



Original Paper

A revision and morphological analysis of the Uruguayan species of *Stevia* (Compositae, Eupatorieae)

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Abstract

A revision and a morphological analysis of the Uruguayan species of *Stevia* (Compositae, Eupatorieae) were performed. Leaf, inflorescence, pubescence and pappus traits were identified as key to separate species. *Stevia entreriensis*, *S. entreriensis* var. *minor*, and *Dissothrix hassleriana* were considered synonyms of *S. hirsuta*, and *S. ophryodonta* and *S. oxylaena* synonyms of *S. veronicae*. Lectotypes for the names *Stevia cinerascens*, *S. megapotamica*, *S. linariifolia*, *S. selloi*, *S. selloi* var. *yparacayensis*, *S. oxylaena* and *S. veronicae* were designated. *Stevia burkartii* was excluded from the Uruguayan flora. As a result, 10 Uruguayan species are considered: *S. aristata*, *S. cinerascens*, *S. congesta*, *S. gratiolooides*, *S. hirsuta*, *S. multiaristata*, *S. sabulonis*, *S. satireiifolia*, *S. selloi*, and *S. veronicae*. A key to the Uruguayan species, descriptions, photographs and distribution maps are provided.

Key words: Asteraceae, South America, taxonomy, Uruguay.

Resumen

Se llevó a cabo una revisión y un análisis morfológico de las especies uruguayas de *Stevia* (Compositae, Eupatorieae). Caracteres de hojas, inflorescencias, pubescencias y pappus son primordiales para la separación de especies. *Stevia entreriensis*, *S. entreriensis* var. *minor*, y *Dissothrix hassleriana* se consideraron sinónimos de *S. hirsuta*, y *S. ophryodonta* y *S. oxylaena* sinónimos de *S. veronicae*. Se designaron lectotipos para los nombres *Stevia cinerascens*, *S. megapotamica*, *S. linariifolia*, *S. selloi*, *S. selloi* var. *yparacayensis*, *S. oxylaena* y *S. veronicae*. *Stevia burkartii* fue excluida de la flora uruguaya. Como resultado, se consideran 10 especies uruguayas para el género: *S. aristata*, *S. cinerascens*, *S. congesta*, *S. gratiolooides*, *S. hirsuta*, *S. multiaristata*, *S. sabulonis*, *S. satireiifolia*, *S. selloi*, y *S. veronicae*. Se proporciona una clave, descripciones, fotografías y mapas de distribución para las especies uruguayas.

Palabras clave: Asteraceae, América del Sur, taxonomía, Uruguay.

Introduction

Asteraceae is one of the largest vascular plant families with 25,000–33,000 species (Anderberg *et al.* 2007; Robinson *et al.* 2009; Mandel *et al.* 2017) and has a high number of genera and species particularly in the Americas, and especially in South America where its origin has been postulated (Barreda *et al.* 2010, 2012).

The genus *Stevia* Cav. (Cavanilles 1797) stands out within Asteraceae for its wide distribution, from southern United States up to northern Chile and northern Patagonia in Argentina, inhabiting different type of environments (King & Robinson 1987; Freire & Ariza Espinar 2014; Gutiérrez *et al.* 2016), and high number of taxa with ca. 175–237 species (King & Robinson 1987; Hind & Robinson

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2007; Robinson *et al.* 2009), with high species-diverse areas in Mexico (Watanabe *et al.* 2001; Turner 2015) along with South America (*e.g.*, Freire & Ariza Espinar 2014; Robinson 2014). It includes the South American species *S. rebaudiana* (Bertoni) Bertoni, commonly known as candyleaf, with food, industrial and medicinal uses (Brandle *et al.* 1998; Soejarto 2002; Salvador-Reyes *et al.* 2014). This genus belongs to the subtribe Piqueriinae of the tribe Eupatorieae, a derivate evolutionary lineage of Asteraceae (Robinson *et al.* 2009; Tippery *et al.* 2014; Rivera *et al.* 2016).

Stevia is a morphologically well circumscribed genus and comprises herbs or shrubs with opposite leaves, cylindrical involucre of five phyllaries, five florets per capitulum with funnellform corollas, and 5-ribbed, pubescent cypselae. The pappus, generally constituted by bristles, short scales, or both, has been traditionally used for species or infrageneric delimitations (Robinson 1930; Bremer *et al.* 1994; Hind & Robinson 2007). At species level, the morphology turns out to be complex since there is overlapping of characters and, in most cases, species delimitations are not clear. Infrageneric classifications of *Stevia* have been made based especially on features of the habit, inflorescence, fruit, and pappus. Baker (1876) proposed the serie categories *Paleaceoaristatae*, *Pauciaristatae* and *Multiaristatae* for Brazilian and bordering countries species, while Robinson (1930) established the series *Corymbosae* and *Podocephalae* for Central and North America. Currently, there is no agreement for recognizing these infrageneric categories (Hind & Robinson 2007), although some of them have been used for a comprehensive approach to the Brazilian species (Monteiro 1982; Nakajima 1991). In addition, molecular phylogenetic evidence indicated that these categories are not monophyletic (Soejima *et al.* 2017).

In summary, *Stevia* is a complex genus and a major taxonomic challenge due to its high number of species, wide geographic distribution, and species variability of morphological characters. One way of untangling the taxonomy of the genus is its treatment by biogeographical areas or by countries. In southern South America, some taxonomical advances have been achieved through checklists (*e.g.*, Freire 2008; Nakajima 2010; Robinson 2014; Avila *et al.* 2016), floristic treatments (*e.g.*, Cabrera 1996; Freire & Ariza Espinar 2014) and revisionary studies (Robinson 1930; Gutiérrez *et al.* 2016). Uruguay is one of the South American countries that still lacks a taxonomical treatment of *Stevia*

although Asteraceae is represented by 374 species and constitutes the second family of vascular plants in species number (Zuloaga *et al.* 2008).

The taxonomical history of *Stevia* in Uruguay started within the genus *Eupatorium*; Lamarck (1786) described *Eupatorium satureiifolium*, currently *Stevia satureiifolia* (Lam.) Sch. Bip. *ex* Klotzsch (1852), on the basis of a specimen from Montevideo. The generic name *Stevia* was created by Cavanilles (1797) who established three Mexican species. In the following years, six Uruguayan species were described or transferred from other genera: *S. multiaristata* Sprengel (1826), *S. congesta* Hook. & Arn. (1835), *S. laxa* Hook. & Arn. (1835), *S. hirsuta* Hook. & Arn. (1836), and *S. violacea* (Griseb.) Hieron. *ex* Kuntze (1898).

The first account of the Uruguayan species of *Stevia* was performed by Baker (1876) in the context of the *Flora brasiliensis*, since bordering countries were also included. It was Arechavaleta (1906) who performed the first detailed treatment of the genus in Uruguay, considering four species: *S. satureiifolia*, *S. oxylaena* DC. (1836: 123), *S. entriensis* Hieron. (1897) and *S. veronicae* DC. (1836). Later, two species were added by Herter (1930), *S. laxa* and *S. polycephala* Baker (1876), and two more by Robinson, *S. sabulonis* B.L. Rob (1931) and *S. ophryodonta* B.L. Rob (1934) (Tab. 1). At the end of the twentieth century, King & Robinson (1987) considered seven species for Uruguay, and, more recently, Freire (2008) accepted 11 in a checklist, a criterion followed by Rodríguez-Craveró *et al.* (2017) in a nomenclatural work (Tab. 1).

As a part of an ongoing revisionary study of the southern South American species of *Stevia*, the goal of this work is to clarify and update the taxonomy of the Uruguayan species by means a revision and a deep morphological analysis of the genus *Stevia* in Uruguay.

Material and Methods

For this study 300 specimens were examined from BA, BAB, BAF, CORD, CTES, LIL, LP, MVFA, MVJB, MVM and SI (Thiers, continuously updated). Additional specimens were examined as digital images available through online resources (BM, E, F, G, GH, GOET, K, NY, P, S, US, Z and other online resources, such as the JSTOR Global Plants web site).

Descriptions are based on herbarium specimens and field observations. Several field trips were made throughout Uruguay and vouchers were deposited in BA, LP and/or MVFA.

Table 1 – Uruguayan species of *Stevia* as treated chronologically by different authors. The number of species in each treatment is indicated. (*) = species treated, (-) = species not treated.

Species/Checklists, taxonomic, and floristic treatments in Uruguay	Baker, 1876	Arechavaleta, 1906	Herter, 1930, 1937	King and Robinson, 1987	Freire, 2008; Rodríguez- Cravero <i>et al.</i> 2017	This work
<i>S. aristata</i>	*	–	–	*	*	*
<i>S. burkartii</i>	–	–	–	–	*	Excluded from Uruguay
<i>S. cinerascens</i>	*	–	–	–	*	*
<i>S. congesta</i>	var. of <i>S. satureiifolia</i>	var. of <i>S. satureiifolia</i>	–	–	*	*
<i>S. entriensis</i>	–	*	*	*	*	Syn. of <i>S. hirsuta</i>
<i>S. gratioloides</i>	var. of <i>S. veronicae</i>	–	–	–	*	*
<i>S. hirsuta</i>	var. of <i>S. satureiifolia</i>	var. of <i>S. satureiifolia</i>	–	–	Syn. of <i>S. multiaristata</i>	* reinstated
<i>S. laxa</i>	var. of <i>S. satureiifolia</i>	var. of <i>S. satureiifolia</i>	*	–	Syn. of <i>S. multiaristata</i>	Syn. of <i>S. multiaristata</i>
<i>S. multiaristata</i>	var. of <i>S. satureiifolia</i>	var. of <i>S. satureiifolia</i>	–	*	*	*
<i>S. ophryodonta</i>	–	–	–	*	*	Syn. of <i>S. veronicae</i>
<i>S. oxylaena</i>	*	*	*	–	–	Syn. of <i>S. veronicae</i>
<i>S. polycephala</i>	*	–	*	–	Syn. of <i>S. aristata</i>	Syn. of <i>S. aristata</i>
<i>S. sabulonis</i>	–	–	–	*	*	*
<i>S. satureiifolia</i>	*	*	*	*	*	*
<i>S. selloi</i>	Syn. of <i>S. oxylaena</i>	Syn. of <i>S. oxylaena</i>	–	*	*	*
<i>S. veronicae</i>	*	*	*	–	–	*
Number of species	6	4	6	7	11	10

All species were macro- and micromorphologically analyzed in detail, especially those previously used for delimiting species (*i.e.*, leaf, trichomes, and pappus traits); in all, 57 specimens were measured. The five florets of one to four capitula per specimen, all at the same stage of maturity, were analyzed. For light microscope examination, leaves were rehydrated, treated with a clearing process

(Zarlavsky 2014) and stained with 2% safranin. In addition, light microscope observations and photographs were taken on a Nikon Eclipse E200 microscope equipped with a digital camera. For scanning electron microscopy (SEM) studies, dry material was placed directly on the stubs and coated with palladium/gold. The samples were scanned and photographed in a Philips XL-30 SEM (Museo Argentino de Ciencias Naturales).

Drawings of *Stevia veronicae* were made by J.F. Rodríguez-Craveró and D.G. Gutiérrez using a Wild Heerbrugg M3 stereomicroscope with a camera-lucida attachment, and inked by V. Piñón.

General terminology for morphological structures follows Harris & Woolf Harris (1994), and Ramayya (1962).

Results

According to our results, we recognize 10 species of *Stevia* instead of 11 previously cited for Uruguay (*i.e.*, Freire 2008; Rodríguez-Craveró *et al.* 2017). These ten species of *Stevia* are present in Uruguay: *S. aristata*, *S. cinerascens*, *S. congesta*, *S. gratiolooides*, *S. hirsuta*, *S. multiaristata*, *S. sabulonis*, *S. satureiifolia*, *S. selloi* and *S. veronicae*. All the Uruguayan species of *Stevia* would belong to the series *Multiaristatae* (Candolle 1836; Grasshof *et al.* 1972) for showing more than 14 bristles per cypsela (at least in the adelphocarps), that are as long as, or somewhat longer than, the corolla.

These species are recognized by key features of stem branching, length of the internodes, the shape, size and arrangement of the leaves, general shape of the inflorescence, length of the peduncles, number of heads, color of the flowers, pappus, bristle size and pubescence of the plant. With the exception of the trichomes, these characters were previously employed by other authors to distinguish species. Variation in the type and number of hairs in phyllaries and peduncles was observed among individuals of the same species, and therefore have not taxonomic relevance.

Phyllotaxy and leaf traits

There are three main types of leaves arrangement: (1) the leaves of the main stem are clustered at the nodes, apparently verticillate (actually opposite) because the internodes are very short; with internodes of the lateral branches also very short (Fig. 1a); (2) the leaves of the main stem are conspicuously opposite and sparsely distributed with long internodes; in this case, the leaves of the lateral branches are apparently verticillate (Fig. 1b) as type one; and (3) leaves of the main stem and that of the lateral branches are conspicuously opposite (sometimes alternate in the upper leaves) and sparsely distributed with long internodes (Fig. 1c). There are intermediate leaf arrangement types.

In general, bigger leaves are found in mature individuals, located at the base of the plant and disposed on the main stem. Leaves are usually smaller in the upper part of the plant (*e.g.*, *S. aristata*, *S. cinerascens*) but sometimes they are of the same size throughout the whole stem (*e.g.*, *S. satureiifolia*, *S. hirsuta*).

Two main types of leaves were identified: (1) Linear type: sessile leaf with linear blade, up to 5 cm long and 7(–8) mm wide, sometimes fleshy with entire margin (*S. satureiifolia*, Fig. 2a) or not-fleshy and denticulate (*S. multiaristata*), a conspicuous midvein, and glandular pubescence, associated with an apparently verticillate phyllotaxy (see above type of phyllotaxy). This combination is found in *S. multiaristata* and *S. satureiifolia*; (2) Non-linear type: Sessile or pseudopetiolate (*i.e.*, with an inconspicuous short winged petiole) leaves

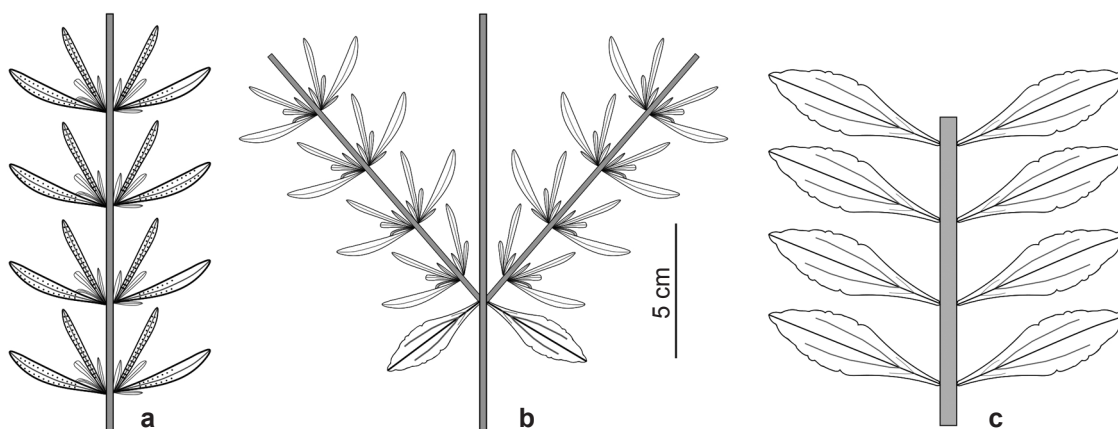


Figure 1 – a-c. Phyllotaxy and leaf traits in Uruguayan *Stevia* – a. leaves densely grouped in the main stem as in *S. satureiifolia*; b. leaves densely grouped in secondary branches as in *S. congesta*; c. evenly spaced leaves with opposite arrange in the primary stem as in *S. aristata*.

with narrowly elliptic, elliptic, ovate, obovate or rhomboidal blade, up to 9 cm long, up to 6 cm wide, entire, crenate or serrate margins, 1- or 3-nerved, and glandular to hirsute pubescence, associated with a conspicuously opposite phyllotaxy. *Stevia aristata*, *S. cinerascens*, *S. congesta*, *S. gratioloides*, *S. hirsuta* (Fig. 2), *S. sabulonis*, *S. selloi*, and *S. veronicae* show this combination.

The blade apex is generally acute, but it is obtuse in *S. congesta*, *S. sabulonis*, and *S. veronicae*. The blade base may be rounded, cuneate, or shortly decurrent (pseudopetiolate).

Inflorescences

The heads of the species of *Stevia* are sessile or pedunculate (up to 2 cm long); if the peduncle is longer than the height of the involucre (ca. 6 mm), it is considered here as a long pedunculate capitulum. The length of the capitula peduncles generally determines the type of secondary inflorescences as following.

The capitula of *Stevia* are borne in two main types of cymose inflorescences: (1) a corymbiform cyme, which has shortly pedunculate capitula, clustered at the top of the lateral branches, densely arranged (Fig. 3a). This type of cyme shows two variations; in one case, lateral and terminal flowering branches reach the upper part of the inflorescence (it is commonly named as “paucicephalous”; e.g. *S. hirsuta*), or, in the other case, the lateral flowering branches are shorter than main flowering axis (i.e. “pluricephalous”; e.g. *S. aristata*); and (2) a paniculiform cyme with few or solitary long pedunculate capitula at the top of the lateral branches, laxly arranged (Fig. 3b).

Trichomes

Trichomes (Figs. 4, 5) are present in main stems and branches, leaves (including phyllaries), inflorescence peduncles, florets and cypselae. There are four types of hairs in the main organs of the plant (papillae and sweeping hairs, for example, not were included in our analysis): (1) biseriate vesicular glandular, (2) simple conical, (3) cylindrical, and (4) twin hairs.

(1) Biseriate vesicular glandular hairs: foot 2-celled, body entire (named subtype β by Ramayya 1962; Figs. 4a; 5a) or differentiated into stalk and head (named subtype α by Ramayya 1962; Figs. 4b; 5b). Body or stalk 1–5-celled in each row, cells of the two rows alternate or subopposite, isodiametric or longer than broad. Inner walls thick, outer walls straight or slightly convex, smooth.

Head, when present, 4–5-celled in each row, of varied shapes, rounded or emarginate. Cuticular vesicle enclosing the last tier of cells or restricted to the apex, persistent or collapsing early. Found in stems, leaves, peduncles, phyllaries and externally in corollas.

(2) Simple conical: Foot 1–2-celled, body entire, uniseriate, 2–4-celled, acute at the apex, constricted at the cross walls (Figs. 4c; 5c). Basal cells wider than long, cross walls thick or thin, lateral walls straight or slightly convex or concave. Found in stems, leaves, peduncles and phyllaries.

(3) Cylindrical: foot 1-celled, body cylindrical, entire, uniseriate, 2–6-celled, cells usually longer above, occasionally the basal ones broader than long, cross walls slightly demarcated, cross and lateral walls thin, acute at the apex, smooth or slightly ridged (Figs. 4d; 5e). Found in stems, leaves (Fig. 2c), peduncles, phyllaries, and externally and internally in corollas. It is important to note that in *Stevia* this type of hair appears in an annular arrangement at the base of the lobes and the upper part of the throat inside the corolla.

(4) Twin: usually short (approximately 30 μm long), two short basal cells (one sometimes reduced), thick walls, and two elongated, cylindrical cells, equal in length or one shorter, acute at the apex, with thick walls, completely united with each other on their longitudinal walls or diverging at the apex (Figs. 4e; 5d). Found exclusively in the cypselae, mainly on the ribs.

The nature of the indumentum in phyllaries and peduncles impart a different appearance to the surface, which can be observed at the light microscope and have taxonomic importance. Generally, phyllaries, peduncles, and smaller surrounding bracts share the same indumentum. The glandular hairs, short and straight, are somewhat perpendicular to the surface. The conical hairs, long and articulate, are incurvate, almost parallel to the surface. Sometimes the glandular hairs are mixed with the conical hairs.

Cypselae and pappus

It is typical in the genus *Stevia* that 1–2 cypselae in each capitulum have a reduced pappus, a phenomenon called heterocarpy. However, heterocarpy is not common in the Uruguayan species (Fig. 6a-c). Some specimens of *S. satureiifolia* may have one cypselae with a reduced pappus (idiocarp, Fig. 7a) whereas the other four cypselae have the regular pappus (adelphocarps, Fig. 7b).



Figure 2 – a. Flowering terminal branch with fleshy leaves in *Stevia satureiifolia*; b. terminal branches of *Stevia hirsuta*, showing bristles in mature capitula; c. pubescence of leaves and stems in *Stevia hirsuta*; d. hills with rocky soil near Montevideo; e. river beach with sandy soil near Soriano. Photos by Diego G. Gutiérrez.

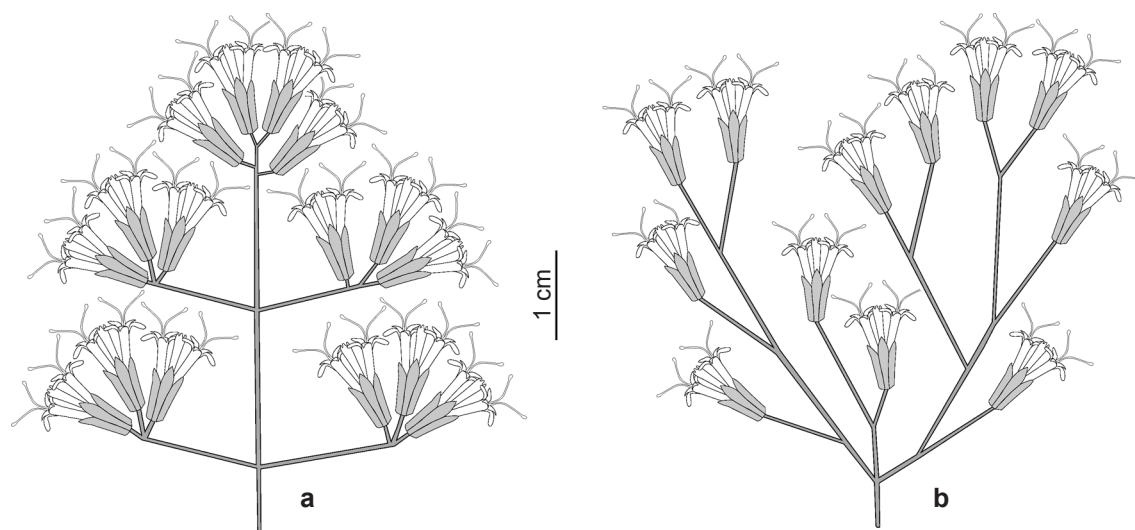


Figure 3 – a-b. Inflorescences in Uruguayan *Stevia* – a. corymbiform dense cyme; b. paniculiform lax cyme.

The pappus is constituted by elements of the same type or by a combination of bristles and scales, in number of 14–30. Pappus elements may be constituted by bristles as long as or longer than the corolla (Fig. 2b), by shorter bristles, and by short scales. The bristles may be linear or triangular, and the margins of the bristles and scales are barbelate or lacinate.

Taxonomical treatment

Stevia Cav., *Icon.* 4: 32, 1797. TYPE: *Stevia salicifolia* Cav., *Nom. Bot.* 2: 1284. 1874.

Mustelia Spreng. *Bot. Gart. Halle* 1: 28. 1801. TYPE: *Mustelia eupatoria* Spreng., *Nachtr. I. Bot. Gart. Halle*: 28. 1801. [= *Stevia eupatoria* (Spreng.) Willd.]

Nothites Cass. *Dict. Sci. Nat.* (2) 35: 163. 1825. TYPE: *Nothites latifolia* Cass., *Dict. Sci. Nat.* (2) 35: 163. 1825 [= *Stevia melissaefolium* (Lam.) Sch.-Bip.]

Xetoligus Raf. *New Fl. Am.* 4: 74. 1838. TYPE: *Xetoligus salicifolia* Raf., *New Fl. Am.* 4: 74. 1838. (= *Stevia salicifolia* Cav.)

Herbs, subshrubs or small shrubs, 0.2–1 m tall, usually with xylopodium. Stems erect or ascendant, terete, slightly striate, glabrous or pubescent, generally with glandular hairs. Leaves opposite, or opposite at the base and alternate terminally, sometimes densely grouped at the nodes, sessile or shortly petiolate; blades linear, elliptical, ovate, obovate or rhomboid, apex acute or obtuse, base decurrent, cuneate or rounded, margin entire, crenate, dentate or serrate, slightly or strongly 3-nerved or 1-nerved in linear blades, surfaces pubescent with glandular hairs. Inflorescences erect, terminal in one or several branches, densely corymbiform or laxly paniculiform cymes; capitula discoid sessile, or long or shortly pedunculate. Involucres cylindrical; phyllaries

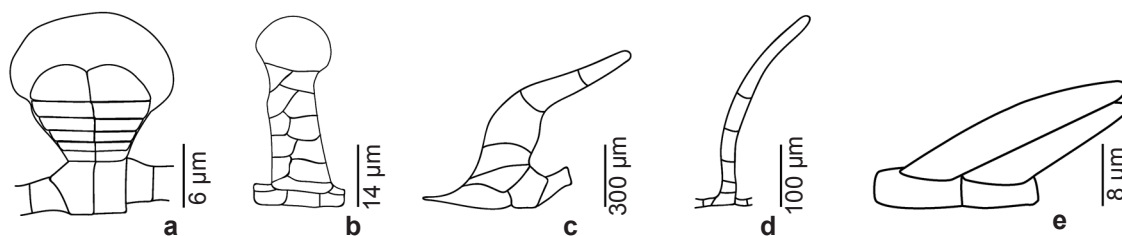


Figure 4 – a-e. Hairs in Uruguayan *Stevia* – a. simple biseriata glandular hair (subtype β); b. simple biseriata glandular hair (subtype α); c. simple conical hair; d. simple filiform hair; e. twin hair.

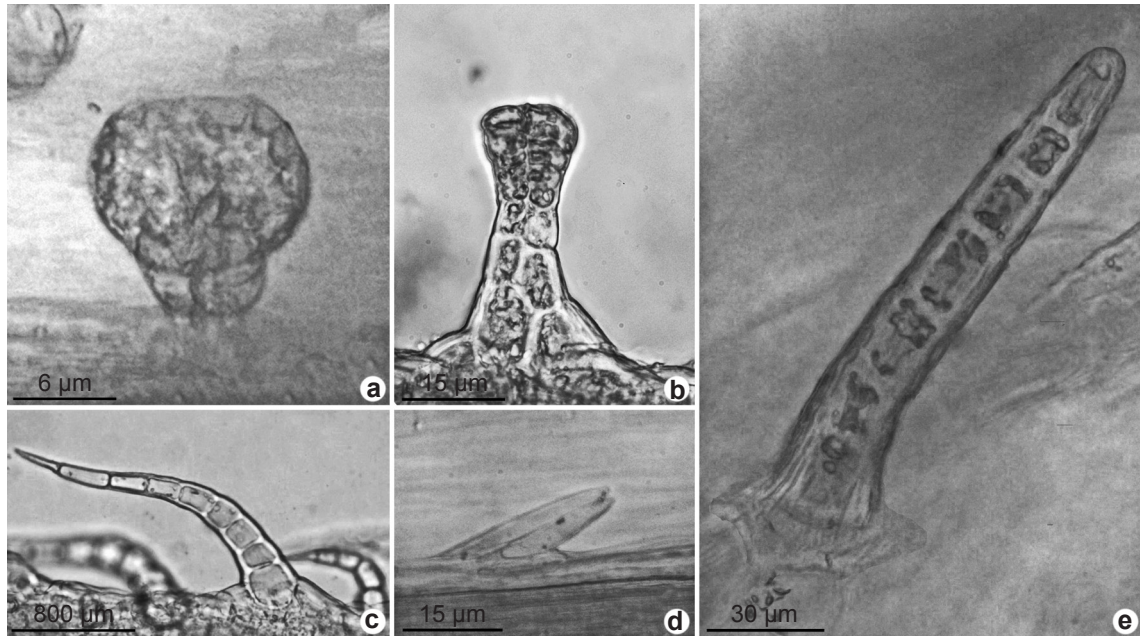


Figure 5 – a-e. Hairs in Uruguayan *Stevia* seen at the light microscope – a. cypselar simple biseriata glandular hair (subtype β); b. peduncle simple biseriata glandular hair (subtype α); c. leaf simple conical hair; d. twin hair; e. corolla simple filiform hair. a,d. *S. selloi* (Chebataroff 2465, LP); c. *S. cinerascens* (Marchesi et al. 23221, MVFA); b,e. *S. multiaristata* (Dematteis & Schinini 1603, CTES).

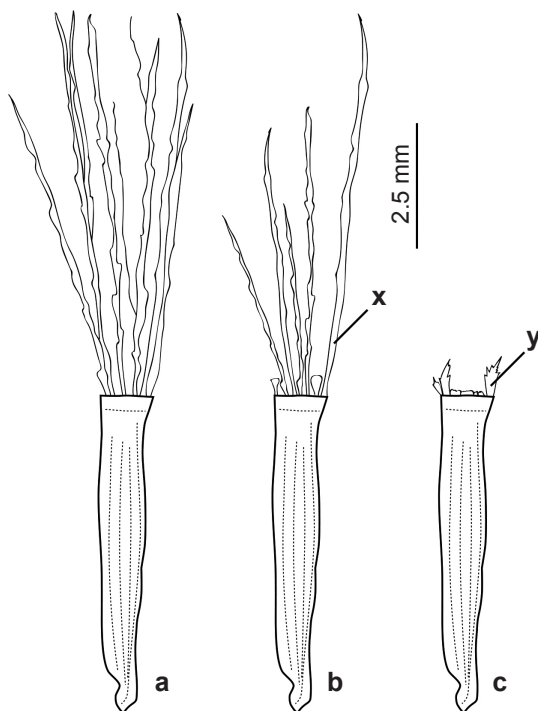


Figure 6 – a-c. Cypselas in Uruguayan *Stevia* – a. adelphecarp; b,c. idiocraps (x = bristle; y = scale).

5, 1-seriate, subimbricate, linear, narrowly obovate, elliptical or oblong, outer 2, convex, apex truncate, acute or obtuse, pubescent with glandular hairs, inner 3, somewhat planate, apex acute or obtuse, slightly pubescent with glandular hairs, otherwise glabrous; receptacles slightly convex, glabrous, with irregular surface. Florets 5(–6) per capitulum, isomorphic, hermaphrodite, corolla funnellform, generally longer than the involucre, white, pink or purple, inner surface with non-glandular hairs on the circular fold between throat and lobes, lobes ovate, at right angle to the throat, apex acute or obtuse, outer surface with sparsely glandular and/or non-glandular hairs. Anthers with apical appendages elliptical, margin irregular, thecae base obtuse, anther collars obovate, oblong or ovate. Style long, base not enlarged and glabrous, with a nectary disc; style branches long-linear, with stigmatic papillae in two lines, apical appendages flagelliform, with many sweeping hairs. Cypselae prismatic or ellipsoid, (4–)5–10-ribbed, pubescent with sparse short twin hairs, and generally glandular hairs, carpodium minutely annuliform or inconspicuous; with homocarpy, the same type

of pappus elements in each cypselae, or rarely heterocarpy, 4(–3) adelphocarps with long bristles, and the idiocarp with reduced pappus elements or the pappus absent. Pappus 1-seriate, bristles with margin barbelate or lacinate, apex not enlarged,

scales short with apex fimbriate, or a combination of bristles and scales, rarely absent, persistent, not fused in a ring at the base, pale brownish, yellowish or whitish. $x = 11, 12, 17$ (Grasshof *et al.* 1972; Watanabe *et al.* 1995, 2007).

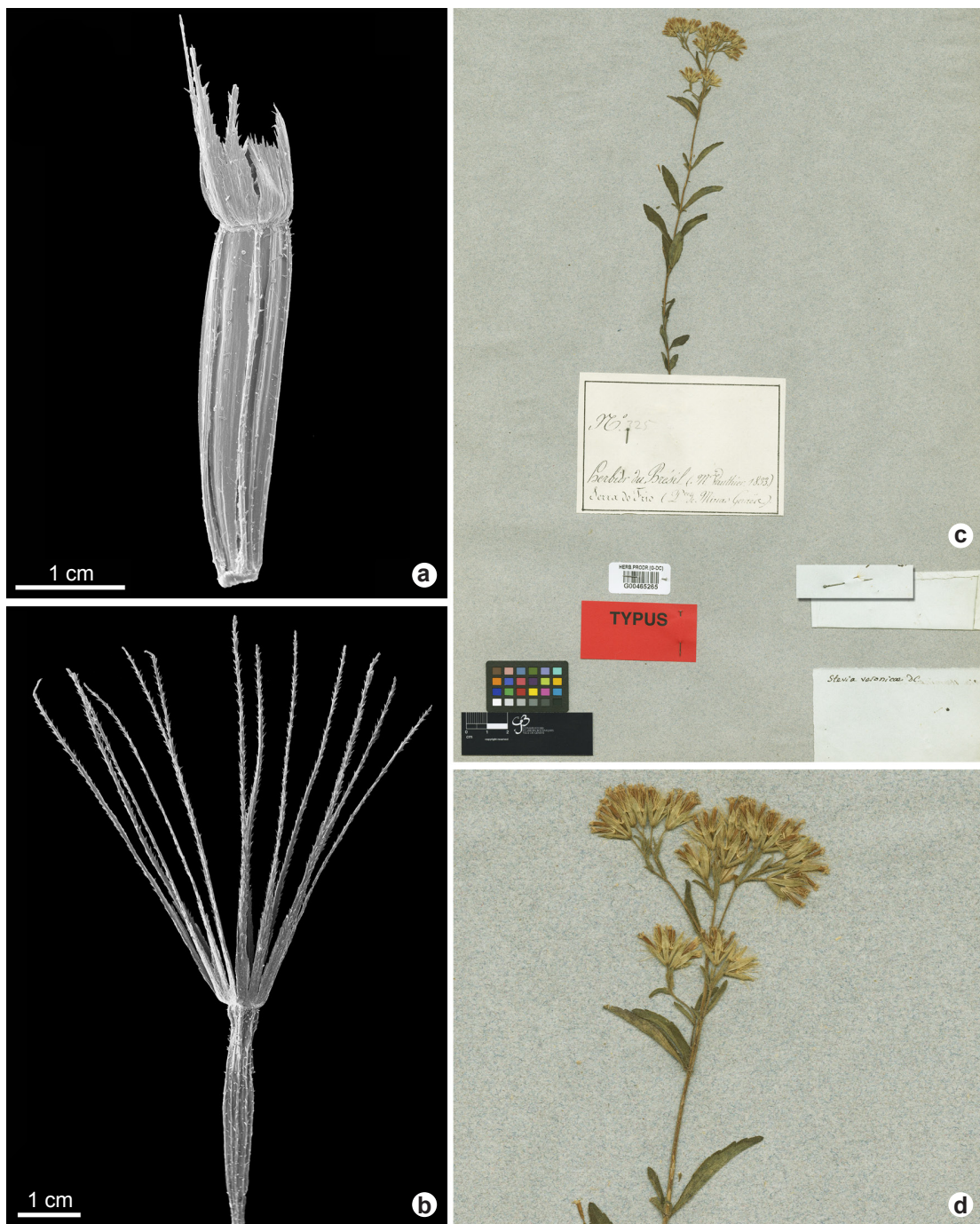


Figure 7 – a. Idiocarp of *Stevia satuireifolia* (Seijo *et al.* 2638, SI); b. adelphocarp of *Stevia satuireifolia* (Seijo *et al.* 2638, SI); c. the lectotype of *S. veronicae* (deposited in G); d. detail of phyllotaxis and terminal inflorescence of *S. veronicae*.

This genus is endemic of the Neotropics, distributed from southwestern United States throughout Mexico and Central America up to southern South America in northern Chile and northern Patagonia in Argentina. In Uruguay,

Stevia is widespread and inhabits all Uruguayan administrative divisions (*i.e.* departments), growing at hills, in grasslands, flood zones, rocky fields, river edges, sandy soils and anthropic environments (Fig. 2d,e).

Identification key to Uruguayan species of *Stevia*

1. Capitula laxly grouped at maturity, forming a paniculiform cyme.
 2. Narrowly elliptical leaf blades, more than 8 mm wide 2. *Stevia cinerascens*
 - 2'. Linear, oblong-rhomboidal, oblong or elliptical leaf blades, up to 7 mm wide.
 3. Densely grouped leaves on nodes; linear, rarely oblong, leaves.....6. *Stevia multiaristata*
 - 3'. Spread opposite leaves on nodes; elliptical, oblong or oblong-rhomboidal leaves.
 4. Leaves twice as long as wide, elliptical or oblong leaf blade; more than 16 headed cymes.....9. *Stevia selloi*
 - 4'. Leaves as long as wide, oblong-rhomboidal leaf blade, 4–16 headed cymes.....4. *Stevia gratioloides*
- 1'. Capitula densely grouped, forming a corymbiform cyme.
 5. Internodes less than 1.5 cm long, leaves usually densely grouped on nodes.
 6. Plants branched from the middle of main stem, peduncles with glandular hairs only, phyllaries with obtuse apex, pappus of bristles equal or less than 6.3 mm long 3. *Stevia congesta*
 - 6'. Plants branched from xylopodium; peduncles with glandular and non-glandular hairs; phyllaries with acute apex; pappus of bristles more than 6.3 mm long.
 7. Peduncles of capitula with sessile glandular and non-glandular hairs; corollas with pinkish or purplish tube and throat 8. *Stevia satireiifolia*
 - 7'. Peduncles of capitula with stalked glandular hairs; corollas with whitish tube and throat 5. *Stevia hirsuta*
 - 5'. Internodes equal or more than 1.5 cm long; opposite leaves conspicuously spread on nodes.
 8. Erect plants, more than 40 cm tall; acute leaf blade apex; usually many-headed cymes up to 20 per plant..... 1. *Stevia aristata*
 - 8'. Small ascendant plants, equal or less than 40 cm tall; obtuse or subacute leaf blade apex; few-headed cymes up to 8 per plant.
 9. Branched plants; elliptical or obovate leaf blades; deeply serrate leaf margin..... 7. *Stevia sabulonis*
 - 9'. Unbranched plants; narrowly elliptical leaf blades; entire or crenulate leaf margin 10. *Stevia veronicae*

1. *Stevia aristata* D. Don ex Hook. & Arn., Companion Bot. Mag. 1: 238. 1836. TYPE. Argentina. Pampas de Buenos Aires, *Gillies 162* (lectotype K 000488792 [photo!], designated by Freire and Ariza Espinar [2014: 413]; isolectotypes, E 00433411 [photo!], GH 00012800 [photo!]). = *Stevia polycephala* Baker (1876: 207) non Bertoloni (1840: 432), nom. illeg. TYPE. Brazil. “Brasilia”, *Sellow 4382* (lectotype K 000488761 [photo!], designated by Rodríguez-Cravero *et al.* [2017: 117]) = *Stevia aristata* D. Don ex Hook. & Arn. var. *typica* B.L. Rob., Contr. Gray Herb. 90: 8. 1930, nom. inval.

Herbs perennial, 0.45–0.8 m tall, with multiple main stems growing from the base, branchy from the middle towards the inflorescence, xylopodium present. Stems erect, terete, striate, glandular-pubescent, leafy up to the inflorescence, internodes 1.5–2 cm long. Leaves opposite, usually densely grouped at the nodes, sessile; blade elliptical-ovate, 2.5–9 × 0.9–6 cm, apex acute, base decurrent or cuneate, forming a pseudopetiole, margin serrate, 3-nerved from the base, surfaces pubescent, with sessile glandular and non-glandular hairs. Inflorescences erect, dense, disposed in 2–10 pairs of terminal branches, in one or several corymbiform

cymes; capitula sessile or shortly pedunculate, peduncles 0.1–5 mm long, densely pubescent, with sessile or stalked glandular hairs and non-glandular hairs. Involucre 5.5–6.5 × 4–6 mm; phyllaries oblong-ovate, 5–6.5 × 1–1.5 mm, outer 2, apex acute, pubescent, with stalked and sessile glandular hairs, and non-glandular hairs, inner 3, apex acute, slightly pubescent. Florets with corollas 5.5–8.5 × 0.9–1.8 mm, throat whitish or purplish, throat plus tube 4.8–6.7 mm long, outer surface laxly pubescent, with sessile glandular hairs and non-glandular hairs, lobes elliptical or ovate, 1–2.1 × 0.6–1 mm, apex acute, white, with non-glandular hairs; anthers 1.8–2.5 × 0.3–0.4 mm, apical appendages elliptical, ca. 0.4 × 0.2 mm, margin irregular, thecae base obtuse, anther collars ovate or oblong, 0.15–0.21 × 0.05–0.10 mm; style 8–10.3 mm long; style branches ca. 4.5 mm long. Cypselae prismatic or ellipsoid, 2.5–3.5 × 0.4–0.85 mm, 5-ribbed, sparsely pubescent with sessile glandular hairs. Pappus isomorphic of 18–24 bristles, 4.8–7 mm long.

This species is distributed in Argentina, Paraguay and Uruguay. Frequent in southwestern Uruguay (Fig. 8), where it has been collected in wetland, flooding areas, grasslands and margins of forest with sandy soil.

Iconography. Cabrera, 1941: 27, fig. 5; Cabrera, 1963: 35, fig. 6; Cabrera, 1974: 160, fig. 77 a, b; Cabrera, 1996: 283, fig. 113; Freire & Ariza Espinar, 2014: 414.

Additional specimens examined: URUGUAY. ARTIGAS: Cuareim, 6.III.1903, fl. e fr., *Berro 2482* (MVFA); sur del Arroyo Guaviyú, 19–23.XII.1977, fl. e fr., *Del Puerto & Berreta 14976* (MVFA). CANELONES: Canelón Chico, 31.III.1910, fl. e fr., *Berro 5822* (MVFA). Las Brujas, II.1941, fl. e fr., *Lombardo 3853* (MVJB). CERRO LARGO: Arroyo Zapallar, 24.XII.1961, fl. e fr., *Legrand 4784* (MVM). COLONIA: San Juan, 17.IV.1965, fl. e fr., *Cabrera 30* (LP). FLORIDA: Arroyo Paraná, 25.III.1994, fl. e fr., *Bayce et al. 24652* (MVFA). Cerro Colorado, 16.II.1944, fl. e fr., *Gallinal et al. PE-5459* (LP, MVM). Isla Mala, III.1934, fl. e fr., *Lombardo 1371* (MVJB). PAYSANDÚ: Estación Experimental M. Cassinoni, 1.III.1969, fl. e fr., *Del Puerto & Marchesi 8308* (MVFA); Río Queguay, II.1940, fl. e fr., *Chebataroff 11309* (LP); Ruta 90, campo al norte de Padule, 16.XII.1998, fl. e fr., *Marchesi & Vignale 28642* (MVFA). RÍO NEGRO: Campo El Jabalí, 2.IV.1998, fl. e fr., *Marchesi & Vignale 28163* (MVFA). Tres Bocas (Estancia El Rosario), 17.IV.1995, fl. e fr., *Marchesi & Bonifacino 24478* (MVFA). ROCHA: Arroyo Los Ceibos, III.1938, fl. e fr., *Lombardo 2324* (MVJB); Fuerte San Miguel, 15.II.1962, fl. e fr., *Del Puerto 1316* (MVFA). Santa Teresa, fl. e fr., *Lombardo 6041* (MVJB). SALTO: Arroyo Sopas, 30.I.1937, fl.

e fr., *Rosengurtt 1027* (MVJB, MVM). Rincón de Daymán, 24.III.1910, fl. e fr., *Osten 5456* (MVM). Salto Grande, 18.IV.1905, fl. e fr., *Berro 3195* (MVFA). SAN JOSÉ: Bañados de La Barra, 1925, fl. e fr., *Legrand* (LP072078). Barra de Santa Lucía, III.1878, fl. e fr., *Arechavaleta 9* (MVM); 13.IV.1907, fl. e fr., *Berro 4065* (MVFA); 1936, fl. e fr., *Osten* (MVM); 4.IV.1947, fl. e fr., *Legrand 1925* (MVM). Rincón de Arazatí, 24.III.1935, fl. e fr., *Legrand 472* (LP, MVM); Río San José, 21.IV.1957, fl. e fr., *García Zorrón 1824* (MVFA). SORIANO: Juan Jackson, 19.III.1940, fl. e fr., *Gallinal et al. PE-5143* (MVM). Mercedes, 17.II.1892, fl. e fr., *Osten 2816, 2909* (MVM); Vera, 22.II.1898, fl. e fr., *Berro 259* (MVFA). TACUAREMBO: Gruta de los Cuervos, 9.III.1966, fl. e fr., *Rosengurtt et al. 9992* (MVFA). TREINTA Y TRES: Ruta 18, entre Vergara y Paso del Dragón, 7.I.1980, fl. e fr., *Brescia et al. 16276* (MVFA).

2. *Stevia cinerascens* Schultz-Bip. ex Baker, in Martius, *Fl. bras* 6 (2): 209. 1876. TYPE. Brazil. “Brasilia”, *Sellow 1949* (73) (lectotype here designated, K 000488750 [photo!]; isolectotypes B [destroyed, photo Field Museum 237903!], P 00704312 [photo!], P 00704313 [photo!]).

Herbs perennial, 0.2–0.6 m tall, with multiple main stems growing from the base, branchy from the middle towards the inflorescence, xylopodium present. Stems erect or ascendant, terete, striate, glandular-pubescent, leafy up to the inflorescence, internodes 1.2–2 cm long. Leaves opposite, sessile; blade narrowly elliptical, 2–6 × 0.8–2.5 cm, apex acute, base decurrent, cuneate or rounded, margin serrate from the apex to the lower third, 3-nerved from the base, upper surface glabrescent, with sessile glandular hairs spread, and non-glandular hairs on veins and margins, under surface pubescent, with sessile and stalked glandular hairs, and non-glandular hairs. Inflorescences erect, lax, disposed in 4–8 pairs of terminal branches, in a paniculiform cyme; capitula pedunculate, peduncles 5–25 mm long, densely pubescent, with sessile glandular and non-glandular hairs. Involucre 5–7 × 2–3 mm; phyllaries elliptical-linear, 5–6 × 0.8–1.1 mm, outer 2, apex acute, pubescent, with sessile glandular and non-glandular hairs, inner 3, apex acute, slightly pubescent. Florets with corollas 5.5–6.5 × 0.7–0.9 mm, throat whitish or pinkish, throat plus tube 4–5.5 mm long, outer surface laxly pubescent, with sessile glandular and non-glandular hairs, lobes ovate or elliptical, 1.5 × 0.7–1 mm, apex acute, white, with non-glandular hairs; anthers 1.3–1.4 × 0.2–0.3 mm, apical appendages elliptical, ca. 0.4 × 0.15 mm, margin irregular, thecae base obtuse, anther collars elliptical, 0.1–0.15 × 0.05–0.1 mm;

style 5.1–5.6 mm long; style branches ca. 2.4 mm long. Cypselae prismatic or ellipsoid, 2.4–4.3 × 0.4–0.8 mm, 5-ribbed, sparsely pubescent with sessile glandular hairs. Pappus isomorphic of 15–25 bristles, 5.1–6.4 mm long.

Stevia cinerascens Baker is based on specimens collected in Brazil. Baker (1876) cited three original materials, two from southern Brazil (*Sello 73* and *Sello 74* and one from Porto Alegre (*Fox s.n.*). In the absence of the indication of a

single specimen as the type, all the specimens cited in the protologue have to be treated as syntypes (Art. 9.5 of ICN, McNeill *et al.* 2012).

We found materials collected by Sello that fit accurately with the protologue deposited in K and P, and a photo kept at F of a material in B that is currently destroyed. In particular, they are one sheet labelled “*Sello 74*” in P (P 00704314), and three sheets “*Sello 1949 (73)*” that were found one in K (K 000488750) and two in P (i.e. P 00704312,

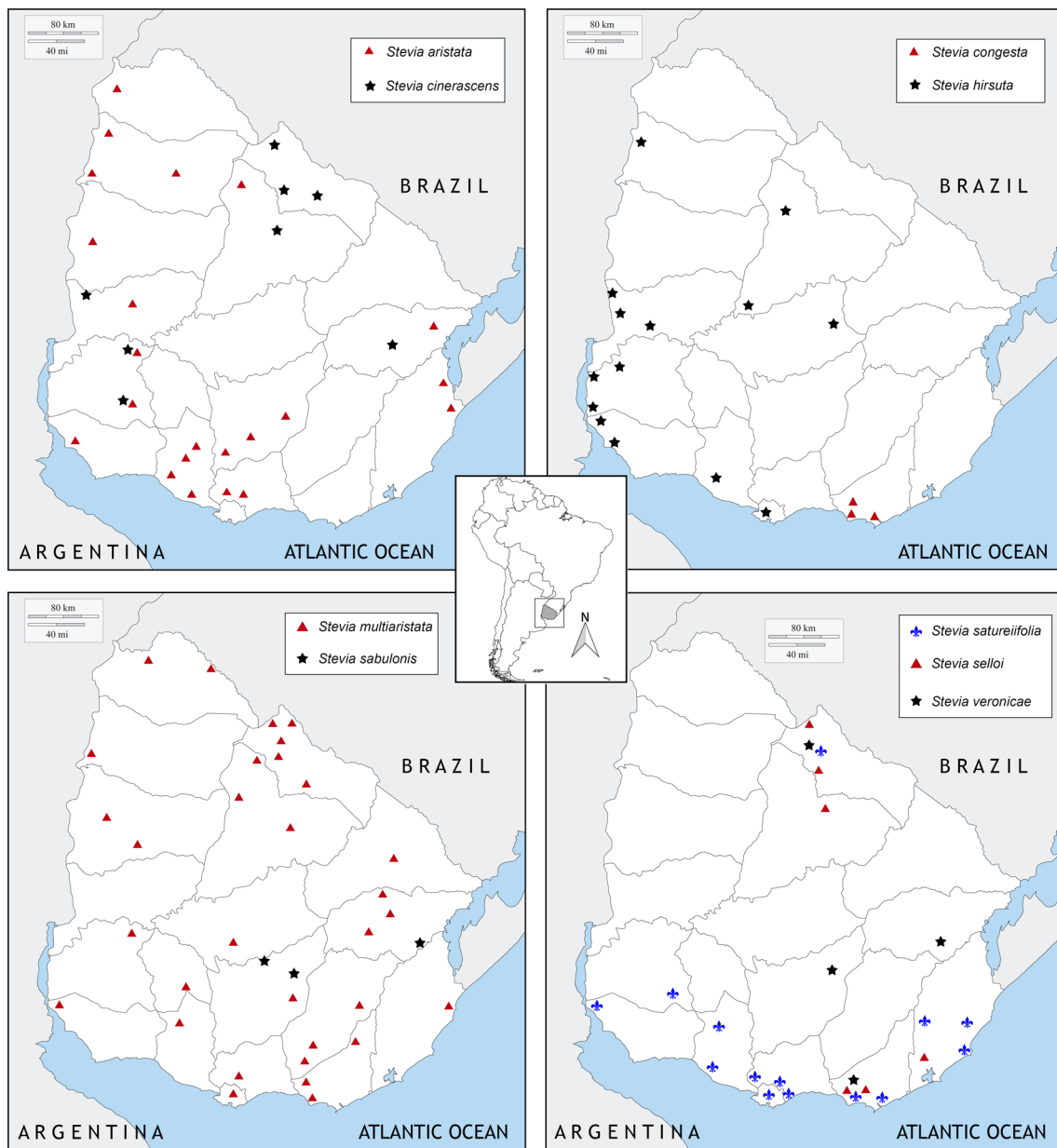


Figure 8 – Distribution map for Uruguayan species of *Stevia*.

P 00704313). In addition, according to Stafleu & Corwan (1976–1988), the types of British Botanist J.G. Baker are kept mainly at K where he has worked. Thus, the specimen at K (K 000488750) is herein designated as the lectotype.

This species is distributed in Northeastern Argentina, Southern Brazil and Uruguay. It is recorded from Río Negro, Rivera, Soriano, Tacuarembó and Treinta y Tres departments (Fig. 8), uncommon, associated with hills and slopes, in calcareous and sandy soils.

Iconography. Freire & Ariza Espinar, 2014: 418.

Additional specimens examined: URUGUAY. RÍO NEGRO: Campo El Jabalí, 11.IV.1994, fl. e fr., *Marchesi et al.* 23221, 23223 (MVFA); 3.V.1994, fl. e fr., *Marchesi & Vignale* 23424 (MVFA); 2.IV.1998, fl. e fr., *Marchesi & Vignale* 28191 (MVFA). PASO YAPEYÚ, 20.III.1901, fl. e fr., *Berro* 1492 (MVFA). RIVERA: Bajada de Pena, 22.V.1964, fl. e fr., *Del Puerto & Marchesi* 3663 (MVFA); Ruta 29, a 5 km al este de Ruta 5, 10.IV.1984, fl. e fr., *Bayce et al.* 17240 (MVFA); Ruta 30, km 110, 24.XI.1992, fl. e fr., *Izaguirre et al.* 21485 (MVFA); Ruta 30, Arroyo Rubio chico, 29.III.1985, fl. e fr., *Marchesi et al.* 17619 (MVFA). DPTO SORIANO: Vera, III.1913, fl. e fr., *Berro* 6539 (MVFA). TACUAREMBO: Bañados de Rocha, 22–28.III.1921, fl. e fr., *Osten* (MVM 16082). TREINTA Y TRES: Sierra del Yerbal, 21.III.1902, fl. e fr., *Berro* 2483 (MVFA).

3. *Stevia congesta* Hook. & Arn., Companion Bot. Mag. 1: 238, 1835. TYPE. Uruguay. “Maldonado, *Tweedie*” (lectotype E 00322816 [photo!], designated by Rodríguez-Cravero *et al.* [2017:118]; isolectotype K 000488777 [photo!]).

Herbs perennial, 0.1–0.8 m tall, simple or with multiple main stems from the base, branchy from the middle towards the inflorescence, xylopodium present. Stems erect or ascendant, terete, striate, densely glandulous, leafy up to the inflorescence, internodes 0.3–1.3 cm long. Leaves opposite, usually densely grouped at the nodes, sessile; blade narrowly elliptical-obovate, upper leaves usually elliptical-linear, 0.4–2 × 0.2–1.5 cm, apex frequently rounded, base decurrent, cuneate or rounded, margin entire or slightly crenate, inconspicuously 3-nerved, glandulous, both surfaces with sessile and stalked glandular hairs, and scarce non-glandular hairs. Inflorescences erect, dense, disposed in 2–4 pairs of terminal branches, in one or several corymbiform cymes; capitula solitary or in pairs, sessile or shortly pedunculate, peduncles 1–10 mm long, densely pubescent, with sessile and stalked glandular

hairs. Involucres 4.5–6.5 × 2–4 mm; phyllaries elliptical-ovate, 4.5–6.5 × 1–1.6 mm, outer 2, apex obtuse, rare acute, densely pubescent, with sessile and stalked glandular hairs, and non-glandular hairs, inner 3, apex obtuse, pubescent. Florets with corollas 6.5–8.5 × 1–1.9 mm, throat whitish, throat plus tube 5–5.8 mm long, outer surface laxly pubescent, with sessile glandular and non-glandular hairs, lobes ovate or elliptical, 1.7–2.9 × 0.6–1 mm, apex acute, white, with non-glandular hairs at the apex; anthers 1.8–2.1 × 0.1–0.3 mm, apical appendages elliptical, 0.4–0.5 × 0.1–0.15 mm, margin irregular, thecae base obtuse, anther collars elliptical, 0.1–0.15 × 0.05–0.1 mm; style 7–11 mm long; style branches 2.6–5 mm long. Cypselae prismatic or ellipsoid, 2.7–4.7 × 0.5–1 mm, 5-ribbed, sparsely pubescent with sessile glandular hairs. Pappus isomorphic of 14–30 bristles, 5.3–6.3 long.

This species is distributed in Southern Brazil (Rio Grande do Sul) and Southern Uruguay. It is only recorded from the Maldonado department (Fig. 8), growing on hills, in rocky soils.

Iconography. Rodríguez-Cravero *et al.* 2017: 118, fig. 1.B-C.

Additional specimens examined: URUGUAY. MALDONADO: Cerro de la Virgen, III.1930, fl. e fr., *Lombardo* 5117 (MVJB). PIRIÁPOLIS, IV.1937, fl. e fr., *Lombardo* 1882, 2330 (MVJB). PLAYA SOLIS, 16.III.1915, fl. e fr., *Berro* 8008 (MVFA). PUNTA BALLENA, 19.II.1941, fl. e fr., *Cabrera* 7122 (LP); IV.1942, fl. e fr., *Lombardo* 6250 (MVJB); 23.IV.1954, fl. e fr., *Del Puerto & Marchesi* 3437 (MVFA); 31.III.1973, fl. e fr., *Izaguirre & Laguardia* 12004 (MVFA). SIERRA DE LAS ÁNIMAS, VI.1937, fl. e fr., *Lombardo* 1988 (MVJB); 28.XII.1963, fl. e fr., *Marchesi* 691 (MVFA); 23.IV.1964, fl. e fr., *Del Puerto and Marchesi* 3437 (MVFA); 7.III.1968, fl. e fr., *Costa* 7175; 9.III.1968, fl. e fr., *Costa* 7192, 7193 (MVFA); 5.IV.1968, fl. e fr., *Lema & Marchesi* 7103 (MVFA); 10.IV.1986, fl. e fr., *Marchesi et al.* 18213 (MVFA).

4. *Stevia gratioloides* Hook. & Arn., Companion Bot. Mag. 1: 238, 1835. ≡ *Stevia veronicae* DC. var. *gratioloides* (Hook. & Arn.) Baker, *Fl. bras.* 6(2): 211. 1876. TYPE. Brazil. Rio Grande do Sul, “Rio Grande, *Tweedie*” (lectotype K 000488745 [photo!], designated by Rodríguez-Cravero *et al.* [2017:119]).

Herbs perennial, 0.1–0.3 m tall, simple and slightly branchy from the middle towards the inflorescence, xylopodium present. Stems erect or ascendant, terete, striate, glandular-pubescent, leafy up to the inflorescence, internodes 0.5–2 cm long. Leaves opposite, sessile; blade oblong-rhomboidal,

0.5–1.5 × 0.3–0.7 cm, apex rounded, base rounded, margin slightly crenate, inconspicuously 3-nerved, pubescent, with sessile glandular and scarce non-glandular hairs. Inflorescences erect, lax, disposed in 1–4 pairs of terminal branches, in a paniculiform cyme; capitula, solitary at maturity, largely pedunculate, peduncles 8–20 mm long, densely pubescent, with sessile and stalked glandular hairs. Involucres 4.5–6 × 2–3 mm; phyllaries elliptical-linear, 4.5–6 × 1–1.2 mm, outer 2, apex acute, densely pubescent, with sessile and long stalked glandular hairs, inner 3, apex acute, slightly pubescent. Florets with corollas ca. 5 mm long, throat purplish, lobes elliptical or ovate, 1.0 × 0.5 mm, apex acute, white. Pappus isomorphic of 14–20 bristles, ca. 5 mm long.

It has not been possible to measure some florets traits. Other specimens assigned to this species by previous authors (e.g., Berro 2482, MVFA) have been herein identified as *S. aristata*.

This species is distributed in Southern Brazil and Northern Uruguay. It is only known from the original collection. It is important to mention that Banda Oriental was indicated on the label of the original material. Banda Oriental (or Banda Oriental del Uruguay) was the former name for the current Republic of Uruguay. However, the northern boundaries of Uruguay with Brazil at that time (approximately 1832) were imprecise and part of what was considered Banda Oriental, nowadays belongs to southwestern Rio Grande do Sul state. Therefore, *Stevia gratioloides* is included with doubts among the species of Uruguay until new collections corroborate its presence in the country.

Iconography. Rodríguez-Craveró *et al.* 2017: 120, fig. 2.C-D.

Additional specimens examined: URUGUAY. Locality imprecise, Banda Oriental, fl., *Tweedie* (K 000488747, 000488748).

5. *Stevia hirsuta* Hook. & Arn., non DC. 1836 nom. illeg., *Companion Bot. Mag.* 1: 239. 1836. TYPE. Argentina. “Buenos Ayres [Aires], *Tweedie*” (lectotype K 000488775 [photo!], designated by Freire & Ariza Espinar [2014: 425]; isolectotype E 00322866 [photo!]).

= *Stevia entereiensis* Hieron., *Bot. Jahrb. Syst.* 22: 739. 1897. TYPE. Argentina. Entre Ríos, Concepción del Uruguay, 9.V.1877, *Lorentz 952* (lectotype GOET 002054 [photo!], designated by Freire & Ariza Espinar [2014: 418]; isolectotypes P 00704288 [photo!], US 1233652 [photo!]). New synonym.

= *Stevia entereiensis* Hieron. var. *minor* Hieron., *Bot. Jahrb. Syst.* 22: 739, 1897. TYPE. Paraguay. Süd Paraguay, IX.1892, *Kuntze* (lectotype NY 00260169 [photo!], designated by Freire & Ariza Espinar [2014: 418]). New synonym.

= *Dissothrix hassleriana* Chodat, *Bull. Herb. Boissier ser.* 2, 1: 411, 1901. TYPE. Paraguay. Central dept., “In campo pr. [prope] Tacuaral” [currently Ypacarai], Sep, [*Hassler*] 1034 (lectotype G 00381744 [photo!], designated by Rodríguez-Craveró *et al.* [2017: 119]; isolectotype G 00381742 [photo!]). New synonym.

Herbs perennial, 0.2–0.6 m tall, simple or with multiple main stems growing from the base, slightly branched towards to the inflorescence or unbranched, xylopodium present. Stems erect or ascendant, terete, striate, glandular-pubescent, leafy up to the inflorescence, internodes 0.3–1.4 cm long. Leaves opposite, usually densely grouped at the nodes, sessile; blade oblong to elliptical-obovate, 2–5 × 0.4–2 cm, apex acute, base decurrent, cuneate or rounded, margin crenate-serrated on the upper half, frequent 3-nerved from the base, 1-nerved in oblong blades, upper surface pubescent to hirsute, with sessile glandular and non-glandular hairs, under surface pubescent on the margins and veins. Inflorescences erect, dense, disposed in 1–5 pairs of terminal branches, in a corymbiform cyme; capitula sessile or pedunculate, peduncles (2–)5–15 mm long, densely pubescent, with sessile and stalked glandular hairs, and non-glandular hairs. Involucres 5.5–8 × 4–6 mm; phyllaries oblong-ovate, (5.5–)6–7.5(–8) × 1–1.5 mm, outer 2, apex acute, pubescent, with sessile and stalked glandular hairs, and non-glandular hairs, inner 3, apex acute, slightly pubescent. Florets with corollas 5.7–8.8 × 0.9–1.8 mm, throat whitish, throat plus tube 4.8–6.7 mm long, outer surface slightly pubescent, with sessile glandular and non-glandular hairs, lobes elliptical or ovate, 1–2.1 × 0.6–1 mm, apex acute, white, with non-glandular hairs; anthers ca. 1.8–2.5 × 0.3–0.4 mm, apical appendages elliptical, ca. 0.4 × 0.2 mm, margin irregular, thecae base obtuse, anther collars ovate or elliptical, 0.15–0.21 × 0.05–0.10 mm; style 9–11.1 mm long; style branches ca. 4.5 mm long. Cypselae prismatic or ellipsoid, 3.2–4.7 × 0.4–0.8 mm, 5-ribbed, sparsely pubescent with sessile glandular hairs. Pappus isomorphic of 15–27 bristles, (6.3–)6.4–8 mm long.

Hooker & Arnott (1836) described *S. hirsuta* by its hirsute pubescence in stems and leaves, densely grouped leaves, serrate leaf margin and

pappus formed by many bristles. Later on, Baker (1876: 208) recognized this species as a part of the variability of *S. satureiifolia*. According to our study, however, *S. hirsuta* differs conspicuously from *S. satureiifolia* based on its morphological characters such as leaf blade shape (narrowly ovate in *S. hirsuta* versus linear in *S. satureiifolia*), leaf margin (crenate versus entire), number of capitula per inflorescence (20–30 versus 14–16), number of pappus bristles (17–30 versus 14–19) and corolla color (white versus pink).

More recently, Cabrera & Freire (1997) considered *S. hirsuta* as a synonym of *S. multiaristata* Spreng., a criterion followed in further works (e.g., Freire 2008; Freire & Ariza Espinar 2014; Rodríguez-Craverro *et al.* 2017). However, *S. hirsuta* can be separated from *S. multiaristata* by its leaf shape (narrowly ovate versus linear in *S. multiaristata*), inflorescences (corymbiform dense cyme versus paniculiform lax cyme), indumentum (hirsute versus pubescent).

On the other hand, *S. entriensis* and *Dissothrix hassleriana* Chodat (1901: 411) constitute new synonyms of *S. hirsuta*, on the basis of similarities in the original descriptions and leaf blade shape, number of pappus bristles and pubescence. The name *S. hirsuta* has priority on *S. entriensis* based on the ICN.

This species is distributed in Central-eastern Argentina, Paraguay and southwestern and central Uruguay. It has been recorded as frequent in Colonia, Río Negro, San José, and Soriano departments (Fig. 8), and uncommonly in Durazno, Montevideo, Salto and Tacuarembó, inhabiting natural or anthropic shores and riverbanks, in dry or sandy soils.

Iconography. Cabrera, 1974: 162, fig. 78 a-g (sub *Stevia entriensis*); Freire, 2009: 383, fig. 177 (sub *Stevia entriensis*); Cabrera, 1996: 296, fig. 119 (sub *Stevia entriensis*); Freire & Ariza Espinar, 2014: 419 (sub *Stevia entriensis*).

Additional specimens examined: URUGUAY. COLONIA: Arroyo del Molino, IV.1913, fl. e fr., *Berro 6761* (MVFA); entre Punta Gorda y Puerto Camacho, 21.II.1990, fl. e fr., *Izaguirre & Beyhaut 19640* (MVFA). MARTÍN CHICO, Puerto Dorado, 31.III.1993, fl. e fr., *Marchesi et al.* (MVFA). NUEVA PALMIRA, 1896, fl. e fr., *Arechavaleta 4066* (MVM); 1.III.1975, fl. e fr., *Marchesi 12347* (MVFA). PUERTO DEL SAUCE, 28.II.1900, fl. e fr., *Berro 1118* (MVFA). RIACHUELO, 16.XI.1936, fl. e fr., *Cabrera 3922* (LP). DURAZNO: Estación Las Palmas, III.1922, fl. e fr., *Schröder* (MVM 16518). MONTEVIDEO: Barra de Santa Lucía, III.1878, fl. e fr., *Arechavaleta 10* (MVM). RÍO NEGRO: norte del Río

Negro, 21.III.1915, fl. e fr., *Berro 8056* (MVFA). NUEVO BERLÍN, 17.III.1989, fl. e fr., *Marchesi & Davies 19539* (MVFA). SAN JAVIER, 2.III.1969, fl. e fr., *Del Puerto & Marchesi 8413* (MVFA). SALTO: Sausal, 21.IV.1905, fl. e fr., *Berro 3196* (MVFA). SAN JOSÉ: desembocadura del Arroyo Cufre, 28.II.1967, fl. e fr., *Lema 6504, 6507* (MVFA). RINCÓN DE ARAZATÍ, 31.III.1979, fl. e fr., *Brescia et al. 16045* (MVFA). SORIANO: Mercedes, 13.III.1903, fl. e fr., *Berro 2480* (MVFA). PLAYA LA AGRACIADA, 8.III.1964, fl. e fr., *Arrillaga et al. 1989* (MVFA). TACUAREMBÓ: Paso de los Toros, 23.II.1936, fl. e fr., *Herter 2042* (Z). VALLE EDÉN, I.1939, fl. e fr., *Chebaroff 5318* (LP).

6. *Stevia multiaristata* Spreng. *Syst. veg.* 3: 449. 1826. ≡ *Stevia satureiifolia* (Lam.) Sch.Bip. var. *multiaristata* (Spreng.) Baker, *Fl. bras.* 6(2): 208. 1876. TYPE. Uruguay. Montevideo, *Sellow 529* [*Herb. Sprengel 537*] (lectotype P 00704370 [photo!], designated by Freire & Ariza Espinar [2014:425]; isolectotype P 00704369 [photo!]). = *Stevia laxa* Hook. & Arn., *Comp. Bot. Mag.* 1: 238, 1835. ≡ *Stevia satureiifolia* (Lam.) Sch.Bip. var. *laxa* (Hook. & Arn.) Baker, *Fl. bras.* 6(2): 209. 1876. TYPE. Argentina. “Buenos Ayres, *Tweedie*” (lectotype E 00322864 [photo!], designated by Freire & Ariza Espinar [2014:425]; isolectotype K 000488773 [photo!]). = *Stevia megapotamica* DC., *Prodr.* 5: 123, 1836. TYPE. Brazil. Rio Grande do Sul, *Gaudichaud s.n.* [*Herb. Imp. Bras. 928*] (lectotype here designated, P 00704368 [photo!]; isolectotype G 00465268 [photo!]). = *Pectis violacea* Griseb., *Symbol. fl. argent.:* 201, 1879. ≡ *Stevia violacea* (Griseb.) Hieron., en Kuntze, *Revis. Gen. Pl.* 3(2): 180, 1898. TYPE. Argentina. Entre Ríos, Concepción del Uruguay, IV.1876, *Lorentz 590* (lectotype GOET 002065 [photo!], designated by Freire & Ariza Espinar [2014:425]; isolectotypes CORD 00006495 [photo!], CORD 00006496 [photo!], GOET 002066 [photo!], GOET 002067 [photo!], K 000488772 [photo!]).

= *Stevia laxa* Hook & Arn. var. *curtula* Malme, *Kongl. Svenska Vetensk. Acad. Handl.* 32(5): 33, 1899. TYPE. Brazil. Rio Grande do Sul, “Exped. Imae [primae] Regnellian. Brasiliari civit. Rio Grande do Sul, Inter Silveir Martins et Cruz Alta”, 25.III.1893, *Malme 726 B* (lectotype S 10-19823 [photo!], designated by Freire & Ariza Espinar [2014:425]; isolectotypes S 10-19822 [photo!], S 10-19824 [photo!], S 10-19825 [photo!]).

Herbs perennial or subshrubs, 0.25–0.6 m tall, with multiple main stems from the base,

branchy from the middle towards the inflorescence, xylopodium present. Stems erect or ascendant, terete, striate, glandular-pubescent, leafy up to the inflorescence, internodes 0.3–1.2 cm long. Leaves opposite, densely grouped at the nodes, sessile; blade linear or rarely oblong, 3–5 × 0.2–0.5 cm, apex acute, base decurrent, cuneate or rounded, margin slightly serrate on the upper third, 1-nerved, upper surface with sessile glandular hairs, non-glandular hairs on the margins and veins, under surface pubescent. Inflorescences erect, lax, disposed in 2–4 pairs of terminal branches, in a paniculiform cyme; capitula solitary, long pedunculate, peduncles (4–)6–30 mm long, slightly pubescent, with sessile and stalked glandular hairs, and usually non-glandular hairs. Involucre 7–8 × 3–6 mm; phyllaries elliptical-ovate, 6.5–8 × 1–2 mm, outer 2, apex acute, pubescent, with sessile and stalked glandular hairs, and non-glandular hairs, inner 3, apex acute, slightly pubescent. Florets with corollas 8–9 × 1–1.6 mm, throat purplish, throat plus tube 6–7.5 mm long, outer surface slightly pubescent, with sessile glandular and non-glandular hairs, lobes ovate or elliptical, 1.4–2 × 0.4–0.9 mm, apex acute, pink or purple, with non-glandular hairs; anthers 2.85–3.3 × 0.3–0.5 mm, apical appendages elliptical, 0.2 × 0.2 mm, margin irregular, thecae base obtuse, anther collars ovate or elliptical, 0.1–0.2 × 0.1–0.2 mm; style 7–11 mm long; style branches 2.1–5.1 mm long. Cypselae prismatic or ellipsoid, 4.8–6.6 × 0.7–1.1 mm, 5-ribbed, sparsely pubescent with sessile glandular hairs, usually with stalked glandular hairs. Pappus isomorphic of 18–27 bristles, 7.7–9.3 mm long.

Currently, *Stevia megapotamica* DC. (1836: 123) is included in the synonymy of *Stevia multiaristata* Spreng. (1826: 449). We found two sheets corresponding with the original material cited by Candolle, one deposited in P (P 00704368) and a fragment in G (G 00465268). Both sheets correspond with the information cited in the protologue, but since the material in P is more complete is herein designated as the lectotype.

This species is distributed in Central-eastern Argentina, southern Brazil in Rio Grande do Sul, and Uruguay. It is common throughout all Uruguay (Fig. 8) not recorded only in Río Negro department, growing on hills and hillsides, in rocky soils.

Iconography. Cabrera, 1974: 160, fig. 77 c-h; Freire & Ariza Espinar, 2014: 425.

Additional specimens examined: URUGUAY. ARTIGAS: Cuareim, 3.X.1902, fl. e fr., *Berro 2481* (MVFA); El Catalancito, 30.I.1948, fl. e fr., *Osorio*

(MVM 14006); Estancia El Ombú, 13.IV.1978, fl. e fr., *Del Puerto & Marchesi 15380* (MVFA). CANELONES: Santa Lucía, 10.XII.1945, fl. e fr., *Lombardo 6271* (MVJB). Toledo, V.1927, fl. e fr., *Herter 92* (MVJB); 23.III.1929, fl. e fr., *Osten* (MVM 20951); without date, fl. e fr., *Chebataroff 132* (LP). CERRO LARGO: Ruta 7 (km 430), 5.XII.1996, fl. e fr., *Bayce & Grela 26226* (MVFA); Sierra Apeguá, I.1926, fl. e fr., *Herter* (MVM 18331). COLONIA: Punta Gorda al norte, 23.XII.1994, fl. e fr., *Millot et al. 24735* (MVFA). DURAZNO: Ruta 6, 15 km al este de Estancia Los Naranjos, 25.II.1994, fl. e fr., *Brescia et al. 23015* (MVFA). FLORES: Ruta 12, km 13, sobre Arroyo Arias, 6.IV.1994, fl. e fr., *Neffa et al. 105* (CTES). FLORIDA: Estancia Rincón de Santa Elena, 23.IV.1943, fl. e fr., *Gallinal et al. 1381½* (MVFA, MVM). LAVALLEJA: La Lorencita, 10.IV.1970, fl. e fr., *Lombardo et al. 9243* (MVFA). Minas, 17–22.III.1924, fl. e fr., *Herter* (MVM 17153); 30.XI.2001, fl. e fr., *Seijo et al. 2611* (CTES, SI); 30.XI.2001, fl. e fr., *Seijo et al. 2611* (CTES). MALDONADO: Aiguá, 20.IV.1935, fl. e fr., *Legrand 598* (MVM). Piriápolis, III.1899, fl. e fr., *Arechavaleta 116* (MVM). Sierra de las Ánimas, 20.V.1934, fl. e fr., *Legrand 158* (MVM); 2.V.1970, fl. e fr., *Marchesi 10027* (MVFA). MONTEVIDEO: Campos, III.1938, fl. e fr., *Lombardo 2694* (MVJB). Carrasco, 24.XI.1912, fl. e fr., *Osten 6393* (MVM). Pajas Blancas, fl. e fr., *Chebataroff 150* (LP). Parque Lecocq, 30.XII.1945, fl. e fr., *Osorio 672* (MVM); 5.XI.1950, fl. e fr., *Legrand 4074* (MVM); 26.X.1968, fl. e fr., *Lema & Rodríguez 7403* (MVFA); 29.X.1968, fl. e fr., *Izaguirre et al. 7622* (MVFA); 6.III.1974, fl. e fr., *Izaguirre et al. 12112* (MVFA). Peñarol, 25.IV.1889, fl. e fr., *Berro 2061* (MVFA). PAYSANDÚ: Estancia El Refugio, 30.IV.1996, fl. e fr., *Marchesi & Vignale 25833* (MVFA); 15 km al este del Río Queguay, fl. e fr., *Dematteis & Schinini 1862* (CTES, SI). RIVERA: Arroyo Cuñapirú, 17.II.2005, fl. e fr., *Zuloaga & Schinini 1522* (SI). Arroyo Lunarejo, 14.V.1984, fl. e fr., *Brussa et al.* (MVJB 20867). Cerro Aurora, 10–12.II.1961, fl. e fr., *Arrillaga et al. 1161* (MVFA). Establecimiento Britos, 14.XII.2004, fl. e fr., *Brussa 1419* (MVJB). Mirador Tres Cerros, 16.IV.2010, fl. e fr., *Denham et al. 329* (SI). Paso del Empedrado, 21.III.1984, fl. e fr., *Pedersen 13886* (SI); Ruta 5, 4 km al sur del empalme con ruta 27, 14.XII.2005, fl. e fr., *Brussa & Grela* (MVJB 24627). Zapucay, 22–25.IV.1908, fl. e fr., *Flossdorf 92* (BAF). ROCHA: Santa Teresa, III.1946, fl. e fr., *Lombardo 4330* (MVJB). SALTO: Costa del Río Uruguay y Arroyo Ceibalito, 28.X.1978, fl. e fr., *Del Puerto & Marchesi 15859* (MVFA). SAN JOSÉ: Sierra de Mahoma, 26.II.1997, fl. e fr., *Bayce et al. 26537* (MVFA). SORIANO: Juan Jackson, 22.I.1944, fl. e fr., *Gallinal et al. 5413* (LP, MVFA, MVM); Vera, 28.XI.1900, fl. e fr., *Berro 43* (MVFA). TACUAREMBO: Arroyo Caraguatá, 14.III.1945, fl. e fr., *Rosengurt 4791* (MVM). Arroyo Laureles, 15.V.1984, fl. e fr., *Majó et al.* (MVJB 21393); Gruta de los Cuervos, 9.III.1966, fl. e fr., *Rosengurt et al. 9990* (MVFA); Pozo Hondo, 7.II.1981, fl. e fr., *Cabrera &*

Zuloaga 32349 (SI); Ruta 5, km 350, 28.X.1985, fl. e fr., *Delfino* (MVJB 20703). Valle Edén, 18.II.1947, fl. e fr., *Osorio* (MVM 13866); 7.XII.1963, fl. e fr., *Arrillaga et al. 1758* (MVFA). TREINTA Y TRES: locality not indicated, 26.II.1956, fl. e fr., *Arrillaga 288* (MVFA); 25 km al sur de Arbolito, 19.II.2005, fl. e fr., *Dematteis & Schinini 1603* (CTES). Estancia La Teja, 19.I.2010, fl. e fr., *Haretche et al. 216* (MVJB). Serranía del Yermal, 9.IV.1936, fl. e fr., *Legrand 707* (MVM).

7. *Stevia sabulonis* B.L. Rob. Contr. Gray Herb. 96: 14. 1931. TYPE. Uruguay, Sands of the Rio Negro opposite Mercedes, IV.1867, *Fruchart 281* (holotype K 00488780 [photo!]; isotypes GH 00012890 [photo!], P 00704342 [photo!]).

Herbs perennial or subshrubs, 0.1–0.3 m tall, with multiple main stems from the base, slightly branched towards the inflorescence or unbranched, xylopodium present. Stems ascendant, terete, striate, glandular-pubescent, leafy up to the inflorescence, internodes 1.5–2.5 cm long. Leaves opposite, sessile; blade elliptical or obovate, 1.6–4 × 1.1–2 cm, apex obtuse, base decurrent or cuneate, usually pseudopetiolate, margin deeply serrate, 3-nerved, both surfaces densely pubescent, with sessile glandular and non-glandular hairs. Inflorescences erect, dense, disposed in 2–4 pairs of terminal branches, in one or several corymbiform cymes; capitula solitary, long pedunculate, peduncles 5–12 mm long, pubescent, with sessile and stalked glandular hairs, and usually non-glandular hairs. Involucre 5–6.5 × 3–4 mm; phyllaries linear or elliptical-linear, 5–6.5 × 0.5–1.5 mm, outer 2, apex acute, pubescent, with sessile and stalked glandular hairs, and non-glandular hairs, inner 3, apex acute, slightly pubescent. Florets with corollas 6–7.5 × 1–1.2 mm, throat whitish, throat plus tube 5–6 mm long, outer surface laxly pubescent, with sessile glandular and non-glandular hairs, lobes ovate or elliptical, 0.8–2 × 0.8–1.2 mm, apex acute, white, with non-glandular hairs; anthers 1.8–2.1 × 0.2–0.4 mm, apical appendages elliptical, 0.5–0.75 × 0.3 mm, margin irregular, thecae base obtuse, anther collars ovate or elliptical, ca. 0.1 × 0.1 mm; style 6.5–9 mm long; style branches ca. 2.7–5 mm long. Cypselae prismatic or ellipsoid, 3.2–4.5 × 0.5–1 mm, 5-ribbed, sparsely pubescent with and sessile glandular hairs. Pappus isomorphic of 16–22 bristles, 6–8 mm long.

This species is distributed in Southern Paraguay and central Uruguay. It has been only recorded from Florida and Treinta y Tres departments (Fig. 8), rare, growing in riverbanks, associated to sandy soils.

Iconography. Cabrera, 1996: 309, fig. 125.

Additional specimens examined: URUGUAY. FLORIDA: Arroyo Mansavillagra, 22.IV.1937, fl. e fr., *Rosengurt 1695* (MVFA). Timote, Río Yi, 23.IV.1943, fl. e fr., *Gallinal et al. 5177* (LP, MVFA). TREINTA Y TRES: Río Cebollatí, 17.III.1902, fl. e fr., *Berro 3029* (MVFA).

8. *Stevia satureiifolia* (Lam.) Sch. Bip. var. *satureiifolia* *Linnaea* 25: 291. 1853. ≡ *Eupatorium satureiifolium* Lam., *Encycl.* 2: 411. 1786. ≡ *Carelia saturiifolia* (Lam.) Juss. ex Cav., *Anales Ci. Nat.* 6(18): 317. 1802. ≡ *Mikania satureiifolia* (Lam.) Willd., *Sp. Pl.* 3(3): 1747. 1804. ≡ *Nothites satureiifolia* (Lam.) DC., *Prodr.* 5: 186. 1836. TYPE. Uruguay. Montevideo, *Commerson* (lectotype P 00704463 [photo!], designated by Freire & Ariza Espinar [2014:428]).

= *Stevia linariifolia* DC., *Prodr.* 5: 123. 1836. TYPE. Brazil. Rio Grande do Sul, *Gaudichaud [Herb. Imp. Bras. 852]* (lectotype here designated, P 00704461 [photo!]; isolectotype G 00465267 [photo!]).

= *Stevia satureiifolia* (Lam.) Sch. Bip. var. *angustifolia* Baker, en Martius, *Fl. bras.* 6(2): 208. 1876. TYPE. Uruguay. Montevideo, 1839, *Isabelle* (lectotype K 000488754 [photo!], designated by Freire & Ariza Espinar [2014:429]).

= *Stevia satureiifolia* (Lam.) Sch. Bip. fo. *genuina* Hieron., *Bot. Jahrb. Syst.* 22: 736. 1897, nom. inval.

Herbs perennial or subshrubs, 0.15–0.6 m tall, with multiple stalks growing from the base, branchy from the middle towards the inflorescence, xylopodium present. Stems erect or ascendant, terete, striate, glandular-pubescent, leafy up to the inflorescence, internodes 0.6–1.4. Leaves opposite, densely grouped at the nodes, sessile; blade linear or oblong, sometimes fleshy, 1.5–4 × 0.1–0.5 cm, apex acute, base decurrent, cuneate or rounded, margin entire, 1-nerved, both surfaces densely pubescent, with sessile glandular and non-glandular hairs. Inflorescences erect, dense, disposed in 1–3 pairs of terminal branches, in one or several corymbiform cymes; capitula solitary, sessile or shortly pedunculate, peduncles 1–5(–9) mm long, densely pubescent, with sessile glandular and non-glandular hairs. Involucre 7–8 × 3–6 mm; phyllaries linear to elliptical-obovate, 6–8 × 1–2 mm, outer 2, apex acute, densely pubescent, with sessile glandular and non-glandular hairs, inner 3, apex acute, slightly pubescent. Florets with corollas 6.5–8.5 × 1–1.6 mm, throat purplish, throat plus tube 5–7 mm long, outer surface laxly pubescent, with sessile

glandular and non-glandular hairs, lobes ovate or elliptical, 1.1–2 × 0.7–1.2 mm, apex acute, pink or purple, with non-glandular hairs; anthers 2–3 × 0.15–0.4 mm, apical appendages elliptical, 0.5–0.8 × 0.25 mm, margin irregular, thecae base obtuse, anther collars ovate or elliptical, 0.1–0.2 × 0.1–0.2 mm; style 8.5–10.6 mm long; style branches 2.5–5 mm long. Cypselae prismatic or ellipsoid, 3.65–5.6 × 0.4–1 mm, 5-ribbed, sparsely pubescent with many sessile glandular hairs. Pappus dimorphic, with (3–)4 adelphocarps of 14–19 bristles, 7.6–9 mm long, and 1(–)2 idiocarp of 0–10 bristles, 0–5 shorter bristles, 2.4–5.1 mm long, and 0–6 scales, ca. 0.9 × 0.2 mm long.

Currently, this species shows three varieties (Freire & Ariza Espinar 2014): *S. satureiifolia* var. *satueiifolia* from central and northwestern Argentina, southwestern Brazil and Uruguay, and *S. satureiifolia* var. *patagonica* and *S. satureiifolia* var. *ventanensis* from central Argentina. According to our analysis, the uruguayan specimens belong to var. *satueiifolia*, since var. *patagonica* is characterized by its sessile heads (*versus* pedunculate heads in var. *satueiifolia*), and var. *ventanensis* by its leaf blades reaching 0.2–0.8 cm wide (*versus* 0.1–0.2 in var. *satueiifolia*).

During the analysis of *S. satureiifolia*, we detected that its synonym *Stevia linariifolia* DC. (1836: 123) needed lectotypification. It is based on original material gathered by Gaudichaud from Rio Grande. We found two specimens, one deposited in P (P 00704461) and other one in G (G 00465267), that fit accurately with the protologue. The specimen in P is herein designated as lectotype since it is a more complete plant.

This species is distributed in Central-eastern Argentina, southern Brazil, and Uruguay. It is very frequent in the southern Uruguayan departments (*i.e.*, Colonia, Maldonado, Montevideo, Rocha, Soriano) (Fig. 8), and rare northwards, on hillsides, associated with dry environments, growing in rocky soils.

Iconography. Cabrera, 1941: 29, fig. 6; Cabrera, 1963: 35, fig. 6; Cabrera, 1971: 14, fig. 1; Cabrera, 1974: 162, fig. 78 h-k; Freire, 2009: 387, fig. 180; Freire, 2013: 99, fig. 95; Freire & Ariza Espinar, 2014: 428.

Additional specimens examined: URUGUAY. CANELONES: Carrasco, 10.II.1940, fl. e fr., *Rosengurtt 1380* (MVM). La Floresta, 22.II.1936, fl. e fr., *Legrand 2830* (MVM). Parador Tajos, III.1941, fl. e fr., *Lombardo 4092* (MVJB). Puerto Jackson, 31.X.1948, fl. e fr., *Rosengurtt 5211* (MVM). COLONIA: Cascada del Rio San Luis, 10.XI.1946, fl. e fr., *Castellanos 17053*

(CTES). Parador Punta Gorda, 10.I.1944, fl. e fr., *Rosengurtt 4333* (MVM); 8.III.1964, fl. e fr., *Arrillaga et al. 1967* (MVFA). Riachuelo, IV.1935, fl. e fr., *Cabrera 3308* (LP). MALDONADO: La Barra, 1.XII.2001, fl. e fr., *Seijo et al. 2638* (CTES, SI). Piriápolis, 13.II.1900, fl. e fr., *Osten 4000* (MVM); 4.IV.1939, fl. e fr., *Legrand 1625* (MVM). MONTEVIDEO: Camino Mendoza, IV.1984, fl. e fr., *Bayes et al. 17382* (MVFA). Cerro Montevideo, III.1858, fl. e fr., *Gibert 44* (LP); V.1920, fl. e fr., *Felippone 3444* (SI); 28.IV.1934, fl. e fr., *Legrand 167* (MVM). Peñarol, 9.III.1924, fl. e fr., *Herter 6300* (MVJB). Playa Pocitos, IV.1924, fl. e fr., *Herter 92* (SI). Punta Gorda, 26.XI.1911, fl. e fr., *Osten 5636* (CORD). RIVERA: Entre Tacuarembó y Tranqueras, 21.III.1984, fl. e fr., *Pedersen* (CTES0024679). ROCHA: en las cercanías de Cabo Polonio, 24.II.1935, fl. e fr., *Hosseus 92* (CORD). Cabo Polonio, 22.III.1961, fl. e fr., *Legrand 4593* (MVM); Dic 2000, fl. e fr., *Baeza* (MVJB 20178); 28.II.2007, fl. e fr., *Callero* (MVJB 26111). Estancia El Palmar, 20.III.1977, fl. e fr., *Marchesi 14050* (MVFA). La Pedrera, I.1981, fl. e fr., *Cabrera 32313* (SI); 19.II.1935, fl. e fr., *Hosseus 56* (CORD); Ruta 109, entre Aiguá y Rocha, 20.XII.2005, fl. e fr., *Bonifacino et al. 2054* (CTES, SI). SAN JOSÉ: Arazatí, 24.III.1935, fl. e fr., *Legrand 512, 514* (MVM); XI.1937, fl. e fr., *Lombardo 2226* (MVJB); Dic 1938, fl. e fr., *Chebaroff 4061* (LP). La Barra, 18.V.1944, fl. e fr., *Osorio 280* (MVM); 4.IV.1947, fl. e fr., *Legrand 1940* (MVM). Paso Mauricio, 21.XI.1961, fl. e fr., *Del Puerto & Millet 692* (MVFA). Santa Lucía, 25.XI.1929, fl. e fr., *Osten 21726* (BAF). Sierra Mahoma, X.1941, fl. e fr., *Lombardo 6056* (MVJB); 12.X.1970, fl. e fr., *Krapovickas & Cristóbal 16249* (CTES). SORIANO: Cerro Gamundí, 20.I.1963, fl. e fr., *Berro 2478* (MVFA).

9. *Stevia selloi* (Spreng.) Sch. Bip. *ex* Baker, *Fl. bras.* 6(2): 209.1876. ≡ *Kleinia selloi* Spreng., *Syst. Veg.* 3: 438. 1826. TYPE. Brazil. Rio Grande, *Herb. Sprengel 473* (lectotype here designated, P 00704320 [photo!]; isoelectotypes P 02677864 [photo!], P 02677868 [photo!], P 02677873 [photo!]). = *Stevia selloi* (Spreng.) Sch. Bip. var. *ypacarayensis* B.L. Rob., *Contr. Gray Herb.* 90: 20. 1930. TYPE. Paraguay. “In regione lacus Ypacaray”, III.1913, *Hassler 12154* (lectotype here designated, GH 00012900 [photo!]; isoelectotype US 00146085 [photo!]).

Herbs annual, 0.2–0.6 m tall, with multiple main stems from the base, branchy from the middle towards the inflorescence, xylopodium present. Stems erect or ascendant, terete, striate, densely glandular-pubescent, leafy up to the inflorescence, internodes 0.4–2 cm long. Leaves opposite, sessile; blade elliptical or oblong, 1.2–5 × 0.1–0.5 cm, apex acute or slightly rounded, base decurrent, cuneate or rounded, margin crenate-serrate on

the upper third, 1-nerved or inconspicuously 3-nerved, both surfaces densely pubescent, with sessile and stalked glandular hairs, and non-glandular hairs. Inflorescences erect, dense at first and lax at maturity, disposed in 2–6 pairs of terminal branches, in a paniculiform cyme; capitula solitary, shortly or long pedunculate, peduncles (1–)6–30 mm long, densely pubescent, with stalked glandular hairs. Involucres 4.5–7 × 2.5–5 mm; phyllaries elliptical-linear, 4.5–7 × 1–2 mm, outer 2, apex acute, pubescent, with sessile and stalked glandular hairs, and scarce non-glandular hairs, inner 3, apex acute, slightly pubescent. Florets with corollas 5–7.5 × 0.65–1.4 mm, throat purplish, throat plus tube 4–6.3 mm long, outer surface laxly pubescent, with sessile glandular and non-glandular hairs, lobes ovate or elliptical, 0.9–1.7 × 0.4–1 mm, apex acute, pink or white, with non-glandular hairs; anthers 1.3–2.2 × 0.2–0.4 mm, apical appendages elliptical, ca. 0.5 × 0.3 mm, margin irregular, thecae base obtuse, anther collars ovate or elliptical, ca. 0.1 × 0.1 mm; style 6–10 mm long; style branches 2.7–3.5 mm long. Cypselae prismatic or ellipsoid, 2–4.3 × 0.4–0.8 mm, 5-ribbed, sparsely pubescent with sessile glandular hairs, usually with stalked glandular hairs. Pappus isomorphic of 15–21 bristles, (2.3–)4.7–7.5 mm long.

In the protologue of *Kleinia selloi* Spreng., Sprengel cited “Rio Grande. Sello” as the original material. We found four sheets kept at P that fits with the original description and some data of the protologue. In three of them (P 02677864, P 02677868, and P 02677873) the labels indicate that the plants were collected by Sello but in Brasilia (ancient name of Brazil). On the other hand, the fourth sheet (P 00704320) was collected in Rio Grande but did not have indication about the collector or its number. Since there is an absence of a designated type, all of these specimens have to be considered as original materials (Art. 40 Note 1 of ICN, McNeill *et al.* 2012; McNeill 2014). We designate here the specimen P 00704320 as the lectotype because fits accurately with the morphological description, it is a more complete plant and the type locality is indicated in its label.

Variety *S. selloi* var. *ypacarayensis* B.L. Rob (1930: 20) was based on material gathered by Hassler for two localities from Paraguay: (1) “on plains, Cordillera de Altos, *Hassler*, no. 3910” and (2) “in the region of lake Ypacaray, *Hassler*, no. 12,154”. Original materials were found deposited in BM (BM 000096215, *Hassler* 3910), GH (GH

00012900, *Hassler* 12154), and US (US 00146085, *Hassler* 12154). We selected the specimen in GH as the lectotype, since fits accurately with the original description and it is a more complete plant.

This species is distributed in Northeastern Argentina, central Paraguay and Uruguay. It has been recorded in Maldonado, Rivera, Rocha, Soriano and Tacuarembó departments (Fig. 8), infrequent, growing on open brushlands and wetlands, in sandy soils associated with streams, rivers, etc.

Iconography. Cabrera, 1996: 310, fig. 126; Freire & Ariza Espinar, 2014: 430.

Additional specimens examined: URUGUAY. ARTIGAS: Paraje Pintadito, sobre laderas rocosas, 31.III.2018, fl. e fr., *González* (MVM). MALDONADO: Pan de Azúcar, III.1900, fl. e fr., *Arechavaleta II* (MVM). Piriápolis, fl. e fr., *Chebataroff* 2465 (LP062151, LP062152); 30.III.1911, fl. e fr., *Osten* 5513 (MVM); 10.II.1933, fl. e fr., *Clos* 4977 (BAB). Sierra de las Ánimas, 13.III.1932, fl. e fr., *Osten* (MVM 22506). RIVERA: camino a Portones Negros, 28.III.1985, fl. e fr., *Marchesi et al.* 17595 (MVFA); Ruta 5, unos km al norte de paso Manuel Díaz, 11.IV.2003, fl. e fr., *Grela & Brussa* (MVJB); Escuela n° 56, 22.II.1966, fl. e fr., *Marchesi* 1494 (MVFA). ROCHA: 10 km al norte de Rocha, 10.IV.2015, fl. e fr., *Muñoz & Díaz* (MVJB). SORIANO: Juan Jackson, 17.IV.1940, fl. e fr., *Gallinal et al.* PE-4331 (LIL, MVM). TACUAREMBÓ: Quirino, I.1940, fl. e fr., *Legrand* 2109 (MVM). Rincón de La Laguna, 14.XI.1947, fl. e fr., *Castellanos* 17720 (CTES).

10. *Stevia veronicae* DC., *Prodr.* 5: 123. 1830. TYPE. Brazil. Minas Geraes, Serra do Frio, *Vauthier* 325 (lectotype, here designated, G 00465265 [photo!]; islectotypes, G 00305948 [photo!], P 00704428 [photo!]) = *Stevia oxylaena* DC., *Prodr.* 5: 123. 1836. TYPE. Brazil. Rio Grande do Sul, 1833, *Herb. Imp. Bras.* 998 (lectotype here designated, P 00704319 [photo!]; islectotype G 00465271 [photo!]). New synonym = *Stevia ophryodonta* B.L. Rob., *Contr. Gray Herb.* 104: 7. 1934. TYPE. Uruguay. Treinta y Tres, Melo, *Schroeder* 16325 [*Herb. Osten*] (holotype GH 00012871 [photo!]). New synonym

Herbs annual, 0.15–0.4 m tall, simple, unbranched, xylopodium present. Stems ascendant, terete, striate, glandular-pubescent, leafy up to the inflorescence, internodes 1.5–3 cm long. Leaves opposite, sessile; blade narrowly elliptical, 1.1–3.1 × 0.4–1.2 cm, apex slightly acute or obtuse, base decurrent, cuneate or rounded, margin entire or crenulate on the upper third, inconspicuously 3-nerved from the base, surfaces pubescent,

with sessile glandular and non-glandular hairs. Inflorescences erect, dense, disposed in 1–3 pairs of terminal branches, in a corymbiform cyme; capitula 3–16, in pairs or grouped, sessile or shortly pedunculate, peduncles 0.1–5(–8) mm long, densely pubescent, with stalked glandular and scarce non-glandular hairs. Involucre 6–9 × 5–6 mm; phyllaries linear or ovate-linear, 5–9 × 1–2 mm, outer 2, apex acute, pubescent, with sessile and stalked glandular hairs, and scarce non-glandular hairs, inner 3, apex acute, slightly pubescent. Florets with corollas 7.3–8 × 1–2 mm, throat pinkish or purplish, throat plus tube 5–6 mm long, outer surface laxly pubescent, with sessile glandular and non-glandular hairs, lobes ovate or elliptical, 1.2–2 × 0.8–1.5 mm, apex acute, white, with non-glandular hairs; anthers 1.8–2.1 × 0.15–0.4 mm, apical appendages elliptical, 0.5–0.75 × ca. 0.3 mm, margin irregular, thecae base obtuse, anther collars ovate or elliptical, ca. 0.1 × 0.1 mm; style 6.5–10 mm long; style branches 2.7–5 mm long. Cypselae prismatic or ellipsoid, 3–4.6 × 0.5–1 mm, 5-ribbed, sparsely pubescent with sessile glandular hairs. Pappus isomorphic of 16–21 bristles, 5.7–8 mm long.

Stevia veronicae (Fig. 7c) and *S. oxylaena* were described by Candolle (1836), in the same page, listed with the numbers 61 and 63, respectively. According to the original description, *S. oxylaena* (1836: 123) was morphologically similar to *S. veronicae* (1836: 123), but both species were distinct by several traits: internodes length (1–2.5 cm long in *S. veronicae* versus 0.5–2 cm in *S. oxylaena*), leaf blade shape (elliptical to obovate versus linear to elliptical, respectively), type of the secondary inflorescence (corymbiform cyme versus paniculiform cyme), and the number of pappus bristles (15–16 versus 20). From the first and second cited characters, there is overlap of measures. In addition, as a result of our analysis, intermediate variants among 15 to 20 pappus bristles were also found. In the case of the inflorescence, similar arrangement of capitula were found in both species, with sessile or shortly pedunculate capitula (0.1–0.5 cm). Thus, we considered these species as synonyms.

We proposed *S. oxylaena* to be a synonym of *S. veronicae* because the latter is more frequently used in literature (e.g., Orth Ritter *et al.* 2010; Magalhaes *et al.* 2013; Soejima *et al.* 2017). Three specimens in total, kept at G and P that match the protologue of *S. veronicae* were found. Since Candolle's original materials are deposited in G

(Stafleu & Corwan 1976), the sheet G 00465265 is designated herein as lectotype. As for *S. oxylaena*, two specimens were found kept at G (G 0046527) and P (P 00704319) that match the protologue. For this case, we selected the material kept at P since it fits accurately with the information of the protologue and it is a more complete plant.

In 1934, B.L. Robinson described *S. ophryodonta* (1934: 7) from northeastern Uruguay. The original material (GH 00012871) is scarce, consisting of fragments of five florets with a photograph of a complete specimen; to this date, we could not find where the photographed material is currently deposited. According to the original description, the leaf margin is dentate-serrate even though it appears entire at glance. The rest of traits that were utilized for delimiting this species, *i.e.* pubescence, phyllotaxis, leaf blade shape and margin, number of heads per inflorescence, and number pappus bristles, fit accurately with *S. veronicae*. Thus, we consider both species as synonyms.

This species is distributed in Central and southern Brazil and Uruguay. It has only been recorded in Maldonado and Rivera departments (Fig. 8), rare, growing on riverbanks, slopes and wetlands, in sandy soils.

Iconography. Fig. 9.

Additional specimens examined: URUGUAY. MALDONADO: Cerro de las Ánimas, III.1938, fl. e fr., *Chebotaroff 3654* (LP). RIVERA: Cerro Alegre, 29.IV.2006, fl. e fr., *Brussa & Grela* (MVJB 30249). Cerro Aurora, 10.II.1961, fl. e fr., *Arrillaga et al. 1101* (MVFA). Paso Tranqueras, III.1945, fl. e fr., *Lombardo 4278* (MVJB).

Excluded species and nomen nudum of *Stevia* for Uruguay

Stevia burkartii B.L. Rob. Contr. Gray Herb. 96: 4. 1931. TYPE. Argentina. Entre Ríos prov., Concordia dpt., Arroyo Yuquerí Chico, cerca de Concordia, 4.II.1927, Burkart 1149 (holotype GH 00012811 [photo!]; isotypes LP 002552!, SI 000985!).

Iconography. Cabrera, 1974: 163, fig. 79; Freire & Ariza Espinar, 2014: 415.

Stevia burkartii was described by Robinson (1931) from eastern Argentina, near the Uruguay River. Taxonomically, this species was well-defined by its glabrous oblong leaf blades, many-headed cymes (more than 60), long peduncles of capitula, inflorescences with more than 10 pairs of terminal branches, involucre of 5–6 mm long, and totally purple corollas (lobes, throat and tube).

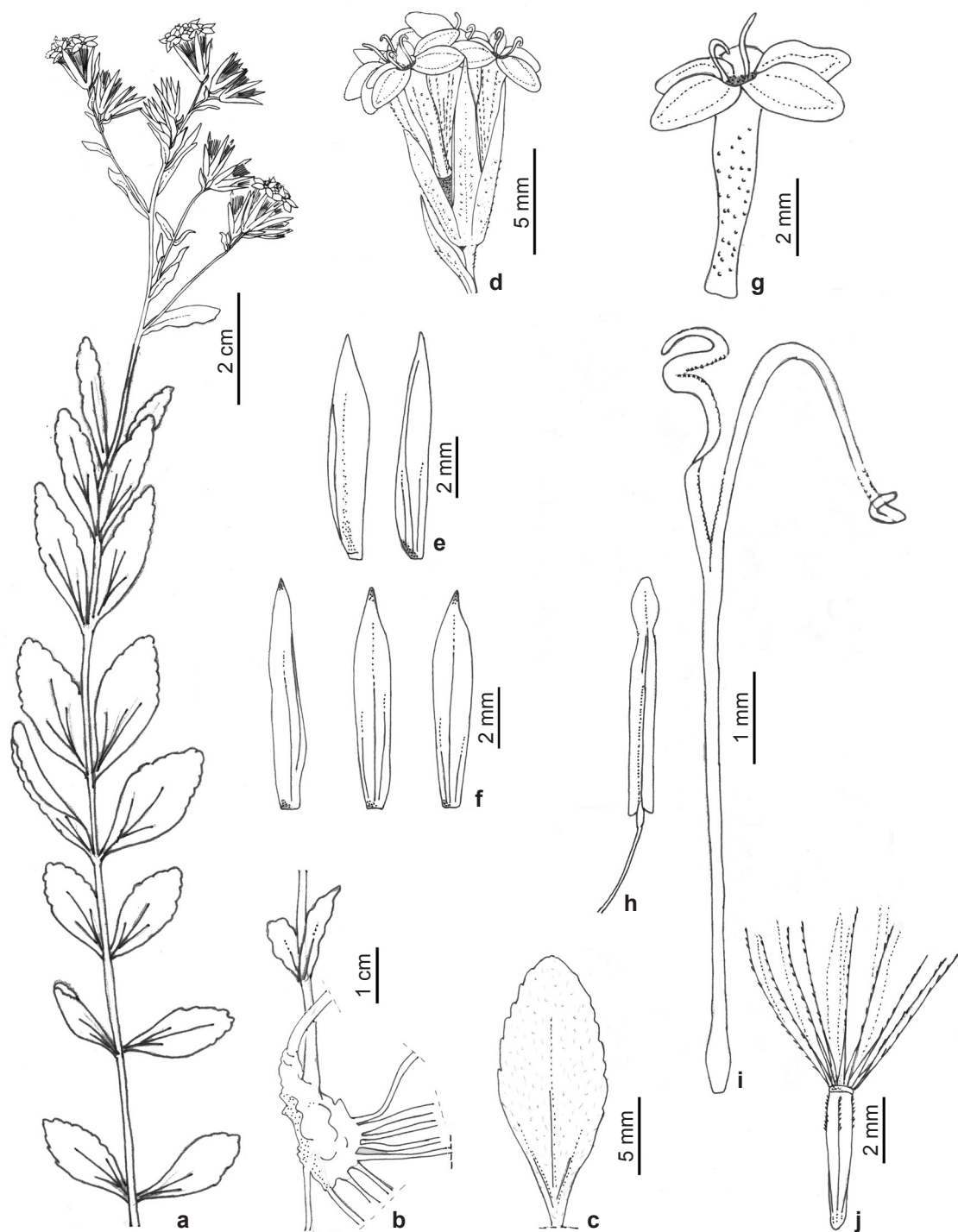


Figure 9 – a-j. *Stevia veronicae* – a. floral branch; b. xylopodium; c. leaf; d. capitulum; e. outer phyllaries; f. inner phyllaries; g. floret (without cypselum and pappus); h. stamen (only with a part of staminal filament); i. style; j. cypselum. (a-j. Chebataroff 3654 (LP)).

More recently, this species was cited also from Uruguay on the basis of the specimen Chebataroff 5318, LP (Freire 2008). However, this specimen corresponds to *S. selloi*. As a result, *S. burkartii* is excluded here from Uruguay and becomes an endemic species of Argentina (Cabrera & Freire 1997; Freire & Ariza Espinar 2014) only known from its type material.

Stevia simplicitalis Herter, *Revista Sudamer. Bot.* 6: 200. 1937. Nomen nudum.

This name, cited by Herter (1937) without a description, is a *nomen nudum*. In his work Herter mentioned a specimen from the Tacuarembó department that is currently kept at Z (*i.e.* Z 000003929). This specimen fits with *S. hirsuta* by leaf and capitula characters.

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References

- Anderberg AA, Baldwin BG, Bayer RG, Breitwieser J, Jeffrey C, Dillon MO, Eldenäs P, Funk VA, Garcia-Jacas N, Hind DJN, Karis PO, Lack HW, Nesom G, Nordenstam B, Oberprieler CH, Panero JL, Puttock C, Robinson H, Stuessy TF, Susanna A, Urtubey E, Vogt R, Ward J & Watson LE (2007) Compositae. In: Kadereit JW & Jeffrey C (eds.) The families and genera of vascular plants, flowering plants: Eudicots, Asterales. Vol. 3. Springer, Berlin. 635p.
- Arechavaleta J (1906) Flora Uruguayana. Anales del Museo Nacional de Montevideo 6: 447-452.
- Avila F, Funk VA, Diazgranados M, Diaz-Piedrahita S & Vargas O (2016) Asteraceae. In: Bernal R, Robber Gradstein S & Celis M (eds.) Catálogo de plantas y líquenes de Colombia. Vol. 1. Universidad Nacional de Colombia, Bogotá. Pp. 795-908.
- Baker JG (1876) Compositae. II. Eupatoriaceae. In: Martius CFP & Eichler AG (eds.) *Flora brasiliensis*. Vol. 6. Fleischer, Monachii, Lipsiae. Pp. 181-376.
- Barreda VD, Palazzesi L, Tellería MC, Katinas L, Crisci JV, Bremer K, Passalia MG & Corsolini R (2010) Eocene Patagonia Fossils of the Daisy Family. *Science* 329: 1621.
- Barreda VD, Palazzesi L, Tellería MC, Katinas L, Crisci JV, Bremer K, Passalia MG, Bechis F & Corsolini R (2012) An extinct Eocene taxon of the daisy family (Asteraceae): evolutionary, ecological and biogeographical implications. *Annals of Botany* 109: 127-134.
- Brandle JE, Starratt AN & Gijzen M (1998) *Stevia rebaudiana*: its agricultural, biological, and chemical properties. *Canadian Journal of Plant Science* 78: 527-536.
- Bremer K, Anderberg AA, Karis PO & Lundberg J (1994) Eupatorieae. In: Bremer K (ed.) Asteraceae. Cladistics and classification. Timber Press, Portland. Pp. 625-680.
- Cabrera AL (1941) Compuesta Bonaerensis. *Revista del Museo de La Plata (n.s.), Sección Botánica* 4: 25-30.
- Cabrera AL (1963) *Stevia*. In: Cabrera AL (ed.) Flora de la provincia de Buenos Aires. Colección Científica del Instituto Nacional de Tecnología Agropecuaria 4: 33-37.
- Cabrera AL (1971) *Stevia*. In: Correa MN (ed.) Flora Patagónica. Colección Científica del Instituto Nacional de Tecnología Agropecuaria 8: 13-15.
- Cabrera AL (1974) *Stevia*. In: Burkart A (ed.) Flora Ilustrada de Entre Ríos. Colección Científica del Instituto Nacional de Tecnología Agropecuaria 6: 158-164.
- Cabrera AL (1996) *Stevia*. In: Spichiger R & Ramella L (eds.) Flora del Paraguay. Conservatoire et Jardin Botaniques de la Ville de Genève, Missouri Botanical Garden, 25: 271-316p.
- Cabrera AL & Freire SE (1997) Flora Fanerogámica Argentina. Asteraceae, parte 8. Tribu II: Eupatorieae. Proflora. CONICET, Buenos Aires. 280p.
- Cavanilles AJ (1797) Icones et Descriptiones Plantarum. Vol. 4. Regia Typographia, Madrid. 82p.
- Freire SE (2008) *Stevia*. In: Zuloaga FO, Morrone O & Belgrano MJ (eds.) Catálogo de las plantas vasculares del Cono Sur (Argentina, Sur de Brasil, Chile, Paraguay y Uruguay). *Monographs in Systematic Botany* 107: 1509-1517.
- Freire SE (2009) *Stevia*. In: Freire SE & Molina AM (eds.) Flora chaqueña. Colección Científica del Instituto Nacional de Tecnología Agropecuaria 23: 379-388.
- Freire SE (2013) *Stevia*. In: Ariza Espinar L & Freire SE (eds.) Flora de San Juan III-b. Editorial Zeta, Mendoza. Pp. 98-103.

- Freire SE & Ariza Espinar L (2014) *Stevia*. In: Zuloaga FO, Belgrano MJ & Anton AM (eds.) Flora argentina: flora vascular de la República Argentina. Vol. 7. Estudio Sigma SRL, Buenos Aires. Pp. 409-435.
- Grasshof JL, Bierner MW & Northington DK (1972) Chromosome numbers in North and Central American Compositae. *Brittonia* 24: 379-384.
- Grisebach AHR (1879) *Symbolae ad floram Argentinam: Zweite Bearbeitung argentinischer Pflanzen. Abhandlungen der Königlichen Gesellschaft der Wissenschaften zu Göttingen* 24: 3-346.
- Gutiérrez DG, Muñoz-Schick M, Grossi MA, Rodríguez-Craverio JF, Morales V & Moreira-Muñoz M (2016) The genus *Stevia* (Eupatorieae, Asteraceae) in Chile: a taxonomical and morphological analysis. *Phytotaxa* 282: 1-18.
- Harris JG & Woolf Harris M (1994) Plant identification terminology. An illustrated glossary. Spring Lake Publishing, Spring Lake. 189p.
- Herter WG (1930) Estudios botánicos en la región uruguaya. IV. Florula Uruguayensis, plantae vasculares. *Sumptibus rei publicae, Montevideo*. 191p.
- Herter WG (1937) *Additamenta ad floram uruguayensem. Pars III. Con una lámina. Revista Sudamericana de Bot* 4: 200.
- Hind DJN & Robinson H (2007) Eupatorieae. In: Kubitzki K (ed.) *The families and genera of vascular plants*. Vol. 8. Springer, Berlin. Pp. 510-574.
- Hieronymus GHEW (1897) *Erster Beitrag zur Kenntnis der Siphonogamenflora der Argentina und der angrenzenden Länder, besonders von Uruguay, Paraguay, Brasilien und Bolivien. Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 22: 672-798.
- Hooker WJ & Arnott GAW (1835) Contributions towards a flora of South America and the islands of the Pacific. *Companion to the Botanical Magazine* 1: 234-244.
- Hooker WJ & Arnott GAW (1836) Contributions towards a flora of South America and the islands of the Pacific. *Companion to the Botanical Magazine* 2: 250-254.
- King RM & Robinson H (1987) The genera of the Eupatorieae (Asteraceae). *Monographs in Systematic Botany* 22: 1-581.
- Klotzsch JF (1852) Beiträge zu einer Flora der Aequinoctial-Gegenden der neuen Welt. *Linnaea* 25: 268-292.
- Kuntze CEO (1898) *Revisio generum plantarum*. Vol. 3. Felix, Leipzig. 576p.
- Lamarck JBAPM (1786) *Encyclopédie Méthodique Botanique*. Vol. 2. Panckoucke, Paris. 774p.
- Magalhaes TL, Bortoluzzi RLC & Mantovani A (2013) Levantamento florístico em três áreas úmidas (banhados) no Planalto de Santa Catarina, Sul do Brasil. *Revista Brasileira de Biociências* 11: 269-279.
- Mandel JR, Barker MS, Bayer RJ, Dikow RB, Gao TG, Jones KE, Keeley S, Kilian N, Ma H, Siniscalchi CM, Sussana A, Thapa R, Watson L & Funk VA (2017) The compositae tree of life in the age of phylogenomics. *Journal of Systematics and Evolution* 55: 405-410.
- Monteiro R (1982) Estudos taxonomicos em *Stevia* serie Multiaristatae no Brasil. *Revista Brasileira de Botânica* 5: 5-15.
- Nakajima JN (1991) Taxonomia fenética das series Paleacearistatae e Pauciaristatae de *Stevia* Cav. (Asteraceae, Eupatorieae). Tese de Maestria. Universidade Estadual Paulista, São Paulo. 202p.
- Nakajima J (2010) *Stevia*. In: Forzza RC, Leitman PM, Costa A, Carvalho Jr AA, Peixoto AL, Walter BMT, Bicudo C, Zappi D, Costa DP, Lleras E, Martinelli G, Lima HC, Prado J, Stehmann JR, Baumgratz JFA, Pirani JR, Sylvestre LS, Maia LC, Lohmann LG, Paganucci L, Silveira M, Nadruz M, Mamede MCH, Bastos MNC, Morim MP, Barbosa MR, Menezes M, Hopkins M, Secco R, Cavalcanti T & Souza VC (eds.) *Catálogo de plantas e fungos do Brasil*. Vol. 2. Instituto de Pesquisas Jardim Botânico do Rio de Janeiro, Rio de Janeiro. Pp. 740-741.
- Ramayya N (1962) Studies on the trichomes of some Compositae I. General Structure. Vol. 4. *Bulletin of the Botanical Survey of India, Calcutta*. Pp. 177-188.
- Ritter LMO, Ribeiro MC & Moro RS (2010) Composição florística e fitofisionomia de remanescentes disjuntos de Cerrado nos Campos Gerais, PR, Brasil - limite austral do bioma. *Biota Neotropica* 10: 379-414.
- Rivera V, Panero JL, Schilling EE, Crozier BS & Dias Moraes M (2016) Origins and recent radiation of Brazilian Eupatorieae (Asteraceae) in the eastern Cerrado and Atlantic Forest. *Molecular Phylogenetics and Evolution* 97: 90-100.
- Robinson BL (1930) Observations on the genus *Stevia* (The *Stevias* of the Argentine Republic; The *Stevias* of Paraguay; The *Stevias* of North America). *Contributions from the Gray Herbarium* 90: 36-160.
- Robinson BL (1931) Records preliminary to a general treatment of the Eupatorieae-IX. *Contributions from the Gray Herbarium* 96: 3-27.
- Robinson BL (1934) Records preliminary to a general treatment of the Eupatorieae-XI. *Contributions from the Gray Herbarium* 104: 3-49.
- Robinson H (2014) *Stevia*. In: Jørgensen PM, Nee MH & Beck SG (eds.) *Catálogo de las plantas vasculares de Bolivia. Monographs in Systematic Botany* 127: 369-372.
- Robinson H, Schilling E & Panero JL (2009) Eupatorieae. In: Funk VA, Susanna A, Stuessy TF & Bayer RJ (eds.) *Systematics, evolution, and biogeography of compositae*. International Association for Plant Taxonomy, Vienna. Pp. 731-744.
- Rodríguez-Craverio JF, Gutiérrez DG & Katinas L (2017) Lectotypifications in Uruguayan *Stevia* (Asteraceae, Eupatorieae). *Phytotaxa* 291: 116-122.

- Salvador-Reyes R, Sotelo-Herrera M & Paucar-Menacho L (2014) Estudio de la *Stevia* (*Stevia rebaudiana* Bertoni) como edulcorante natural y su uso en beneficio de la salud. *Scientia Agropecuaria* 5: 157-163.
- Soejarto DD (2002) Botany of *Stevia* and *Stevia rebaudiana*. In: Kinghorn AD (eds.) *Stevia: the genus Stevia*. Medicinal and aromatic plants: industrial profiles. Taylor and Francis, London. Pp. 18-39.
- Soejima A, Tanabe AS, Takayama I, Kawahara T, Watanabe K, Nakazawa M, Mishima M & Yahara T (2017) Phylogeny and biogeography of the genus *Stevia* (Asteraceae: Eupatorieae): an example of diversification in the Asteraceae in the new world. *Journal of Plant Research* 130: 953-972.
- Sprengel K (1826) *Systema Vegetabilium* (ed. 16). Vol. 3. *Librariae Dieterichianae*, Göttingen. 936p.
- Stafleu FA & Cowan RS (1976-1988) *Taxonomic literature*. Vols. 1-7. International Association for Plant Taxonomy, Utrecht.
- Thiers B [continuously updated] *Index Herbariorum: a global directory of public herbaria and associated staff*. New York Botanical Garden's Virtual Herbarium. Available at <<http://sweetgum.nybg.org/science/ih/>>. Access on 14 Feb 2018.
- Tippery NP, Schilling EE, Panero JL, Les DH & Williams CS (2014) Independent origins of aquatic Eupatorieae (Asteraceae). *Systematic Botany* 39: 1217-1225.
- Watanabe K, King RM, Yahara T, Ito M, Yokojama J, Suzuki T & Crawford DJ (1995) Chromosomal cytology and evolution in Eupatorieae (Asteraceae). *Annals of the Missouri Botanical Garden* 82: 581-592.
- Watanabe K, Yahara T, Soejima A & Ito M (2001) Mexican species of the genus *Stevia* (Eupatorieae, Asteraceae): chromosome numbers and geographical distribution. *Plant Species Biology* 16: 49-58. doi: <<https://doi.org/10.1046/j.1442-1984.2001.00050.x>>.
- Watanabe K, Yahara T, Hashimoto G, Nagatani Y, Soejima A, Kawahara T & Nakazawa M (2007) Chromosome numbers and karyotypes in Asteraceae. *Annals of the Missouri Botanical Garden* 94: 643-654.
- Zarlavsky GE (2014) *Histología vegetal: técnicas simples y complejas*. Sociedad Argentina de Botánica, Buenos Aires. 198p.

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