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Generic separateness and infrageneric classification of *Sigmatostalix* (Orchidaceae)

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Summary: The generic separateness of *Oncidium*, *Ornithophora* and *Sigmatostalix* is evaluated based on morphological data. A comparative morphology of the studied genera is provided. The first infrageneric classification of *Sigmatostalix* is presented. One new combination on the species level is proposed.

Keywords: Oncidieae, *Petalocentrum*, *Roezliella*, taxonomy, comparative morphology

The orchid genus *Sigmatostalix* was described by Heinrich Gustav Reichenbach (1852) based on *Specklinia graminea* Poepp. & Endl. which he considered similar in habit and gynostemium morphology to *Odontoglossum* Kunth and in clinandrium form to *Rodriguezia* Ruiz. & Pav.

The genus was accepted by subsequent authors who considered it related to *Odontoglossum* and *Oncidium* Sw. (e.g. Ames & Correll 1953; Schweinfurth 1961; Atwood & Mora-Retana 1999; Dressler 2003; Carnevali & Ramírez-Morillo 2003). *Sigmatostalix* was included either to Odontoglossinae (originally Odontoglosseae) by Pfitzer (1887) and Kraenzlin (1922) or Oncidiinae by Schlechter (1915), Dressler & Dodson (1960), Dressler (1993), Senghas (1997) and Szlachetko (1995). The genus was treated as well-defined in aspect of its morphology. However, in 1918 Schlechter segregated two new genera from *Sigmatostalix*: *Petalocentrum* Schltr. and *Roezliella*. Schlechter (1918) recognized both taxa as distinguishable from *Sigmatostalix* in having a sessile lip. Additionally, *Petalocentrum* was defined by calcariform apices of the petals, unlobed lip and depressed basal lip callus. In contrary, *Roezliella* species have flat petal apices, 3-lobed lip and excavated callus. The two newly created genera were, however, not accepted by taxonomists.

Chase et al. (2008) included *Sigmatostalix* in *Oncidium* based on genetic research. In the phylogenetic tree presented by Chase (2009), species of *Sigmatostalix* form a monophyletic group which is sister to *Oncidium durangense* Hágsater and *O. reflexum* Lindl. The author explained that species of *Sigmatostalix* are similar to *Oncidium* except plant size. In the most recent molecular studies on oncidioid orchids, Neubig et al. (2012) included additional samples of *Sigmatostalix* and *Oncidium* (Fig.1). In their phylogenetic tree the former genus forms a monophyletic clade composed of species of *Vitekorchis* Romowicz & Szlach.*, Oncidium, Collare-stuartense* Senghas & Bockem.*, Solenidiopsis* Senghas*, Cochlioida* Lindl.*, Symphyglossum* Schltr. and *Odontoglossum.* Neubig et al. (2012) explained that the vegetative habit of *Sigmatostalix* and *Oncidium* differs only in plant size. The adaptation to different groups of smaller oil-collecting bees was given as reason of various size of flowers of *Oncidium* and *Sigmatostalix*. According to the authors, although many of the traditionally recognized genera are monophyletic in their phylogenetic trees (e.g. *Sigmatostalix*), they are embedded within a larger clade of *Oncidium* species with diverse

floral morphology and pollination systems. As stated, the recognition of these segregate genera "would require creation of many new genera to maintain monophyly, and these new genera would be difficult to diagnose using floral or vegetative traits". The arguments quoted by Neubig et al. (2012) can be equally well exploited to support fragmentation of *Oncidium* s.latiss. and separateness of *Sigmatostalix* in particular. *Oncidium* according to the concept proposed by the authors mentioned is exactly "difficult to diagnose using floral or vegetative traits".

Ornithophora was described by João Barbosa Rodrigues (1882) who found it similar to *Sigmatostalix* and *Phymatidium* Lindl. From both genera *Ornithophora* differs in elongated tegula and additionally from *Sigmatostalix* in pseudobulbs forming a mat. Among these genera only *Phymatidium* has two pairs of pollinia. Generic separateness of *Ornithophora* was not accepted by Dressler (1993) and Dressler & Dodson (1960), while Burns-Balogh & Funk (1986), Senghas (1997) and Szlachetko & Mytnik-Ejsmont (2009) included it in their classification systems as member of Oncidiinae. In the phylogenetic tree presented by Neubig et al. (2012), *Ornithophora* is sister to the clade composed of *Coppensia* Dumort. and *Menezesiella* Chiron & V.P. Castro.

The aim of the presented study was to evaluate morphological differences between *Oncidium*, *Ornithophora* and *Sigmatostalix* and to characterize the infrageneric variation of the latter genus.

Materials and methods

A total of over 1 500 herbarium specimens and liquid preserved flowers of oncidioid orchids deposited in AMES, AMO, BM, COL, CUVC, F, FLAS, HUA, JAUM, K, MO, NY, P, PMA, UGDA, VALLE and W (Thiers 2015) were examined according to standard procedures. Every studied sheet was photographed and data from the labels were taken. Vegetative and generative characters of each plant were studied. Shape and size of the pseudobulbs and leaves were examined first. Then, inflorescence architecture as well as shape and size of the floral bracts were investigated. Finally, flower morphology was examined after its softening in boiling water.

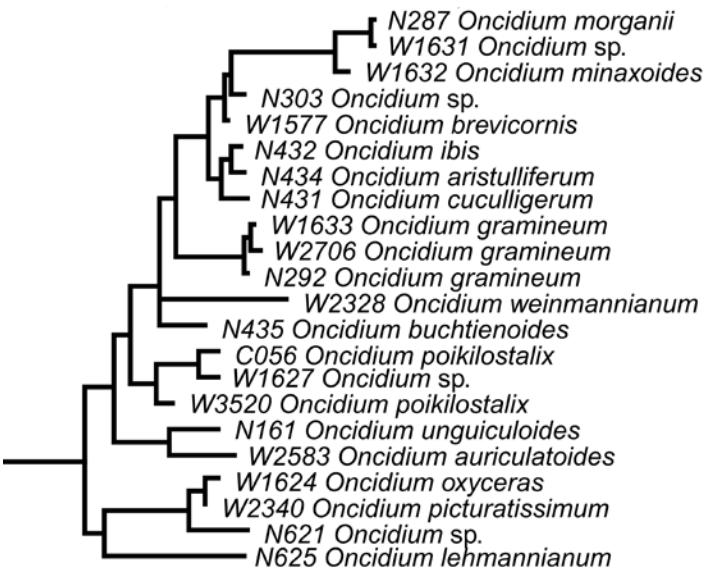

Figure 1. Fragment of the phylogenetic tree presented by Neubig et al. (2012).

Table 1. Comparative morphology of *Oncidium*, *Ornithophora* and *Sigmatostalix*.

	Oncidium (Fig. 2)	*Sigmatostalix* (Fig. 3)	*Ornithophora* (Fig. 4)
Pseudobulbs	laterally compressed, ovoid, ancipitous	laterally compressed, ellipsoid or ovoid, ancipitous	laterally compressed, ellipsoid or ovoid, ancipitous
Leaves	2–4, linear to linear-lanceolate, conduplicate	usually 1, linear to linear-lanceolate, conduplicate	2, linear-lanceolate, conduplicate
Inflorescence	branched or unbranched, erect to pendent, usually longer than leaves, few- to many-flowered	branched or unbranched, erect to pendent, usually longer than leaves, few- to many-flowered	unbranched, erect, loosely several- to many-flowered
Tepals	usually free, subsimilar, not reflexed	usually free, subsimilar, strongly reflexed	free, subsimilar, strongly reflexed
Lip	sessile to subsessile, hastate to 3-lobed, sometimes fused to gynostemium, callus simple to complex	unguiculate or sessile, entire to 3-lobed, sometimes auriculate at base, usually perpendicular to the claw; callus basal, simple or more complexed	unguiculate, entire, auriculate at base, perpendicular to the claw; callus basal, simple
Gynostemium	slightly arched or erect, rather stout; column part about twice longer than anther, basally fused with the lip, usually broadly alate near the stigma, wings uneven and papillate, or entire on margins; column foot absent	erect or gently arched, delicate, more or less swollen at the apex; column part about 2–4 times longer than anther, terete, non-winged, occasionally with two wing-like projections just below the stigma base; column foot absent	erect, elongate, delicate; column part ca. twice as long as anther, terete, non-winged, slightly swollen just below stigma base; column foot absent
Anther	subapical, incumbent, operculate, ovoid, obscurely 2-chambered, papillate	subapical, incumbent, operculate, obovoid to subglobose, obscurely 2-chambered, papillate	subventral, incumbent, operculate, obovoid cordate, obscurely 2-chambered, papillate
Connective	narrow, slightly thickened on the dorsal surface	narrow, apically elongate in rostrate projection, or thickened	narrow, apically elongate in rostrate projection
Pollinia	2, subglobose, slightly dorsiventrally flattened, hard, unequally and deeply cleft	2, obliquely oblong ellipsoid, hard, unequally and shallowly cleft	2, obliquely obovoid, hard, unequally and deeply cleft
Caudiculae	sticky, amorphous	sticky, amorphous	sticky, amorphous
Clinandrium	obscure	obscure	obscure
Stigma	large, ovate to elliptic, deeply concave	small, elliptic, deeply concave, sometimes partially hidden by rostellum	small, elliptic, deeply concave, partially hidden by rostellum
Rostellum	short, conical-digitate in the middle, obtuse; remnant bilobulate at the middle, with oblique shallowly concave plate between acute lobules	elongate, rostrate or short, rounded, thick, erect, obtuse; remnant rounded at the apex, obscurely bilobed, with shallowly concave plate between lobes or rostrate, cylindric, bilobulate at the apex, both lobules widely spread, wing-like, thin	elongate, rostrate, thick, bent down at apex, obtuse; remnant rostrate, bilobulate at apex, canaliculated on dorsal surface
Viscidium	single, oblong-elliptic, thick, fleshy	single, oblong ovoid, very thick and fleshy or thin, lamellate	single, oblong ovate, thin, lamellate
Tegula	single, oblong, thin, lamellate, flattened and elongate at the apex and here slightly thickened	single, oblong or deltoid to oblong-obovate, more or less apically expanded, thin, lamellate, occasionally laterally flattened and apically thickened	single, linear, apically expanded, thin, lamellate

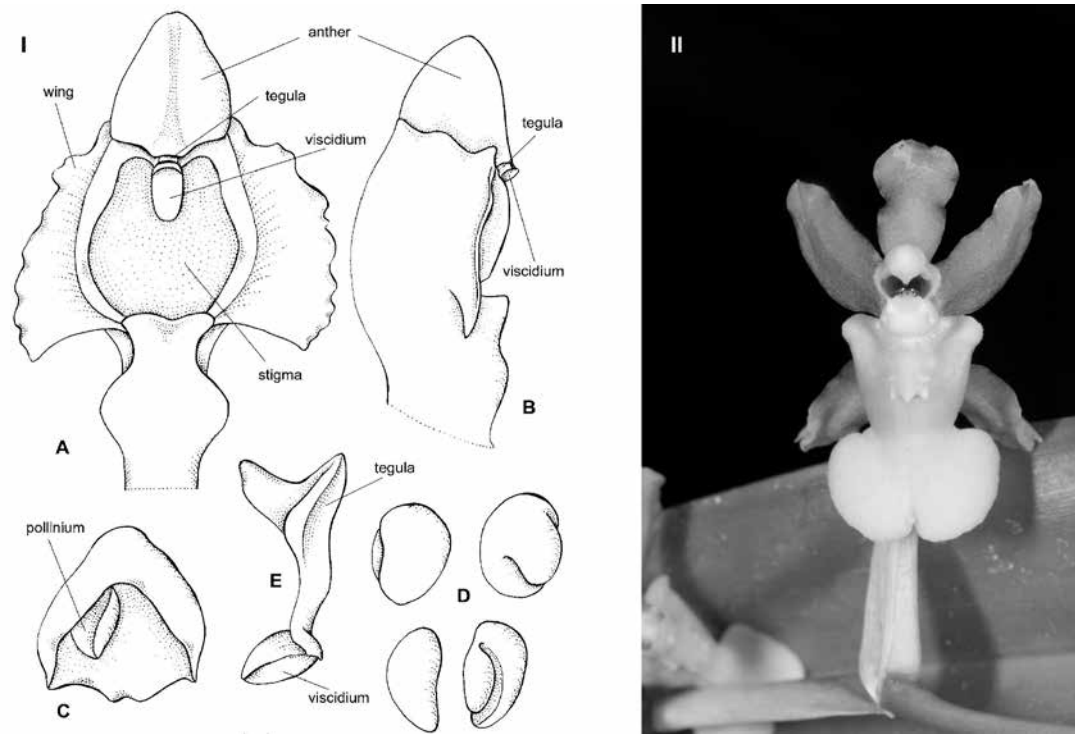

Figure 2. I. Gynostemium of *Oncidium altissimum* (Jacq.) Sw. A – Gynostemium, bottom view; B – Gynostemium, side view; C – Anther; D – Pollinia, various views; E – Tegula and viscidium (Heidelberg BG O-648, HEID; Szlachetko & Mytnik-Ejsmont 2009). II. Flower of *O. chrysomorphum* (photo: T. Kusibab).

Results and discussion

Generic separateness of *Sigmatostalix*

While in fact *Sigmatostalix* and *Oncidium* are vegetatively similar (as many other oncidioid genera), their floral characters seem to be adequate to treat them as separate genera. The comparative morphology of both is presented in Table 1. While *Sigmatostalix* and *Oncidium* produce laterally compressed pseudobulbs, they are usually apically unifoliate (vs 2–4 in *Oncidium*). Both genera differ in the size of flowers, but in both they are arranged in elongate inflorescences. The branching inflorescence of *Sigmatostalix* is composed of aborted, very short branches gathered in fascicles supported by scarious bracts. This character is rarely found in other Oncidiinae. Only in *Sigmatostalix*, the tepals are strongly reflexed and the lip form varies within both genera. Gynostemium of *Oncidium* is short, stout, with the column part twice longer than the anther, while in *Sigmatostalix* it is elongate, delicate, arched, with column part 2–4 times longer than the anther. In the former genus, broad wings are visible near the large stigmatic surface. This character is absent in *Sigmatostalix* – only small, wing-like projections are sometimes observed at the base of a small stigmatic cavity. Unlike *Oncidium*, the connective of *Sigmatostalix* is elongate in the rostrate projection or thickened in the apical part. The prominent tabula infrastigmatica is not observed in the latter genus.

Ornithophora differs from *Sigmatostalix* in both vegetative and floral characters. In comparison to the latter genus, pseudobulbs of *Ornithophora* show a mat looking growth. No appendices are

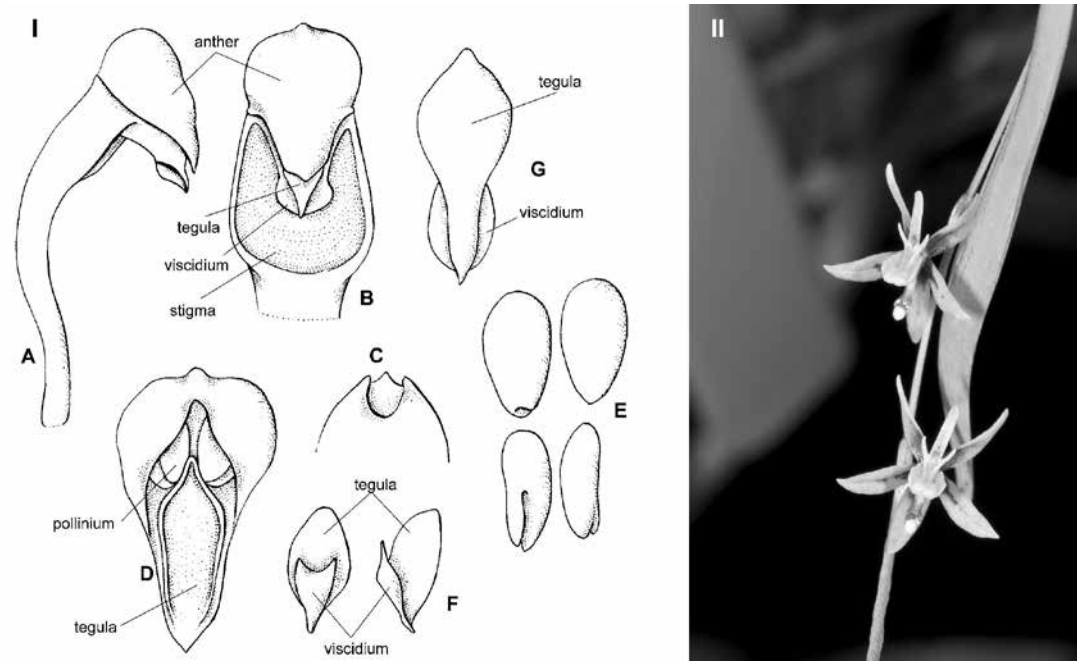

Figure 3. I. Gynostemium of *Sigmatostalix guatemalensis* Schltr. A – Gynostemium, side view; B – Apical part of gynostemium, bottom view; C – Rostellum remnant, bottom view; D – Anther; E – Pollinia, various views. F–G Tegula and viscidium, front view (Heidelberg BG O-1199, HEID; Szlachetko & Mytnik-Ejsmont 2009). II. Flowers of *S. cuculligera* (photo: T. Kusibab).

observed in its gynostemium, the anther is subventral, the rostellum is apically bent down, obtuse and its remnant is rostrate, bilobulate at the apex and canaliculated on dorsal surface.

As stated above, Neubig et al. (2012) consider *Sigmatostalix* as diminutive relative to *Oncidium*, reflecting adaptations to different groups of smaller oil-collecting bees. In the case of *Sigmatostalix*, this adaptation has a strong background in flower morphology. As orchids in general are especially prone to adaptation to various pollinators, in our opinion this can be reflected in their taxonomy. Therefore, we believe *Sigmatostalix* deserves the status of a separate genus.

Infrageneric classification of *Sigmatostalix*

So far, the only infrageneric classification of *Sigmatostalix* was proposed by Kraenzlin (1922) who distinguished three groups within the genus based on lip lobation (*Trilobae*, *Subintegrae*, *Integrae*) leaving *S. picta* Rchb. f. unplaced. Unfortunately, this concept is subjective and numerous species cannot be undoubtedly included in any of these informal groups.

The genetic study of Neubig et al. (2012) embraces the largest number of *Sigmatostalix* species, i.e. 15 species and 4 undetermined taxa. It is about 15–20% of all species recognized in the genus so far, including also representatives of two other genera separated from *Sigmatostalix*, i.e. *Roezliella* and *Petalocentrum*. The *Sigmatostalix*-clade can be splitted into two subclades – the first one is coincident with *Petalocentrum* and includes *S. lehmannianum*, *S. picturatissima* and *S. oxyceras*, hence species with sessile, simple lip adorned basally by prominent basal cavity surrounded by thick rim, usually divided by internal partition into two chambers. The other subclade embraces 4 groups and two species with unsolved phylogenetic relation, i.e.

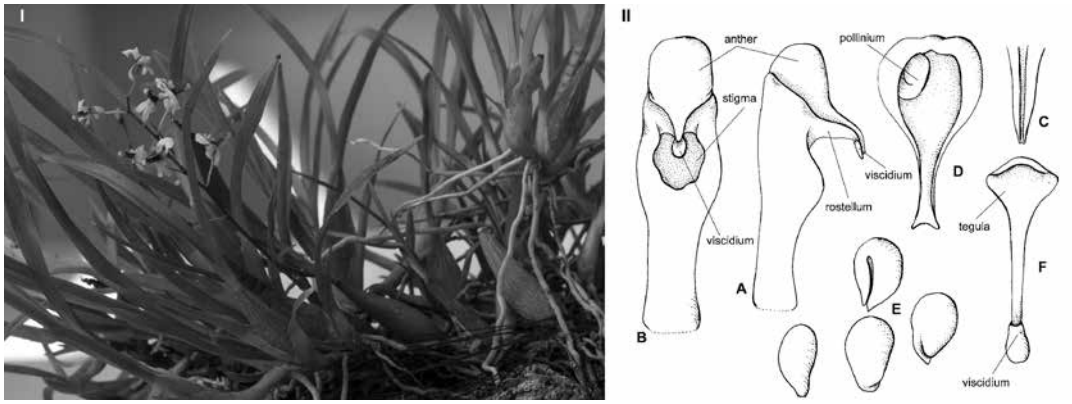

Figure 4. Habit (photo: A. Avetta) and gynostemium of *Ornithophora radicans.* A – Gynostemium, side view; B – Gynostemium, bottom view; C – Rostellum remnant, front view; D – Anther; E – Pollinia, various views; F – Tegula and viscidium, back view (Heidelberg BG O-433, HEID; Szlachetko & Mytnik-Ejsmont 2009).

S. weinmanniana and *S. buchtieni*. Morphologically, *S. weinmanniana* appears to be somewhat similar to species grouped in *Roezliella* and its lip middle lobe is furculate, i.e. dissected into two spread linear lobules with small apiculus between them. On the other side, *S. buchtienii* is morphologically similar to *S. poikilostalix*-group. The first of the group mentioned above includes *S. unguiculata* and *S. auriculata*. The only mutual character for both species is a long clawed lip, but its lamina morphology is completely different. The next group embraces *S. poikilostalix*, i.e. species with prominently clawed lip and basal margins thickened and elongated into two horns. It is interesting to note that a very similar lip can be found in *S. auriculata*. Both of these groups are classified in *Sigmatostalix* s.str. *S. graminea* forms a distinct group characterized by shortly clawed (or rather subsessile) lip with cup-like, two-chambered basal callus and thin lip basal margins. The last group is constituted of such species as *S. morganii*, *S. minax*, *S. aristullifera* or *S. cuculligera*, hence those which Schlechter classified in his genus *Roezliella*. They are easily separable from other *Sigmatostalix* species by sessile lip, 3-lobed just above the base, with the middle lobe being the longest, by complex basal lip callus perpendicular to the lamina, produced just below the base of the gynostemium.

Below we propose a modified concept of Schlechter (1918) and divide the genus in the section rank trying to maintain its congruence with the results of the phylogenetic study of Neubig et al. (2012). We hope it will be useful for future studies of this genus and for identification of species. Specific composition of the sections and keys to their identification are presented. *Sigmatostalix ibis* which was included in the molecular analysis is not assigned to any section because this taxon is only cited in one unpublished doctoral dissertation (Walter 1983).

Taxonomic treatment

Sigmatostalix Rchb. f.

Bot. Zeitung (Berlin) 10(44): 769. 1852. — TYPE: *Sigmatostalix graminea* (Poepp. & Endl.) Rchb. f.

Sigmatostalix includes about 70–80 species distributed from Mexico to Bolivia and Brazil with the greatest diversity in Colombia. The genus can be distinguished by the unornamented, slender, elongate gynostemium swollen at the apex and flat tegula.

The sections may be recognized as follows:

1. Lip sessile 2
1* Lip unguiculate 5
2. Lip lamina entire, unlobed, basal callus concave 3
2* Lip lamina deeply lobed, callus convex 4
3. Lip base rounded to truncate,
lamina more or less transversely elliptic ..... 1. Sect. *Petalocentrum*
3* Lip base narrow, cuneate, lamina longer than wide ..... 2. Sect. *Integrilabrae*
4. Lip middle lobe furculate with small apiculus at the bottom of the sinus ... 5. Sect. *Hirtziae*
4* Lip middle lob unlobed ..... 9. Sect. *Roezliella*
5. Lip callus concave ..... 6. Sect. *Sigmatostalix*
5* Lip callus convex 6
6. Lip lamina unlobed 7
6* Lip lamina 3-lobed 8
7. Lip lamina base rounded ..... 8. Sect. *Abortivae*
7* Lip lamina base truncate to cordate ..... 4. Sect. *Pictae*
8. Lip claw longer than lamina ..... 3. Sect. *Unguiculatae*
8* Lip claw much shorter than lamina ..... 7. Sect. *Panduratae*

1. Section *Petalocentrum*

Lip lamina more or less transversely elliptic, with rounded to truncate base (Fig. 5A). Six species are included in this section.

Sigmatostalix angustifolia (Schltr.) Szlach. & Kolan., comb. nov.

Basionym: *Petalocentrum angustifolium* Schltr., Repert. Spec. Nov. Regni Veg. 15: 145. 1918. — TYPE: Peru, Chanchamayo, *E. Köhler 1911* (not localized)

Sigmatostalix huebneri Mansf., Repert. Spec. Nov. Regni Veg. 36 (936–941): 62–63. 1934.
Sigmatostalix macrobulbon Kraenzl., Pflanzenr. IV. 50(Heft 80): 307, f. 27B. 1922.
Sigmatostalix picturatissima Kraenzl., Pflanzenr. IV. 50(Heft 80): 312. 1922.
Sigmatostalix pusilla Schltr., Repert. Spec. Nov. Regni Veg. 10: 392. 1912.
Sigmatostalix racemifera L.O. Williams, Ann. Missouri Bot. Gard. 27(3): 285–286, t. 36. 1940.

2. Section *Integrilabrae* Szlach. & Kolan., sect. nov.

TYPE: *Sigmatostalix integrilabris* Pupulin

Lip lamina longer than wide, base narrow, cuneate (Fig. 5B). Ten species are included in this section.

Sigmatostalix adamsii Dodson, Selbyana 2(1): 54, f. 15C. 1977.
Sigmatostalix brownii Garay, Caldasia 10(47): 236–237. 1968.
Sigmatostalix gentryi Dodson, Orquideología 21(1): 15. 1998.
Sigmatostalix integrilabris Pupulin, Harvard Pap. Bot. 8(1): 45–47, f. 7. 2003.
Sigmatostalix ligiae Königer & R. Escobar, Arcula 4: 116. 1995.
Sigmatostalix oxyceras Königer & J.G. Weinm., Arcula 5: 146. 1996.
Sigmatostalix pichinchensis Dodson, Orquideología 21(1): 21. 1998.
Sigmatostalix portillae Königer, Arcula 3: 87. 1995.

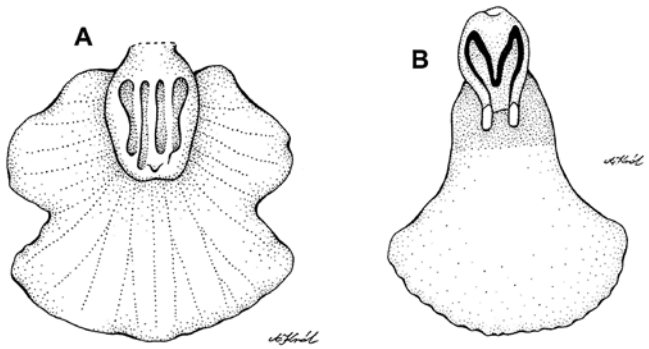

Figure 5. Lip form of representative of sect. *Petalocentrum* (A – *S. racemifera*, Williams 1940) and sect. *Integrilabrae* (B – *S. ligiae*, Königer 1995). Redrawn by A. Król.

Sigmatostalix putumayensis P. Ortiz, Orquideología 18: 178. 1991.
Sigmatostalix trimorion Königer, Arcula 6: 172. 1996.

3. Section *Unguiculatae* Szlach. & Kolan., sect. nov.

TYPE: *Sigmatostalix unguiculata* C. Schweinf.

Lip long unguiculate, lamina 3-lobed, lobes narrow (Fig. 6 B). Three species are included in this section.

Sigmatostalix pseudounguiculata Pupulin & Dressler, Lindleyana 15(1): 27, 29–30, f. 5. 2000.
Sigmatostalix renatoi Königer, Arcula 12: 308, f. s.n. [p. 309]. 2003.
Sigmatostalix unguiculata C. Schweinf., Bot. Mus. Leafl. 8(2): 55–56. 1940.

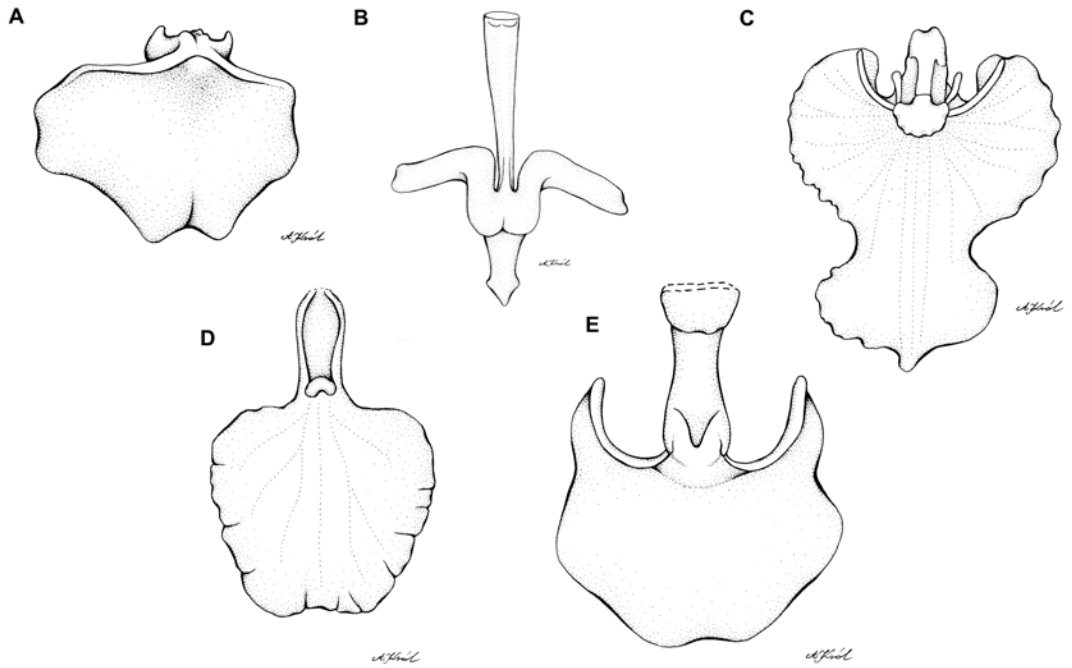

Figure 6. Lip form of representative of sect. *Sigmatostalix* (A – *S. graminea,* Bennett & Christenson 1998), sect. *Unguiculatae* (B – *S. pseudounguiculata*, Pupulin 2000), sect. *Panduratae* (C – *S. pandurata*, Schlechter 1920), sect. *Abortivae* (D – *S. abortiva*, Williams 1940) and sect. *Pictae* (E – *S. picta,* Dodson 1980). Redrawn by A. Król.

4. Section *Pictae* Szlach. & Kolan., sect. nov.

TYPE: *Sigmatostalix picta* Rchb. f.

Lip clawed, lamina transversely elliptic with truncate to cordate usually thickened basal margins (Fig. 6E). Twenty-one species are included in this section.

Sigmatostalix ariasii Königer, Arcula 8: 241. 1999.
Sigmatostalix aurosanguinea Rchb. f., Linnaea 41: 68. 1876.
Sigmatostalix bicallosa Garay, Arch. Jard. Bot. Rio de Janeiro 11: 57. 1951.
Sigmatostalix caquetana Schltr., Repert. Spec. Nov. Regni Veg. Beih. 27: 117. 1924.
Sigmatostalix cardioglossa Pupulin, Harvard Pap. Bot. 8(1): 38–40, f. 2. 2003.
Sigmatostalix costaricensis Rolfe, Bull. Misc. Inform. Kew 1916(3): 78. 1916.
Sigmatostalix crescentilabia C. Schweinf., Amer. Orchid Soc. Bull. 16: 162. 1947.
Sigmatostalix dulcineae Pupulin & G.A. Rojas, Orchids, Mag. Amer. Orchid Soc. 75(9): 681–683, f. 1–2, 3E. 2006.
Sigmatostalix eliae Rolfe, Bull. Misc. Inform. Kew 1908: 416. 1908.
Sigmatostalix guatemalensis Schltr., Repert. Spec. Nov. Regni Veg. 10(248–250): 253. 1911.
Sigmatostalix hermansiana Königer, Arcula 8: 243. 1999.
Sigmatostalix lunata Schltr., Repert. Spec. Nov. Regni Veg. 14: 394. 1916.
Sigmatostalix lutzii Königer, Arcula 3: 84. 1995.
Sigmatostalix marinii Königer, Arcula 4: 119. 1995.
Sigmatostalix mexicana L.O. Williams, Amer. Orchid Soc. Bull. 10(6): 239, f. 1. 1942.
Sigmatostalix peruviana Rolfe, Kew Bull. 371. 1910.
Sigmatostalix picta Rchb. f., Ann. Bot. Syst. 6: 859. 1864.
Sigmatostalix poikilostalix Kraenzl., Pflanzenr. IV. 50(Heft 80): 310, f. 26D. 1922.
Sigmatostalix savegrensis Pupulin, Harvard Pap. Bot. 8(1): 55, f. 12. 2003.

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Sigmatostalix auriculata Garay, Caldasia 10(47): 236. 1968.
Sigmatostalix buchtienii Kraenzl., Repert. Spec. Nov. Regni Veg. 25: 24. 1928.

These species are morphologically very similar to other representatives of the section *Pictae*, but molecular studies do not confirm their position in this group.

5. Section *Hirtziae* Szlach. & Kolan., sect. nov.

TYPE: *Sigmatostalix hirtzii* Dodson

Lip middle lobe furculate with small apiculus at the bottom of the sinus (Fig. 7B). Two species are included in this section.

Sigmatostalix hirtzii Dodson, Orquideología 21(1): 17. 1998.
Sigmatostalix weinmanniana Königer, Arcula 2: 55. 1994.

6. Section *Sigmatostalix*

Lip shortly clawed, callus somewhat concave (Fig. 6A). Three species are included in this section.

Sigmatostalix amazonica Schltr., Beih. Bot. Centralbl. 42(2): 148. 1925.
Sigmatostalix graminea (Poepp. & Endl.) Rchb. f., Bot. Zeitung (Berlin) 10(44): 769. 1852.
Sigmatostalix curvipetala D.E. Benn. & Christenson, Brittonia 47(2): 202, 205, f. 14. 1995.

7. Section *Panduratae* Szlach. & Kolan., sect. nov.

TYPE: *Sigmatostalix pandurata* Schltr.

Lip shortly clawed, lamina pandurate, more or less 3-lobed near the middle, lobes elliptic, ovate to subcordate (Fig. 6C). None of the species mentioned below were included in the genetic study, but morphologically they differ clearly from other representatives of the genus. Therefore, we propose to separate them as section:

Sigmatostalix hymenantha Schltr., Beih. Bot. Centralbl., Abt. 2 36(2): 419. 1918.
Sigmatostalix pandurata Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7: 192. 1920.

8. Section *Abortivae* Szlach. & Kolan., sect. nov.

TYPE: *Sigmatostalix abortiva* L.O. Williams

Lip long clawed, lamina simple, unlobed, elliptic, with rounded base (Fig. 6D). Two species are included in this section.

Sigmatostalix abortiva L.O. Williams, Ann. Missouri Bot. Gard. 27(3): 284–285, t. 34, f. 1–6. 1940.
Sigmatostalix adelaidae Königer, Arcula 3: 82. 1995.

9. Section *Roezliella* (Schltr.) Szlach. & Kolan., comb. et stat. nov.

TYPE: *Sigmatostalix dilatata* Rchb. f., Linnaea 41: 16. 1877.

Lip middle lobe unlobed, narrow to somewhat flabellate (Fig. 7A). Seventeen species are included in this section.

Sigmatostalix arangoi Königer, Arcula 11: 290. 2001.
Sigmatostalix aristulifera Kraenzl., Pflanzenr. 305. 1922.
Sigmatostalix brevicornis Königer & J. Portilla, Arcula 10: 271. 2000.
Sigmatostalix cuculligera (Schltr.) Garay, Orquideología 7(4): 202. 1972.
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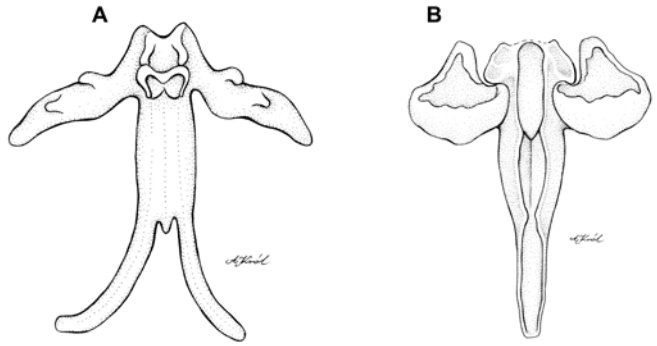

Figure 7. Lip form of representative of sect. *Roezliella* (A – *S. arangoi,* Königer 2001) and sect. *Hirtziae* (B – *S. hirtzii,* Dodson 1998). Redrawn by A. Król.

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Incertæ sedis

We did not examine any representative of the species listed below, hereby their subgeneric affinity remains unknown.

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