Taxonomic revision of Sinningia Nees (Gesneriaceae) II : new species from Brazil

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Taxonomic revision of Sinningia Nees (Gesneriaceae) II: new species from Brazil

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ABSTRACT

CHAUTEMS, A. (1991). Taxonomic revision of Sinningia Nees (Gesneriaceae) II: new species from Brazil. *Candollea* 46: 411-425. In English, English and French abstracts.

Five new species of *Sinningia* are described from Brazil: *Sinningia aghensis, S. harleyi, S. kautskyi, S. nivalis* and *S. valsuganensis*. All species are illustrated and details on distribution, ecology, phenology and taxonomic relationships are provided.

RÉSUMÉ

CHAUTEMS, A. (1991). Révision taxonomique de Sinningia Nees (Gesneriaceae) II: nouvelles espèces du Brésil. *Candollea* 46: 411-425. En anglais, résumés anglais et français.

Cinq espèces nouvelles de *Sinningia* du Brésil sont décrites: *Sinningia aghensis, S. harleyi, S. kautskyi, S. nivalis* and *S. valsuganensis*. Toutes les espèces sont illustrées et des détails sur la distribution, l'écologie, la phénologie et les relations taxonomiques sont présentés.

Introduction

In the course of the revision of the genus *Sinningia* (CHAUTEMS, 1990), several undescribed species have been encountered. Five of these are described below, based on herbarium and fieldwork in Brazil. All appear to be restricted endemics; their recent introduction in cultivation may contribute to their conservation.

1. Sinningia aghensis Chautems, **spec. nov.** (Fig. 1).

Planta tuberosa, rupicola, folia opposita, dense pilosa, inflorescentia longipedunculata, corolla roseo-purpurea, digitaliformis, limbo patulo; S. speciosae affinis, vero cauli elongati, inflorescentia terminali, corollae forma differt.

Terrestrial herbs, arising from rupicolous tubers 5-15 cm in diameter, stems erect, 5-20 cm tall, hairy with trichomes 2-2.5 mm long. Leaves 2-3 pairs, slightly unequal, condensed at base of peduncle; petiole short, 0.5-2.5 cm, villous with trichomes 2-3 mm long; blade ovate, up to 14 × 10 cm, margin finely crenate-denticulate, above dull green with appressed multicellular trichomes ca. 1 mm long, below withish-sericeous with trichomes 0.5-1 mm long, 5-7 pairs of veins. Inflorescence a compound pair-flowered cyme borne on erect peduncle, 20-30 cm long, reddish brown, glabrescent; prophylls ca. 3 mm long, pedicels ascending, 1-2.5 cm long, reddish brown. Calyx obliquely pendent, green, 6-9 mm long with the tube up to 3 mm, bearing glandular and non glandular trichomes, 1-1.5 mm long, lobes triangular; corolla erect in calyx, foxglove-shaped, tube with a

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double dorsal gibbosity at base, constricted above, then expanding and somewhat ventricose, up to 3.5 cm long, 1.5 cm wide at throat, purplish pink, sparsely hairy with trichomes longer and denser on the dorsal side, limb formed by 5 lobes, 2 dorsal ca. 0.7 × 1.6 cm, 2 lateral ca. 0.7 × 0.8 cm, the ventral ca. 0.7 × 1.4 cm; stamens 4, included; nectary consisting of 5 glands, 2 dorsal larger, 1.5 × 2 mm, obtuse at the apex, 3 ventral smaller, 1.5 × 1 mm; ovary 5 mm long, sericeous, style included, white, glabrous, stigma stomatomorphic. Fruit a dry ovoid capsule, 1.5 × 0.9 cm, pointed at the apex; seeds spindle-shaped, twisted, striate, reddish brown.

Type: BRAZIL, Espirito Santo, Vila Velha, sobre rocha, 14.9.1984, *P.C. Vinha s.n.* (Holotype: VIES 679; Isotype: G).

Paratypes: BRAZIL, Espirito Santo, Vila Velha, Morro do Moreno, 20°21'S/41°18'W, encosta granítica dominando o mar, 5.3.1990, *Chautems & Pereira 379* (G unicata); 70 km ao sul de Vitória, entre Piuma e Itapemirim, litoral em encosta de rochas graníticas, 50 m altitude, 9.1977, *Shepherd et al. UNICAMP 5893* (UEC); Piuma, Monte Aghá, saxícola, exposta ao sol, 11.1982, *Brügger s.n.* (CESJ 19362); Santa Teresa, São João de Petrópolis, Escola Agrotécnica Federal, 12.1985, *Boone 980* (MBML, CEPEC).

Etymology. — The species name comes from the first collection I was aware of, through a picture taken by Mr. R. A. Kautsky. The material had been collected originally in Morro do Aghá and then grown in his greenhouse. This local name refers to a hill ("morro") shaped like the letter H ("aghá" in portuguese).

Material in cultivation. — Plant grown by R.A. Kautsky, originally collected in Piuma, Monte Aghá, 150 m alt. Collection in Mr. M. Peixoto's greenhouse near São Paulo, Accession N° 162 and 162A, originally collected in the same locality. M. Peixoto, Accession N° AC-1514 = same locality as *Chautems & Pereira 379.*

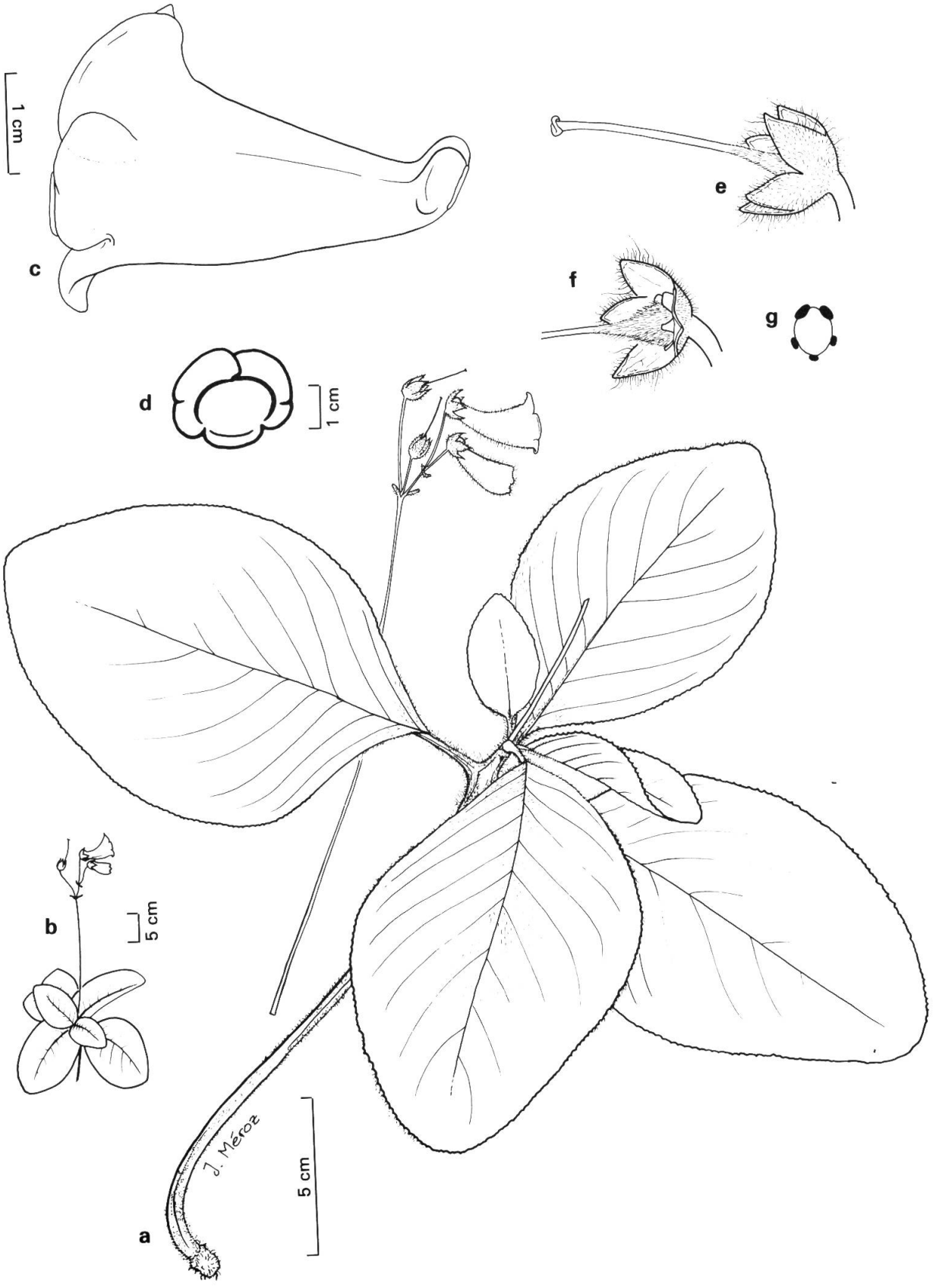
Distribution. — The species is endemic to the southern coast in the state of Espirito Santo (Fig. 6). Only three localities, within a distance of about 120 km, are presently known. At Vila Velha, I found a population of over 10 individuals.

Ecology. — Tubers were observed growing in crevices of bare granitic rocks, exposed to full sun. The presence of succulent plants, like Cactaceae and Agavaceae, in the locality visited, indicates a poor groundwater availability. Because of the virtual absence of soil, the vegetative tissue have to store water, either in the tuber or in stems and leaves. The annual mean precipitation for the area (Vitória) is around 1400 mm, without any totally dry period.

Phenology. — From the few collections reported, the flowering period seems to take place between September and December, when the rainfall is more abundant. By the time of my collection, in March, only one plant was in flower; the others had dried stems or new growth starting from their tubers.

Relationships. — This species presents some very interesting features: it belongs to Sect. *Sinningia* based on the floral morphology (cf. *S. speciosa* (Lodd.) Hiern). However, its habit, with a long erect peduncle bearing the inflorescence, shows a definite similarity with the species from Sect. *Rechsteineria* (Regel) Bentham. This can be seen as a new element supporting the inclusion of the former genus *Rechsteineria* in *Sinningia,* in addition to the hybridization and cytological works from CLAYBERG (1968, 1970).

Fig. 1. — *Sinningia aghensis.*
a: habit; **b:** natural habit; **c:** corolla; **d:** corolla limb; **e:** calyx and style; **f:** calyx opened to show part of nectary; **g:** schema of nectary in transversal cut; (**a,** herbarium specimen; **b,** slides of live plant; **c-g,** pickled flowers, all from *Chautems & Pereira 379*).


1 cm
c
e
f
g
d
1 cm
b
5 cm
J. Méroz
5 cm
a

2. Sinningia harleyi Wiehler & Chautems, **spec. nov.** (Fig. 2).

Planta parva (15-35 cm) viscida, foliis ovatis; ex affinitate S. aggregatae (Ker-Gawler) Wiehler, sed pedunculis nullis, pedicellis singularibus, corollae tubo majore latioreque (4.5-5 cm longo), lobis latioribus (0.7-1 cm) differt.

Terrestrial herbs with erect stems arising from tubers and growing in rock crevices; stems 15-35 cm tall, ca. 3 mm in diameter, green to reddish, hirsute, internodes 2-5 cm long; stems, leaves and flowers covered with viscid, capitate-glandular trichomes giving to the whole plant a strong fragrance. Leaf pairs equal to subequal; petiole 0.8-1.7 cm long, green, hirsute; blade ovate, 3-6.5 cm × 1-3.5 cm, apex acute or acuminate, rounded at base, margin serrate with teeth ca. 3 mm high × 3-8 mm wide, above green, paler beneath, pilose to hirsute, 5-7 pairs of veins. Inflorescences axillary cymes reduced to solitary flowers; peduncle absent, prophylls 0.3-1.5 cm long; pedicels ascending, 1.5-2 cm long, green to reddish, hirsute. Calyx obliquely pendent, turbinate, lobes subequal, lanceolate, ca. 1 cm long × 0.5 cm wide (dorsal lobe somewhat narrower), entire, ciliate, green, hirsute; corolla tubular, erect in calyx, 4.5-5 cm long, 0.8-1.1 cm wide, with a small spur, bright red (pale yellow in bud), pilose and sparsely hirsute, lobes of the limb unequal, lower lobe ca. 1 × 1 cm, lateral and upper lobes ca. 0.6 × 0.7 cm, tube inside light pink with red striations, glabrous; stamens 4, included, filaments ca. 4 cm long, white, glabrous, anthers 1.3 × 1.3 mm, pollen white; nectary consisting of a large, double-connate dorsal gland, yellowish, 0.9 × 0.2 mm, and 3 very small lateral and ventral glands; ovary green, style and stigma white. Fruit a capsule, not seen at maturity.

Type: BRAZIL, Bahia, Jussiape, próximo da cidade de Rio de Contas, cachoeira da Fraga, 11.2.1991, *Carvalho & Chautems 3235* (Holotype: CEPEC; Isotypes: G, GES, US).

Paratypes: BRAZIL, Bahia, Pico das Almas, lower NE slopes of the Pico das Almas, ca. 25 km WNW of the town Rio de Contas, "carrasco" scrub among rocks, with occasional wet flushes, and some areas partly burnt over, altitude 1500 m, 13°32'S/41°55'W, in rock crevices, 22.1.1974, *Harley 15401* (CEPEC, GES, K, SEL); Pico das Almas, lower NE slopes of the Pico, ca. 25 km WNW of the Vila Rio de Contas, rock outcrops, altitude 1500m, 13°33'S/41°57'W, 17.2.1977, *Harley 19500* (CEPEC, K, US); Pico das Almas, between 2.5 and 5km S of Vila de Rio de Contas, on side-road to the Rio Brumado, in rock crevices above river, altitude ca. 980 m, 13°36'S/41°50'W, 28.3.1977, *Harley 20061* (CEPEC, US); Pico das Almas, em frestas de rochas, altitude 1460 m, 14.12.1984, *Giuletti et al. CFCR 6854* (CEPEC, SPF); Jussiape, água empoçada à margem do rio de Contas, próximo da cidade, cachoeira da Fraga, 16.2.1987, *Harley et al. 24338* (G, SPF); entre Rio de Contas e Brumadinho, entre Fazenda Brumadinho e Queiroz, altitude 1400 m, 21.2.1987, *Harley et al. 24635* (K, SPF).

Etymology. — This species is named for its first collector, Dr. Raymond M. Harley who works in the herbarium of the Royal Botanic Gardens at Kew, England. He was responsible for several field expeditions in the state of Bahia, with a special intererest for the "campos rupestres" flora and the taxonomy of the *Labiatae* family.

Material in cultivation. — Three tubers were recently brouhgt back from Bahia and introduced in the greenhouse of Mr. Mauro Peixoto in the vicinity of the city of São Paulo, under the Accession N° AC-1663.

Distribution. — So far, this species is known only from the area of the Pico das Almas, in the interior of the state of Bahia (Fig. 6). This area is part of the Chapada Diamantina, a northern extension of the Espinhaço Range from the state of Minas Gerais. Several botanical expeditions took place there in the last 15 years. The first results obtained showed that the area is very rich in endemics. This phenomenon can be explained by the relative isolation of the mountain range and by special climatic, relief and soil conditions, which are unique in Brazil (GIULETTI & PIRANI, 1988).

Ecology. — This species was found growing in rock crevices, with very little soil accumulation. The plant parts above ground, during flowering period in the summer, have to resist intense

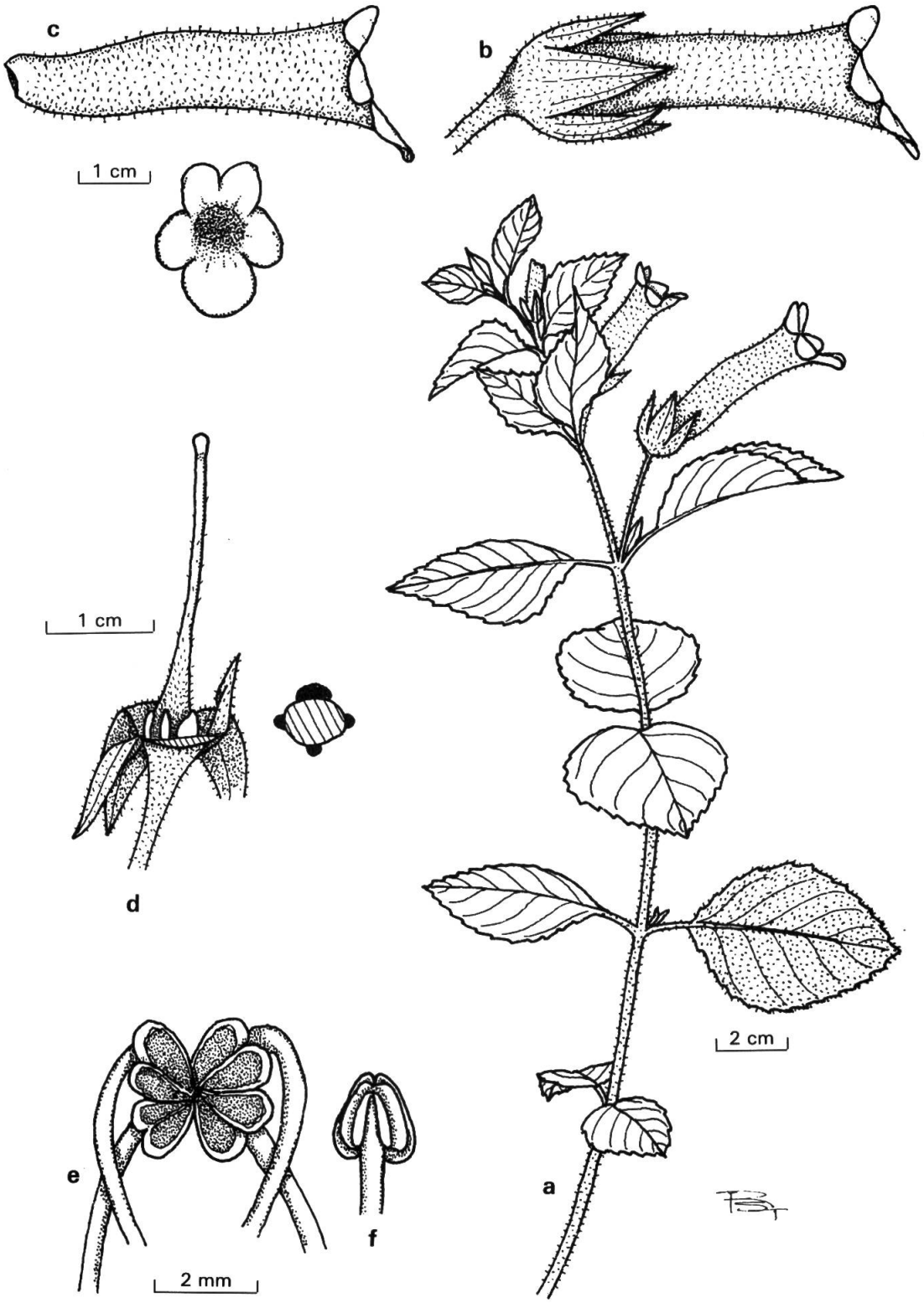


Fig. 2. — *Sinningia harleyi.*
a: habit; **b:** calyx and corolla; **c:** corolla; **d:** calyx opened to show part of nectary and schema of nectary in transversal cut; **e:** anthers arrangement in frontal view; **f:** anther in dorsal view; (from *Harley 15041*). Illustration sponsored by Ben Paternoster, Bayside, New York, in memory of Al Katzenberger (plate 41 of yet unpublished "Illustrated Digest of Neotropical Gesneriaceae").

radiation from the sun and extremely dry air. The small and shriveled tubers, found in the bottom of small cracks, are very tightly stuck in the rocks and usually protected from direct sun radiation. From all the species observed so far in the wild, *S. harleyi* thrives in the most arid conditions.

Phenology. — The flowering period seems restricted to the months of December to March.

Relationships. — *Sinningia harleyi* belongs to Sect. *Rechsteineria* (Regel) Bentham, on account of the habit and configuration of its nectary. With its solitary, axillary large red flowers, Dr. Harley's *Sinningia* is one of the most advanced species in the section, in which the hummingbirds pollination syndrome predominates. Only a few others species share the viscid and fragrant characters, namely *S. aggregata* (Ker-Gawler) Wiehler and *S. valsuganensis* Chautems (see below key of this group of species, after the description of the latter).

3. Sinningia kautskyi Chautems, **spec. nov.** (Fig. 3).

Planta prostrata, folia subtus vinosa, calicis lobi triangulares, corolla violacea, tubus infundibuliformis deflexus; a S. hirsuta pilis curtioribus (1-2 mm longis), foliis minoris, pedunculis nullis, corollae tubi forma differt.

Terrestrial herbaceous plants, arising from small tubers, stems short 1-10 cm, hirsute with trichomes 1-1.5 mm long, prostrate. Leaves opposite, condensed in a pseudo-rosette; petiole pale green, 1-3.5 cm, hirsute, trichomes 1 mm long, blade heart-shaped, orbicular to ovate, 2-6.0 cm long and 1.5-5.5 cm wide, margin crenate and slightly deflexed, above dull dark green, sericeous to setose with long multicellular appressed trichomes 1.5 mm long, below wine-reddish, with 3-5 pairs of well marked veins, covered by dense, erect trichomes up to 1.5 mm long. Inflorescences axilar, peduncles lacking; 1-12 flowers developing in each axil, pedicels 3-7.5 cm long, erect, green to brown-reddish, hirsute with erect trichomes ca. 1.0 mm long. Calyx horizontal, up to 0.7 cm long with a tube reaching 0.4 cm, lobes ovate-triangular, green at anthesis and turning brownish after corolla shedding, covered with dense, erect trichomes 1.5 mm long; corolla, funnel-shaped, tube erect in calyx at base, then sharply bent downward, 1.5 cm long, 0.2-0.25 cm wide at base above ovary, expanding to 0.4 cm wide at base of limb, pale purple, sparsely covered with trichomes 0.5 mm long, 2-sulcate on dorsal and ventral sides, limb composed of 5 lobes, spreading, glabrous, slightly unequal, reaching 1.8-1.9 cm in width (between tips of two lateral lobes) and 1.1 cm in height (between tip of ventral lobe and sinus formed by the two dorsal ones), margin of ventral lobe slightly sinuate, throat cream to yellow with dark purple dots and two dark purple spots at base of lateral lobes, tube and external face of lobes covered by sparse and short hairs; stamens 4, included, filaments glabrous, reaching 0.5 cm at anthesis, purplish colored in the lower half, white above, pollen white; nectary formed of 5 pale yellow glands; ovary hirsute, style 0.4-0.5 cm long, stigma slightly bilobed at maturity. Fruit a dry capsule.

Type: BRAZIL, Espirito Santo, Domingos Martins, 20°21'S/40°39'W, introduced in the property of Mr. Roberto A. Kautsky, approx. 600 m alt., 4.6.1987, *Chautems, Kautsky & Peixoto 269* (Holotype: VIES).

Paratype: material cultivated from tuber collected in the type locality and grown by Mauro Peixoto in São Paulo, 2.2.1990, *Chautems 390* (G).

Etymology. — The name of this species honors Mr. Roberto A. Kautsky, who discovered this interesting taxon, in recognition for his work and enthusiasm in trying to save the very rich flora surrounding his home city.

Material in cultivation. — Plants raised from seeds, collected in the type locality under the Accession N° AC-1320, are grown at the Conservatoire et Jardin botaniques de la Ville de Genève; the same material has been recently distributed among some members of the AGGS (American Gloxinia and Gesneriad Society). The cultivation of *S. kautskyi* is a way of keeping this attractive species alive, while its native habitat is suffering a rapid destruction. This species has several horticultural qualities, which should attract the Gesneriaceae amateurs and growers: small and

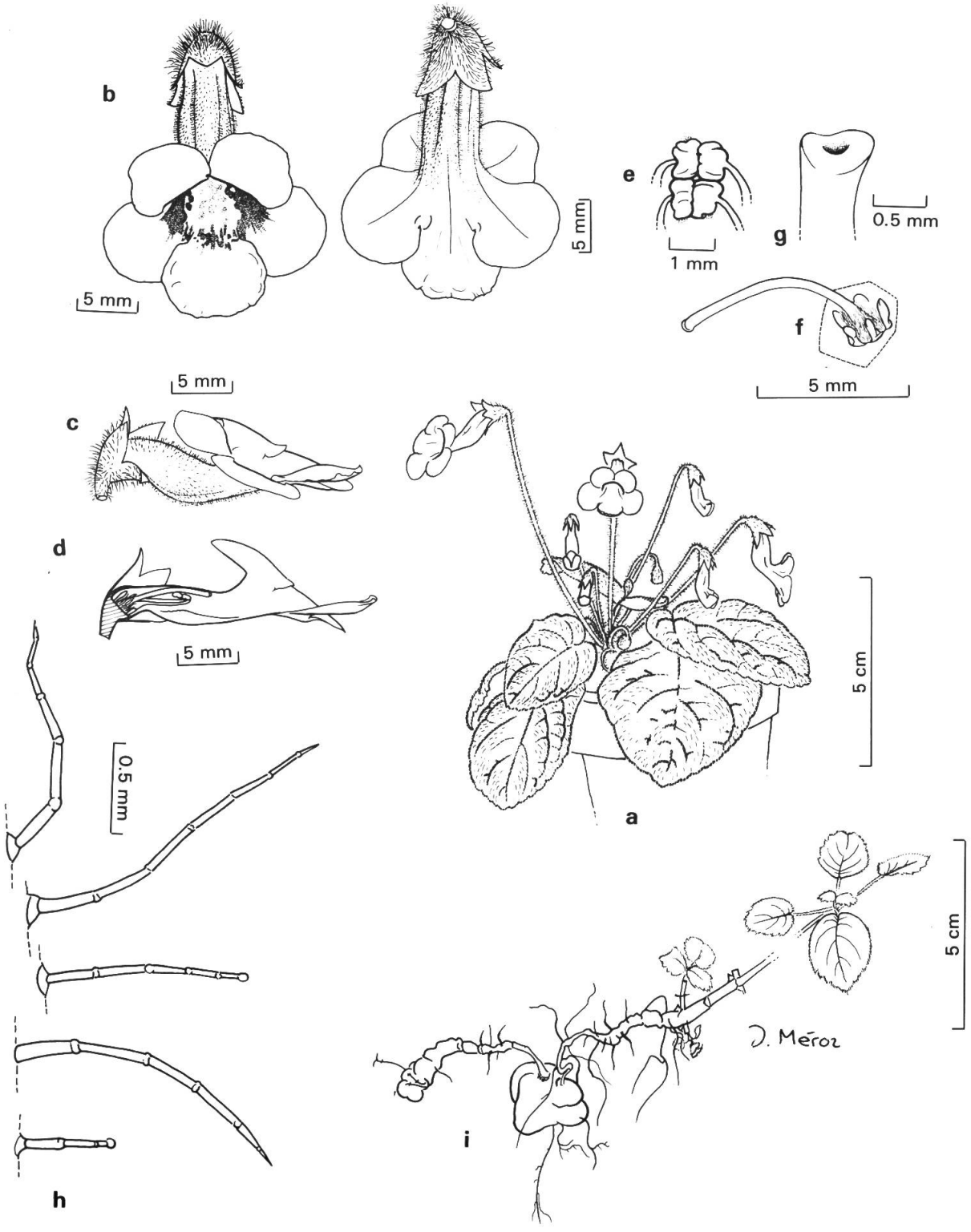


Fig. 3. — *Sinningia kautskyi*.
a: habit; **b:** flower in dorsal and ventral view; **c:** flower in lateral view; **d:** flower in longitudinal cut; **e:** anthers arrangement in dorsal view; **f:** opened flower to show nectary; **g:** stigma; **h:** trichomes — from top to bottom — adaxial face of leaf, pedicel (non glandulous), pedicel (glandulous), calyx, corolla; **i:** tuber and prostrate stems; (from cultivated material Accession N° AC-1320).

compact, appropriate for terrarium, floriferous with delicate flowers well in evidence over the rosulate leaves, easy to propagate by tuber or by seeds. The unsual prostrate habit in the genus *Sinningia* is derived from the one or two stems produced by the tuber during the first growing season; after flowering, the leaves wither and die and new shoots arise from several nodes along the thickened stem. At the end of the process, tuberous structures arise from some of these nodes and get rooted on the surface of the growing medium. An artificial hybrid with *S. hirsuta* was recently produced by M. Peixoto, indicating a promising future for new crosses with the miniature *Sinningia* varieties.

Distribution. — The species is known only from the original collection (Fig. 6). According to Mr. Kautsky, the exact wild locality is: near Domingos Martins, Biririca, property of Mr. G. Volkers, humid forest, on a steep rocky outcrop, next to a waterfall and growing between roots of other plants.

Ecology. — The plants introduced by Mr. Kautsky in his property were placed in a wet forest, on the floor, in rich humus and between rocky outcrops. In cultivation, the best results were obtained by growing the species in a terrarium. The plants that Mauro Peixoto placed in sphagnum moss, under the benches of his greenhouse, responded also very well. These experiences indicate that the species needs a very high level of atmospheric humidity, combined with a good drainage.

Phenology. — This taxon has been observed in flower during the month of June in Domingos Martins, suggesting that the growing period, in its natural habitat, takes place during the cooler winter months. In cultivation, in the conditions of the greenhouse in Geneva, flowers were observed in August-September. Under artificial light and in terrarium conditions, M. Peixoto obtained flowers during several months, from October to March.

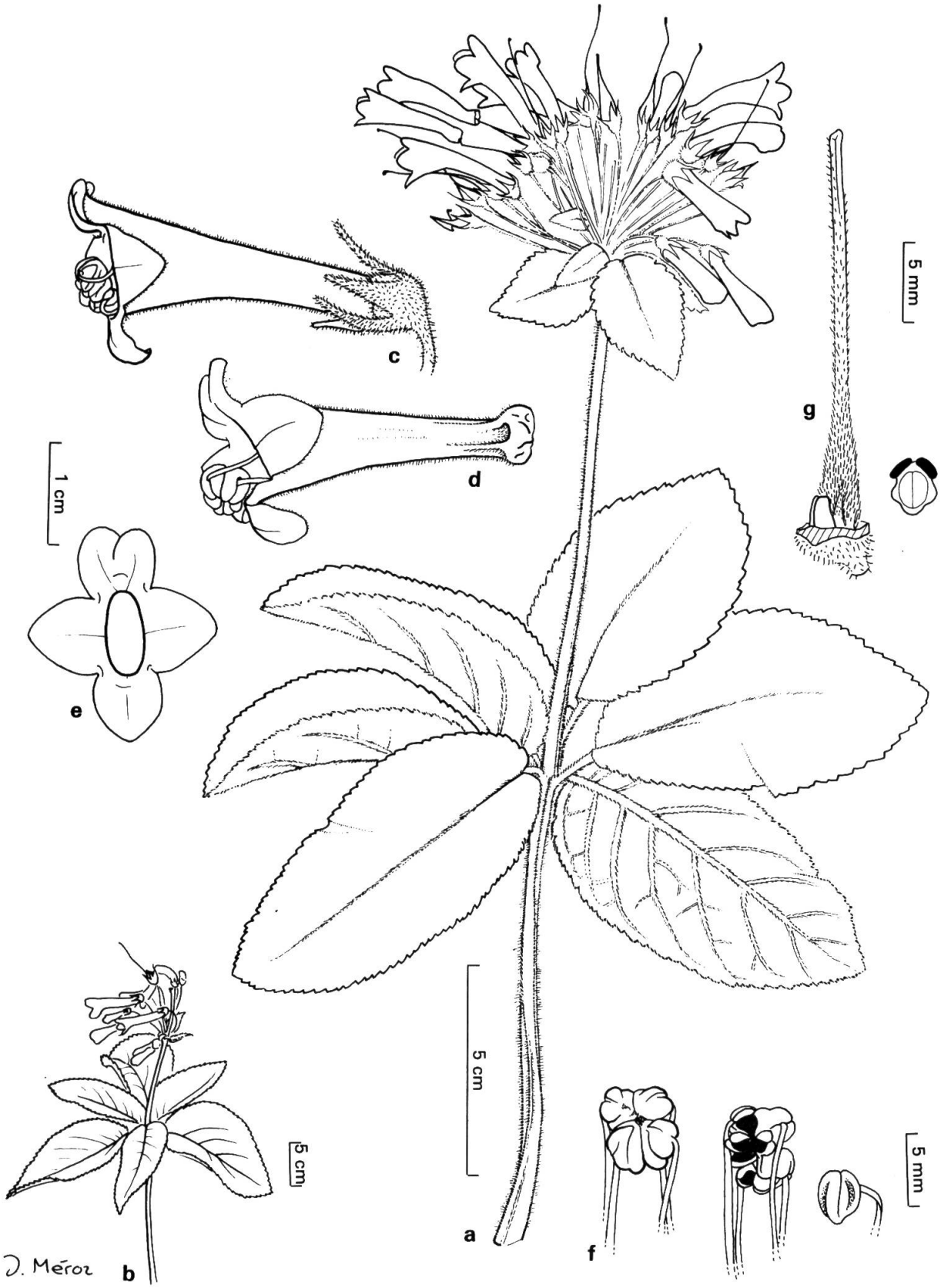
Relationships. — This species is best placed in Sect. *Sinningia,* according to its habit and the nectary divided in 5 separate glands. *S. kautskyi* is morphologically related to *S. hirsuta* (Lindl.) Nicholson, but differs from that species by smaller leaves, weaker indument on leaves and flowers with shorter trichomes (1.5-2 mm vs. 5-8 mm long), absence of peduncles, calyx lobes wider and more triangular, corolla tube bent (vs. straight), corolla darker and lobes imbricating at their base (vs. separated).

4. Sinningia nivalis Chautems, **spec. nov.** (Fig. 4).

Planta tota villosa, folia verticillata; S. douglasii affinis sed petiolis brevioribus (0.3-2.5 cm longis), calicis laciniis angustioribus longioribus (5-7 mm longis), corolla breviora (2.5-3 cm) differt.

Terrestrial herbs with erect stems arising from tubers; stems 10-15 cm, pilose, green to reddish. Leaves in a whorl of 6, rarely 4 or 5, subequal, petiole 0,3-2,5 cm, tomentose, pinkish below; blade elliptic-ovate, 6-15 cm long, 3.5-7 cm wide, obtuse at the apex, cordate or sometimes unequal at the base, margin irregularly crenate to serrate, 7-9 pairs of veins, above green, strigillose, below whitish-tomentose with midrib and veins pinkish. Inflorescences terminal, pseudo-umbellate, composed of pair-flowered cymes, borne on erect axis (hypodium) 7-17 cm, reddish green, hirsute; prophylls in a whorl of 3, each 1-4 × 0.3-1.5 cm; peduncles 0.1-1 cm long, reddish, hirsute; pedicels ascending 1.5-4 cm long, reddish, hirsute; a second inflorescence rarely develops above the first. Calyx ± horizontal, campanulate, tube 2-3 mm long, hoary-tomentose, lobes linear-lanceolate, 5-7 mm long, acuminate, margin entire, reddish, pilose; corolla erect in calyx, tubular, 2.5-3 cm long, salmon-pink with dark red striations and dots toward the upper half, pilose, base with 5 gibbosities between the calyx lobes, tube constricted above base, 4 mm wide, then expanding gradually to 6-9 mm at throat, limb spreading, lobes 5, unequal, the upper 2 partially connate, forming

Fig. 4. — *Sinningia nivalis.*
a: habit; **b:** natural habit; **c:** flower; **d:** corolla; **e:** corolla limb; **f:** anthers arrangement in frontal and dorsal view; **g:** style and nectary, with schema of nectary in transversal cut; (**a** from *Chautems & Reitz 352*; **b** from slides of live plants *Chautems & Reitz 353*; **c-g** from pickled flowers *Chautems & Reitz 354*).


c
d
1 cm
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5 cm
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5 cm
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f
5 mm
D. Méroz

a pseudo-galea, 6 mm long, 8 mm wide, the 3 other lobes subequal, ca. 6 × 6 mm; stamens 4, included, filaments 2.7-3.0 cm long, glabrous, anthers coherent, star-shaped, pollen white; nectary consisting of two separate dorsal glands; ovary 8 mm long, 3 mm wide, hispid, style 2.0 cm long, reddish, pubescent. Fruit a dry two-valved capsule, 1.3-1.7 cm long, 0.5-0.7 cm wide, acuminate, reddish brown, pubescent; seeds narrowly ellipsoid, 0.7-0.9 cm long, brown.

Type: BRAZIL, Santa Catarina, Bom Jardim, topo da Serra dos Aparados, próximo ao monumento rodoviário, altitude 1450 m, 28°23'S/49°32'W, 2.12.1989, *Chautems & Reitz 354* (Holotype: HBR; Isotypes: G, US).

Paratypes: BRAZIL, Santa Catarina, Bom Retiro, Campo dos Padres, 11.1956, *Pereira s.n.* (HBR, NY, US); São Joaquim, Bom Jardim, Serra do Oratório, Aparados da Serra, alt. 1500 m, 18.9.1958, *Reitz & Klein 7164* (HBR); São Joaquim, nos peraus da serra, 21.1.1959, *Mattos 6600* (HAS); São Joaquim, Invernadinha, na mata, sobre um perau, 12.1963, *Mattos s.n.* (HAS); São Joaquim, campo and boggy brook, Santa Barbara, alt. 1400 m, ca. 28°07'S/49°30'W, 3.1.1965, *Smith & Reitz 14221* (R, US); São Joaquim, Fazenda de Emilio Rodrigues, ad arbores, 2.1958, *Mattos 6213* (PACA); São Joaquim, estrada São Joaquim-Bom Jardim, Mantiqueira, no barranco rochoso da estrada, 2.12.1989, *Chautems & Reitz 352* (G, HBR); São Joaquim, Cascata, saida da estrada para Lauro Müller, 2.12.1989, *Chautems & Reitz 353* (G, HBR); Lauro Müller, Serra do Rio do Rastro, rochas dos Aparados, alt. 1000 m, 18.9.1958, *Reitz & Klein 7179* (G, HBR, NY, R, UC, US); Timbé do Sul, subida da Serra da Rocinha, nos barrancos, 12.11.1987, *Silveira et al. 5019* (HAS). Ibidem, 12.11.1987, *Silveira et al. 5020* (HAS); Rio Grande do Sul: Cambará do Sul, na mata, alt. 1050 m, 8.11.1987, *Wasum et al.-HUCS 2614* (US); Cambará do Sul, Fortaleza, junto aos peraus da Fortaleza, 18.9.1981, *Bueno 3062* (HAS); Cambará do Sul, Fortaleza, no alto do morro, sobre pedras, 27.3.1987, *Mattos et al. 30993* (HAS); Cambará do Sul, fundo da cascata do Rio das Antas, estrada para S. Rocinha, 14.9.1975, *Dillenburg s.n.* (HAS); São Francisco de Paula, Contendas, erva junto às rochas, 18.3.1983, *Stehman & Sobral 103* (ICN); São Francisco da Paula, Taimbesinho, in araucarieto ad arbores, 18.12.1950, *Rambo 49387* (B); São Francisco de Paula, Taimbezinho, in araucarieto, epiphyta, 3.11.1954, *Rambo 56197* (B, HBR).

Etymology. — The epithet "nivalis" refers to the snow-falls occuring commonly in winter (July) in the area of São Joaquim. This locality, situated at an altidude of 1360 m, is very likely the coldest city in Brazil, according to the information reported by REITZ (1965).

Material in cultivation. — Plants grown in the greenhouse of the Conservatoire et Jardin botaniques de la Ville de Genève, Accession N° AC-1458 and AC-1459 = same material as *Chautems & Reitz 352* and *353,* respectively; material grown from seeds, Accession N° AC-1460 = Lauro Müller, Serra do Rio do Rastro, ca. 800 m altitude, leg. *Chautems & Reitz,* 2.12.1989. Seeds from the material AC-1460 has been distributed in 1990 to several members of the AGGS (American Gesneriads and Gloxinia Society).

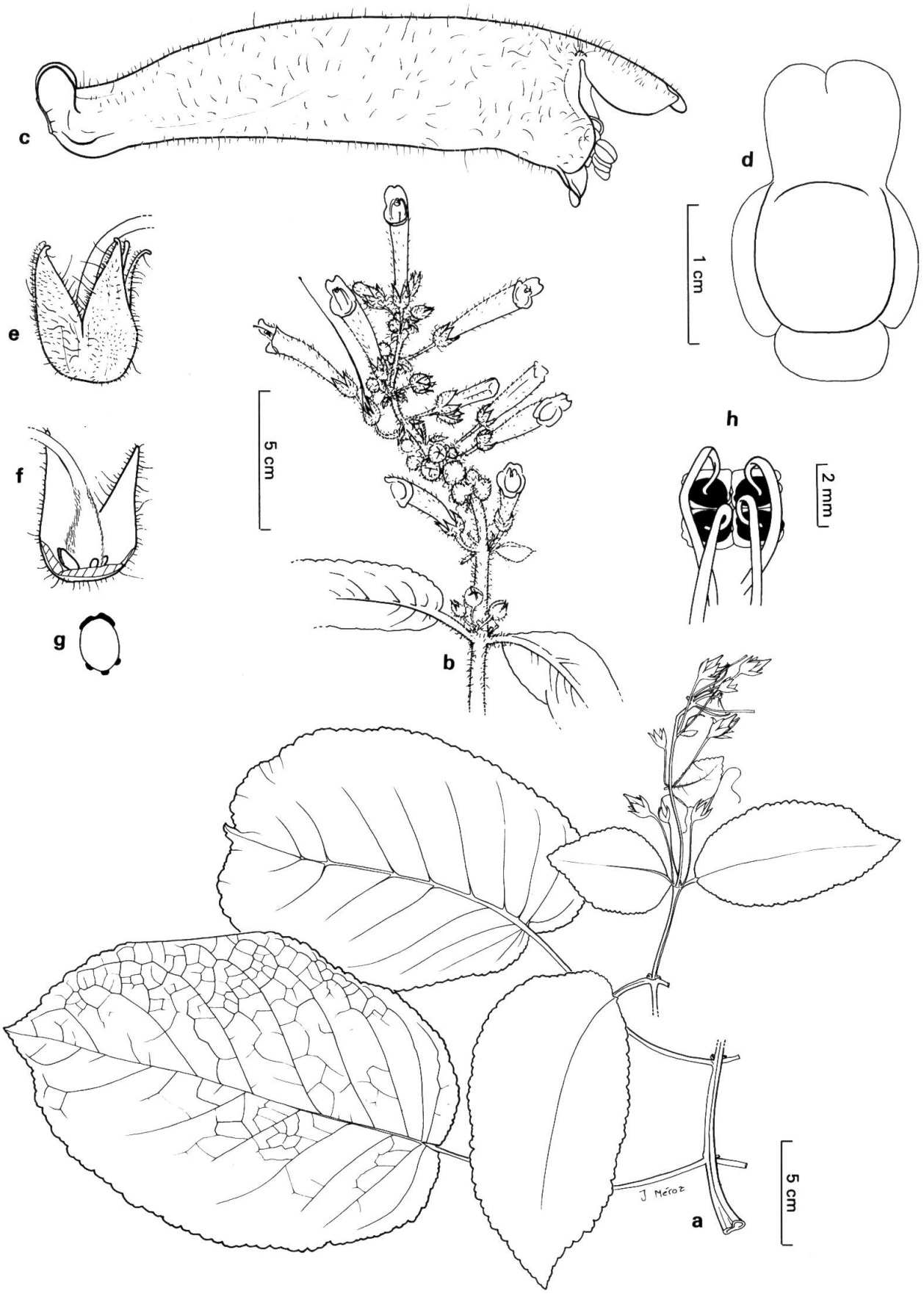
Distribution. — This species is known so far only from the southeastern part of the state of Santa Catarina and the adjacent area in the state of Rio Grande do Sul, along the southern part of the Serra Geral range (Fig. 6).

Ecology. — The vegetation type where the species occurs is described by REITZ (1965) as zone of "campos e pinhais", on the Serra do Rio do Rastro. The plants grow between 800 and 1500 m, on basaltic outcrops or rarely as epiphytes on trees. The species is quite frequent all along the steep slopes and cliffs, in the upper part of the road Lauro Müller-São Joaquim.

Phenology. — The species has been found in flower between the months of September and December, in fruit from November to March.

Relationships. — This species belongs to Sect. *Rechsteineria* (Decne.) Bentham; it is rather similar to *Sinningia douglasii* (Lindl.) Chautems, in plant habit, inflorescence shape and flower

Fig. 5. — *Sinningia valsuganensis.*
a: habit; **b:** inflorescences; **c:** corolla; **d:** corolla limb; **e:** calyx; **f:** calyx opened to show part of nectary; **g:** schema of nectary in transversal cut; **h:** anthers arrangement in dorsal view; (from *Chautems & Boudet Fernandes 380,* herbarium specimens, pickled flowers and slides of live plants).


c
d
1 cm
e
5 cm
h
2 mm
f
g
b
J. Méroz
a
5 cm

color. *S. nivalis* is distinguished by denser indument on the whole plant, shorter petioles, leaf-blades usually elliptic-ovate (vs. lanceolate-ovate), margin irregularly crenate to serrate, narrower and longer calyx lobes and the ecology: *S. douglasii* is often found as an epiphyte in the coastal rain forest, from the south of the state of Minas Gerais state down to the state of Rio Grande do Sul and in the riverine forest of the Uruguay basin in southern Brazil and northern Argentina (Misiones), while *S. nivalis* is encountered on rock formation, in open vegetation ("campos") and much colder climate. *Sinningia nivalis* is found within the range of *S. douglasii,* but intermediates between the two species have never been encountered.

5. Sinningia valsuganensis Chautems, **spec. nov.** (Fig. 5).

Planta villoso-glandulosa; a S. aggregata foliis semper oppositis, majoribus (5-23 cm longis), corolla labiata majora (ca. 5 cm) et indumento pilis longis hyalinis recedit.

Terrestrial herbs with erect stems arising from tubers; stems 30-60 cm tall, 3-5 mm in diameter, sometimes hollow when mature, green, glandular pilose, internodes 4-8 cm long; stems and leaves with a weak fragrance. Leaf pairs equal to subequal; petiole 1-11 cm, green, villous; blade ovate, 5-23 × 4-16 cm, acute to acuminate, attenuate to cordate at base, margin crenate, ciliate, above green and strigillose, below pale green, sericeous on veins and veinlets, 8-10 pairs of veins. Inflorescences consisting of axillary cymes, 4-16 flowers per node, peduncles 0.5-3 mm, prophylls 4-6 × 1-1.5 mm, pedicels ascending, 1.5-2.5 cm long, reddish, pilose hirsute with 8 cell-long trichomes and shorter glandular hairs. Calyx erect, campanulate, lobes subequal, lanceolate, ca. 9 × 5 mm, margin entire and ciliate, reddish, villous outside, strigillose inside; corolla erect in calyx, tube ca. 4.2 cm long, red-orange, the base gibbous and reaching 6 mm wide, then narrowing to ca. 4 mm, broader at the middle, up to 9 mm wide, hirsute with long translucid trichomes, limb bilabiate, the 2 upper lobes erect, 8-10 mm long, lateral and ventral lobes ca. 6 × 3-4 mm, tube inside cream with narrow reddish striations; stamens 4, included, filaments ca. 4.0 cm long, white, glabrous, anthers ca. 1.5 × 1.5 mm, pollen pale yellow; nectary consisting of 5 glands, including one large, double-connate dorsal gland, 1 × 2 mm and 3 smaller lateral and ventral glands; ovary reddish, strigillose, style white. Fruit a capsule, ovoid, pointed at the apex; seeds 0.8-1 mm, brown, twisted, striate.

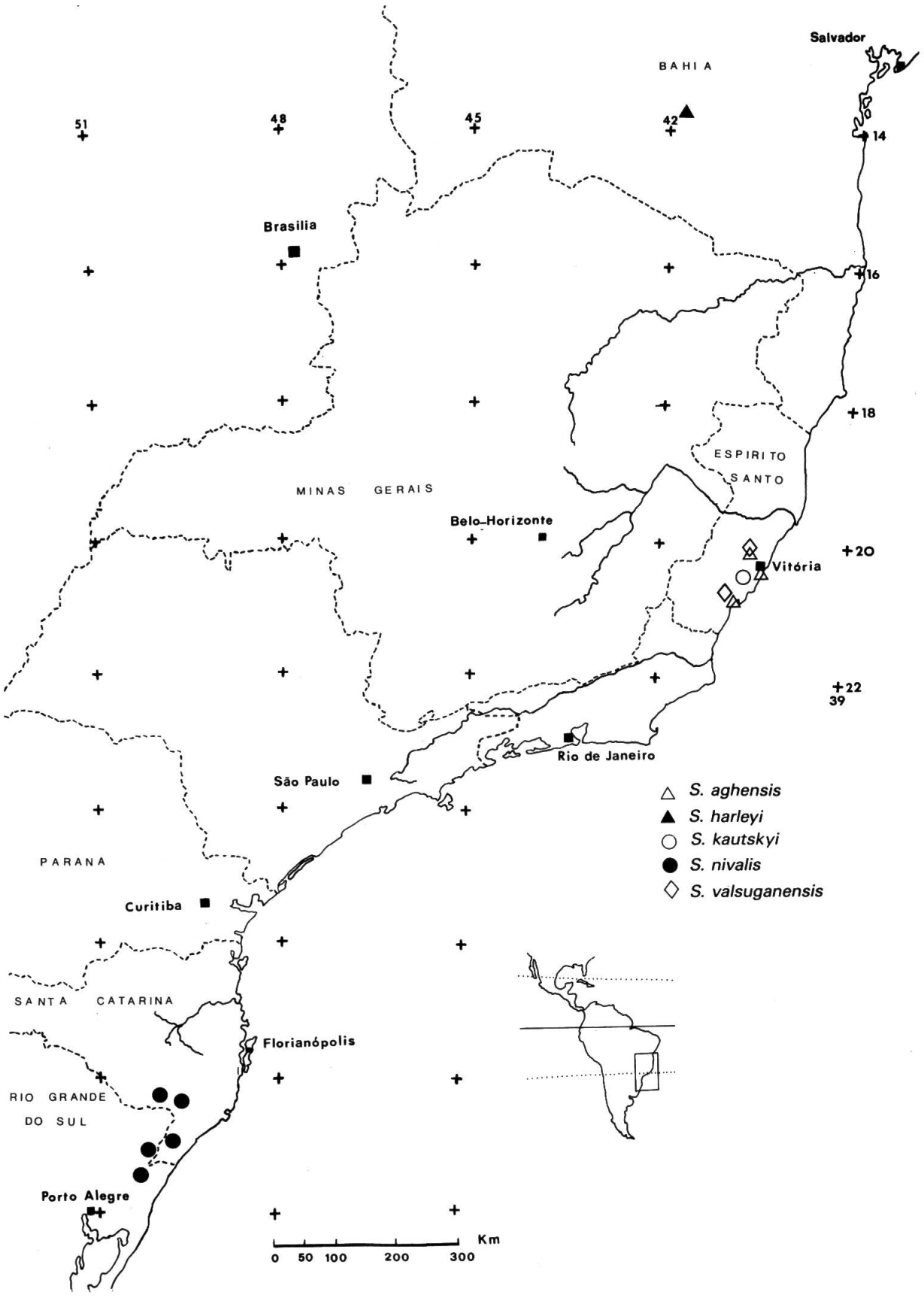
Type: BRAZIL, Espirito Santo, Santa Teresa, Valsugana Velha, afloramento granítico dominando um cafezal, acima do loteamento "Jardim da Montanha", 19°56'S/40°36'W, 7.3.1990, *Chautems & Boudet Fernandes 380* (Holotype: MBML; Isotypes: G, US).

Paratypes: BRAZIL, Espirito Santo, Santa Teresa, Vale do Canaan, 800-850 m, saxícola, heliófila, pedra úmida, 2.1969, *Sucre & Braga 4581* (RB); Santa Teresa, Valsugana Velha, heliófila, rupestre, 10.1.1986, *Boone 1010* (CEPEC, MBML); Santa Teresa, Valsugana Velha, encosta atràs do Bairro dos Pinheiros, 11.2.1986, *Boone 1104* (CEPEC, MBML); Santa Teresa, Valsugana Velha, sobre rocha, capoeirão, semi-sombra, 10.1.1986, *Boudet Fernandes 1756* (CEPEC, MBML); Vargem Alta, 12.1972, *Duarte 14062* (G, RB).

Etymology. — The epithet of this species is based on the locality of the type collection: "Valsugana Velha". This name was probably given to the area by Italian emigrants in the Santa Teresa region, during the last century.

Cultivated material. — Plants grown from seeds in Geneva, at the greenhouse of the Conservatoire et Jardin Botaniques, under Accession N° AC-1515 (= seeds from the type collection); seeds from the same origin were recently distributed among some AGGS (American Gesneriads and Gloxinia Society) members and a tuber (from the type collection) is currently cultivated by Mr. Mauro Peixoto, in the vicinity of São Paulo, Brazil.

Fig. 6. — Distribution of the five *Sinningia* species in Brazil.


Salvador
BAHIA
51
48
45
42
14
Brasilia
16
18
ESPIRITO SANTO
MINAS GERAIS
Belo-Horizonte
20
Vitória
22
39
Rio de Janeiro
São Paulo
S. aghensis
S. harleyi
S. kautskyi
S. nivalis
S. valsuganensis
PARANA
Curitiba
SANTA CATARINA
Florianópolis
RIO GRANDE DO SUL
Porto Alegre
0 50 100 200 300
Km

Distribution. — This species seems restricted to the south of the state of Espirito Santo, in Brazil (Fig. 6); the localities "Santa Teresa" and "Vargem Alta" are about 90 km distant from each other.

Ecology. — *Sinningia valsuganensis* grows on granitic outcrops, surrounded by shrubby vegetation. The tubers are rooted in well-drained organic litter, which offers the right amount of humidity. In the type locality, *Paliavana tenuiflora* (Ker-Gawler) Bentham, a shrubby Gesneriaceae, was found growing side by side.

Phenology. — Collected in flower between December and March, i.e. during the warm and humid summer. Like most of the taxa in the genus, the plants wither during the drier and cooler winter months; new shoots arise during the following growing period from well developped tubers.

Relationships. — This species belongs to Sect. *Rechsteineria* (Regel) Bentham and shares a similar glandular and fragrant indument with *S. aggregata* (Ker-Gawl.) Wiehler and *S. harleyi* Wiehler & Chautems. The differentiating characters are summarized in the following key:

1. Leaves opposite, never ternate, corolla more than 4 cm long 2

1a. Leaves usually ternate, inflorescences in dense axillary cymes, 4-10 flowers per axil, corolla tubular 2-3.5 cm long, distributed from southern Brazil (Santa Catarina) to central Brazil (Minas Gerais, Goiás) ..... **S. aggregata**

2. Inflorescences reduced to a single flower per axil, corolla tubular, wide, from central Bahia ..... **S. harleyi**

2a. Inflorescences in dense axillary cymes, 2-8 flowers per axil, corolla with a long upper lip, from southern Espirito Santo ..... **S. valsuganensis**

The role of the fragrant secretion is not yet well understood. The hypothesis of an attracting effect for pollinators is very doubtful, because the corolla morphology suggests an adaptation to hummingbirds pollination. From my field observations, I would rather hypothesize that this glandular exsudate is a by-product of intense metabolic reactions, linked to the open, dry and sun-exposed habitat where those three species are found. The character is more pronounced in *S. harleyi,* which occurs in the driest habitat.

Discussion

The genus *Sinningia* is spread throughout the neotropics (with the exception of the Caribbean Islands), but the center of diversity is southeastern Brazil, i.e. the states of Minas Gerais, Espirito Santo, Rio de Janeiro and São Paulo, where 2/3 of the taxa known so far are encountered. The discovery of three species from Espirito Santo supports MORI's (1989) assertion that: "the preservation of the area from Espirito Santo northward is ... especially critical".

The restricted distributions of all the five species described in this paper are not exceptional for the genus. The same phenomenon occurs in most of the species: more than half of them have a range of less than 250 km.

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