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# Novae Gesneriaceae Neotropicarum XVI: *Pearcea pileifolia*, a New Species of Gesneriaceae from South America

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**ABSTRACT.** A new species of Gesneriaceae (tribe Gloxinieae) is described from Ecuador and Peru in South America. *Pearcea pileifolia* J. L. Clark & L. E. Skog is vegetatively distinctive from all other species of *Pearcea* Regel by its oblong leaf blades with crenate to serrate margins and markedly anisophyllous, opposite leaves with the smaller leaf in a pair reduced to a scalelike appendage. Observations of the bivalved fruit dehiscence and the resulting appearance of winged appendages in *P. pileifolia* and other congeners are discussed.

**Key words:** Ecuador, Gloxinieae, IUCN Red List, *Pearcea*, Peru.

The most recent treatment of the genus *Pearcea* Regel (Gesneriaceae) is that by Kvist and Skog (1996), who recognized 17 species, including nine new species. The description of *P. pileifolia* J. L. Clark & L. E. Skog makes *Pearcea* a genus of 18 species. It is remarkable that the presently described species occurs where extensive fieldwork has been conducted and where several other species were recently described from Ecuador by Kvist and Skog (1996). Ecuador is the most diverse country for *Pearcea* with 13 species, followed by Peru with seven species. *Pearcea pileifolia* has been collected only four times: three times in Napo Province of Ecuador and once in the Cajamarca region of Peru. Napo Province of Ecuador is the most diverse region for *Pearcea* with more than half of the species (10 species of 18) evident in the genus.

The monophyly of the genus *Pearcea* is well supported by two separate molecular-based phylogenetic analyses that focused on relationships within the Gloxinieae. Roalson et al. (2005) included four species of *Pearcea* as strongly supported based on nuclear ITS data (nuclear ribosomal DNA ITS region) and chloroplast data (*trnL* intron and *trnL-trnF* intergenic spacer region). Smith et al. (2004) included two species of *Pearcea* as strongly supported based on nuclear markers (*GCYC*, which is a Gesneriaceae homolog of *CYCLOIDEA*, ITS, and two paralogues of

the nuclear-encoded chloroplast-expressed glutamine synthetase) and chloroplast markers (*ndhF*, *trnL* intron, *trnL-trnF* intergenic spacer region, and *rpl20-rps12* intergenic spacer region).

*Pearcea* differs from related genera in the tribe Gloxinieae by the detachment of the fruit walls at the base of a dry bivalved capsule. The detachment of the fruit wall appears like a pair of winged appendages (Figs. 1G, H, 2). The fruits of all *Pearcea* initially dehisce loculicidally and then secondarily along the base of the capsule. The walls of the dry capsule remain attached to the apex of the septum. Thus, the capsule is nearly circumscissile except for the persistence of the two septa. This type of secondary dehiscence is unknown in any other genus of the Gesneriaceae.

This distinctive fruit dehiscence of *Pearcea* is illustrated in *P. pileifolia* (Fig. 1G, H). Detached fruit walls were also recently observed and photographed in many individuals and species of *Pearcea* (cf., selection of some of these images in Fig. 2). Images of the fruits exist at the Clark Lab (<<http://www.bama.ua.edu/~gesner>>) and in the Gesneriaceae photo library at the Smithsonian Institution's National Museum of Natural History and herbarium collections (MO, SEL, US, UNA, and elsewhere) for the following species: *Pearcea abunda* (Wiehler) L. P. Kvist & L. E. Skog (Fig. 2A), *P. hypocyrtiflora* (Hooker f.) Regel (Fig. 2B), *P. purpurea* (Poeppig) L. P. Kvist & L. E. Skog (Fig. 2C), *P. schimpfii* Mansfeld (Fig. 2D), *P. sprucei* (Britton) L. P. Kvist & L. E. Skog var. *sprucei* (Fig. 2E), and *P. sprucei* var. *parviflora* (Rusby) L. P. Kvist & L. E. Skog (Fig. 2F).

Other fruits in the Gloxinieae are capsules with two or four valves, but never with detached capsule walls at the base. The typical fruit in the Gloxinieae is a bivalved capsule, and some fruits in *Kohleria* Regel dehisce by a single longitudinal slit on the dorsal surface (Kvist & Skog, 1992; Clark & Skog, 2008). Very few observations of the fruits in *Pearcea* have been documented, and only one fruit was illustrated by Kvist and Skog (1996). The few observations of the

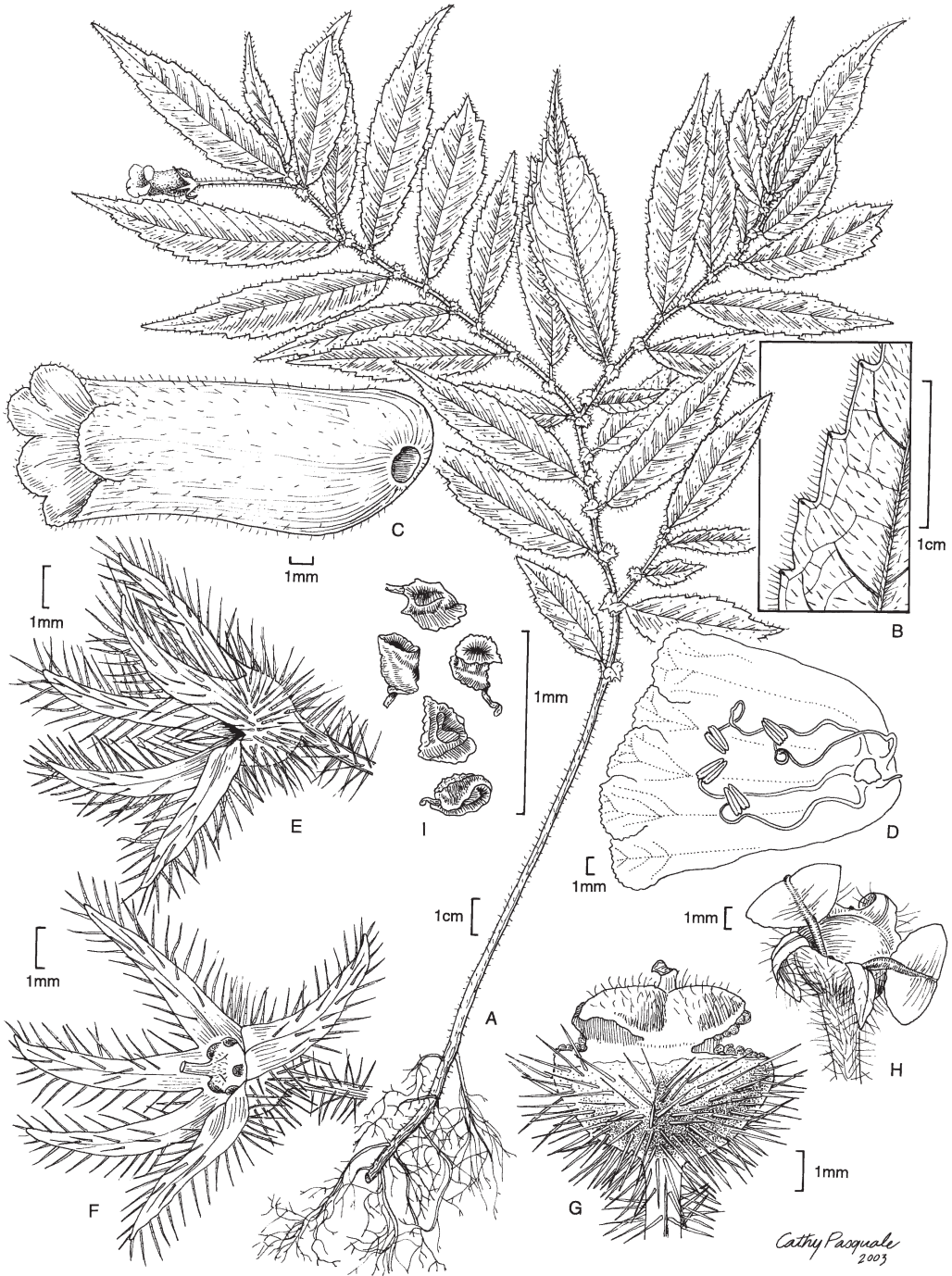


Figure 1. *Pearcea pileifolia* J. L. Clark & L. E. Skog. —A. Habit. —B. Indument of abaxial leaf surface. —C. Corolla. —D. Corolla opened to show stamens. —E. Calyx. —F. Calyx opened and corolla removed to show separate nectary glands. —G. Lateral view of mature fruit with calyx lobes removed. —H. Dorsal view of mature fruit showing valve walls attached to septum. —I. Seeds. A–I from the holotype, J. L. Clark, E. Narvaez & V. Greff 5672 (US).

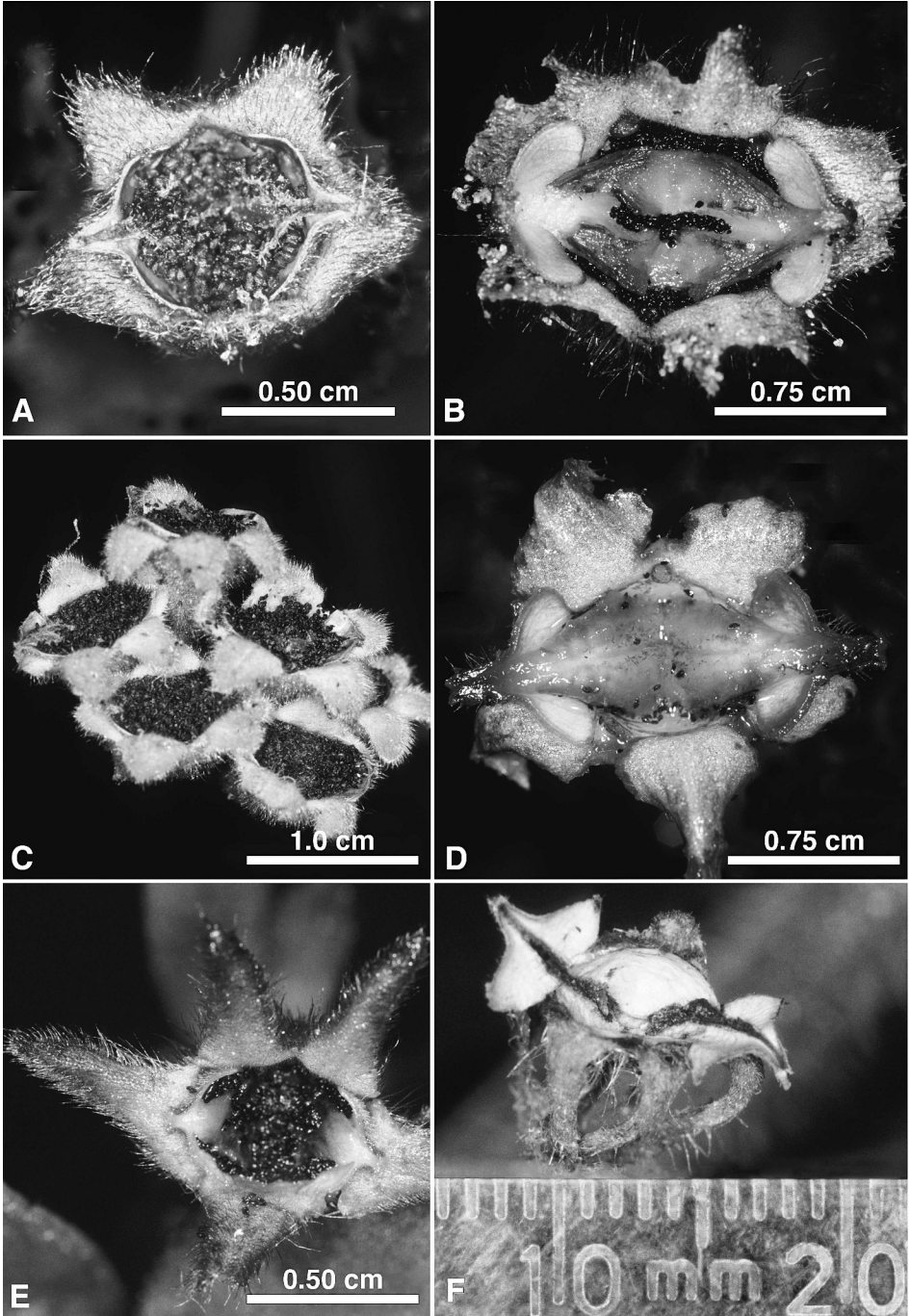


Figure 2. Variation in fruit walls found throughout *Pearcea*. —A. *P. abunda* (Wiehler) L. P. Kvist & L. E. Skog. —B. *P. hypocytiflora* (Hooker f.) Regel. —C. *P. purpurea* (Poeppig) L. P. Kvist & L. E. Skog. —D. *P. schimpfii* Mansfeld. —E. *P. sprucei* var. *sprucei* (Britton) L. P. Kvist & L. E. Skog. —F. *P. sprucei* var. *parviflora* (Rusby) L. P. Kvist & L. E. Skog. A from J. L. Clark & D. Menz, S. Quinn & M. Katan 9132; B from J. L. Clark & D. Menz, S. Quinn & J. Vargas 9163; C from J. L. Clark, H. Beltran & I. Salinas 8184; D from J. L. Clark & J. Rea 8037; E from J. L. Clark 7062; F from J. L. Clark 6593.

fruit in Kvist and Skog (1996: 7) were summarized as "... field studies showed that *Pearcea* fruits instead split from the apex all the way to the base, with two fleshy valves reflexing to expose a glutinous seed mass." We suggest that the fruits of *Pearcea* are not persistently fleshy as in many of the capsules of *Episceiae*, but become dry. Seeds in the capsules of *Pearcea* are exposed on reflexed valves that may at first be fleshy, but the valves persist much longer (e.g., up to weeks) instead of hours or days as in the fleshy fruits of *Episceiae* (e.g., *Glossoloma* Hanstein or *Drymonia* Martius).

A distinctive feature of *Pearcea pileifolia* is the change in posture from immature to mature flowers. Immature flowers of *P. pileifolia* are appressed to the abaxial leaf surface until they mature. Upon anthesis or soon thereafter, the pedicels become erect and the flowers and subsequent fruits are held above the leaves on erect pedicels. This has also been observed in two species of *Gasteranthus* Benth (e.g., *G. leopardus* M. Freiberg and *G. wendlandianus* (Hanstein) Wiehler); the significance of the change in flower posture has not been explored, but it may facilitate pollination or seed dispersal.

***Pearcea pileifolia* J. L. Clark & L. E. Skog, sp. nov.**

TYPE: Ecuador. Napo: Cantón Cando, N of Río Jatunyacu, 01°04'45"S, 77°56'29"W, 540 m, 21 Dec. 2000 (fl., fr.), J. L. Clark, E. Narvaez & V. Grefa 5672 (holotype, US; isotypes, AAU, BM, BRIT, CAL, COL, E, F, K, MO, NY, P, QCA, QCNE, SEL, UNA). Figure 1.

Haec species a congeneris laminis foliorum oblongis margine crenatis vel serratis et foliis valde anisophyllis paris folio minore in appendicem squamiformem reducto differt.

A terrestrial shrub; roots fibrous, stolons and scaly rhizomes absent; stems slender, basal diam. to 3 mm, erect, 40–100 cm tall, terminally branched, subwoody at base and herbaceous at apex, terete, sparsely pilose below, densely pilose to villous above. *Leaves* opposite, unequal in a pair; larger leaf with petioles terete, 1–3 mm, green, blade membranous when dry, oblong, (2–)5–8 × 1–2 cm, base acute and occasionally asymmetrical, apex attenuate, margin crenate to serrate, adaxially pale green, sparsely pilose, abaxially uniformly green, uniformly red, or green with reddish tinge, uniformly pilose to densely pilose on veins and leaf margins; smaller leaf sessile or petiolate, petioles terete, up to 1 mm long, blade orbicular, 0.5–2 × 1–2 mm, vestiture and coloration same as larger leaf. *Inflorescence* epedunculate with solitary flowers in upper leaf axils; bracteoles absent; pedicels held below leaves when immature and becoming erect at anthesis, 2.5–3.5 cm long, densely

pilose. *Floral* tube conic, 1.5–2.5 × 2–3 mm, densely pilose; calyx lobes 5, equal, erect at anthesis, persistent and reflexed in fruit, oblong-lanceolate, 3–5 × 0.5–1.5 mm wide at base, apex attenuate, margin entire, light green, outside and inside uniformly pilose; corolla 8–15 mm long, ca. 5.5 mm diam. medially, uniformly tubular with constriction at base, horizontal in calyx, outside mostly red with white base, sparsely pilose, inside mostly white with red spotting, glabrous, limb with lobes subequal, reflexed, rotund, ca. 1 × 3 mm wide at base, red, margin entire; stamens 4, didynamous, included; filaments 5–6 mm, adnate to base of corolla for 1–2 mm, glabrous; anthers longer than broad, ca. 2 × 1.5 mm, dehiscent by longitudinal slits; staminode not observed; nectary of 5 separate glands evenly distributed around ovary, glabrous, all ca. 0.25 × 0.25 mm; ovary half inferior, ca. 0.5 × 1 mm, glabrous; style and stigma not observed. *Fruit* a globose capsule, ca. 5 × 5 mm, appearing fleshy at first and then becoming dry, valves reflexed, loculicidally dehiscent, secondarily dehiscent along base with valve walls attached to septum and appearing winged; seeds numerous, subglobose, irregularly striate, ca. 0.3 × 0.3 mm, dark brown.

*Distribution and habitat.* *Pearcea pileifolia* is known from Ecuador on the eastern Andean slopes in Napo Province and the Cajamarca region of Peru from 540–2020 m. The forests where *P. pileifolia* occurs have been noted on the herbarium labels as being pluvial premontane, montane wet, or tropical wet. The species is not locally common, but has been observed to be abundant along streams (J. L. Clark et al. 5672) and a ridge (J. L. Clark et al. 5308). Otherwise, extensive fieldwork throughout Napo Province between 1997 and 2000 has not resulted in documenting other populations of this rare species.

*IUCN Red List category.* *Pearcea pileifolia* should be considered Critically Endangered (CR B2b[iv]) according to IUCN Red List criteria (IUCN, 2001). Farming and human pressures on native flora are extensive along the eastern border of the Reserva Ecológica Antisana, where one of the two Ecuadorian populations is known to exist. The population in Parque Nacional Sumaco Napo-Galeras is 40–45 km east of the Reserva Ecológica Antisana and 15–20 km east of major cities (e.g., Tena). It is likely that more fieldwork in these areas will locate additional populations of *P. pileifolia*, but so far it is considered to have a very restricted range. Although the population observed by the first author was locally abundant, it is not common along most regions of the river. It is assumed that populations are limited and that the range is severely fragmented.

*Phenology.* *Pearcea pileifolia* has been collected in flower in April, November, and December, and collected in fruit in December only.

*Etymology.* The epithet *pileifolia* is derived from the appearance of the leaves, which are reminiscent of the widespread genus *Pilea* Lindley in the Urticaceae. *Pilea* is distributed throughout the tropics and temperate regions and is one of the larger genera in the Urticales and eudicot rosids. The leaves of *Pearcea pileifolia* have crenate margins and brochidodromous venation, which are features that resemble those found in *Pilea*.

*Paratypes.* ECUADOR. **Napo:** Cantón Archidona, Reserva Ecológica Antisana, comunidad Shamato, entrada por Km 21–Shamato, camino Sardinias–Shamato, 00°44'S, 77°48'W, 1700 m, 28 Apr. 1998 (fl.), *J. L. Clark, E. Narvaez & P. Mamallacta 5308* (MO, QCNE, UNA, US); Cantón Archidona, Parque Nacional Sumaco Napo-Galera, Cordillera de Galeras, Bloque 19, línea 30 (Compañía Triton), 00°53'S, 77°33'W, 1400 m, 24 Apr. 1996 (fl.), *E. Freire & J. Cerda 543* (MO, QCNE, US). PERU. **Cajamarca:** San Ignacio, San José de Lourdes, 00°59'22"S, 78°53'3"W, 2020 m, 23 Nov. 1999 (fl.), *R. Vásquez & S. Flores 26324* (US).

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