

Novae Gesneriaceae Neotropicarum VIII: Alloplectus grandicalyx, a new species from Colombia and Ecuador.

Novon 12: 173-178.

REFNO: 3187

KEYWORDS:

Alloplectus, Colombia, Ecuador

Novae Gesneriaceae Neotropicarum VIII: *Alloplectus grandicalyx*, a New Species from Colombia and Ecuador

John L. Clark^{1,2} and Laurence E. Skog²

¹George Washington University, Biological Sciences, 2023 G Street, N.W., Washington, D.C. 20052, U.S.A. clark.john@nmnh.si.edu

²Botany Section-Systematic Biology, Smithsonian Institution, P.O. Box 37012, National Museum of Natural History, MRC-166, Washington, D.C. 20013-7012, U.S.A. skog.larry@nmnh.si.edu

ABSTRACT. A new species, *Alloplectus grandicalyx* J. L. Clark & L. E. Skog, is described from northern Ecuador and southern Colombia. *Alloplectus grandicalyx* is differentiated from other similar species on the basis of larger calyx lobes, longer pedicels, and villous pubescence on the stems, leaves, petioles, and calyx lobes. A key is provided to help distinguish *A. grandicalyx* from other shrubby and resupinate flowered *Alloplectus* species. In addition, the commonly confused and widely spread *Alloplectus tetragonoides* Mansfeld is discussed and neotypified.

Key words: *Alloplectus*, Colombia, Ecuador, Gesneriaceae.

An ongoing study of *Alloplectus* Martius has revealed a new species from Ecuador and Colombia that can be distinguished from congeners by the combined characters of calyx lobes that cover the bottom third to half of the corolla, pedicels that usually exceed the petioles, and villous pubescence on the stems, leaves, petioles, and calyx lobes.

Alloplectus is a genus in need of revision as the most recent treatment of the entire genus is over 100 years old (Hanstein, 1865). Hanstein's publication focused on the Gesneriaceae at the botanical garden in Berlin and provided an overview of the family. *Alloplectus* was only a part of an entire monograph of the Gesneriaceae known at that time, but Hanstein recognized 30 *Alloplectus* species in his treatment. More recent estimates of the genus range from 75 (Burt & Wiehler, 1995) to 65 (Wiehler, 1973). After a thorough review of the 119 names listed in *Index Kewensis*, only 32 are considered by us to be currently accepted names in *Alloplectus*. Below are described two species of *Alloplectus* that have been confused, one new and the other poorly known and needing neotypification.

Alloplectus grandicalyx J. L. Clark & L. E. Skog, sp. nov. TYPE: Ecuador: Napo: Cantón Archidona, Reserva Ecológica Antisana, Sector Guacamayos, Sendero Jumandy-La Virgen (km 30), path that follows potential oil pipeline, 00°38'S, 77°49'W, 1700–1800 m, 1 May 1998, J. L. Clark, E. Narvaez & T. Pauchi 5449 (holotype, QCNE; isotypes, AAU, COL, E, MO, QCA, SRP, US). Figure 1.

Haec species *A. tetragonoides* similis sed pedicellis longioribus et calycibus grandioribus differt.

Terrestrial suffrutescent shrub; stem erect, quadrangular, succulent, becoming woody, 0.5–1.5 m tall, to ca. 1 cm diam., usually glabrescent basally, villous pubescent distally, unbranched, internode length 3–15 cm, nodes and leaf scars swollen. *Leaves* opposite, nearly equal in a pair; blades elliptic, 8–22 × 4–10 cm, apex acuminate, base acute, margin serrate, above green, rugose, glabrous, below all green, all red, or green with red tinge, sparsely to densely pilose; petioles terete, 3–8 cm long, green, sparsely to densely pilose. *Inflorescences* axillary, of 1 to 4 pendent, epedunculate flowers per axil; bracts caducous at anthesis, ovate, 1.5–3 × 1–2 cm, red; pedicels 4–9 cm long, red, villous. *Flowers* resupinate, showy, and zygomorphic; calyx lobes 5, conduplicate, erect, nearly equal, ventral lobe narrowly ovate, other lobes ovate, 3–4 × 2–3 cm, red, base cordate, apex obtuse, margin serrate; corolla tubular, 4–5 cm long, dark red with or without yellow lobes, outside sparsely pilose becoming densely pilose at apex, inside glabrous, base gibbous, ampliate toward the limb, the mouth ventricose on dorsal surface, limb 1–1.5 cm wide, the lobes free, nearly equal, 3–5 × 3–8 mm, entire; stamens 4, included, filaments glabrous, connate at base and adnate to corolla tube base for 3–5 mm, anthers included, coherent by their apices, ca. 3.5 × 1.5 mm; disc of a single bilobed, unlobed, or multilobed gland, glabrous;

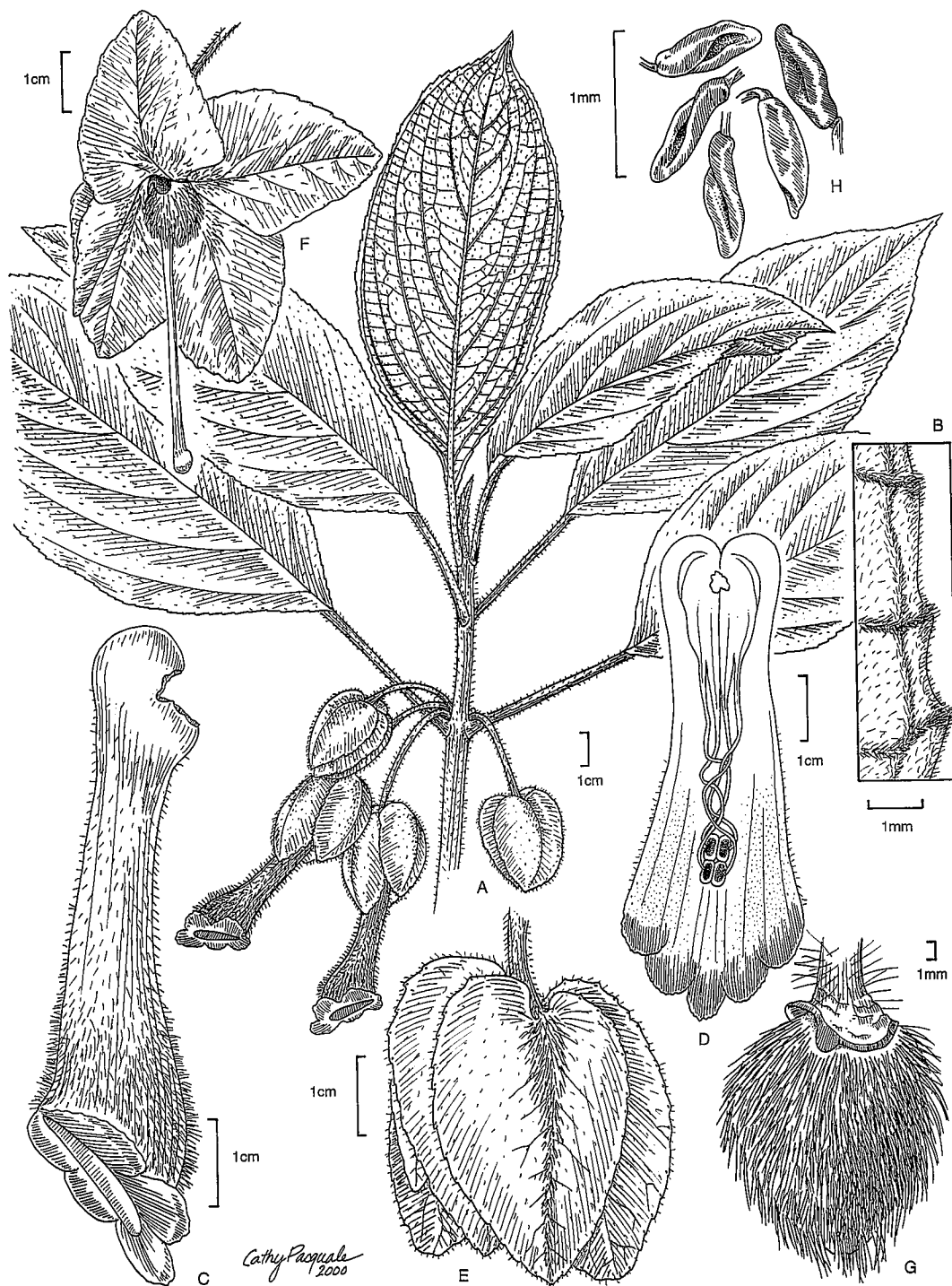


Figure 1. *Alloplectus grandicalyx* J. L. Clark & L. E. Skog. —A. Habit. —B. Leaf margin. —C. Corolla. —D. Corolla opened to show stamens. —E. Calyx. —F. Calyx opened and corolla removed to show bilobed nectary. —G. Young fruit. —H. Seeds. A from R. E. Schultes & M. Villarreal 7667; B from J. Cuatrecasas 8620; C–F from M. L. Bristol 366; G from the isotype, J. L. Clark, E. Narvaez & T. Pauchi 5449; H from A. Gentry, M. Monsalve & P. Silverstone 47657A.

ovary ca. 0.6×0.4 cm, woolly, style included, 4 cm long, glabrous. *Fruit* a fleshy capsule usually hidden in persistent calyx lobes, pendent, ovoid, ca. 1.5×1.0 cm, woolly; seeds 0.8–1.1 mm long, numerous, fusiform, dark brown, and longitudinally striate.

Distribution and ecology. *Alloplectus grandicalyx* is found in the montane forests of Ecuador and southern Colombia, but is most common between 1500 and 2500 m on the northeastern slopes of the Ecuadorian Andes. The species frequently overlaps with *A. tetragonoides*, which is trans-Andean and more common at lower elevations. At mid elevations on the eastern slopes of the Andes, these two species are apparently sympatric. In areas where these two species overlap *A. grandicalyx* can be distinguished from *A. tetragonoides* by having larger calyx lobes, longer pedicels, and villous pubescence. The resupinate flowers in these two species are typical of most *Alloplectus* species with tubular ventricose corollas. However, little is known about the adaptive functions of resupinate flowers in *Alloplectus* or other genera in Gesneriaceae where it is known; e.g., *Nematanthus* Schrader (Chautems, 1988).

Alloplectus grandicalyx is distinguished from the similar *Alloplectus tetragonoides* and other species of *Alloplectus* by having unusually large calyx lobes that cover the bottom third to half of the corolla tube. The pedicel is also longer than that normally found in other species of this genus and usually exceeds the length of the petiole. The calyx will commonly appear entire on herbarium sheets because the lobes are imbricate with involute margins. Some characters that are difficult to see on herbarium collections but readily available in the field include the dark red to maroon corollas with or without yellow lobes and the tendency for the leaf blades to be bullate. Also, most other similar *Alloplectus* species will have a lighter red or yellow corolla and non-bullate leaves (e.g., many populations of *A. tetragonoides* from the Napo and Tungurahua provinces of Ecuador). Most *Alloplectus* species have a single or two-lobed nectary gland, whereas *A. grandicalyx* sometimes has a multilobed nectary gland. We are including below a description of *A. tetragonoides* because of the possible confusion with *A. grandicalyx* and *A. tetragonus* (Hanstein) Hanstein. In order to stabilize the species concept of *A. tetragonoides* we have selected a neotype.

Paratypes. COLOMBIA. **Caquetá:** Río Hacha, *J. Cuatrecasas* 8553 (US); Guadalupe–Florencia road, km 14, W of pass, *X. Londoño & L. P. Kvist* 99 (COL, US).

Huila: eastern slope of Cordillera Central, Finca Merenberg, km 101 La Plata–Popayan road, *B. A. Stein* 3730 (MO, US); Cordillera Oriental, San Andrés, *J. Cuatrecasas* 8620 (COL, US). **Putumayo:** Sibundoy, near Río Blanco (via Mocoa), *E. Hernández, A. Guerrero & A. Estrada* 401-A (US), 404 (US); Río Mocoa drainage, between Schamate and San Antonio, *J. A. Ewan* 16693 (MO, US); valley of Sibundoy, *R. E. Schultes & M. Villarreal* 7475 (US), *R. E. Schultes & M. Villarreal* 7667 (US), *J. Cuatrecasas* 11460 (US), *M. L. Bristol* 366 (COL, GH, US). ECUADOR. **Carchi:** 12 km E of Maldonado on road to Tulcán, *A. H. Gentry & G. Shupp* 26626 (MO, SEL); Río Verde and ridge flanking Cerro Golondrinas, *W. S. Hoover* 2354 (MO). **Morona-Santiago:** Tumbes, 17–18 km N of Gualaquiza on road to Indanza, *G. Harling & L. Andersson* 24222 (GB, US); Limon Indanza, Cordillera de Huaracayo, E of Cordillera del Cóndor and Río Coangos, E of Shuar village of Tinkimints, *D. Neill & J. Manzanares* 13126 (MO, QCNE, US). **Napo:** Baeza Tena road, S slope of Cordillera de los Guacamayos, *J. L. Luteyn & M. Lebron-Luteyn* 5669 (CAS, MO, NY, SEL, US), *G. Harling & L. Andersson* 19501 (GB, US), *W. G. D'Arcy* 14089 (MO, US), *W. Palacios* 6896 (MO, QCNE, US), *W. Palacios* 5931 (MO, QCNE, US), *B. A. Stein* 2647 (MO, US), *J. H. Kirkbride, Jr. & H. Chamba R.* 4191 (U, US); Comunidad de Santa Lucía de Bermejo, *A. Alvarez, O. Brito & S. Romero* 867 (MO, QCNE, US); Cosanga, trail E of town, *J. D. Boeke & J. B. McElroy* (GH, NY, SEL, US); Yanayacu Biological Station and Center for Creative Studies, 5 km W of Cosanga, *J. L. Clark & H. F. Greeney* 5774 (QCNE, US). **Orellana:** Sumaco Napo Galeras National Park, Volcán Sumaco, *J. L. Clark* 2282 (QCNE, US). **Sucumbios:** Reserva Ecológica Cayambe Coca, Volcán Reventador, trail between Río Quijios and refugio, *J. L. Clark* 4448 (QCNE, US). **Tungurahua:** Hacienda San Antonio, 2 km E of Baños on Río Ulba, *B. A. Stein* 2929 (NY); Río Verde, forested trail from Baños Puyo road towards Cascada de San Miguel, *J. L. Clark, E. Narvaez & E. Varros* 5719 (QCNE, US). **Zamora-Chinchipec:** W of Zamora, *J. Hart* 1172 (A); Agua Rica, along main road from Limón (Gral Leonidas Plaza Gutiérrez) to Gualaceo, *J. L. Clark, L. Jost & F. Sanchez* 5939 (AAU, AZUAY, COL, K, MO, NY, QCA, QCNE, US).

Alloplectus tetragonoides Mansfeld, *Biblioth. Bot.* 116: 144–145. 1937. TYPE: Ecuador. Tungurahua: Cantón Baños, Parroquia Río Negro, near Río Topo, $01^{\circ}23'S$, $78^{\circ}10'W$, 1400 m, 17 Jan. 2001, *J. L. Clark & V. Duran* 6000 (neotype, designated here, QCNE; isoneotypes, AAU, COL, F, K, MO, NY, QCA, S, US).

Terrestrial suffrutescent shrub or rarely epiphytic herb; stem erect, quadrangular, succulent, becoming woody, 0.5–2.0 m tall, to ca. 1 cm diam., usually glabrescent, sometimes sparsely pubescent distally, unbranched, internode length 3–12 cm, nodes and leaf scars swollen. *Leaves* opposite, nearly equal in a pair; blades elliptic, sometimes ovate, $9\text{--}39 \times 3.5\text{--}24$ cm, apex acuminate, base cuneate or acute, margin serrate, above green and sparsely pilose, below green, red, or green with red tinge, sparsely pilose to densely pilose (especially pilose on young foliage); petioles sulcate, 2–14 cm long,

green, glabrous to densely pilose. *Inflorescences* axillary, of 1 to 4 pendent, pedunculate flowers per axil; bracts caducous at anthesis, ovate, 2–3 × 0.5–1.5 cm, red or green; pedicels 1–5 cm long, glabrous to pilose. *Flowers* resupinate, showy, and zygomorphic; calyx lobes 5, erect, nearly equal, ventral lobe narrowly ovate, other lobes ovate, 1.5–2.5 × 1–2 cm, all green, all red, red with green margins, or green with red margins, sparsely pilose to hirsute, midvein especially pilose, base truncate to slightly cordate, apex acute to acuminate, margin serrate to serrulate; corolla tubular, 3–6 cm long, red, yellow, or red with yellow lobes, outside densely pilose, inside glabrous, the base gibbous, ampliate toward the limb, the mouth ventricose, limb 1.4–2.0 cm wide, the lobes free, nearly equal, ca. 4–5 × 5–8 mm, entire; stamens 4, included, filaments glabrous, connate at base and adnate to corolla tube base for 3–5 mm, anthers included, coherent by their apices, ca. 2.0 × 2.5 mm; disc of a single bilobed or unlobed gland, glabrous; ovary ca. 0.7 × 0.5 cm, hirsute, style included, 5 cm long, glabrous. *Fruit* a fleshy capsule usually hidden in persistent calyx lobes, pendent, ovoid, ca. 1.5 × 1 cm, green; seeds ca. 0.9 × 0.3 mm, numerous, fusiform, dark brown, and longitudinally striate.

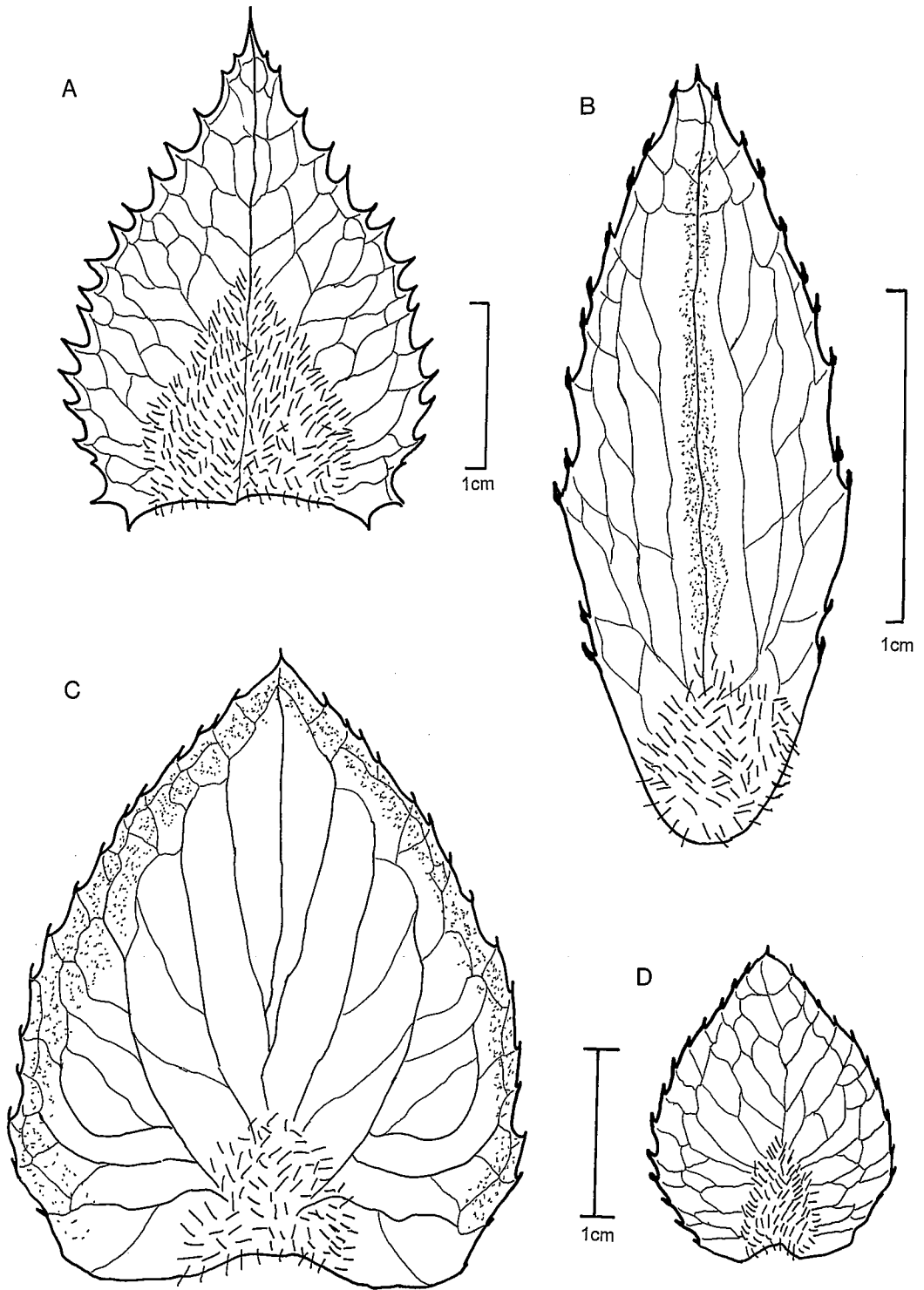
Distribution and ecology. *Alloplectus tetragonoides* is common in Andean montane forests throughout Ecuador and Colombia. It occurs on the Western and Central Cordilleras of Colombia and both eastern and western Andean slopes of Ecuador. The species is frequent between 1500 and 1800 m, but occurs occasionally to 2200 m. The low mountains along the border with Panama and the drier forests of northern Colombia probably act as an ecological barrier to this species' range and may explain why it has not been collected in montane forests north of Colombia.

Alloplectus tetragonoides is highly variable, leading to its confusion with other species (see key below). The undersurface of the leaves can be totally green, green with a tinge of red, to totally red. Calyxes can be green or red, and with either completely yellow, completely red, or yellow with red lobed corollas. It is common to find individuals with green calyxes and yellow corollas with red lobes growing sympatrically with individuals that have completely red perianths. The most useful character in differentiating *A. tetragonoides* from similar species such as *A. tetragonus* and *A. grandicalyx* is its smaller calyx with lobes having serrulate margins (Fig. 2). In comparison to *A. tetragonoides*, the calyx lobe margin of *A. tetragonus* is more dentate.

The calyx of *A. grandicalyx* is two to three times larger than that of *A. tetragonoides* and *A. tetragonus* (viz. Fig. 2). All of the illustrated species in Figure 2 differ from *Alloplectus cucullatus* C. V. Morton (included in key, but not in illustration) by having calyx lobes that are plane relative to the cucullate calyx lobes of *A. cucullatus*.

The first author visited the Río Topo area in the Tungurahua province of Ecuador in January of 2001. This area is where Ludwig Diels made the original collection selected for the holotype of *Alloplectus tetragonoides* (Mansfeld, 1937). No duplicates of *L. Diels 1002* are known to exist. Although many pre-World War II photos of Gesneriaceae type specimens from the Berlin herbarium are extant, we have not been able to locate photos of the collections that Mansfeld designated as type specimens. Most of Mansfeld's publications on Gesneriaceae were in the later part of the 1930s. Therefore, the collections that Mansfeld used for his species concepts probably only existed as types for a few years until they were subsequently destroyed in the aftermath of Allied bombing of Berlin in 1943. Thus, to stabilize the concept of the species, we have designated a neotype collected from the type locality where the species is extremely common.

Representative specimens. COLOMBIA. **Cauca:** Carretera Mococa Pitalito, sitio Sajonia, *F. Betancur et al. 5538* (COL, US). **Chocó:** Mpio. de San José del Palmar, SW of town, *E. Forero et al. 3402* (COL, US(2)). **Huila:** Río Villalobos, region of the confluence of Ríos Villalobos and Cauchos, *R. E. Schultes & M. Villarreal 5204* (GH, US). **Nariño:** 10 km de Guayacana por la vía Tumaco Junín, *X. Londoño et al. 510* (US). **Putumayo:** along road between Pasto and Mococa, El Selencia, *H. Kennedy 210* (US). **Valle del Cauca:** Cordillera Occidental, hoya del Río Sanquiniñí, *J. Cuatrecasas 15503* (US); Mpio. Dagua, Corregimiento el Carmen, *M. Amaya & J. F. Smith 581* (COL). ECUADOR. **Carchi:** cloud forest above Maldonado, *C. Luer et al. 3374* (SEL). **Imbabura:** Carretera Otavalo Selva Alegre, *H. van der Werff & W. Palacios 10558* (MO, US). **Manabí:** Carmen, *G. H. H. Tate 472* (US). **Morona-Santiago:** Cordillera del Cóndor, Cuangos, 20 km E of Gualaquiza, *A. Gentry 80029* (MO, US (2)); Cordillera Cutucú, above Río Tzontza, *F. Prieto CuP-12* (NY). **Napo:** Cantón Archidona, Reserva Ecológica Antisana, comunidad Shamato, entrada por km 21 Shamato, *J. L. Clark 5033* (AAU, COL, E, MO, QCNE, SRP, US). **Orellana:** Southern slopes of Volcán Sumaco, Hollín Loreto road, Km 25, *D. Neill & M. Asanza 8882* (MO, QCNE, US). **Pastaza:** Baños Puyo road, 5 km W of Mera, *L. P. Kvist 60334* (QCA, US). **Pichincha:** along old road between Santo Domingo–Quito and Chiriboga, *Mendoza et al. 625* (QCA, QCNE, US). **Sucumbios:** Reserva Ecológica Cayambe Coca, Volcán Reventador, trail between Río Quijos and refugio, *J. L. Clark 4454* (AAU, COL, E, MO, NY, QCA, QCNE, SRP, US). **Tungurahua:** 5 km W of Baños, *C. H. Dodson & L. B. Thien 977* (US(2)); between Río Mapoto and Río Margaritas, *C. W. Penland & R. H. Summers 186* (GH, US); roadside between Ambato and Baños, *W. D'Arcy*



John L. Clark
1999

Figure 2. Lateral calyx lobe variation in *Alloplectus*. —A. *A. tetragonus*. —B. *A. panamensis*. —C. *A. grandicalyx*. —D. *A. tetragonoides*. A from E. Hernández et al. 751; B from K. Sytsma & L. Andersson 4611; C from the isotype, J. L. Clark, E. Narvaez & T. Pauchi 5449; D from D. Neill & M. Asanza 8882.

14017 (MO, US). **Zamora-Chinchipe:** 10 km E of Paquisha, G. Harling & L. Andersson 24095 (US).

KEY TO COMMONLY CONFUSED SHRUBBY *ALLOPECTUS* SPECIES WITH RESUPINATE FLOWERS

(This key is not intended for the non-resupinate or lianoid species of *Alloplectus*.)

- 1a. Distal leaves and calyx lobes covered with villos or puberulous-pilose pubescence.
 - 2a. Calyx lobe margin denticulate to dentate, lobes plane, ovate, and acute at apex; corolla red or appearing yellow due to the dense yellow pubescence; widespread throughout the mountains of Panama and Costa Rica, rarely collected in Colombia . . . *A. tetragonus*
 - 2b. Calyx lobe margin serrulate to serrate, lobes plane to cucullate, ovate to oblong, and apex acute to obtuse; corolla completely red, completely yellow, or yellow with red lobes.
 - 3a. Pedicels longer than petioles; calyx at least one third the length of the corolla tube, red; corollas dark red to maroon, with or without yellow lobes; leaves sometimes bullate; montane forests of northern Ecuador and southern Colombia *A. grandicalyx*
 - 3b. Pedicels shorter than petioles; calyx less than one third the length of the corolla tube, color variable; corolla color variable, red, yellow, and sometimes yellow with red lobes; leaves not bullate; common in Andean montane forests throughout Ecuador and Colombia *A. tetragonoides*
- 1b. Distal leaves and calyx lobes covered with tomentose-woolly pubescence.
 - 4a. Calyx lobes cucullate and ovate; corollas red with dense yellow pubescence; transitional and montane forests of northern Nicaragua, Honduras, and Guatemala *A. cucullatus*
 - 4b. Calyx lobes plane and oblong; corolla red

with white hirsute pubescence; common in wet forests from Panama to Colombia, and occasionally reaching Ecuador
 *A. panamensis* C. V. Morton

Acknowledgments. We are grateful to Cathy Pasquale-Johnson for preparing the illustration of the new species. The first author thanks Alice Tangerini for providing guidance in making the illustration of calyx lobes. We are especially grateful to John K. Boggan, Harold Robinson, Peter M. Jørgensen, J. F. Smith, and V. Hollowell for their helpful comments on the manuscript. Fieldwork for the first author was made possible by the Explorers Club Washington Group, George Washington University Chapter of the Society of Sigma Xi, and the José Cuatrecasas Botanical Fund of the Department of Systematic Biology-Botany, U.S. National Museum of Natural History.

Literature Cited

- Burt, B. L. & H. Wiehler. 1995. Classification of the family Gesneriaceae. *Gesneriana* 1: 1–4.
- Chautems, A. 1988. Révision taxonomique et possibilités d'hybridations de *Nematanthus* Schrader (Gesneriaceae), genre endémique de la forêt côtière brésilienne. *Dissertationes Botanicae*, 112: 1–226. J. Cramer: Berlin, Germany.
- Hanstein, J. 1865. Die Gesneraceen des Königlichen Herbariums und der Gärten zu Berlin, nebst monographischer Uebersicht der Familie im Ganzen, II. Abschnitt. Gattungen und Arten. Drittes Stück. Die Eugesneraceen, Rhytidophylleen, und Beslerieen. *Linnaea* 34: 225–462.
- Mansfeld, R. 1937. Gesneriaceae, *In*: Beiträge zur Kenntnis der Vegetation und Flora von Ecuador. *Biblioth. Bot.* 116: 144–147.
- Wiehler, H. 1973. One hundred transfers from *Alloplectus* and *Columnnea* (Gesneriaceae). *Phytologia* 27: 309–329.