

Stevia grazielae (Asteraceae: Eupatorieae: Ageratinae): a new species from the Cadeia do Espinhaço, Minas Gerais, Brazil

Aline Silva Quaresma¹, Jimi Naoki Nakajima² & Nádia Roque³

Summary. The Neotropical genus *Stevia* comprises c. 230 species and can be easily recognised by its heads with five phyllaries and five florets. During a floristic survey of Eupatorieae in the Planalto de Diamantina, in the Cadeia do Espinhaço, Minas Gerais, Brazil, a new species of *Stevia* was collected in "cerrado" and "campo rupestre" vegetation. *S. grazielae* differs from the other 32 Brazilian species by its characteristic opposite and alternate linear and flat to conduplicate leaves, heads in a lax panicle, with divaricate secondary branching, and 5 cypselas with isomorphic pappus, 7 – 9 awns and 1 – 3 scales, or cypselas with heteromorphic pappus, 7 – 10 awns and 1 – 3 scales in 3 – 4 adelphocarps, and 9 – 11 awns and 0 scales in 1 – 2 idiocarps. *S. grazielae* is described, illustrated, and the conservation status is assessed.

Key Words. campos rupestres, Compositae, *Pauciaristatae*, Planalto de Diamantina.

Introduction

Stevia Cav. (Asteraceae: Eupatorieae: Ageratinae) is one of the most distinctive genera of Eupatorieae and is easily recognised by the uniformity of the head — with five phyllaries and five florets. It is recognised as a natural taxon in several taxonomic treatments (de Candolle 1836; Baker 1876; Robinson 1930; Monteiro 1982; King & Robinson 1987; Nakajima 1991). The genus can also be recognised by the presence of trichomes inside the corolla and anthers with obovate to elliptic apical appendages with crenulate margins (King & Robinson 1987). Since reproductive characteristics in *Stevia* are constant, vegetative and pappus characteristics are taxonomically important (King & Robinson 1987), but many questions remain about species limits.

De Candolle (1836) was the first author to study *Stevia*, including Brazilian species, and proposed an infrageneric classification subdividing the genus into groups, which was based on pappus characters: *Stevia* * *Exaristatae* — species with coroniform pappus or pappus with 5 – 6 small scarious paleae; *Stevia* ** *Paleaceoaristate* — pappus with short paleae and 1 – 5 awns; and *Stevia* *** *Multiaristatae* — pappus with 6 – 20 awns. Later, Baker (1876) made changes, arranging the Brazilian species with coroniform pappus or with short paleae and 0 – 4 awns in the group *Paleaceoaristatae*; species with pappus of 4 – 10 wide scales with awns that extend to the cypselas in the group *Pauciaristatae*; and

species with a pappus with 10 – 20 or more awns in the group *Multiaristatae*. The infrageneric classification established by Baker (1876) for the Brazilian species remains in use to the present day (Monteiro 1982; Nakajima 1991).

Stevia contains approximately 230 species distributed from the southwest of the USA to Argentina, with greater richness in South America and Mexico (King & Robinson 1987; Soejima *et al.* 2001). In Brazil 32 species are recognised, 25 being endemic, with greater diversity in the southern and southeastern part of the country, in areas of the Pampas, Cerrado and Mata Atlântica domains (Nakajima 2013).

During the floristic survey of Eupatorieae in the Diamantina Plateau, Minas Gerais, a new species of *Stevia* group *Pauciaristatae* was collected and is described, illustrated and the conservation status presented below.

Taxonomy

***Stevia grazielae* Quaresma & J. N. Nakaj. sp. nov.** Type: Brazil, Minas Gerais, Diamantina, A. S. Quaresma & M. M. T. Cota 379 (holotype HUEFS!; isotypes ALCB!, HUFU!).

<http://www.ipni.org/urn:lsid:ipni.org:names:77133554-1>

Herb or *subshrub* 30 – 90 cm tall. *Stems* terete, pilose, glabrescent. *Leaves* opposite, upper alternate, sessile,

¹ Programa de Pós-Graduação em Botânica, Universidade Estadual de Feira de Santana, Av. Transnordestina, Km 03, BR 116, 44031-460, Feira de Santana, Bahia, Brazil. e-mail: alinesilvaquaresma@yahoo.com.br

² Instituto de Biologia, Universidade Federal de Uberlândia, CP 593, Uberlândia, 38400-902, Minas Gerais, Brazil.

³ Instituto de Biologia, Departamento de Botânica, Universidade Federal da Bahia, Campus Ondina, Av. Adhemar de Barros, sn, Salvador, Bahia, Brazil.

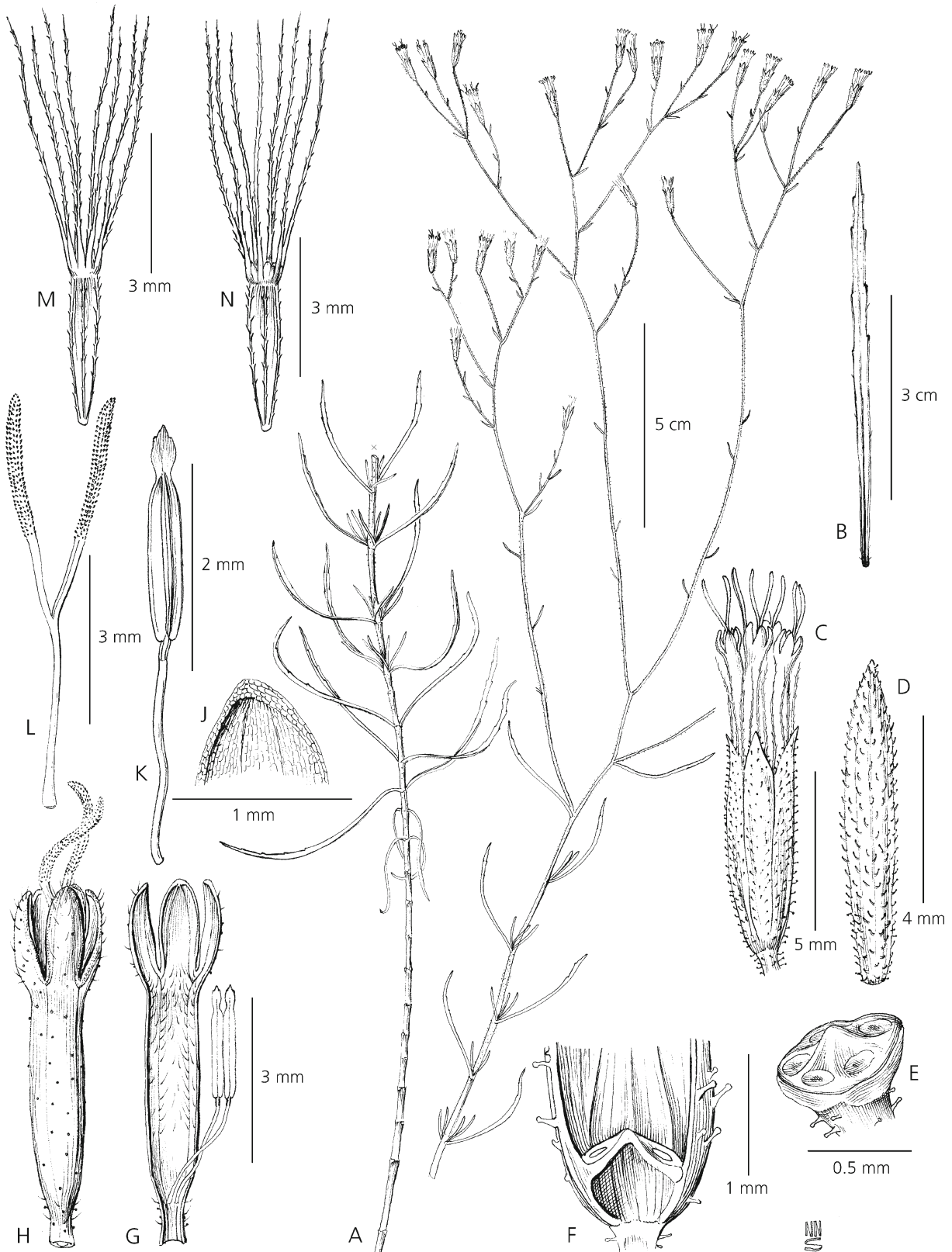


Fig. 1. *Stevia graziellae*. A flowering branch; B lamina; C head; D phyllary; E receptacle; F longitudinal section of base of involucre and receptacle; G corolla interior and insertion of filaments; H floret (without cypsel); J inner surface of corolla lobe showing papilla; K stamen; L style; M isocarpic cypsel, with only awns; N heterocarpic cypsel, with awns and scales. DRAWN BY NATANAEL NASCIMENTO DOS SANTOS.

Table 1. Distinctive morphological characters between some Brazilian species of *Stevia*.

Characters	Paucicariatae			Paleoacariatae		Multicariatae	
	<i>S. grazielae</i>	<i>S. heptachaeta</i>	<i>S. riadeli</i>	<i>S. oligocephala</i>	<i>S. cinerascens</i>	<i>S. saturnifolia</i>	
Phyllotaxy	Opposite and alternate at apex	Opposite	Opposite	Opposite	Opposite	Opposite	
Lamina shape	Linear	Lanceolate to elliptic	Linear	Linear-lanceolate	Lanceolate	Linear	
Lamina width (mm)	2 – 4	7.5 – 10	5 – 7.5	7.5 – 10	5 – 7.5	1.2 – 2.5	
Margins	Dentate	Dentate	Entire	Serrate	Entire to crenulate	Entire	
Petiole	Sessile	Short-petiolate	Sessile	Short-petiolate	Sessile	Sessile	
Lamina indument	Glandular trichomes	Pilose with glandular trichomes	Glabrous	Glabrous	Griseo-pubescent	Griseo-pubescent	
Venation	Only central vein	Pinnate	3-veined	3-veined	Pinnate	Only central vein	
Capitulescence	Terminal panicle, lax	Terminal panicle, lax	Axillar panicle, lax	Axillar panicle, lax	Axillar panicle, lax	Corymb, congested	
Involucre	Densely covered by glandular trichomes	Glandular trichomes	Sparse glandular trichomes	Glabrescent with glandular trichomes	Pubescent	Pubescent	
Flower length	Larger than the involucre	Larger than the involucre	Same as the involucre	Larger than the involucre	Larger than the involucre	Larger than the involucre	
Pappus	With 7 – 11 awns and 0 – 3 scales	With 6 – 8 awns	With 4 – 8 awns	Coroniform with 2 – 3 awns	With 12 – 18 awns	With more than 10 awns	
Pappus heteromorphy	Homomorphic or heteromorphic	Homomorphic	Heteromorphic	Heteromorphic	Homomorphic	Homomorphic	

lamina linear, flat to conduplicate, 4.7 – 5.9 × 0.2 – 0.4 cm, apex acute to obtuse, margins dentate, base attenuate to truncate, adaxial and abaxial surfaces with sessile or stipitate-glandular trichomes, glabrescent, 1-veined. *Capitulescence* paniculiform, terminal, lax, heads 29 – 69, peduncle 0.6 – 2.7 cm long, with stipitate-glandular trichomes, bracteoles 2.7 – 13 × 0.6 – 1.3 mm, linear to lanceolate, apex obtuse to acute, pilose, trichomes glandular, sessile and stipitate. *Involucre* cylindrical, 6.6 – 7.4 × 2.1 – 2.8 mm; phyllaries 5, lanceolate to oblanceolate, 6.3 – 6.7 × 1 – 1.3 mm, green with vinaceous acuminate apex, margins entire, adaxial surface with sessile and stipitate-glandular trichomes; receptacle slightly convex, epaleaceous. *Florets* 5, corollas 6.2 – 6.7 × 0.7 – 1.2 mm, pilose, with sessile and stipitate-glandular trichomes, corolla tube 0.7 – 1.1 × 0.3 mm, vinaceous, corolla lobes lanceolate, 1 – 1.4 × 0.4 – 0.7 mm, pinkish, papillose inside; apical anther appendages obovate, margins erose, c. 0.5 mm long, longer than wide, base obtuse, anther collars cylindrical; style 7.6 – 8.2 mm long, style branches linear, long papillose, apex obtuse; stylopodium thickened, glabrous. *Cypsela* scarcely cylindrical, 3.2 – 4.1 mm long, 5-costate, setuliferous along ribs; carpopodium anuliform, asymmetric; pappus uniseriate, 7 – 9 awns and 1 – 3 scales (5 isomorphic cypselas), or 7 – 10 awns and 1 – 3 scales in 3 – 4 adelphocarps and 9 – 11 awns and 0 scales in 1 – 2 idiocarps (heteromorphic cypselas), barbelate awns 5.5 – 6.3 mm long, small scales 0.5 – 1.2 mm long, purple. Fig. 1.

RECOGNITION. *Stevia grazielae* belongs to the group *Paucicariatae* Baker and is related to *S. heptachaeta* DC. but differs by the leaves opposite at the base and alternate at the apex of stems (vs only opposite), lamina flat to conduplicate (vs flat), linear, 2 – 4 mm wide (vs lanceolate to elliptic, 7.5 – 10 mm wide), with only one central vein (vs pinnately veined), involucre densely covered by glandular trichomes (vs sparse glandular trichomes) and heteromorphic pappus with awns and scales (vs homomorphic pappus with only awns).

DISTRIBUTION. Brazil, Minas Gerais, municipalities of Diamantina and Joaquim Felício.

SPECIMENS EXAMINED. BRAZIL. Diamantina: estrada para Milho Verde, 18°20'S, 43°32'W, 13 April 2012, A. S. Quaresma & M. M. T. Cota 379 (holotype HUEFS; isotypes ALCB, HUFU); São João da Chapada, 28 March 1970, H. S. Irwin et al. 28563 (RB); estrada para Milho Verde, 18°20'S, 43°32'W, 19 May 2008, J. N. Nakajima et al. 4865 (HUFU); Joaquim Felício: Serra do Cabral, 7 June 2004, G. Hatschbach et al. 77522 (MBM).

HABITAT. Cerrado and campos rupestres vegetation, around 1,100 m.

CONSERVATION STATUS. According to IUCN (2010) criteria and categories, the species appears Endangered (EN B1, B2, a, ciii, civ, D), since the only three known populations exist in an area less than 500 km²;

the size of these populations is unknown but estimated as fewer than 250 mature individuals.

PHENOLOGY. Flowering occurs from March to June, and flowers and fruits in May and June.

ETYMOLOGY. The epithet is in honour of Graziela Maciel Barroso, one of the greatest Brazilian taxonomists who devoted part of her life to the study of the Asteraceae.

NOTES. *Stevia grazielae* is characterised by its opposite leaves that are alternate at the apex, lamina linear, flat to conduplicate, 2 – 4 mm wide, with dentate margins, and only one central vein. The capitulescence is a terminal panicle, lax and composed of many heads. The involucre is densely covered by sessile and stipitate glandular trichomes, and cypselas with isomorphic pappus with 7 – 9 awns and 1 – 3 scales, or cypselas with heteromorphic pappus with 7 – 10 awns and 1 – 3 scales (3 – 4 adelphocarps) and with 9 – 11 awns and 0 scales (1 – 2 idiocarps).

Morphological characters which distinguish the Brazilian species with subulate, linear or linear-lanceolate leaves from *Stevia grazielae* are shown in Table 1.

Acknowledgements

The authors are grateful to CAPES for the Masters scholarship provided to the first author.

We also thank Natanael Nascimento dos Santos for the line drawing. Special thanks to the reviewers of the manuscript for valuable comments and suggestions. This work was funded by REFLOA (CNPq 563541/2010-5), and PRONEM (PNE 1642/2011) funded the fieldwork. To CAPES for the postdoctoral scholarship granted to the second author (BEX 9611/12-6) and CNPq (PQ 371248/2001-6) for the research scholarship to the last author.

References

- Baker, J. G. (1876). Compositae II. Eupatoriaceae. In: C. F. P. Martius & A. G. Eichler (eds), *Flora Brasiliensis* 6 (2): 181 – 374. Frid. Fleischer, München.
- de Candolle, A. P. (1836). Compositae – Eupatoriaceae. In: A. P. de Candolle (ed), *Prodromus Systematis Naturalis Regni Vegetabilis* 5: 103 – 211. Treuttel & Würtz, Paris.
- IUCN (2010). *Guidelines for using the IUCN red list categories and criteria*. Version 8.1. Prepared by the Standards and Petitions Sub-Committee in March 2010. Available: <http://intranet.iucn.org/webfiles/doc/SSC/RedList/RedListGuidelines.pdf>. Accessed Feb. 2013.
- King, R. M. & Robinson, H. (1987). The genera of the Eupatorieae (Asteraceae). *Monogr. Syst. Bot. Missouri Bot. Gard.* 22.
- Monteiro, R. (1982). Estudos taxonômicos em *Stevia* série *Multiaristate* no Brasil. *Revista Bras. Bot.* 5: 5 – 15.
- Nakajima, J. N. (1991). *Taxonomia fenética das séries Paleacearistate e Pauciaristate de Stevia Cav. (Asteraceae, Eupatorieae)*. Dissertação de mestrado. Universidade Estadual Paulista, Rio Claro.
- ____ (2013). *Stevia* in *Lista de Espécies da Flora do Brasil. Jardim Botânico do Rio de Janeiro*. Available: <http://floradobrasil.jbrj.gov.br/jabot/floradobrasil/FB16310>. Accessed July 2013.
- Robinson, B. L. (1930). Observations on the genus *Stevia*. *Contr. Gray Herb* 90: 36 – 58.
- Soejima, A., Yahara, T. & Watanabe, K. (2001). Thirteen new species and two new combinations of *Stevia* (Asteraceae: Eupatorieae) from Mexico. *Brittonia* 53: 377 – 395.