM); 13.iii.1975, *Dombrowski 5983* (C, MBM); Curitiba, Manantiais da Serra-Piraquara, 1.iii.1977, *Dombrowski 7128* (K, MBM); Curitiba, campos do Capão da Imbuia-Curitiba-PR, ii.1965, *Dombrowski & Saito 1207* (K, MBM); iii.1965, *Dombrowski & Saito 1348* (K, MBM); Curitiba, 14.i.1912, *Dusén 13806* (BM, SI); 21.i.1904, *Dusén 3024* (W); Curitiba, 26.i.1972, *Imaguire 2735* (K); 18.i.1973, *Imaguire 3151* (K); Desvio Ribas, 10.ii.1952, *Araujo 144* (BAA); *Araujo 151* (BAA); Estrada do Xisto km 2-Curitiba-Lapa, 17.ii.1967, *Dombrowski 2493* (K, MBM); Guarapuava, 20/23.iii.1946, *Swallen 8865* (MO); 20/23.iii.1946, *Swallen 8864* (MO); Manantiais da Serra-Piraquara-PR, 7.ii.1968, *Dombrowski 2863* (K, MBM); Mun. de Palmas a Iaciçaba, 10.iii.1953, *Araujo 188* (BAA); Palmeira, correjo de Anta, 2.ii.1975, *Pedersen 10934* (C, CTES); Pinhães, 12.ii.1914, *Dusén 14514* (MO); Ponta Grossa, 28.i.1946, *Swallen 8337* (MO). Rio de Janeiro: Macieiras, Serra de Itatiaia, 18.i.1925, *Chase 8334* (MO); Itatiaia, 6.iv.1871, *Glaziou 5435* (C, K, P, W); Itatiaia, Planalto, iii.1937, *Brade 15626* (MO). Rio Grande do Sul: São Francisco da Paula, 30.i.1965, *Clayton 4483* (K); Mun. Rio Pardo, potrero da Inferno, ii.1910, *Jürgens G 378* (W). São Paulo: Capital, Brooklyn paulista, 21.iii.1949, *Hoehne SPF 12465* (K); Campos do Jordão, Serra Mantiqueira, 20/22.iv.1925, *Chase 9923* (MO); Estrada de Cachueira. Bei S. Anna, 1908, *Urban s.n.* (W); Prov. St. Pauli, 1869, *Burchell 4460* (BR, K); Estrada da Cachueira bei S. Anna unweit S. Paulo in Brasilien auf roter alluvialer Erde, 10.ii.1908, *Barbosa et al. 723* (C, K, MO, SI, W). Santa Catarina: 5 km north of Lajes along Highway BR-116, 10.iii.1976, *Davidse et al. 11111* (K, MO); No campo de Capivane azima da Serra Geral, iii.1891, *Ule 1972* (P).

DISCUSSION

Numerous herbarium specimens mentioned here as *Schizachyrium hatschbachii*, were previously identified as *S. gracilipes*. Both species present similar shape of the inflorescences (Figs 2–6) but they differ for the characters of the spatheole and the spikelets. *Schizachyrium gracilipes* is a graceful plant (Fig. 9), and *S. hatschbachii* is a robust plant (Fig. 10)

that resembles *S. microstachyum* ssp. *elongatum* (Fig. 11).

In *S. gracilipes* the spatheole is generally smaller than 20 mm long (Figs 2, 3), the apex of the lower glume (sessile spikelet) is subacute or bifid, the awn is generally 6–8 mm long., shorter than in *S. hatschbachii*. The callus is glabrous or pilosiusculus (Fig. 12) and the apex of the pedicellate spikelet is acute or acuminate (Fig. 18). Both entities have a similar distribution in Brazil (in the same states), but *S. gracilipes* lives in temporary wetlands, while *S. hatschbachii* lives in open, mostly dry grasslands (see Table 1).

The general aspect of the new species, being a robust herb, is reminiscent of *Schizachyrium microstachyum* ssp. *elongatum*. Rosengurtt *et al.* (1968) recognize two subspecies: ssp. *microstachyum* and ssp. *elongatum* which has a longer inflorescence, a wider spatheole and a shorter peduncle that remains within the spatheole at maturity (Figs 7, 8). The type specimen of this entity, stored at Paris, differs from *S. hatschbachii* in the peduncle's length, the number of internodes of the spiciform raceme (Fig. 8) and the

relative size of rachis internodes/sessile spikelet and lower glume/upper glume of the sessile spikelet (Fig. 17). *Schizachyrium microstachyum* ssp. *elongatum* has a wider distribution in Brazil, almost reaching Amazonas state.

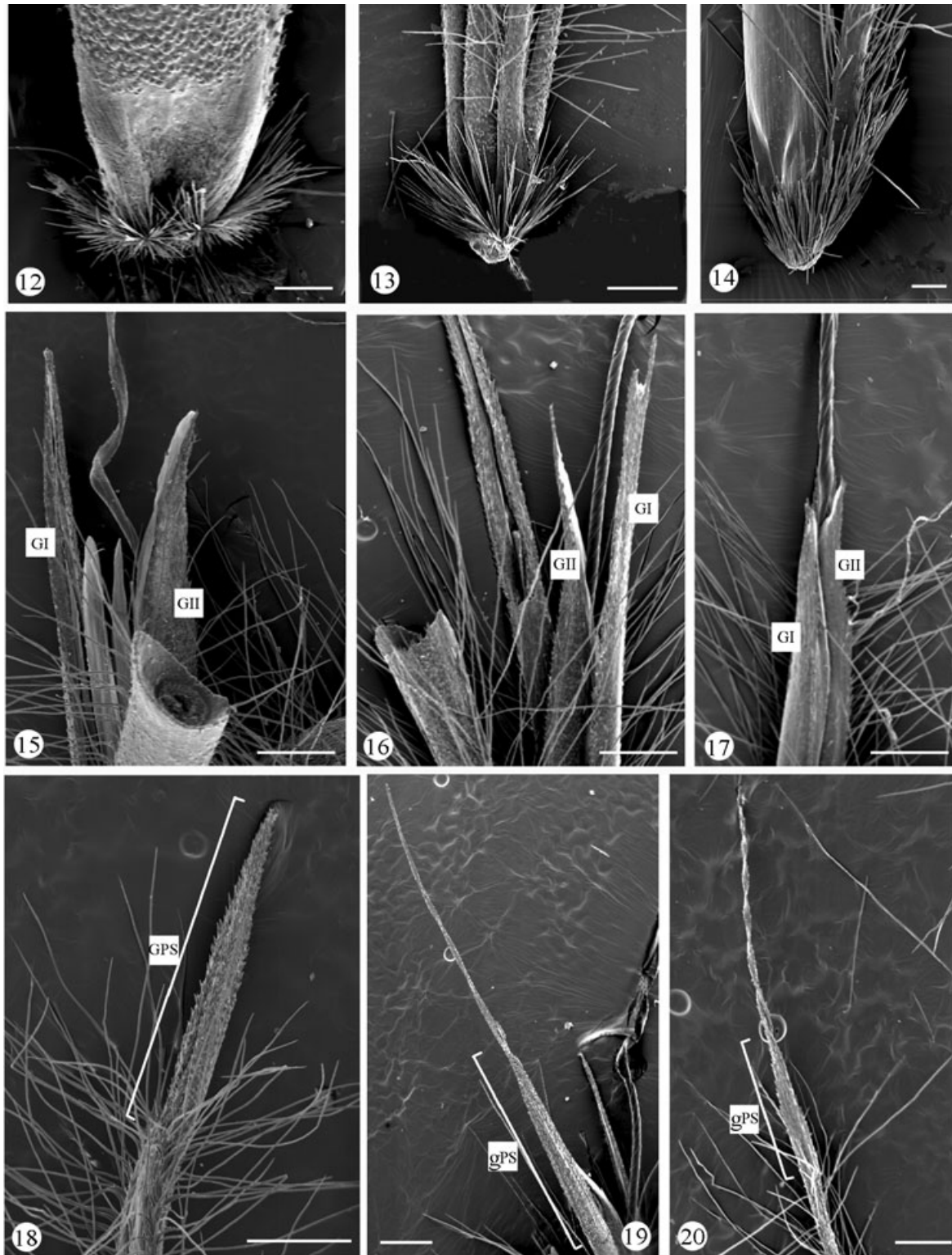
Some morphological characters and habitat showing similarities and differences among the three entities considered are displayed in Table 1.

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Table 1. Comparison of the diagnostic characters of *Schizachyrium hatschbachii*, *S. gracilipes* and *S. microstachyum* ssp. *elongatum*

Characters	<i>S. gracilipes</i>	<i>S. hatschbachii</i>	<i>S. microstachyum</i> ssp. <i>elongatum</i>
Plant: base	Slender	Robust	Robust
Spatheole:			
Width	Wide, open	Narrower, subconvolute	Narrower, subconvolute
Length	< 20 mm	> 25 mm	< 25 mm
Peduncle: length	< 5 mm	5–10 mm	generally < 5 mm
Spiciform raceme:			
number of internodes	4–6	8–11	3–7
Rachis internodes:			
Length	3 mm	3 mm	3.5–4 mm
Apex width	> 0.5 mm	> 0.5 mm	< 0.5 mm
Callus: pilosity (Figs 12–14)	Glabrous or pilosiusculus	With hairs 0.7 mm long	With hairs 0.8 mm long
Sessile spikelet:			
Lower glume length	4.5–5 mm	(4–) 4.5–5 mm	3.5–4.5 mm
Lower glume apex shape	Subacute or bifid	Bimucronate	Acute or hyaline fissile medial part
Upper glume (Figs 15–17)	< Lower glume	= Lower glume	Slightly > lower glume
Awn length	6–8 mm	8–10 (–12) mm	10–11 mm
Pedicellate spikelet:			
Lower glume apex (Figs 18–20)	Acute or acuminate	Aristate–mucronate	Aristate
Lower glume length	2 mm	2–3 mm	1–1.5 mm de long.
Awn length	–	1.5–3 mm long.	1.5–2 mm long.
Habitat	Temporary wetlands	Open, mostly dry grasslands	'campo cerrado', frequently dry grasslands



Figures 12–20. Micromorphological features of the spikelets, SEM photographs. Figs 12, 15, 18. *S. gracilipes*. Figs 13, 16, 19. *S. hatschbachii*. Figs 14, 17, 20. *S. microstachyum* ssp. *elongatum*. Figs 12–14. Detail of the callus. Figs 15–17. Proportion of the lower and upper glumes. Figs 18–20. Pedicellate spikelet, detail of the apex. Scale bar = 100 μ m (Figs 12, 14), 500 μ m (Figs 13, 15–20). GI, lower glume (sessile spikelet); GII, upper glume (sessile spikelet); gPS, glume of pedicellate spikelet.

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