



Taxonomic notes on *Lyroglossa* and *Pteroglossa* (Orchidaceae: Spiranthinae): two new generic records for the flora of Rio Grande do Sul

CRISTIANO ROBERTO BUZATTO¹, RODRIGO B. SINGER² and SÉRGIO A.L. BORDIGNON³

¹Programa de Pós-Graduação em Botânica, Universidade Federal do Rio Grande do Sul,
Av. Bento Gonçalves, 9500, Bloco IV, Prédio 43433, Campus do Vale, Agronomia, 91501-970 Porto Alegre, RS, Brasil

²Universidade Federal do Rio Grande do Sul, Departamento de Botânica,
Av. Bento Gonçalves, 9500, Bloco IV, Prédio 43433, Campus do Vale, Agronomia, 91501-970 Porto Alegre, RS, Brasil

³Programa de Pós-Graduação em Avaliação de Impactos Ambientais em Mineração, Centro Universitário La Salle,
Av. Victor Barreto, 2288, 92010-000 Canoas, RS, Brasil

Manuscript received on July 11, 2013; accepted for publication on October 25, 2013

ABSTRACT

Lyroglossa and *Pteroglossa* (Orchidaceae: Spiranthinae) are first recorded for Rio Grande do Sul. Descriptions, illustrations, taxonomic notes and distribution are presented. We also provide an artificial key to distinguish the genera of the “*Stenorrhynchos* Clade” reported so far in Rio Grande do Sul.

Key words: Brazil, “*Stenorrhynchos* Clade”, taxonomy, terrestrial orchids.

INTRODUCTION

Spiranthinae Lindl. ex Meisner comprises about 42 genera and 470 species (Chase et al. 2003, Salazar 2003) of predominantly terrestrial orchids (Salazar et al. 2003). This subtribe has two main biodiversity centers, one in Mexico and Central America and the other in Southern and Southeastern Brazil (Dressler 1993, Balogh 1982).

Spiranthinae has been supported as a monophyletic group in several phylogenetic studies (Salazar 2003, Figueroa et al. 2008, Salazar et al. 2003, 2009, 2011). All these studies support the existence of four clades: “*Stenorrhynchos* Clade”, “*Pelexia* Clade”, “*Eurystyles* + *Lankesterella* Clade” and “*Spiranthes* Clade”.

During fieldwork and the revision of some herbaria we verified the occurrence of two

Spiranthinae genera: *Lyroglossa* Schltr. and *Pteroglossa* Schltr., currently included within the so-called “*Stenorrhynchos* Clade”, *sensu* Salazar et al. (2003). To date, these taxa have not been formally cited for the orchid flora of Rio Grande do Sul (Rambo 1965, Pabst and Dungs 1975). The purpose of the present contribution is thus to present descriptions, diagnostic features, illustrations, geographical and taxonomic notes for these taxa. In addition, an artificial key of the genera currently placed into the “*Stenorrhynchos* Clade” that are native to Rio Grande do Sul Brazilian State is provided. This paper is part of a series of taxonomic studies on the Orchidaceae native to Rio Grande do Sul (Buzatto et al. 2012, 2014).

MATERIALS AND METHODS

Protologues were examined, as well as the herbaria that hold the type collections (AMES, B, BHCN,

Correspondence to: Cristiano Roberto Buzatto
E-mail: crbuzatto@gmail.com

BM, CEN, CTES, F, G, GH, HAS, HB, HBG, HEPH, HUEFS, IBGE, ICN, INPA, IPA, K, K-L, M, MBM, NY, P, PACA, PEL, R, RB, S, SP, UB, UEC, VIC and W - acronyms according to Thiers 2009) and relevant literature to Orchidaceae (Cogniaux 1895, 1906, Dressler 1993, Salazar 2003). This paper follows the general orchid classification proposed by Chase et al. (2003). Orchid morphology terms were defined as per Dressler (1993) and abbreviations for authorities for plant names follow Brummitt and Powell (1992).

TAXONOMIC TREATMENT

1. *Lyroglossa grisebachii* (Cogn.) Schltr., *Anexos* Mem. Inst. Butantan, Secc. Bot. 1(2): 27-28. 1921 \equiv *Spiranthes grisebachii* Cogn., Fl. Brasil. 3(4): 207. 1893-1906. Figures 1 and 3E-F.

Type: FRENCH GUIANA. *sine loc.*, 1840, *F.M.R. Leprieur s.n.*, no herbarium cited; lectotype designated by Szlachetko and Rutkowski (2008): G 168827, isoelectotypes: P 345573; AMES (photo as G 168827).

Herb to 17.5 cm high, including the inflorescence. *Roots* fleshy, cylindrical, often stipitate, lanuginose. *Leaves* ca. 2.3 \times 0.7 cm, 1-2, forming a basal rosette, usually absent during anthesis sometimes withered, sessile, acute, coriaceous, margin slightly translucent, bright to olive green, elliptic-lanceolate, gradually attenuate. *Inflorescence* ca. 3.5 cm long, 6 to 7-flowered, pubescent, scape terete, partially covered by 5 sheathing, acute bracts; raceme congested, most of them opened simultaneously; floral bracts ca. 2.5 cm long, prominent, green, glabrous, loosely concave, ovate, acuminate. *Flowers* resupinate, fleshy, whitish-green. *Sepals* densely pubescent outside. *Dorsal sepal* ca. 6.1 \times 2.3 mm, slightly spreading, adherent to the lateral sepals on its proximal part, densely pubescent externally, lanceolate, recurved at the acute apex, the margins entire. *Lateral sepals* ca. 6.4 \times 2.8 mm, slightly to strongly patent, shortly

connate at base forming a small, conical, rounded spur of ca. 5 mm long, densely pubescent outside, ovate-lanceolate, recurved at apex, acute, margins entire. *Petals* ca. 5.8 \times 2.2 mm, glabrous, with 5 conspicuous green veins, ovate, acute, margins entire. *Labellum* ca. 7.2 \times 3.5 mm, three-lobed, blade pubescent outside, often papillose near the base, adnate at base with the lateral sepals in the spur, long-clawed and narrowly channeled below the middle; apical lobe deflexed, obtuse to retuse. *Column* ca. 7.2 \times 3.1 mm, ca. 2.2 mm height, semiterete, stout, pubescent, the base extended into a long column-foot, the membranaceous clinandrium margins are rounded and enclose the basal portion of the anther; the anther is thick, massive, ovate, acuminate, with filament adnate; pollinarium ca. 2.6 \times 1.1 mm, 0.7 mm height, formed by 2 deeply bipartite, granular pollinia, narrowly clavate, with ventral, apical, oval, grey viscidium; rostellum remnant ca. 0.8 mm long, narrowly triangular, stiff, obscurely tridentate at the portion originally covered by the viscidium; stigma bilobed toward the base. *Ovary* ca. 7.2 mm long, 3.1 mm diameter near the apex, densely pubescent up to pedicel. *Capsule* ellipsoid. *Seeds* minute and fusiform.

Notes: *Lyroglossa grisebachii* is the type-species of the genus (Salazar 2003). *Lyroglossa* shares some floral features with *Pteroglossa*, such as the short, ventrally channelled column, narrowly triangular rostellum, concave anther and marginal, completely adnate nectar glands (Salazar 2003). Based on morphological features, Salazar (2003) tentatively placed it in the so-called “*Stenorrhynchos* Clade”. However, its relationships are still not sustained by a molecular phylogeny (Chase et al. 2003, Salazar 2003).

Distribution: *Lyroglossa grisebachii* is currently known in the Atlantic Rain Forest and Cerrado Biomes, in Minas Gerais, Paraná, São Paulo, Goiás, Distrito Federal and Mato Grosso.

In Rio Grande do Sul, this species dwells in wet grassy formations (“*campos*”) surrounding

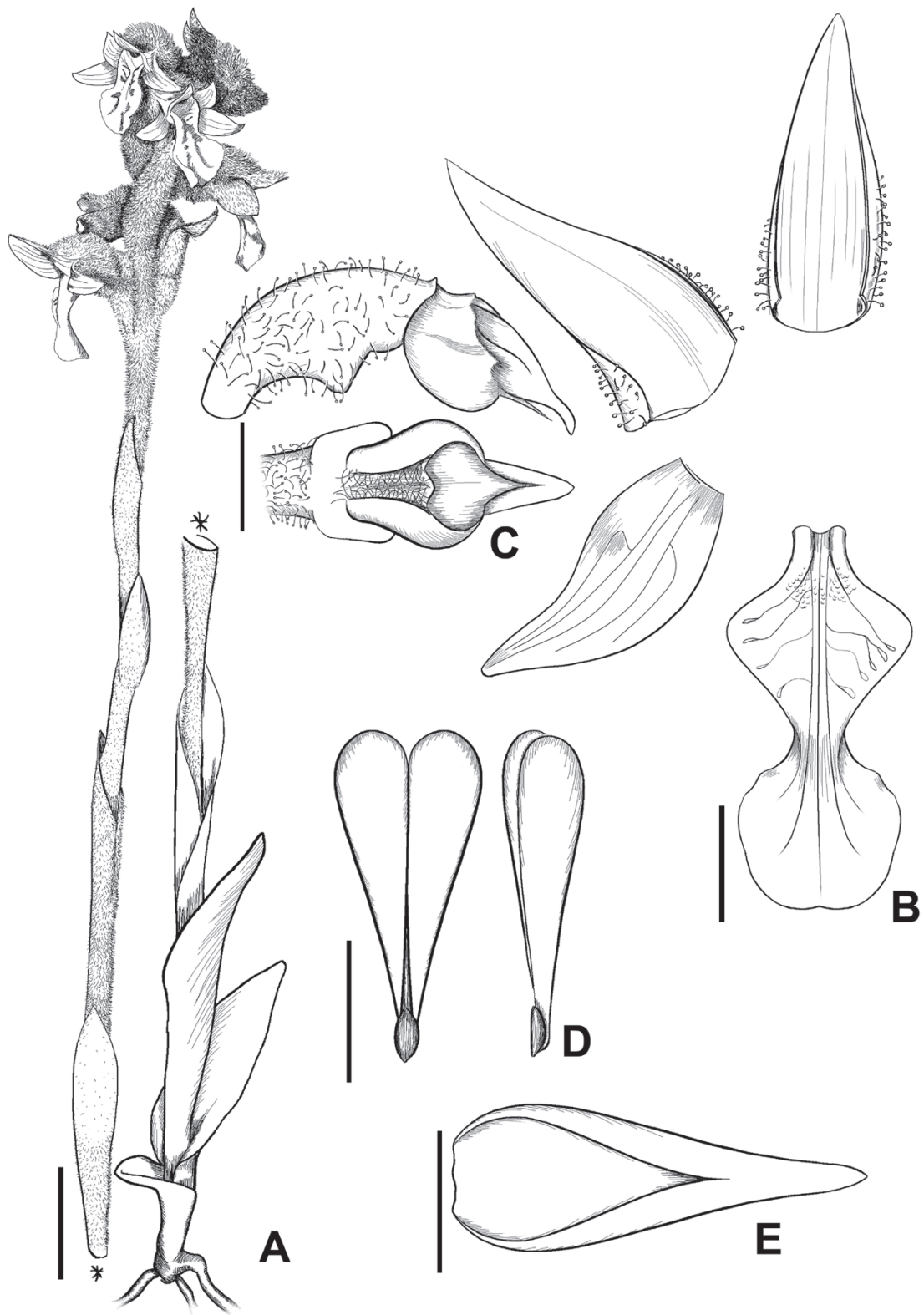


Figure 1 - *Lyroglossa grisebachii* (Cogn.) Schltr.; **A.** Habit; **B.** Floral diagram; **C.** Column in lateral and ventral view; **D.** Pollinarium in ventral and lateral view; **E.** Anther in dorsal view. Scale bars: **A** and **C** = 2 cm; **B** = 2 mm; **D** and **E** = 1 mm.

Atlantic forests. Additionally, *L. grisebachii* occurs in grasslands within the Pampa Biome, growing in slightly humid soils.

Batista et al. (2012), mentioned the presence of *L. grisebachii* in Rio Grande do Sul without providing a voucher. We herein formally record *L. grisebachii* for the State of Rio Grande do Sul, therefore extending the austral limit of this genus.

Specimens examined: BRAZIL. Rio Grande do Sul: Cachoeira do Sul, December 1986, fl., *M. Sobral et al.* 5367 (ICN); São José dos Ausentes, 23 January 2010, fl., *C.R. Buzzatto 606 & R.B. Singer* (ICN); 2 February 2008, fl., *J.A.N. Batista 2492* (BHCB).

Additional specimens examined: BRAZIL. Distrito Federal: Brasília, 14 December 1989, fl., *J.A.N. Batista 37* (HUEFS). Goiás: Alto Paraíso de Goiás, 9 February 2004, fl., *C. van den Berg 1226* (HUEFS); Cavalcante, 1 January 1999, fl., *J.A.N. Batista 824* (HUFU, UEC); Pirenópolis, 8 December 1987, fl., *L.C. Bernacci 19970* (UEC); *sine loc.*, 21 December 1968, fl., *Graziela et al.* 517 (HB). Mato Grosso: Chapada dos Guimarães, 14 October 1973, fl., *G.T. Prance 18955A* (INPA). Minas Gerais: Minduri, 5 November 1999, fl., *A.O. Simões 952* (UEC); Tiradentes, 6 December 1983, fl., *H.F. Leitão Filho 15266* (UEC). Paraná: Curitiba, 5 January 1965, fl., *L.T. Dombrowski & Y. Saito 1283b* (MBM); Sengés, 19 September 1975, fl., *G. Hatschbach 37112* (MBM). São Paulo: *sine loc.*, 10 October 1917, fl., *A. Gehrt 1041* (NY).

2. *Pteroglossa macrantha* (Rchb. f) Schltr., Beih. Bot. Centralbl. 37(2): 450. 1920 - *Spiranthes macrantha* Rchb. f., Linnaea 19: 378. 1846 \equiv *Gyrostachys macrantha* (Rchb. f.) Kuntze, Revis. Gen. Pl. 2: 664. 1891 \equiv *Stenorrhynchos macranthum* (Rchb. f.) Cogn., Fl. Bras. 3(4): 176. 1895. Figures 2 and 3A–D.

Type: BRAZIL: Minas Gerais, *sine loc.*, 1838, *M. Claussen 391* (P 345647).

Spiranthes albescens Barb. Rodr., Gen. Sp. Orchid. 1: 186. 1877 \equiv *Stenorrhynchos albescens*

(Barb. Rodr.) Barb. Rodr., Gen. Sp. Orchid. 1 (Index): X. 1877.

Type: BRAZIL. “*Hab. Dans la Serra de Caldas, Minas Geraes*”, s.d., *J. Barbosa Rodrigues s.n.* [lost], lectotype designated by Buzzatto et al. (2013).

Herb to 45 cm high, including the inflorescence. *Roots* fleshy, cylindrical, often stipitate, lanuginose. *Leaves* ca. 20–25 \times 5–8 cm, 7–8, forming a basal rosette, usually present during anthesis sometimes withered, sessile, acute, coriaceous, margin translucent, light green, lanceolate, external leaves slightly attenuate at base, the inner leaves more attenuate. *Inflorescence* ca. 14 cm long, with ca. 15 flowers, pubescent, scape terete, partially covered by 6–7 tubular, acute bracts; raceme congested, most of them opened simultaneously; floral bracts ca. 4.5–6 cm long, prominent, green, glabrous, loosely concave, ovate, acuminate. *Flowers* resupinate, fleshy, greenish-white with yellow veins. *Sepals* densely pubescent outside. *Dorsal sepal* ca. 26 \times 4 mm, slightly spreading, adherent to the lateral sepals on its proximal one-thirds, densely pubescent outside, lanceolate, acuminate, the margins entire. *Lateral sepals* 36 \times 6 mm, forming a shortly conical, rounded, prominent spur of ca. 15 mm long, densely pubescent outside, elliptic-lanceolate, falciform, acuminate, margins entire. *Petals* ca. 29 \times 5 mm, glabrous, bearing 3 conspicuous veins, fusiform, acuminate, margins entire. *Labellum* ca. 30 \times 9 mm, three-lobed, blade pubescent outside, glabrous near the apex, adnate at base with the lateral sepals in the spur, long-clawed and narrowly channelled below the middle; the lateral lobes semi-orbicular, the mid-lobe ovate to obovate-spatulate, acute to rounded. *Column* ca. 15 \times 10 mm, 5 mm height, hemi-terete, stout, pubescent, the base extended into a long column foot, the membranaceous clinandrium margins are enclosed with basal portion of the anther; the anther is thick, massive, ovate, long-acute, with filament completely adnate; pollinarium 2 \times 3–4 mm, 3 mm height, formed by 2 deeply bipartite, granular pollinia, narrowly clavate, with ventral-apical, oval, grey

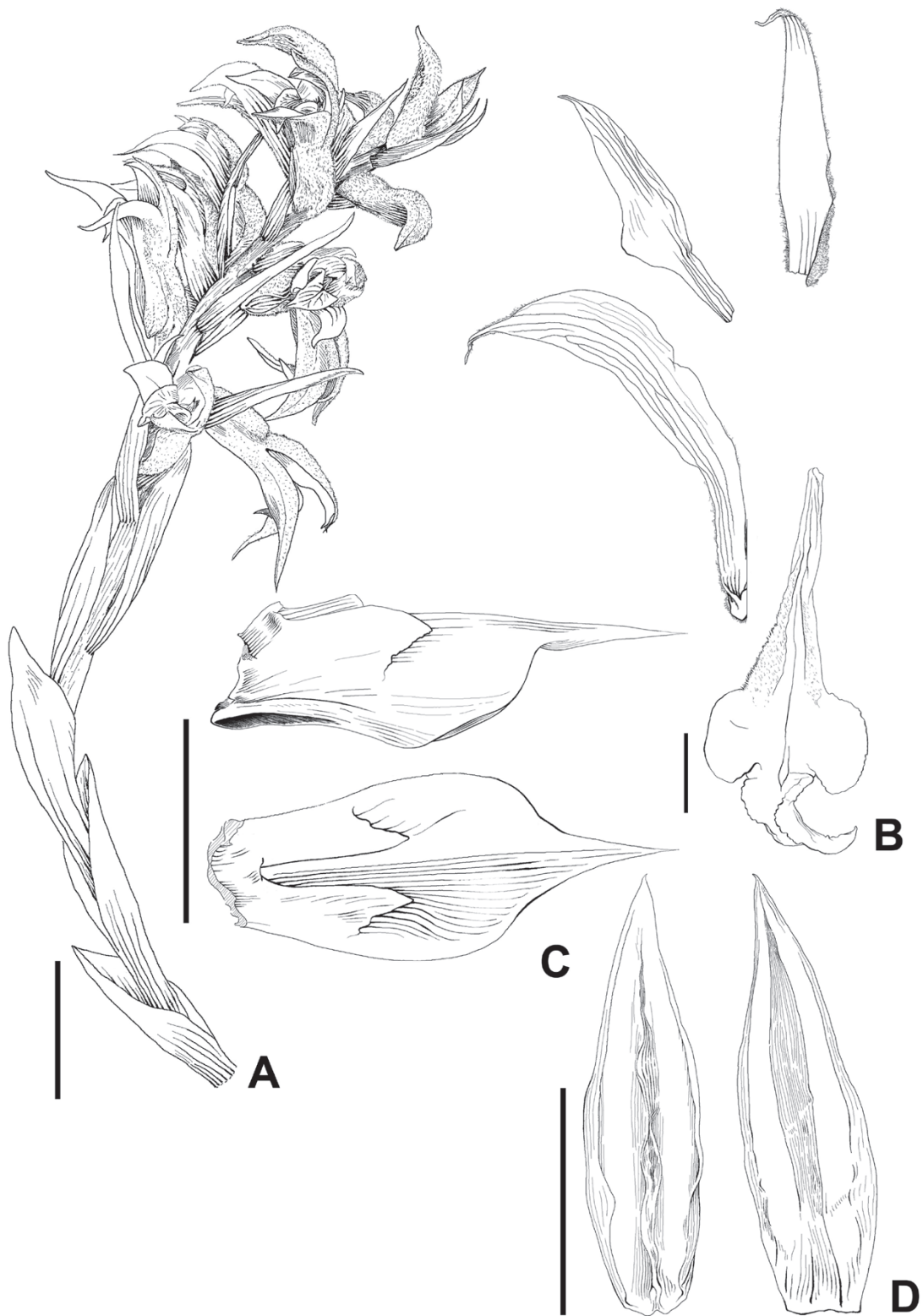


Figure 2 - *Pteroglossa macrantha* (Rehb. f.) Schltr.; **A**. Habit; **B**. Floral diagram; **C**. Column in lateral and dorsal view; **D**. Anther in ventral and dorsal view. Scale bars: **A** and **B** = 1 cm; **C** and **D** = 5 mm.



Figure 3 - *Pteroglossa macrantha* (Rchb. f.) Schltr. and *Lyroglossa grisebachii* (Cogn.) Schltr.; **A–D** *Pteroglossa macrantha*; **A**. Adaxial surface of leaf; **B**. Abaxial surface of leaf; **C**. Detail of inflorescence; **D**. Column in lateral, dorsal and ventral views; **E–F**. *Lyroglossa grisebachii*; **E**. Detail of cauline leaves; **F**. Detail of inflorescence. Scale bars: **A** and **B** = 5 cm; **C** = 1 cm; **D** = 5 mm; **E** and **F** = 2 cm.

viscidium; rostellum remnant ca. 3 mm long, narrowly triangular, stiff, obscurely tridentate at the portion originally covered by the viscidium; stigma slightly

bilobed toward its base. *Ovary* ca. 20 mm long, 5 mm diameter near the apex, densely pubescent. *Capsule* ellipsoid. *Seeds* minute and fusiform.

Notes: *Pteroglossa macrantha* is the type-species of the genus (Salazar 2003). It is worth noticing here that leaf morphology of the specimens examined do not agree with the description provided by Salazar (2003), who described the leaves of this species as being oblanceolate and long petiolate. The specimens we studied have leaves. Salazar's description of leaves fits very well the description of two other species, namely *P. roseoalba* (Rchb.f) Salazar & M.W.Chase and *P. glazoviana* (Cogn.) Garay. However, the attenuated leaves of *P. macrantha* (Figure 3A–B) are considerably different from this description (see species description) and are remarkably similar to those of robust specimens of *Skeptrostachys* Garay.

Pteroglossa comprises about ten species distributed from Mexico to Costa Rica and from Colombia to Argentina (Salazar 2003). In Brazil, *Pteroglossa* occurs mainly in the Atlantic Rain Forest Biome, in the states of Minas Gerais, Paraná, São Paulo, Rio de Janeiro and Espírito Santo (Salazar 2003). It shares a number of morphological features (e.g. labellum and column shape; Figure 3D) with other members of the “*Stenorrhynchos* Clade”, mainly with *Eltroplectris* Raf., and this seems to indicate a closer relationship between these and other genera in this clade. Recent molecular studies (Salazar et al. 2011) support such a relationship and have indicated that *Pteroglossa* is inserted within the “*Stenorrhynchos* Clade”, and is closely related to *Sacoila* Raf., *Mesadenella* Pabst & Garay and *Eltroplectris*.

Distribution: *Pteroglossa macrantha* occurs mainly at the Cerrado Biome (especially, Goiás, Distrito Federal and Mato Grosso). After an extensive revision of the literature and the herbarium material available, this species is recorded for the first time to the State of Rio Grande do Sul. This new record makes Rio Grande do Sul the austral limit of this genus.

Specimens examined: BRAZIL. Rio Grande do Sul: Jaquirana, 5 January 2013, C.R. Buzatto

899 & S.A.L. Bordignon (ICN); São Francisco de Paula, 23 January 2007, fl., S.A.L. Bordignon s.n. (ICN 174065).

Additional specimens examined: BRAZIL. Distrito Federal: Brasília, s.d., fl., *F. Sello* s.n. (HBG 506820). Goiás: Alvorada do Norte, 10 October 1976, fl., *G. Hatschbach* 39113 (MBM); *sine loc.*, 26 October 1964, fl., *H.S. Irwin* 7371 (NY). Mato Grosso: Coxipó, December 1978, fl., *J.G.A. Lima* 860 (HB); Lago São Léo, 11 October 1968, fl., *A. Lima* 438–68 (IPA); Xavantina, 12 October 1967, fl., *A. Argent & J. Ramos* 6735 (HB); *sine loc.*, 10 October 1964, fl., *H.S. Irwin* 6725 (NY); *sine loc.*, s.d., fl., *Willian* s.n. (HB 75708). Minas Gerais: Caldas, 20 October 1866, fl., *A.F. Regnell* III1198 (S); Ituiutaba, 10 November 1948, fl., *A. Macedo* 1342 (MBM, NY, RB); Paracatú, 21 October 1989, fl., *A.H. Salles et al.* 1411 (HEPH); *sine loc.*, 1838, fl., *P. Claussen* 391 (P). Rio de Janeiro: Santo Antônio de Imbé, April 1932, fl., *A.C. Brade & S. Lima* 11734 (HB). Tocantins: Aparecida do Rio Negro, 1 November 2001, fl., *C.E. Rodrigues Jr.* 1514 (HEPH).

Artificial key to the genera of the “*Stenorrhynchos* Clade” native to Rio Grande do Sul

1. Leaves always present during anthesis *Mesadenella*
- 1'. Leaves sometimes absent or deteriorated during anthesis 2
2. Flowers mostly greenish-white. Column ventrally channeled 3
- 2'. Flowers vivid red, pinkish white or orange; column not channelled ventrally 4
3. Plants to 17.5 cm high. Labellum whitish with green veins, longer than sepals *Lyroglossa*
- 3'. Plants to 45 cm high. Labellum yellowish, as long as the sepals *Pteroglossa*
4. Flowers long tubular, 3.2-5 cm, light pinkish or vivid red *Sacoila*
- 4'. Flowers shortly tubular, 2-3 cm, pinkish white or orange *Skeptrostachys*

ACKNOWLEDGMENTS

We thank Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq project 470353/2011-2) for financial support. CRB acknowledges the study grant (project 1099/2010) received from Coordenação de Aperfeiçoamento do Pessoal de Nível Superior (CAPES) and Pró-Reitoria de Pós-Graduação (PROPG/UFRGS, Edital 001/2011) for financial support.

RESUMO

Lyroglossa e *Pteroglossa* (Orchidaceae: Spiranthinae) são registradas pela primeira vez para o Rio Grande do Sul. Descrições, ilustrações, notas taxonômicas e distribuição são apresentadas. Nós também fornecemos uma chave artificial para distinguir os gêneros do “Clado *Stenorrhynchos*” registrados até o momento para o Rio Grande do Sul.

Palavras-chave: Brasil, “Clado *Stenorrhynchos*”, taxonomia, orquídeas terrestres.

REFERENCES

- BALOGH P. 1982. Generic redefinition in subtribe Spiranthinae (Orchidaceae). *Amer J Bot* 69: 1119-1132.
- BATISTA JAN, MENINI NETO L AND ALVES AA. 2012. Three new species, four new records and an updated checklist of *Habenaria* (Orchidaceae) from Rio Grande do Sul, Brazil. *Nordic J Bot* 30: 1-14.
- BRUMMITT RK AND POWELL CE. 1992. *Authors of plant names*. Royal Botanic Gardens, Kew, 732 p.
- BUZATTO CR, DAVIES KL, SINGER RB, PIRES RS AND VAN DEN BERG C. 2012. A comparative survey of floral characters in *Capanemia* Barb. Rodr. (Orchidaceae: Oncidiinae). *Ann Bot* 109: 135-144.
- BUZATTO CR, SANGUINETTI A, ROMERO-GONZÁLEZ GA, VAN DEN BERG C AND SINGER RB. 2014. A taxonomic synopsis of the Brazilian Chloraeinae (Orchidaceae). *Phytotaxa* 158: 1-22.
- BUZATTO CR, SINGER RB, ROMERO-GONZÁLEZ GA, VAN DEN BERG C AND SALAZAR GA. 2013. Typifications and taxonomic notes in species of Brazilian Goodyerinae and Spiranthinae (Orchidaceae) described by José Vellozo and Barbosa Rodrigues. *Taxon* 63: 609-621.
- CHASE MW, BARRET RL, CAMERON KN AND FREUDENSTEIN JV. 2003. DNA data and Orchidaceae systematics: a new phylogenetic classification. In: Dixon KM (Ed), *Orchid Conservation*, Natural History Publications, Kota Kinabalu, Sabah, Malaysia, p. 69-89.
- COGNIAUX A. 1895. Fl Bras (Martius) Vol III, part 4.
- COGNIAUX A. 1906. Fl Bras (Martius) Vol III, part 6.
- DRESSLER RL. 1993. Phylogeny and classification of the orchid family. Dioscorides Press, Portland Oregon, 316 p.
- FIGUEROA C, SALAZAR GA, ZAVALA HA AND ENGLEMAN EM. 2008. Root character evolution and systematics in Cranichidinae, Prescottiinae and Spiranthinae (Orchidaceae, Cranichideae). *Ann Bot* 101: 509-520.
- PABST GFJ AND DUNGS F. 1975. *Orchidaceae Brasilienses*. Hildesheim: Kurt Schmiersow, 408 p.
- RAMBO B. 1965. *Orchidaceae Riograndenses*. *Iheringia*, Bot 13: 1-96.
- SALAZAR GA. 2003. Subtribe Spiranthinae. In: Pridgeon AM et al. (Eds), *Genera Orchidacearum* vol. 3: Orchidoideae part 2, Vanilloideae. Oxford University Press, Oxford, p. 164-278.
- SALAZAR GA, CABRERA LI AND FIGUEROA C. 2011. Molecular phylogenetics, floral convergence and systematics of *Dichromanthus* and *Stenorrhynchos* (Orchidaceae: Spiranthinae). *Bot J Linn Soc* 167: 1-18.
- SALAZAR GA, CABRERA LI, MADRIÑAN S AND CHASE MW. 2009. Phylogenetic relationships of Cranichidinae and Prescottiinae (Orchidaceae, Cranichideae) inferred from plastid and nuclear DNA sequences. *Ann Bot* 104: 403-416.
- SALAZAR GA, CHASE MW, SOTO ARENAS MA AND INGROUILLE M. 2003. Phylogenetics of Cranichideae with emphasis on Spiranthinae (Orchidaceae, Orchidoideae): evidence from plastid and nuclear DNA sequences. *Amer J Bot* 90: 777-795.
- SZLACHETKO DL AND RUTKOWSKI P. 2008. Classification of Spiranthinae, Stenorrhynchidinae and Cyclopogoninae. In: Rutkowski P, Szlachetko DL and Górnjak M (Eds), *Phylogeny and taxonomy of the subtribes Spiranthinae, Stenorrhynchidinae and Cyclopogoninae (Spirantheae, Orchidaceae)* in Central and South America. Wydawnictwo Uniwersytetu Gdańskiego, p. 130-222.
- THIERS B. 2009. *Index Herbariorum*: a global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. Available in: <<http://sweetgum.nybg.org/ih/>>. Access in: 25 September 2009.