



Four new species and eighteen lectotypifications of *Larnax* from Ecuador and Peru and a new synonym of *Deprea orinocensis* (Solanaceae: Solanoideae, Physalideae)

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Abstract

Four new species of *Larnax*, *L. macasiana*, *L. pumila*, *L. purpureocarpa*, and *L. toledoana*, are described and illustrated and species conservation assessments presented. Eighteen lectotypifications of Peruvian *Larnax*: *Larnax abra-patriciae*, *L. altomayoensis*, *L. bongaraensis*, *L. chotanae*, *L. dilloniana*, *L. kann-rasmusseniorum*, *L. longipedunculata*, *L. lutea*, *L. nieva*, *L. pedrazae*, *L. peruviana*, *L. pilosa*, *L. pomacochaense*, *L. purpurea*, *L. sagasteguii*, *L. sawyeriana*, *L. schjellerupiae*, and *L. vasquezii* are proposed, mostly to replace material destroyed in a fire at HAO (Trujillo, Peru). A new synonym of *Deprea orinocensis* from Ecuador, *Ioichroma suffruticosum* is also proposed and lectotypified based on an examination of original type material.

Key words: Taxonomy, South America, Species conservation assessments

Introduction

The genus *Larnax* was described by Miers (1849: 37) from species of *Physalis* L. (1753: 182; *P. subtriflora* Ruiz López & Pavón 1799: 42, *P. orinocensis* Kunth in Humboldt *et al.* 1818: 12, and *P. xalapensis* Kunth in Humboldt *et al.* 1818: 13). These species were then transferred from one genus to another (*Withania* Pauquy 1825: 14, *Athenaea* Sendtner in Martius 1846: 133, and *Deprea* Rafinesque 1838: 57) by different authors (Dunal 1852, Hemsley 1882, Zahlbruckner 1892, D'Arcy 1973, 1993) making it difficult to delimit the genus. Hunziker (1977) reinstated *Larnax*, and Sawyer (2005) defined and differentiated *Larnax* from its most closely related genus *Deprea* based on six synapomorphies: filament base expansion (=stamen petalum, abruptly expanded, forming a short conspicuous or inconspicuous plaque with rounded or angular borders in *Larnax* vs. tapering, not forming a plaque in *Deprea*); filament length (heterodynamous, sometimes homodynamous in *Larnax* vs. always homodynamous in *Deprea*); filament adnation (< 1.8 mm in *Larnax* vs. > 2.5 mm in *Deprea*); anther length (unequal in *Larnax* vs. equal in *Deprea*); corolla shape (campanulate-rotate in *Larnax* vs. infundibular in *Deprea*); and pollen surface texture (scabrate or psilate in *Larnax* vs. rugulate in *Deprea*). Together with the other 12 so-called “physaloid” genera *Larnax* was included in the large tribe Solaneae by its accrescent calyx, longitudinally dehiscent anthers and the presence of a nectary at the base of the ovary (Averett 1979, D'Arcy 1991). From a phylogenetic standpoint *Larnax* is currently placed in a small unnamed subclade of the Physalideae clade (Olmstead *et al.* 2008, Särkinen *et al.* 2013). During the last two decades *Larnax* has expanded from eight to 33 species due to the description of many new species (Sawyer 1998, 2001, Leiva González *et al.* 2008, Leiva González & Barboza 2009, Leiva González *et al.* 2009).

Larnax is a neotropical genus that inhabits wet, premontane or montane forest edges, usually on slopes along streams or rivers, from southern Peru to Colombia (Hunziker 2001, Leiva González *et al.* 2009). A single species and subspecies is known from Central America: *L. sylvarum* (Standley & C. V. Morton 1938: 1036) N. W. Sawyer (2001: 461) subsp. *sylvarum*. Most *Larnax* species are herbs, shrubs or exceptionally small trees (up to 5 m). They

are easily recognized in the field by their plagiotropic green or purple upper stems, axillary fascicles of three to 15 flowers per node (rarely solitary), campanulate, stellate or rotate corolla ranging from cream or greenish yellow to purple, sub-bilobate stigma, stamen petalum with two prominent tooth-like appendices or auricles and fleshy white, green or orange berries containing reniform seeds and always enclosed by the calyx.

Southern Ecuador and northern Peru are the main centres of *Larnax* species diversity (Hunziker 2001). In the last years the majority of newly described *Larnax* species have been from the Amotape-Huancabamba region of northern Peru (21 spp.). Leiva González *et al.* (2008) suggest that this area is a centre of species diversity of the genus. After Peru, Ecuador is the country with the most recorded *Larnax* species (8 spp., Jørgensen & León-Yáñez 1999) where diversity is richest in the southern and eastern Ecuadorian highlands (Sawyer 2005).

The highest level of endemism is associated with the Andes and the Galapagos Islands. The flora of mainland Ecuador is extremely rich and ca. 30% is thought to be endemic (Balslev 1988, Eliasson 1991, Borchsenius 1997, Valencia *et al.* 2000). Despite this its territory has not been thoroughly explored due to the lack of active botanists working there (van der Werff & Consiglio 2004).

As part of a monographic treatment of the genus we have revised the whole *Larnax* collections housed in 33 herbaria including the types. In doing so we found unidentified Ecuadorian specimens that did not fit with known species and this encouraged us to undertake extensive fieldwork in Ecuador (Provinces of Napo, Pastaza, Morona-Santiago, Pichincha, Cotopaxi, Loja, Zamora-Chinchipec) which resulted in the discovery of the four new species described here.

On 6 June 2010 the type collections of many Peruvian *Larnax* species were partially or completely destroyed in a fire at the Atenor Orrego Herbarium (HAO, Trujillo, Peru). As a consequence lectotypifications of many species are needed.

In addition, *Larnax suffruticosa* (Dammer 1905: 386) Hunziker (1977: 9) is proposed as a new synonym of *Deprea orinocensis* (Kunth) Rafinesque (1838: 57).

Materials and methods

New species descriptions—Descriptions were based on measurements of living plants taken during fieldwork in Ecuador and examination of herbarium specimens loaned from, or inspected at, the 33 herbaria listed below. Observations were made in the field and morphological examinations of herbarium specimens or material preserved in FAA solution were conducted using a Zeiss Stemi 2000-C stereomicroscope at x6.5–50 magnification. Measurements of herbarium specimens were made from the dissections of flowers rehydrated in hot water. Information about flower, fruit, leaf and seed colour was based on our own observations in the field. Photographs “*in situ*” and images of trichomes were taken for more precise analysis.

The geographic distribution for each species is based on data of all the herbarium collections studied. Georeferenced data were checked for inconsistencies. Data points without coordinates were assigned coordinates where possible, whereas duplicate or doubtful data were removed. Conservation Assessments were undertaken using IUCN criteria B, ‘Geographic range’ in the form of B1 (extent of occurrence) and A, ‘Population size reduction’ (IUCN 2012). Species distributions were plotted using Google Earth (GoogleEarth 2011) and DIVA-GIS (Hijmans *et al.* 2012) and Extent of Occurrence calculated using DIVA-GIS and R (Hijmans *et al.* 2001, R Core team 2012) by projecting the data to UTM 17S projection system. In addition, available data on the DIVA-GIS website (<http://www.diva-gis.org/>) was used to assess the nature of the vegetation cover, urbanization, and the proximity to roads at the different localities, which were used as indicators of plausible future threats.

Lectotypifications—Type specimens of *L. peruviana* (Zahlbruckner 1892: 7) Hunziker (1977: 9) were analyzed from digital images provided by W and F staff. *Larnax suffruticosa* is lectotypified from a recovered specimen found in QPLS. For those Peruvian *Larnax* species whose holotypes were destroyed in the HAO fire we searched for duplicates in AAU, B, BAF, BM, CCSU, COL, CONN, CORD, CPUN, F, GH, HAO, HUSA, HUT, LP, K, Q, QAP, QCA, QCNE, QPLS, QUSF, LOJA, M, MO, NY, P, TEX, US, USM, VEN, W, and WIS. The specimens selected as lectotypes correspond to the best preserved and most diagnostic specimens or the only remaining material. Photographs of the most diagnostic characters of the species lectotypified were compiled and are included here.

Results

Taxonomy

New species descriptions

Larnax macasiana Deanna, S. Leiva & Barboza, *sp. nov.* (Figs. 1, 2, 3 B, F)

Type:—ECUADOR. Morona Santiago: Macas, Cerro San José del Quílamo, 500 m antes de la Virgen Purísima de Macas en el Quílamo, 1369 m, 78°08'19.3"W, 02°17'45.4"S, 23 January 2013 (fl, fr), R. Deanna & S. Leiva III (holotype QUSF 29472!, isotypes CORD 00006797!, CORD 00006799!, HAO!, QUSF 29480!).

Larnax macasiana differs from *L. altomayoensis* in being a lower shrub (0.7–0.8 m vs. 1.2–1.5 m in *L. altomayoensis*), in having smaller, villous to tomentose leaves (6.5–7.2 cm long, 3.4–3.7 cm wide vs. larger glabrescent leaves 10.2–19.5 cm long, 3.7–4.1 cm wide), bifurcate trichomes on the outer corolla surface (vs. bifurcate trichomes absent on the corolla), and in its calyx with long non-glandular trichomes and short glandular trichomes (vs. calyx with only long glandular trichomes).

Shrubs widely branched, plagiotropic, 0.7–0.8 m tall. Stems terete, hollow; old stems slightly 4–5-angulate, 10–12 mm wide at base, green, sometimes purple, glabrescent, without lenticels, with longitudinal short fissures; young stems green, with deep purple macules, densely villous, slightly sericeous, with long simple 4–6-celled transparent patent non-glandular trichomes. Leaves alternate; petiole semi-terete, green or sometimes deep purple, (2–) 3.2–3.5 cm long; leaf blade entire, 6.5–7.2 cm long, 3.4–3.7 cm wide, membranous to slightly fleshy, ovate, apex acute, base oblique or asymmetric, lustrous, villous to slightly sericeous, dark green with purple veins in the 1/3 basal adaxially, opaque, tomentose, and light green abaxially, with the same trichomes of young stems and petioles. Flowers axillary solitary, sometimes paired; pedicels 4–6 mm long, green, filiform, curved to pendent, weak, tomentose, with long simple non-glandular trichomes. Flowering calyx (3–) 4–4.6 mm diameter in anthesis, green externally, with protruding dark green main veins, greenish yellow internally, cup-shaped, fleshy, tomentose externally, with long transparent patent non-glandular trichomes, and many short simple glandular trichomes (stalk unicellular, ochraceous head 6-celled) abundantly on lobes apex, glabrous internally; tube 1–1.2 (–1.8) mm long, 2.9–3.1 mm diameter; lobes 0.8–0.9 mm long, 0.9–1 mm wide, triangular, acute, erect. Corolla stellate, slightly campanulate, 8–10 mm diameter in anthesis, fleshy; tube green in both sides, (2.5–) 3.4–3.6 mm long, (5–) 6–8 mm diameter, glabrescent externally, with short simple transparent non-glandular trichomes, glabrous internally; lobes 5–7 mm long, (2.5–) 3.6–3.8 mm wide, triangular, slightly erect, with protruding main veins abaxially, deep purple with greenish yellow margins and veins in both sides, villous, slightly sericeous externally, with scarce long simple and bifurcate transparent non-glandular trichomes, and short simple glandular trichomes on the surface, apex papillate, margin ciliate, glabrescent internally, with long transparent non-glandular trichomes mainly along veins, and occasionally short glandular trichomes homogeneously dispersed; inner annular ring of trichomes absent. Stamens exerted, homodynamous; filaments glabrous, cream, 0.8–1 mm long, filament base expansion auriculate, greenish cream 0.9–1 mm, auricles conspicuous; anthers 1.8–2 mm long, 1.7–1.8 mm wide, deep purple to dull purple, widely ovoid, mucronate, thecae slightly divergent, connective cream, widely elliptic to triangular. Gynoecium with stylar heteromorphism; ovary cream, glabrous, subglobose, 1–1.2 mm long, 1–1.1 mm wide, nectary annular, cream, occupying 20–30% of the ovary length; style glabrous, cream, broadened at the apex, short style 2–2.5 mm long, long style 5–5.5 mm long; stigma bilobate, dark green, 0.3–0.4 mm long, 0.4–0.5 mm diameter. Fruit a berry, widely ovoid, 14–16 mm diameter, greenish white when mature, fleshy, glabrous. Fruiting calyx accrescent, loosely enveloping the berry, 20–22 mm long, 15–17 mm diameter, open at the apex, bright green, markedly 10-costate, wrinkled in appearance, villous, slightly sericeous externally, with abundant long transparent patent non-glandular trichomes mainly along veins and some short glandular trichomes scattered on the surface; lobes conspicuous, short, < 1 mm long, triangular acute. Fruiting pedicels 7–10 mm long, green, erect, sericeous. Seeds 65–75 per fruit, 2.4–2.5 mm long, 2–2.2 mm diameter, brownish tan, reniform; testa foveolate. Embryo curved cream.

Etymology:—From Macas (Ecuador), the locality where the holotype was collected.

Phenology:—Flowering and fruiting from January to April.

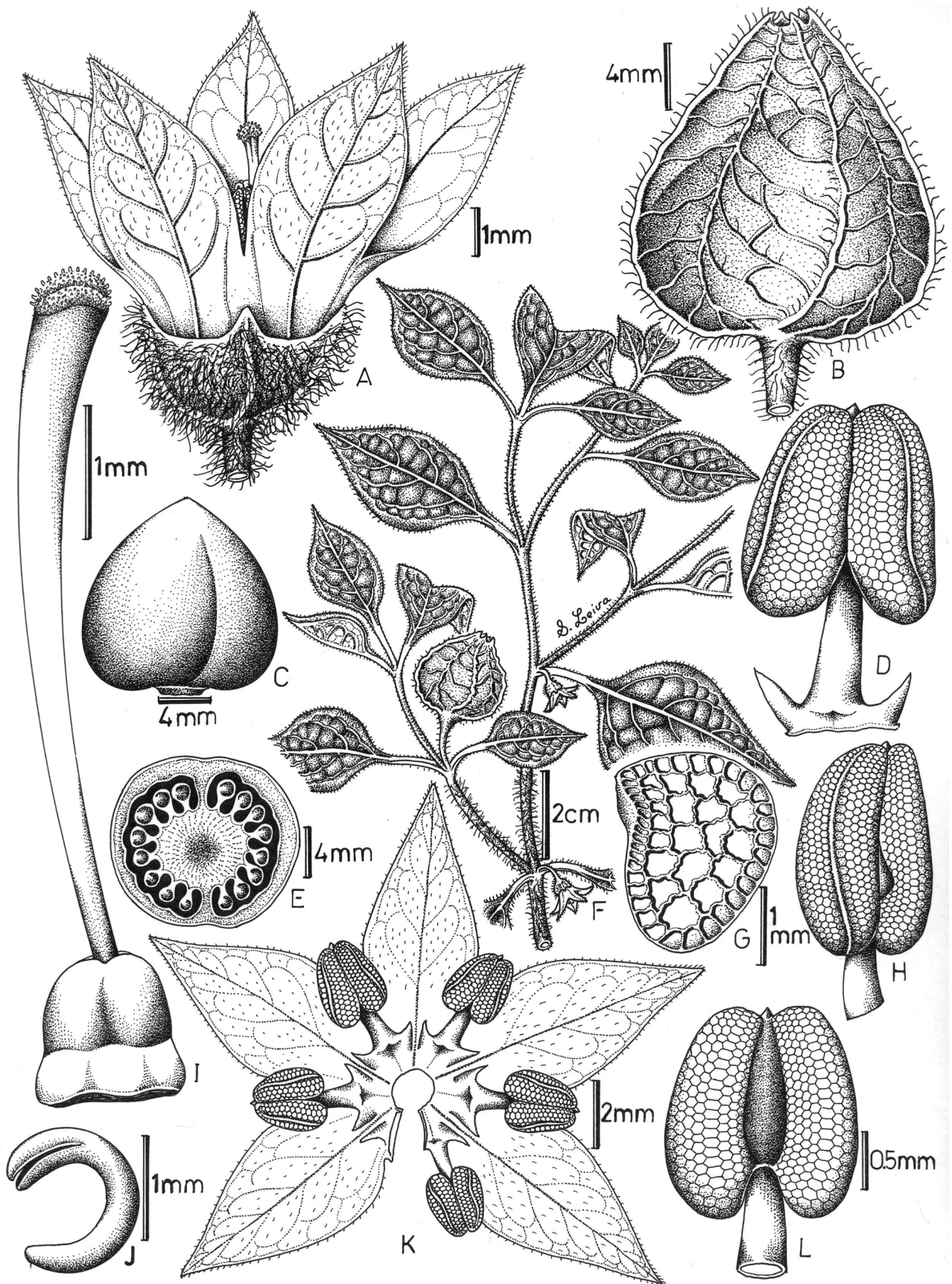


FIGURE 1. *Larnax macasiana*. **A.** Flower. **B.** Fruit surrounded by accrescent calyx. **C.** Fruit. **D, H, L.** Anthers in dorsal, lateral and ventral views, respectively. **E.** Ovary in cross section. **F.** Flowering branch. **G.** Seed. **I.** Gynoecium. **J.** Embryo. **K.** Open corolla. From Deanna & Leiva 111. Drawing by Segundo Leiva González.

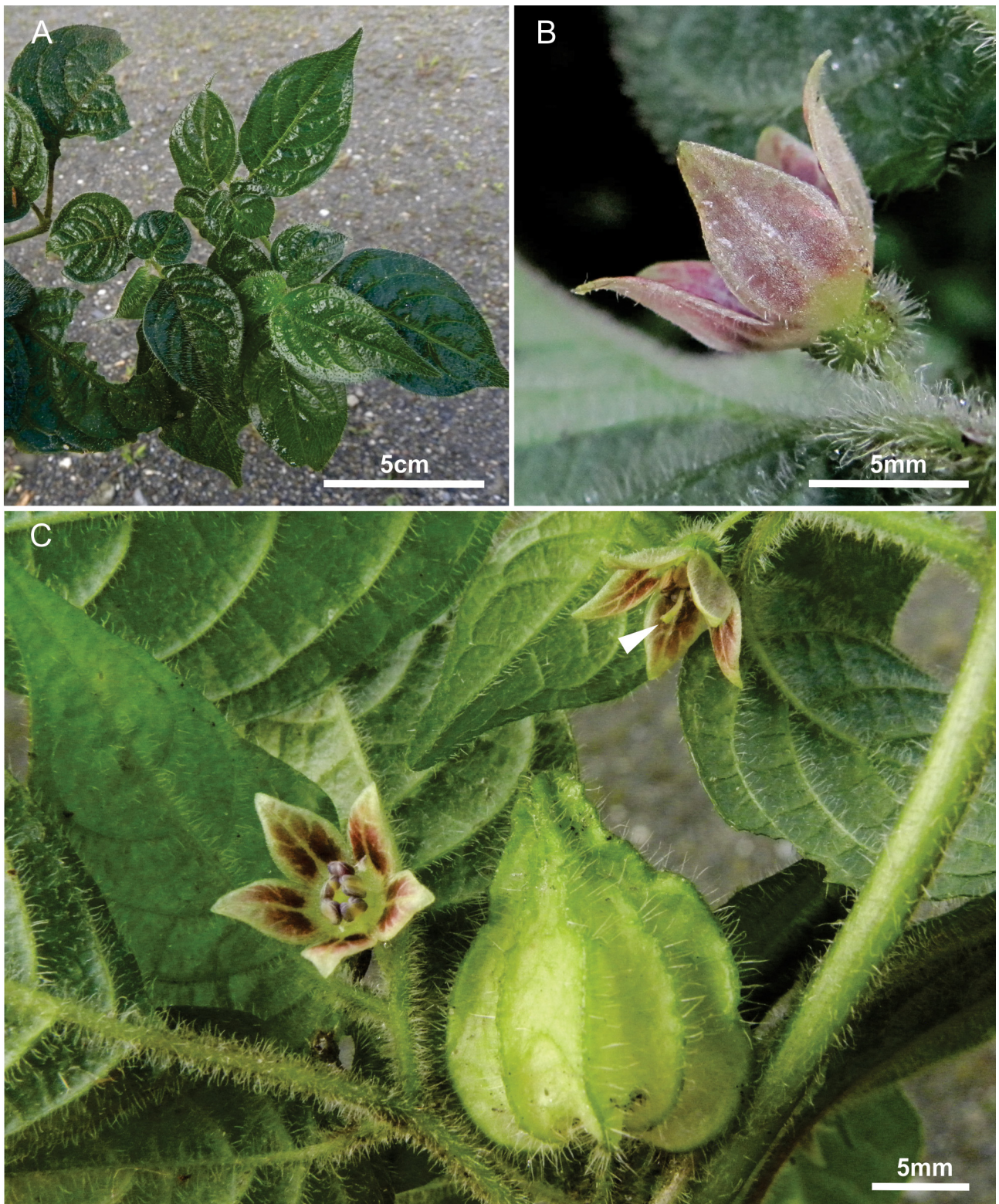


FIGURE 2. *Larnax macasiana*. **A.** Vegetative branch. **B.** Flower in anthesis, lateral view. **C.** Flower and fruit (the arrow shows the long style). From Deanna & Leiva III (Photo by Rocío Deanna).

Distribution and Ecology:—Endemic to the environs of Macas (Province Morona Santiago, Ecuador; Fig. 4). *Larnax macasiana* inhabits primary cloud forest from 900 to 1400 m elev.

Species conservation assessment:—According to IUCN criteria (IUCN 2012), *Larnax macasiana* is considered as Endangered (EN). The extent of occurrence is calculated to be ca. 145 km² (Criterion B1 <5000 km²) and the species is known only from two localities (Criterion B1a ≤5). Active threat can be seen from the

remarkable habitat fragmentation, a consequence of city expansion and construction of new roads nearby. The type specimen was collected on a sacred hill (“San José del Quílamo” hill) named due to the presence of a religious statue. More collections with population assessment would be necessary to refine this.

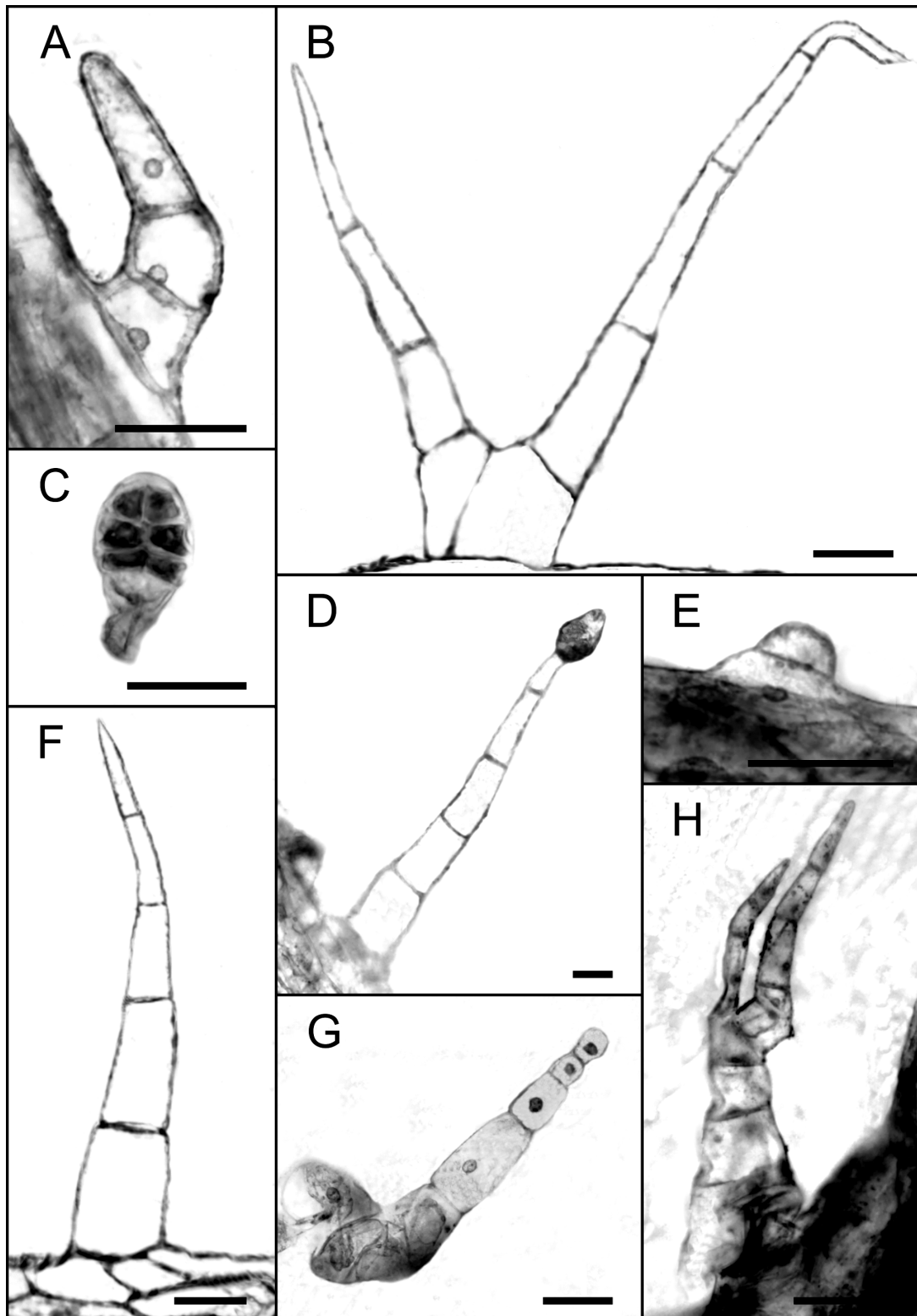


FIGURE 3. Trichomes of *Larnax* species. **A.** Short simple trichome of *L. pumila* calyx. **B.** Bifurcate trichome of *L. macasiana* corolla lobes. **C.** Short glandular trichome of *L. purpureocarpa* corolla lobes. **D.** Long glandular trichome of *L. purpureocarpa* fruiting calyx. **E.** Papillae of *L. pumila* calyx apex. **F.** Long non-glandular trichome of *L. macasiana* corolla lobes. **G.** Simple non-glandular trichome of *L. toledoana* inner corolla. **H.** Bifurcate trichome of *L. toledoana* corolla lobes. Scale = 5 μ m.

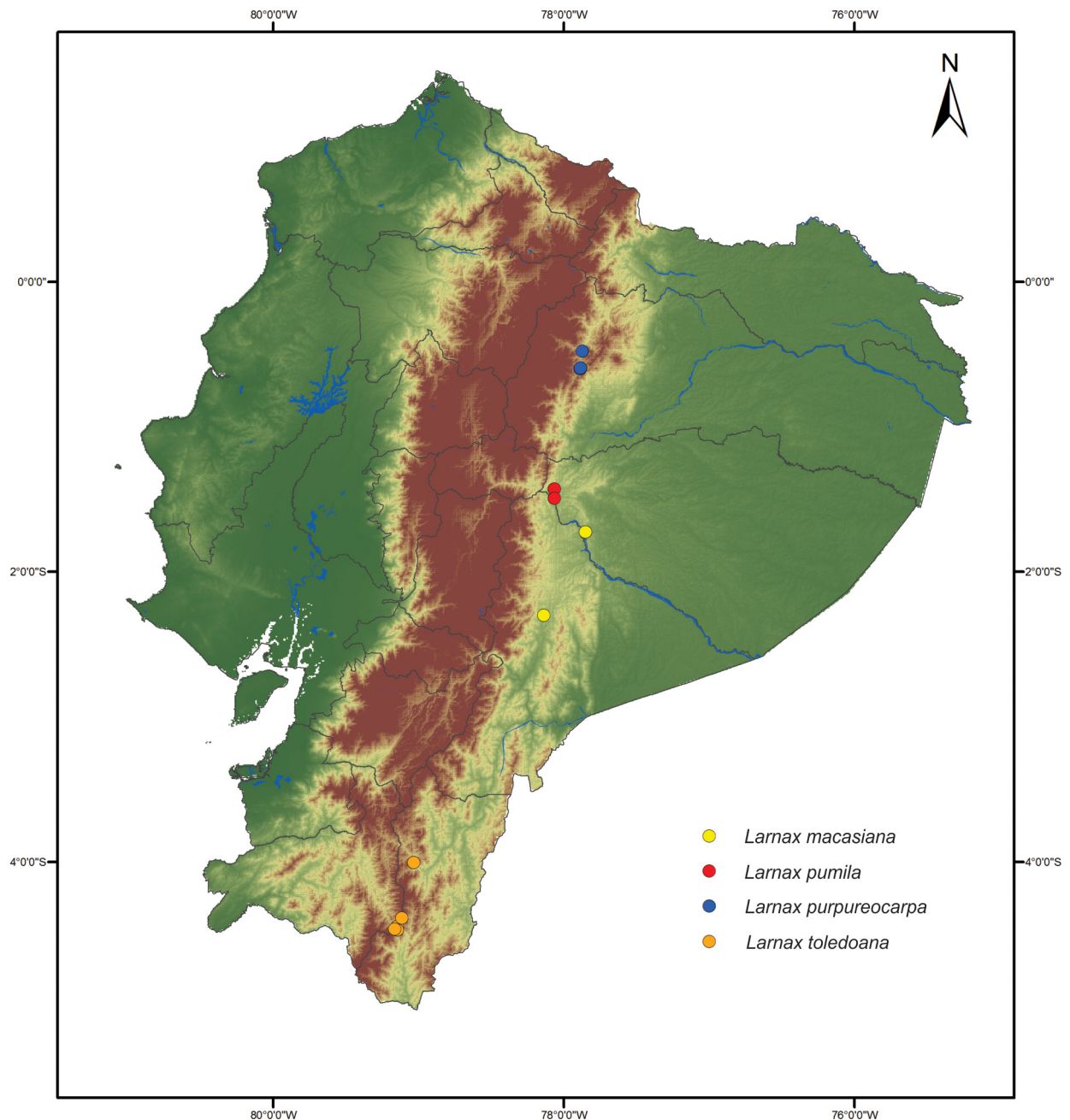


FIGURE 4. Schematic distribution of the novel *Larnax* species in Ecuador.

Additional specimens examined:—ECUADOR. Morona Santiago: Macas, forest N of the village, c. 900 m, 14 March 1956 (fl, fr), *Asplund 19775* (S!; CORD Negative 02172!); Macas, oeste de la pista del aeropuerto, bosque secundario, 1050 m, 2°18'S 78°07'O, 22 February 1986 (fl, fr), *Baker 6552* (QCNE!, QAME, MO, NY; Carretera Macas-Puyo, 44 km al sur de Puyo, en bosque primario, borde de carretera, 952 m, 01°43'28.5"S 77°51'11.5"W, 24 January 2013 (fl), *Deanna & Leiva 112* (CORD!, QUSF!).

Discussion:—The combination of a villous to tomentose indumentum with simple non-glandular trichomes (Fig. 2 A–C & 3 F), 1–2-flowered pendent inflorescences, the corolla colour (deep-purple with yellow greenish in margins and veins on both sides; Fig. 2 B, C) and external pubescence with bifurcate hairs (Fig. 3 B), erect fruiting pedicels, and the calyx loosely enveloping the berry (Fig. 2 C) identify *L. macasiana* as a distinct species.

Larnax macasiana is superficially similar to *L. altomayoensis* S. Leiva & Quipuscoa (2008: 199) from northern Peru. Both species have a fruiting calyx loosely enveloping the greenish white berry, deep-purple corolla lobes with greenish yellow margins, homodynamous stamens, and 1–2 flowered inflorescences (Fig. 2 A–C, 11

F–J). This species does not have any sympatric species and the nearest geographically is *L. andersonii* N. W. Sawyer (1998: 72). Both species have similar pubescence on the vegetative organs, erect fruiting pedicels, and a fruiting calyx loosely enveloping the berry. *Larnax macasiana* can be distinguished from those species by several characters summarised in Tables 1 and 2.

TABLE 1. Morphological comparison of *L. macasiana* and *L. altomayoensis*.

Characters	<i>L. macasiana</i>	<i>L. altomayoensis</i>
Shrub height	0.7–0.8 m	1.2–1.5 m
Leaf size	6.5–7.2 cm long, 3.4–3.7 cm wide	10.2–19.5 cm long, 3.7–4.1 cm wide
Leaf pubescence	villous to tomentose	glabrescent
Trichomes types on calyx surface	long simple non-glandular trichomes and short glandular trichomes	only long glandular trichomes
Corolla with bifurcate trichomes	yes	no

TABLE 2. Morphological comparison of *L. macasiana* and *L. andersonii*.

Characters	<i>L. macasiana</i>	<i>L. andersonii</i>
Stems colour	green	deep purple
Anthers	mucronate	apiculate
Fruiting calyx colour	bright green	greenish white
Berry	greenish white	orange

Larnax pumila S. Leiva, Barboza & Deanna, *sp. nov.* (Figs. 3 A, E, 5, 6)

Type:—ECUADOR. Pastaza: Mera, rumbo hacia Río Anzú, sendero, 1340 m, 78°04'01.5"W, 01°25'31.6"S, 13 November 2011 (fl, fr), C. I. Orozco, G. E. Barboza, A. Orejuela & S. Leiva 3890 (holotype CORD 0006758!, isotypes COL!, QCA!).

Larnax pumila differs from *L. andersonii* in its glabrous leaves above (vs. strigose leaves above in *L. andersonii*), its shortly mucronate anthers (vs. apiculate anthers), its oblique to pendent fruiting pedicels (vs. erect fruiting pedicels), and in its white to cream mature berry (vs. orange berry); it also differs from *L. dilloniana* in being a lower shrub (0.5–1 m tall vs. 0.7–3 m tall in *L. dilloniana*), in having smaller dimorphic leaves (the larger ovate 7.2–9.6 cm long and, the smaller cordate 2.4–2.7 cm long vs. elliptic leaves 9–16.3 cm long in *L. dilloniana*), and in its 1–3 flowered inflorescence (vs. 3–6 flowered).

Shrubs, widely branched, plagiotropic, 0.5–1 m tall. Stems terete with two ribs slightly marked, hollow, glabrescent, with long simple antrorse multicellular non-glandular trichomes; old stems 6–8 (–10) mm wide at base, green, sometimes purple, without lenticels, with longitudinal short fissures; young stems green, sometimes purple above, green below, or completely deep purple; nodes generally deep purple. Leaves alternate, distal leaves sometimes geminate; petiole semi-terete, (0.9–) 2–2.7 (–3) cm long, deep purple above, green or partially purple below; leaf blade entire, fleshy, bright green and glabrous above, light green and glabrescent to pubescent below, slightly sericeous with the same trichomes of the stems and petioles mainly along veins, and with some short, ochraceous glandular trichomes occasionally on the surface, the major leaf ovate, apex acuminate, base unequal, 7.2–9.6 cm long, 3.7–5.6 cm wide; the minor leaf cordate, apex short acuminate, base oblique, 2.4–2.7 cm long, 1.9–2.2 cm wide. Fascicles axillary, 1–3-flowered; pedicels (4–) 5–7 mm long, light-green, filiform, pendent, pubescent, with short antrorse multicellular non-glandular trichomes. Flowering calyx (2.9–) 3.5–4.5 mm diameter in anthesis, light green with dark green veins externally, light-green internally, cup-shaped, fleshy, pubescent, slightly sericeous externally, with abundant short glandular trichomes (stalk unicellular, ochraceous head 6-celled), glabrous internally; protruding main veins with long transparent non-glandular trichomes; tube 1.7–2.1 mm long, (2.7–) 3–4 mm diameter; lobes minute, (0.2–) 0.3–0.5 mm long, 0.2–0.4 mm wide, unequal, shortly triangular, acute, erect, with papillae and 2–3 celled transparent non-glandular trichomes at the apex. Corolla slightly campanulate before anthesis, clearly stellate in anthesis, (6–) 7–9 mm diameter in anthesis, fleshy; tube yellowish green on both sides, 1.7–2.2 mm long, (3–) 3.5–4.1 mm diameter, glabrescent externally, with short glandular trichomes, glabrous internally; lobes (5.5–) 7–9 mm long, (2–) 2.7–2.9 mm wide, triangular, erect or expanded,

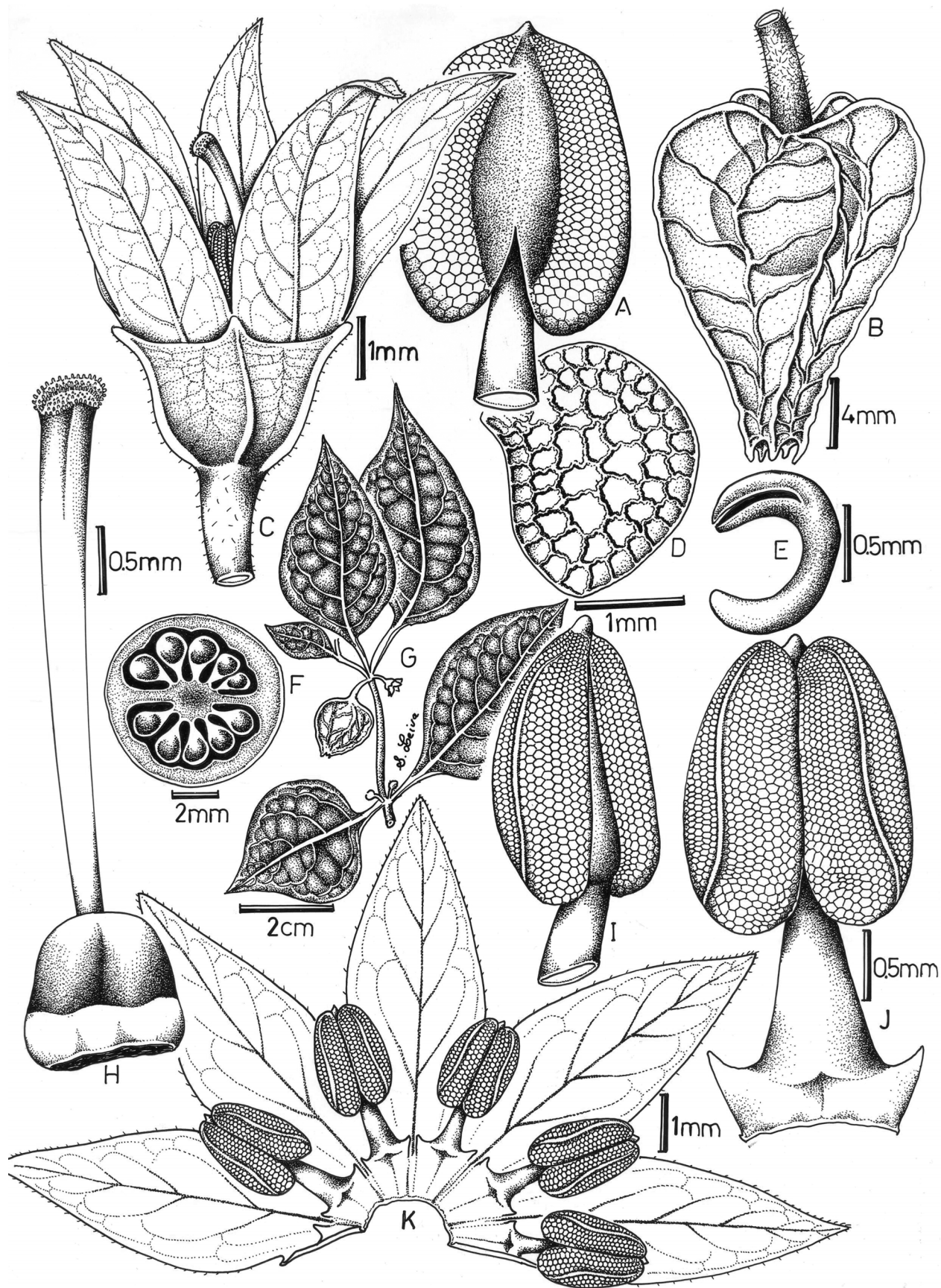


FIGURE 5. *Larnax pumila*. **A, I, J:** Anthers in ventral, lateral and dorsal views, respectively. **B.** Fruit surrounded by accrescent calyx. **C.** Flower. **D.** Seed. **E.** Embryo. **F.** Ovary in cross section. **G.** Flowering branch. **H.** Gynoecium. **K.** Open corolla. From Orozco *et al.* 3890. Drawing by Segundo Leiva González.



FIGURE 6. *Larnax pumila*. **A.** Habit. **B.** Flower in anthesis. **C.** Flower and fruit. From Orozco *et al.* 3890 (Photo by Segundo Leiva González).

rarely slightly reflexed, opaque and cream externally, lustrous and deep-purple internally with yellowish green apex, margins and veins, margin ciliate, glabrescent externally, with short glandular trichomes, slightly sericeous internally, with short non-glandular and glandular trichomes; inner annular ring of trichomes absent. Stamens exerted, heterodynamous; filaments glabrous, cream, three longer (1–1.2 mm long), two shorter (0.8–1 mm long), filament base expansion auriculate, yellowish-green, 1–1.1 mm long, auricles conspicuous; anthers 2–2.2 mm long,

1.5–1.6 mm wide, deep purple to dull purple, ellipsoidal, shortly mucronate, connective cream to dull purple, narrowly elliptical. Ovary green, glabrous, ovate, subglobose, 1.2–1.4 mm long, 1.2–1.3 mm wide, nectary annular, greenish yellow, occupying 30–40% of the ovary length; style 3.6–3.9 mm long, glabrous, cream, slightly broadened at the apex, extending ca. 0.7 mm beyond the anthers; stigma clavate, subbilobate, light green to tan, 0.3–0.35 mm long, 0.4–0.5 mm diameter. Fruit a berry, globose or subglobose, 8–10 mm long, 7–8 mm diameter, cream to white when mature, green when immature, fleshy, glabrous. Fruiting calyx accrescent, loosely enveloping the berry, 20–22 mm long, 15–17 mm diameter, open at the apex, lustrous, invaginate-pyriform-plicate, green with dark green ribs, pubescent with abundant short glandular trichomes (stalk unicellular, ochraceous head 6-celled), occasionally with some short, transparent, non-glandular trichomes mainly along veins externally, glabrous internally; lobes conspicuous, ca. 1 mm long. Fruiting pedicels 11–13 mm long, green, oblique to pendent, glabrescent. Seeds 50–60 per fruit, 2.5–2.7 mm long, 2–2.2 mm diameter, brown, reniform, glabrous; testa foveolate. Embryo curved.

Etymology:—This species is named due to its distinctive habit, which is one of the lowest species of the genus.

Phenology:—Flowering from April to January, and fruiting from November to January.

Distribution and Ecology:—Found on margins of the Anzu, Plata, and Tena rivers in the Pindo-Mirador reserve and in the environs of Mera (Napo, Pastaza). *Larnax pumila* is distributed on the eastern slopes of the Andes Mountains, always along the course of rivers or streams (Fig. 4). It inhabits primary cloud forest from 400 to 1400 m elev.

Species conservation assessment:—According to IUCN criteria (IUCN 2012), *L. pumila* is considered as Near Threatened (NT). The extent of occurrence is calculated to be ca. 100 km² (Criterion B1 <5000 km², Endangered) and the species is known from only four localities (Criterion B1a ≤5, Endangered). However, no decline in geographic range or fragmentation of the habitat has been observed and so this assessment has been regarded as Near Threatened. More collecting and population assessments would help to confirm this assessment.

Additional specimens examined:—ECUADOR. Napo-Pastaza: Napo, Tena, forested bank of Rio Tena, 400 m, 8 April 1935 (fl), *Mexia* 7195 (US!, UCR!). Pastaza: Mera, Colonia Pindo Mirador, en la Reserva Pindo-Mirador, Río Plata, 1230 m, 12 November 2011 (fl, fr), *Orozco et al.* 3878 (CORD!, COL, QCA, HAO); Mera, 9.3 km desde la Plaza Mayor de Mera hacia Cavernas del Río Anzú (vía hacia las antenas), en borde de riachuelo, bosque primario, 1332 m, 01°25'32.2"S 78°04'00.1"W, 24 January 2013 (fl, fr), *Deanna & Leiva* 113 (CORD!, QUSF!); environs of Mera, forest remnants above town, 1200 m, 22 November 1974 (fl, fr), *Plowman & Davis* 4505 (GH, USM!, MO, K); vicinity of Shell, 1.2 km N of town, disturbed virgin forest in swampy area, 1092 m, 01°29'33"S 78°03'57"W, 9 May 2003 (fl), *Croat et al.* 88868 (QCNE!; MO).

Discussion:—*Larnax pumila* is distinctive by its small and characteristically plagiotropic habit, its leaf dimorphism (larger leaf ovate; smaller leaves cordate, Fig. 6 A), and its white to cream berry loosely enclosed by the invaginate-pyriform-plicate fruiting calyx (Fig. 6 C).

Larnax pumila is most similar to the sympatric *L. andersonii*, the two species occurring in Pastaza Province (Ecuador). Both have a flowering calyx with minute lobes < 1 mm long and accrescent fruiting calyx loosely enveloping the berry, but *L. pumila* can immediately be distinguished by its indumentum, anthers, fruiting pedicels and berries as summarised in Table 3.

TABLE 3. Morphological comparison of *L. pumila* and *L. andersonii*.

Characters	<i>L. pumila</i>	<i>L. andersonii</i>
Upper leaf surface pubescence	glabrous	strigose
Lower leaf surface pubescence	pubescent with only simple non-glandular and glandular trichomes	villous with non-glandular trichomes, and bifurcate trichomes along the leaf margin and veins
Anthers	shortly mucronate	apiculate
Fruiting pedicel position	oblique to pendent	erect
Mature berry colour	white to cream	orange

In addition, *Larnax pumila* is superficially similar to *L. dilloniana* S. Leiva, Quipuscoa & N. W. Sawyer (1998: 85) from northern Peru. Both species have an internally glabrous corolla of the same colour, and an invaginate-

pyriform-plicate fruiting calyx loosely enveloping the berry (Fig. 6 A–C & Fig. 13 B, C). *Larnax pumila* differs from *L. dilloniana* in its height, leaf size, and number of flowers per inflorescence (Table 4, Figs. 6 A, 13 A–C). According to *L. dilloniana* distribution cited by Leiva *et al.* (1998a), this species would be sympatric with *L. pumila*. Leiva *et al.* did not cite any specimens for Ecuador and after a careful revision of the Ecuadorian herbaria and others where collections from Ecuador are housed (AAU, CORD, HUT, NY, Q, QCA, QCNE, QPLS, QUSF, S, USM) and extensive fieldwork we also did not find *L. dilloniana* in Ecuador.

TABLE 4. Morphological comparison of *L. pumila* and *L. dilloniana*.

Characters	<i>L. pumila</i>	<i>L. dilloniana</i>
Shrub height	0.5–1 m	0.7–3 m
Dimorphic leaves	yes	no
Leaf size	the larger 7.2–9.6 cm long, the smaller 2.4–2.7 cm long	9–16.3 cm long
Number of flowers per inflorescence	1–3	3–6

Larnax purpureocarpa S. Leiva, Deanna & Barboza, *spec. nov.* (Figs. 3 C, D, 7, 8)

Type:—ECUADOR. Napo: carretera Cosanga-Baeza, 5.4 km al sur de Baeza, en borde de carretera, 1855 m, 77°52'20.2"W, 00°28'34.2"S, 25 January 2013 (fl, fr), R. Deanna & S. Leiva 125 (holotype QCNE 0233491!, isotypes CORD 00006800!, HAO!).

Larnax purpureocarpa differs from *L. harlingiana* in its pubescent leaves underneath, with long simple transparent non-glandular trichomes (vs. hirsute leaves below, with long simple ochraceous non-glandular trichomes in *L. harlingiana*), its 5–6-flowered inflorescence (vs. 2–4-flowered inflorescence), its calyx lobes 0.6–1.1 mm long (vs. tiny calyx lobes 0.1–0.3 mm long), its corolla lobes greenish yellow externally, yellow internally with dull purple at the lobe apex (vs. an entirely green corolla), its homodynamous stamens (vs. heterodynamous stamens), and in its blackish purple fruiting calyx (vs. green fruiting calyx).

Shrubs, widely branched, 0.5–0.8 m tall. Stems terete, slightly 4–5-angulate, solid; old stems 7–10 (–12) mm wide at base, deep blackish purple, glabrescent (long simple 3–5-celled transparent non-glandular trichomes), without lenticels, with longitudinal short fissures; young stems lustrous, deep purple to dull purple, villous, slightly sericeous, with short transparent antrorse simple non-glandular trichomes. Leaves alternate, distal leaves sometimes geminate; petiole semi-terete, (2.5–) 4.6–5.7 cm long, deep purple or purple-blackish, sometimes dull purple, with the same pubescence as the young stems; leaf blade entire, 17.5–21 cm long, 8.5–8.9 cm wide, ovate, apex acute, base cuneate, slightly oblique, membranous, opaque, dark green with purple veins above, deep purple below, glabrescent above, with long, transparent, non-glandular trichomes scattered, and pubescent, slightly sericeous below, with the same trichomes of the adaxial surface only on veins and margins. Fascicles axillary, (4–) 5–6-flowered; pedicels 25–28 mm long, deep purple to blackish, filiform, pendent, pubescent, slightly sericeous, with short simple transparent non-glandular and ochraceous glandular trichomes (stalk unicellular, head 6-celled). Flowering calyx 4.9–5.2 mm diameter in anthesis, deep purple to dull purple externally, dull purple internally, cup-shaped, fleshy, with protruding principal veins, villous, slightly sericeous externally, with long transparent non-glandular trichomes mainly along veins, and short simple ochraceous glandular trichomes scattered, glabrous internally; tube 1.9–2 mm long, (4–) 4.7–4.9 mm wide; lobes unequal, 0.6–1.1 mm long, 0.6–0.8 mm wide, shortly triangular, acute, erect, with papillae and non-glandular 2–3-celled trichomes at the apex. Corolla campanulate before anthesis, slightly stellate in anthesis, 7–9 mm diameter in anthesis, fleshy; tube green externally, cream internally, 1.8–2.2 (–3.2) mm long, 5–6 mm diameter, completely glabrous in both surfaces; lobes (3.5–) 4–4.1 mm long, (2–) 2.8–3 mm wide, triangular, reflexed at the apex, greenish yellow externally, yellow to dull purple at the apex internally, ciliate margin, sparsely pubescent, slightly sericeous externally, with abundant short and a few long simple glandular trichomes (2–5-celled stalk, oblong unicellular ochraceous head), mixed with some short transparent non-glandular trichomes on the surface, glabrous internally, the apex papillate. Stamens exerted or slightly exerted, homodynamous; filaments glabrous, cream, 0.9–1.1 mm long, filament base expansion auriculate, cream, 0.5–0.6 mm long, auricles pronounced and triangular; anthers 1.8–2 mm long, 1.9–2.1 mm wide, cream to bluish cream, ellipsoidal to widely ovoid, mucronate, thecae slightly divergent, connective whitish cream,

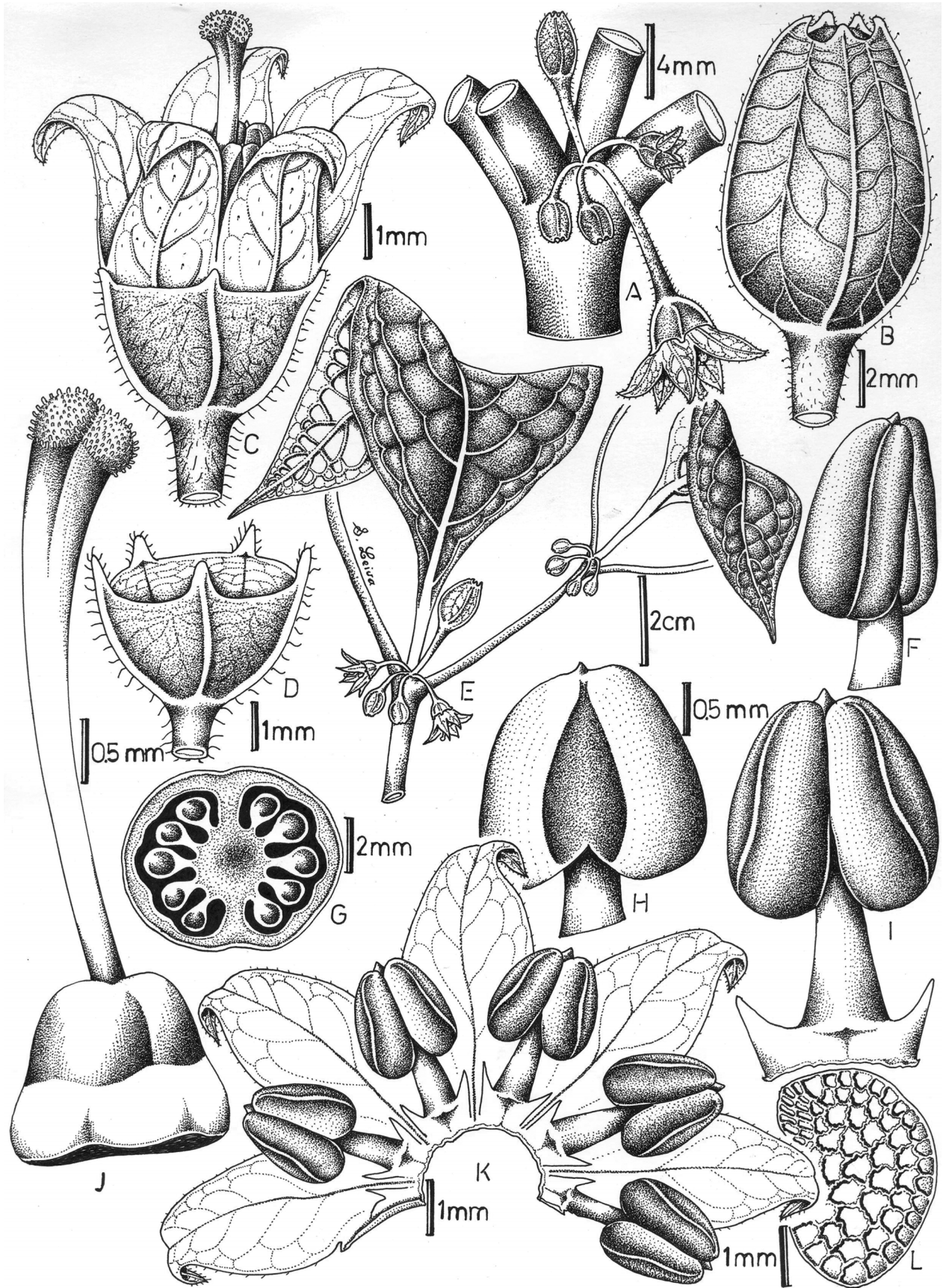


FIGURE 7. *Larnax purpureocarpa*. **A.** Flowers and buds. **B.** Fruit surrounded by accrescent calyx. **C.** Flower. **D.** Calyx. **E.** Flowering branch. **F, H, I.** Anthers in lateral, ventral and dorsal views, respectively. **G.** Ovary in cross section. **J.** Gynoecium. **K.** Open corolla. **L.** Seed. From Deanna & Leiva 125. Drawing by Segundo Leiva González.

widely triangular, and protruding. Gynoecium with stylar heteromorphism; ovary creamy white, glabrous, pyriform, 1.4–1.5 mm long, 1.6–1.8 mm wide, nectary annular, conspicuous, yellowish white, occupying 40–50% of the ovary length; style glabrous, cream, broadened at the apex, exerted, short style 4.2–4.4 mm long, extending ca. 2 mm beyond the anthers, long style 6.2–6.6 mm long, extending ca. 4 mm beyond the anthers; stigma clavate, bilobate, dark green, 0.3–0.4 mm long, 0.7–0.8 mm diameter. Fruit a berry, elliptic-fusiform, (10–) 13–14 mm long, 7–9 mm diameter, cream with some purple spots, fleshy, lustrous, glabrous. Fruiting calyx accrescent, tightly enveloping the berry, 13.2–14.1 mm long, 8.2–9.2 mm diameter, open at the apex, lustrous, deep purple to blackish purple, markedly 10-costate, villous, slightly sericeous externally, with abundant long and short simple glandular trichomes, and some long simple transparent non-glandular trichomes; lobes conspicuous, short, < 1 mm long, triangular acute. Fruiting pedicels 20–22 mm long, purple, erect to oblique, pubescent, slightly sericeous. Seeds 31–35 per fruit, 2.5–2.8 mm long, 2–2.1 mm diameter, creamy brown, reniform, glabrous; testa foveolate.

Etymology:—From the conspicuous blackish purple fruiting calyx which is an important diagnostic character of this species.

Phenology:—Flowering and fruiting from November to February.

Distribution and Ecology:—Endemic to roadsides of the Cosanga-Baeza road, Yanayacu Biological Station, and Antisana Ecological Reserve (Napo Province, Ecuador; Fig. 4). *Larnax purpureocarpa* is distributed on the eastern slopes of the Ecuadorian Andes, inhabiting primary cloud forest from 1850 to 2600 m elev.

Species conservation assessment:—According to IUCN criteria (IUCN 2012), *L. purpureocarpa* is considered as Near Threatened (NT). The extent of occurrence is calculated to be ca. 100 km² (Criterion B1 <5000 km², Endangered) and it is known from four localities (Criterion B1a ≤5, Endangered). However, as no decline in the geographic range or fragmentation of the habitat has been observed, this assessment has been regarded as Near Threatened. Future research is required to confirm this assessment.

Additional specimens examined:—ECUADOR. Napo: Quijos, Reserva Ecológica Antisana, Río Aliso, 8 km al suroeste de Cosanga, afluyente del río Aliso, margen derecha a 1 km, bosque muy húmedo Montano Bajo, suelo aluvial, 2530 m, 00°35'S 77°57'W, 12 November 1998 (fl, fr), *Vargas et al. 2951* (QCNE!, MO); Yanayacu Biological Station, ca. 5 km W of Cosanga–Las Caucheras road, roadside, 2150 m, 0°35'56.1"S 77°53'19.1"W, 6 February 2011 (fl, fr), *Tepe et al. 2900* (QCNE!); Ca. 4 km W of Cosanga on the Cosanga–Las Caucheras road, roadside, 2100 m, 0°35'35.0"S 77°53'10.8"W, 7 February 2011 (fl, fr), *Tepe et al. 2908* (QCNE!).

Discussion:—*Larnax purpureocarpa* is unique in having an elliptic-fusiform berry tightly enclosed by a blackish purple fruiting calyx with copious long glandular trichomes (Fig. 8 C, E); another diagnostic trait is the discolorous leaves (Fig. 8 A). These two characters unequivocally differentiate this species from its congeners.

Larnax purpureocarpa most closely resembles *L. harlingiana* Hunziker & Barboza (1955: 157) from southern Ecuador. Both species have elliptic-fusiform berries, calyx 2–3 mm long and mucronate anthers. *Larnax purpureocarpa* can be distinguished from *L. harlingiana* on the basis of the inner leaf surface pubescence, number of flowers per inflorescence, calyx lobes length, corolla lobes colour, homogeneity of stamens length, and fruiting calyx colour, as can be seen in Table 5 and Figs. 8 B–E.

TABLE 5. Morphological comparison of *L. purpureocarpa* and *L. harlingiana*.

Characters	<i>L. purpureocarpa</i>	<i>L. harlingiana</i>
Lower leaf surface pubescence	pubescent with transparent non-glandular trichomes	hirsute with ochraceous non-glandular trichomes
Number of flowers per inflorescence	5–6	2–4
Calyx lobes length	0.6–1.1 mm	0.1–0.3 mm
Corolla lobes colour	greenish yellow externally, yellow internally with dull purple at the lobe apex	entirely green
Stamens	homodynamous	heterodynamous
Fruiting calyx colour	blackish purple	green

Furthermore, *Larnax purpureocarpa* is sympatric with *Larnax hawkesii* Hunziker (1977: 9), they both have a small corolla, calyx lobes of 0.5–1.1 mm in length, mucronate anthers and an elliptic-fusiform berry. *Larnax purpureocarpa* differs from *L. hawkesii* by its height, leaf shape, inflorescence, and fruiting calyx colour and pubescence (Figs. 8 A–D) as summarised in Table 6. *Larnax pumila* is a geographically close and it is distinguished from *L. purpureocarpa* by its indumentum, corolla colour and globose or subglobose berries (Fig. 6 A–C).

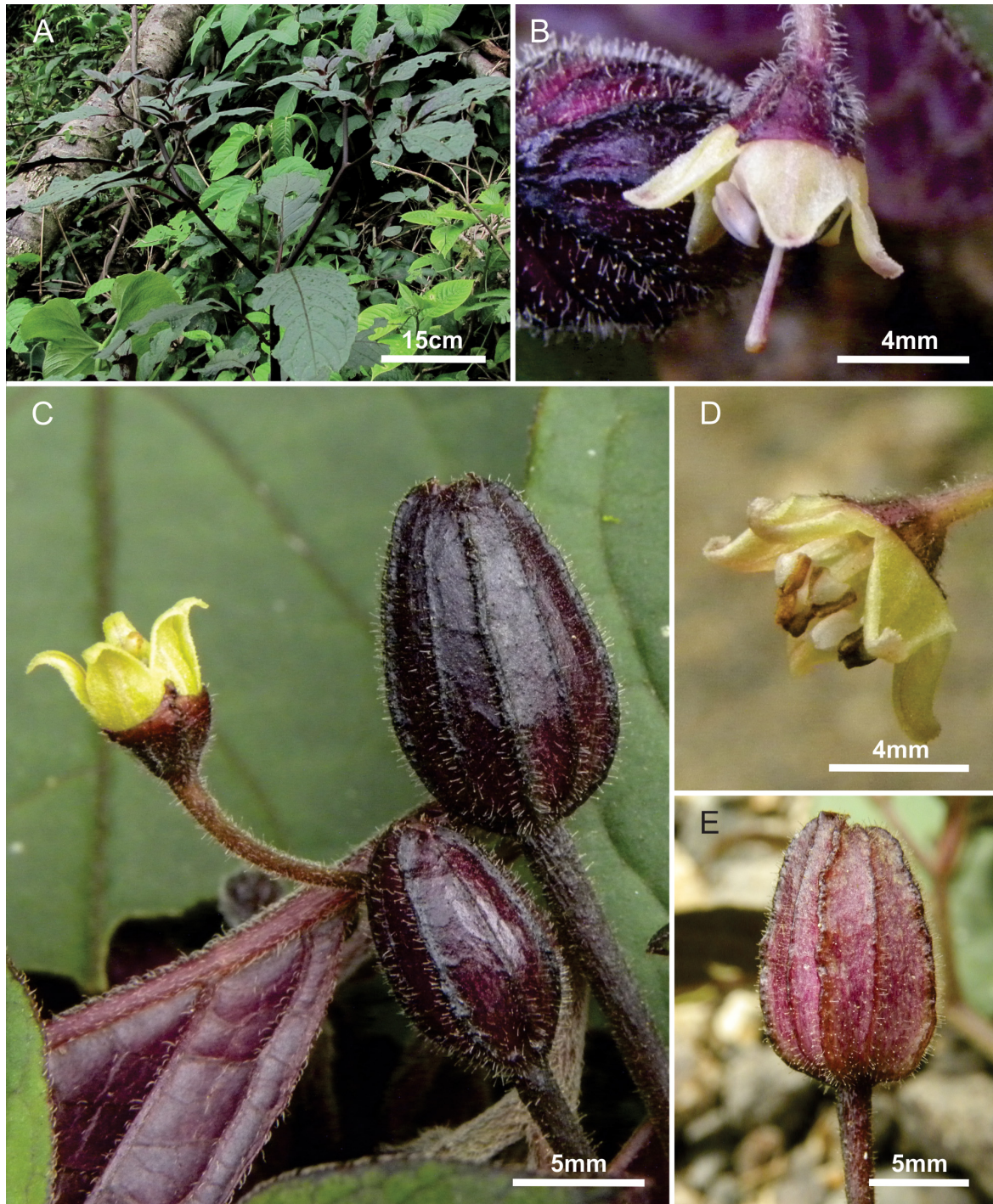


FIGURE 8. *Larnax purpureocarpa*. **A.** Habit. **B.** Long-styled flower in anthesis. **C.** Short-styled flower and fruits. **D.** Flower in lateral view. **E.** Fruit. From Deanna & Leiva 125 (Photo by Rocío Deanna & Segundo Leiva González).

TABLE 6. Morphological comparison of *L. purpureocarpa* and *L. hawkesii*.

Characters	<i>L. purpureocarpa</i>	<i>L. hawkesii</i>
Shrub height	0.5–0.8 m	1.5–3 m
Leaf shape	ovate	widely elliptic
Number of flowers per inflorescence	5–6	2–4
Fruiting calyx colour	blackish purple	creamy green
Trichomes types on the fruiting calyx	abundant long glandular trichomes	mainly non-glandular trichomes

Larnax toledoana Barboza & S. Leiva, *sp. nov.* (Figs. 3 G, H, 9, 10)

Type:—ECUADOR. Zamora-Chinchipe: [Cerro Toledo], rumbo a Valladolid desde Yanganá, al costado de la ruta, 2690 m, 79°08'52.7"W, 04°26'30.7"S, 16 November 2011 (fl, fr), *C. I. Orozco, G. E. Barboza, A. Orejuela & S. Leiva 3936* (holotype QCA!, isotypes CORD 0000676!, CORD 00006770!, CORD 00006771!, COL, HAO).

Larnax toledoana differs from *L. sagasteguii* in its short equal calyx lobes (vs. long unequal calyx lobes in *L. sagasteguii*), glabrous filaments (vs. pubescent filaments), non-mucronate anthers (vs. mucronate anthers), and in its widely subglobose fruiting calyx (vs. globose fruiting calyx).

Shrubs, widely branched, plagiotropic, 1–1.6 m tall. Stems terete, hollow; old stems nodose, 10–12 mm wide at base, purple, glabrescent (long simple 4–7-celled non-glandular trichomes), with longitudinal short fissures, and with abundant cream or pale tan lenticels; young stems green, sometimes purple above, always green below, densely villous, slightly sericeous, with long patent simple multicellular non-glandular trichomes; nodes usually deep purple. Leaves alternate, sometimes paired; petiole semi-terete, 1.7–2 cm long, purple above, green below; leaf blade entire, ovate to elliptic, 7.7–8.5 cm long, 3.4–4.1 cm wide, apex somewhat acute, base cuneate, oblique or asymmetric, membranous, slightly fleshy, dark-green and scabrous above, light-green, markedly reticulately nerved with prominent midvein and 4–6 secondary veins pairs below, homogeneously villous with the same trichomes of the stem and petioles on adaxial surface, and mainly on veins and margins on the abaxial surface; branched long non-glandular hairs occurring occasionally along veins below. Fascicles axillary, 4–5-flowered; pedicels 9–11 mm long, green, sometimes purple or dull purple above, filiform, pendent, villous, with long multicellular non-glandular and glandular trichomes. Flowering calyx 4.5–5 mm diameter in anthesis, green, sometimes purple or dull purple externally, dull purple the distal half and green the basal half internally, cup-shaped, fleshy, with protruding principal veins, densely villous externally, with long transparent patent non-glandular and tiny glandular trichomes (stalk unicellular, ochraceous head 6-celled), glabrous internally; tube 2.3–2.5 mm long, 3.6–4.5 mm diameter; lobes minute, 0.3–0.5 mm long, 0.5–0.6 mm wide, shortly triangular, acute, erect, with papillae or 2–3-celled non-glandular trichomes at the apex. Corolla slightly campanulate before anthesis, clearly stellate in anthesis, (13–) 16–17 mm diameter, fleshy; tube greenish yellow, 3.4–3.8 mm long, 3.5–4 mm diameter, completely glabrous on both surfaces; lobes 7–9.2 mm long, 2.9–3.1 mm wide, triangular, greenish yellow with dull brownish red spots externally, greenish yellow with a few brownish red spots to almost completely brownish red, except for some greenish yellow stripes internally, the apex papillate and reflexed, margin ciliate, pubescent externally, with long transparent multicellular non-glandular simple and branched (bifurcate or trifurcate) trichomes along the veins, and short glandular trichomes scattered on the surface; glabrescent internally, with the same small glandular trichomes of outer calyx and corolla surface; upper edge of corolla tube with an annular ring of long transparent non-glandular trichomes. Stamens exerted, heterodynamous; filaments glabrous, cream, three longer (2.9–3.1 mm long), two shorter (2.4–2.6 mm long), filament base expansion auriculate, greenish cream, 1–1.1 mm long, auricle small and conspicuous; anthers 1.9–2.1 mm long, 1.7–2 mm wide, white, rarely dull lilac, widely ovoid, non-mucronate, thecae divergent, connective white, triangular, wide, and protruding. Ovary glaucous, glabrous, subglobose, 1.4–1.6 mm long, 1.2–1.4 mm wide, nectary annular, yellowish cream, occupying 20–30% of the ovary length; style 6–6.3 mm long, glabrous, green in the distal area, cream at the base, broadened at the apex, extending ca. 1 mm beyond the anthers; stigma clavate, subbilobate, dark green, 0.4–0.5 mm long, 0.8–1 mm diameter. Fruit a berry, globose, 8–11 mm diameter, bright orange when mature, green when immature, fleshy, glabrous, stone cells 21–23 per fruit, cream, variously shaped (triangular, oblong, polyhedral). Fruiting calyx accrescent, tightly enveloping the berry, (7–) 11–15 mm diameter, open at the apex, transparent or reddish orange apically, markedly 10-costate, pubescent with shorter rather than longer glandular trichomes (stalk 4–6-celled, head oblong ochraceous unicellular) mixed with transparent non-glandular trichomes mainly along veins; lobes conspicuous, short, < 1 mm long, equal, triangular acute. Fruiting pedicels 12.5–15 mm long, green or purple, oblique to pendent, pubescent, sericeous. Seeds 60–75 per fruit, 1.7–2 mm long, 1.2–1.4 mm diameter, yellowish brown, reniform, glabrous; testa foveolate.

Etymology:—From the same place as the holotype, “Cerro Toledo” in Podocarpus National Park (Ecuador).

Phenology:—Flowering and fruiting from April to December.

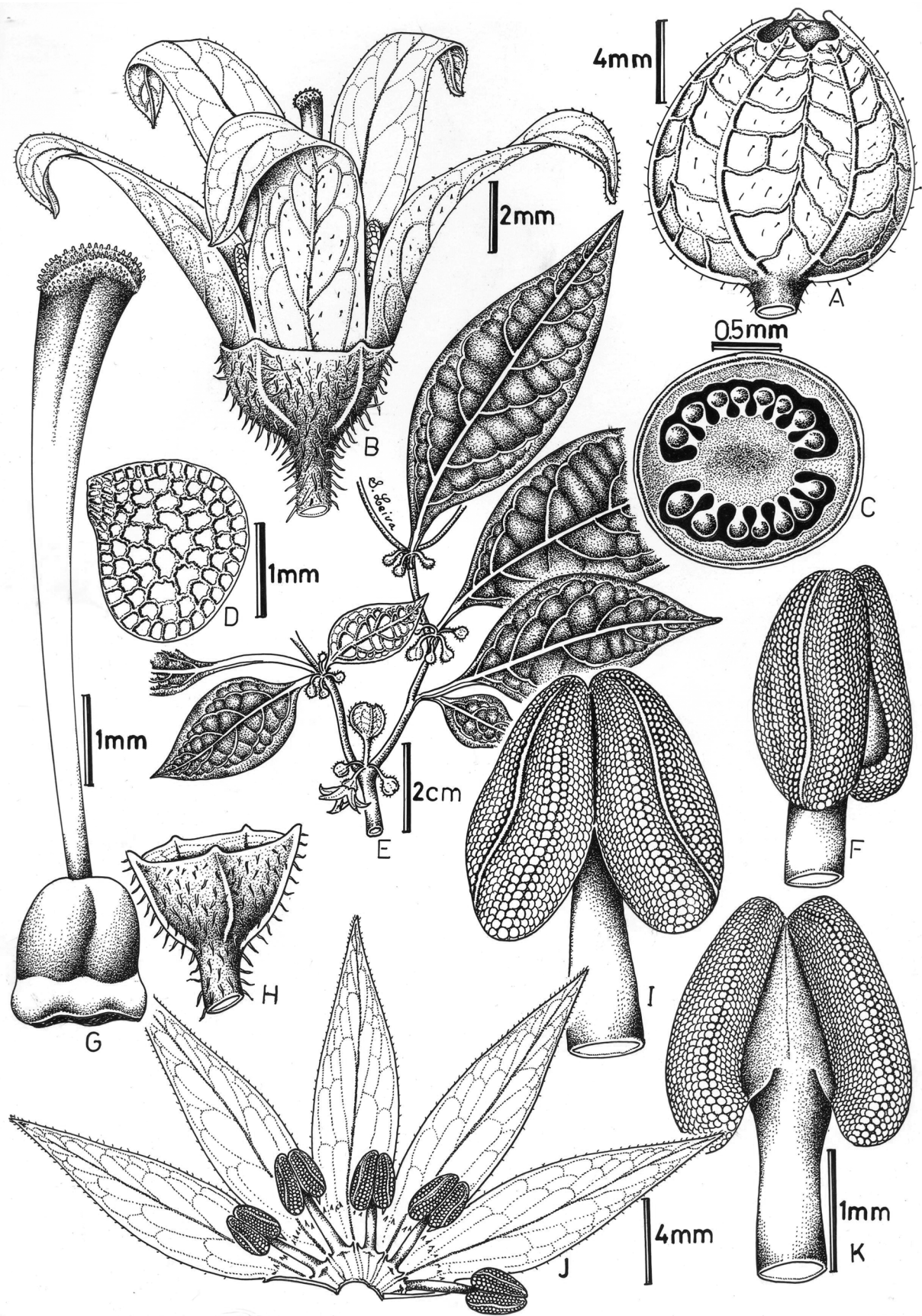


FIGURE 9. *Larnax toledoana*. **A.** Fruit surrounded by acrescent calyx. **B.** Flower. **C.** Ovary in cross section. **D.** Seed. **E.** Flowering branch. **F, I, K:** Anthers in lateral, dorsal and ventral views, respectively. **G.** Gynoecium. **H.** Flowering calyx. **J.** Open corolla. From Orozco *et al.* 3936. Drawing by Segundo Leiva González.

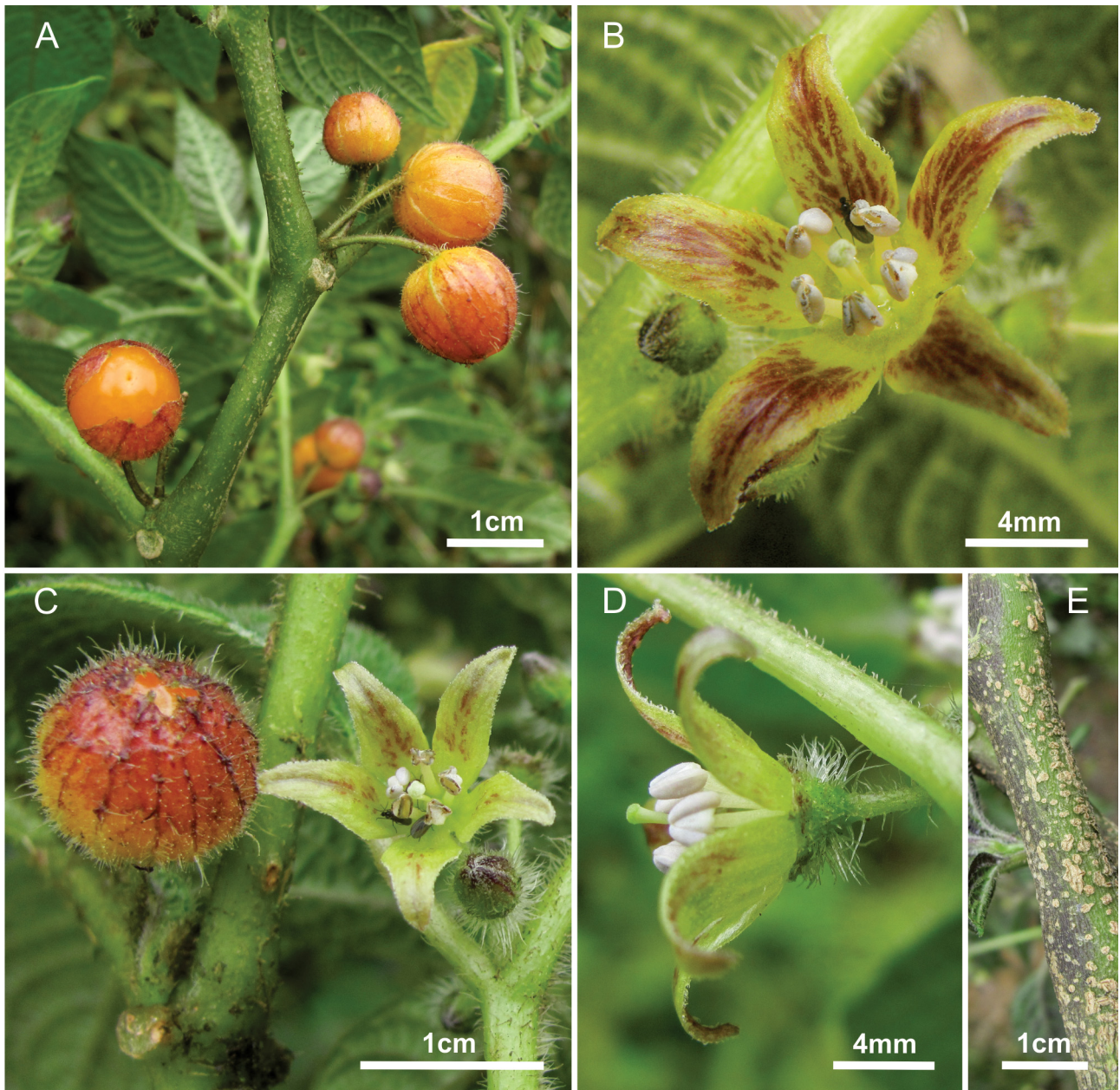


FIGURE 10. *Larnax toledoana*. **A.** Mature fruits. **B.** Flower in anthesis. **C.** Flower and fruit. **D.** Flower in lateral view. **E.** Lenticels on an old stem. From Orozco *et al.* 3936 (Photo by Segundo Leiva González).

Distribution and Ecology:—Endemic to the Podocarpus National Park located in southern Ecuador (boundary between Zamora-Chinchipe and Loja Provinces) where it is distributed over an area of approximately 600 km² (GoogleEarth 2011; Fig. 4). *Larnax toledoana* inhabits primary cloud forest between 2500–3200 m elev., nearby to streams and rivers.

Species conservation assessment:—According to IUCN criteria (IUCN 2012), *L. toledoana* is considered as Vulnerable (VU) based on its extent of occurrence which is estimated to be less than 20,000 km² (Criterion B1) and the fact that it is known from less than 10 localities (B1a) and there are fluctuations in its area of occupancy (B1c) suggesting ongoing threats to this species.

Additional specimens examined:—ECUADOR. Loja: ca. 14 km east of Loja, eastern range of the Andes, 2850 m, 79°1'60"W, 4°0'0"S, 28 November 1965 (fl, fr), *Knight 922 & 939* (WIS!); Parque Nacional Podocarpus, common along El Sendero de Lagunas del Compadre, wet montane forest along a quebrada, 2800 m, 79°08'W, 04°05'S, July 1995 (fl, fr), *Sawyer 709* (CORD!); Parque Nacional Podocarpus, vegetación de bosque nublado, 2500–2910 m, 2 August 1986 (fl, fr), *Jaramillo et al.* 8766 (QCA 95-13/66!, 95-13/74!, NY!); Parque Nacional

Podocarpus, 5 km from the entrance. Humid montane forest on the "Nudo de Sabanilla", 2730 m, 79°09'W, 4°07'S, 2 August 1986 (fl), *Jørgensen 61386* (QCA!); Parque Nacional Podocarpus, Nudo de Cajanuma, alrededores del "Centro de Información", 2850–3000 m, 79°09'W, 04°02'S, 19 December 1990 (fl, fr), *Yáñez & Gavilanes 88* (QCA!); Cerro Toledo, jeep track to "La Torre", 10–12 km SE Yanganá, montane forest, 3000–3200 m, 6 April 1985 (fl, fr), *Harling & Anderson 23769* (GB!, CORD!). Zamora-Chinchipe: rumbo a Valladolid desde Yanganá, al costado de la ruta, 2573 m, 79°08'54.3"W, 04°28'21.4"S, 16 November 2011 (fl, fr), *Orozco et al. 3942* (CORD 00006765!, 00006764!, 00006763!, COL, QCA, HAO!); 500 m adelante del punto anterior, 2650 m, 79°08'52.6"W, 04°27'53.1"S, 16 November 2011 (fl, fr), *Orozco et al. 3939* (CORD 00006767!, 00006766!, COL, QCA, HAO!); Yanganá, rumbo al Cerro Toledo, acceso a 700m de un puente de Yanganá pasando la segunda curva, 3024 m, 79°06'57"W, 04°23'1.9"S, 17 November 2011 (fl, fr), *Orozco et al. 3949* (CORD!, COL, HAO!); ruta Yanganá-Valladolid, en borde de bosque, base de Reserva Joco-Toco, 2647 m, 79°09'51.7"W, 4°27'34.2"S, 15 July 2012 (fl, fr), *Deanna & Leiva 7 & 8* (CORD 00006751!, 00006752!, 00006753!, 00006754!, 00006755!); Vilcabamba-Valladolid road, 21.4–27.8 km S of Yanganá, disturbed montane forest with steep roadside slopes, 2560–2680 m, 79°08'W, 4°30'S, 21 April 1992 (fl, fr), *Luteyn & Romoleraux 14527* (QCA!).

Discussion:—*Larnax toledoana* can be distinguished from other species of the genus by the combination of short calyx lobes (Fig. 10 D), pubescence on vegetative and reproductive organs (Fig. 10 A–D), corolla colour (Fig. 10 B–D), and the fruiting calyx colour and shape (Fig. 10 A, C).

Larnax toledoana most closely resembles *L. sagasteguii* S. Leiva, Quipuscoa & N. W. Sawyer (1998: 86), an endemic from eastern Ayabaca (Dept. Piura, Peru). Both species have an externally villous calyx with long transparent simple multicellular non-glandular trichomes, exerted and heterodynamous stamens, an orange mature berry tightly enclosed by the fruiting calyx, and young stems sometimes purple above, with long transparent simple non-glandular trichomes (Fig. 10 A–E, 17 G–J). *Larnax toledoana* differs from *L. sagasteguii* in its axillary flowers (Fig. 10 A), calyx lobes (Fig. 10 D), stamen pubescence, presence of mucronate anthers (Fig. 10 B, D, 17 G) and fruiting calyx shape and pubescence (Fig. 10 C, 17 J) as summarised in Table 7.

TABLE 7. Morphological comparison of *L. toledoana* and *L. sagasteguii*.

Characters	<i>L. toledoana</i>	<i>L. sagasteguii</i>
Disposition of flowers	axillary	along a short peduncle
Calyx lobes length	0.3–0.5 mm	1.1–2.5 mm
Stamens pubescence	glabrous	with simple trichomes at the filament base
Presence of mucronate anthers	no	yes
Fruiting calyx shape	globose	widely subglobose
Trichomes types on fruiting calyx surface	mainly short glandular and long non-glandular trichomes	mainly long glandular trichomes

Larnax psilophyta N. W. Sawyer (1998: 74) is sympatric with *L. toledoana*, both inhabiting Podocarpus National Park (Sawyer 1999) and can be distinguished according to the characters in Table 8. *Larnax harlingiana* is another geographically close species and differs from *L. toledoana* in several characters (Table 9).

A specimen belonging to *L. toledoana* has been erroneously cited as neotype of *L. suffruticosa* (Sawyer 1999) because no original material of this latter species had been located. Consequently many specimens of *L. toledoana* have frequently been wrongly annotated as *L. suffruticosa* (here synonymized with *Deprea orinocensis*).

Lectotypifications

Larnax abra-patriciae S. Leiva & Barboza (2009: 30)

Lectotype (designated here):—Leiva González & Barboza, *Arnaldia* 16(1): 32. Fig. 1. 2009.

Additional material examined:—PERU. Amazonas: Bongará, Área de Conservación Privada Abra-Patricia, Alto Nieva, Km 364–365 carretera Fernando Belaunde Terry, borde de sendero 'Trocha mono', 2334 m, 5°41'30.7"S 77°48'41.2"W, 21 July 2012 (fl, fr), *Deanna & Leiva 41* (CORD 00006786!, HAO!; Fig. 11 B–E).

This lectotypification is due to the fact that the duplicates were not distributed prior to the HAO fire and so

were destroyed at the same time as the holotype. The lectotype designated here is the illustration in the protologue (art. 9.12, ICN 2012) which is of high quality and allow the species to be identified unambiguously (Fig. 11 A). As it was possible to collect the species again at the original site of collection, a topotype is cited.

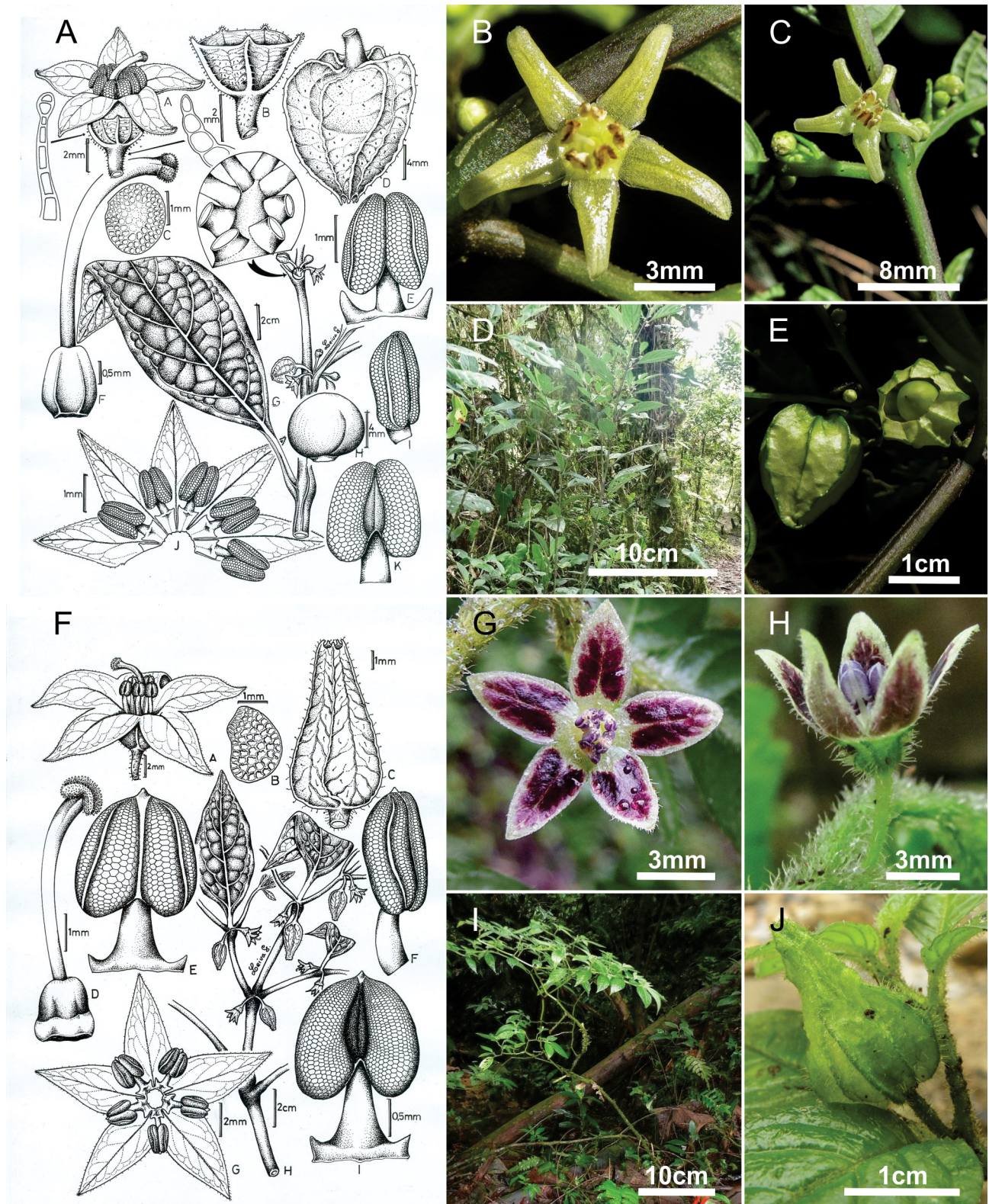


FIGURE 11. A–E. *Larnax abra-patriciae*. A. Lectotype. B. Flower in anthesis. C. Flower in lateral view. D. Habit. E. Fruits. F–J. *Larnax altamayoensis*. F. Lectotype. G. Flower in anthesis. H. Flower in lateral view. I. Habit. J. Fruit. A and F reproduced with permission of Arnaldoa.

TABLE 8. Morphological comparison of *L. toledoana* and *L. psilophyta*.

Characters	<i>L. toledoana</i>	<i>L. psilophyta</i>
Indumentum	glabrescent to villous	glabrous
Corolla length	10.4–12.6 mm	4.2–7 mm
Corolla colour	greenish yellow with dull brownish red spots externally	entirely dull greenish yellow
Trichomes in an annular ring at the upper edge of the inner corolla tube	yes	no
Leaf consistence	membranous	fleshy
Lower leaf markedly reticulately nerved	yes	no

TABLE 9. Morphological comparison of *L. toledoana* and *L. harlingiana*.

Characters	<i>L. toledoana</i>	<i>L. harlingiana</i>
Lower leaf surface pubescence	villous with transparent trichomes	hirsute with ochraceous trichomes
Corolla colour	greenish yellow with dull brownish red spots externally	completely green
Berry shape	globose	elliptic-fusiform
Fruiting calyx colour	transparent or reddish orange apically	creamy white with ten green ribs

Larnax altomayoensis S. Leiva & Quipuscoa (2008: 199)

Lectotype (designated here):—Leiva González, Pereyra Villanueva & Barboza, *Arnaldoa* 15(2): 200. Fig. 1. 2008.

Additional material examined:—PERU. San Martín: Rioja, Bosque de Protección del Alto Mayo, entre Aguas Verdes y Santa Rosa de Alto Mayo, 966 m, 5°40'03.3"S 78°37'59.5"W, 17 January 2013 (fl), *Deanna & Leiva 84* (CORD 00006785!, HAO!; Fig. 11 G–J).

This lectotypification is due to the fact that the duplicates were not distributed prior to the HAO fire and so were destroyed at the same time as the holotype. The lectotype designated here is the illustration in the protologue (art. 9.12, ICN 2012), Fig. 11F, which is of high quality and allow the species to be identified unambiguously.

Larnax bongaraensis S. Leiva (2006: 292)

Lectotype (designated here):—Leiva González & Rodríguez Rodríguez, *Arnaldoa* 13(2): 293. Fig. 1. 2006.

Additional material examined:—PERU. Amazonas: Bongará, km 328–329 carretera Bongará–Nueva Cajamarca, arriba de Laguna Pomacochas, lado oriental, borde de bosque, 2467 m, 5°48'45.7"S 77°55'47.0"W, 21 July 2012 (fl), *Deanna & Leiva 40* (CORD 00006783!, HAO!; Fig. 12 B–E).

Notes:— This lectotypification is due to the fact that the duplicates were not distributed prior to the HAO fire and so were destroyed at the same time as the holotype. The lectotype designated here is the illustration in the protologue (art. 9.12, ICN 2012), Fig. 12A, which is of high quality and allow the species to be identified unambiguously.

Larnax chotanae S. Leiva, Pereyra & Barboza (2008: 203)

Lectotype (designated here):—Leiva González, Pereyra Villanueva & Barboza, *Arnaldoa* 15(2): 204. Fig. 3. 2008.

Additional material examined:—PERU. Cajamarca: Chota, Bosque El Pargo, La Loma, entre Llama y Huambos, 2–3 km desde desvío de la carretera, 3107 m, 06°27'26.6"S 79°03'30.4"W, 13 January 2013 (fl, fr), *Deanna & Leiva 60* (CORD 000067682!, HAO!; Fig. 12 G–J).

This lectotypification is due to the fact that the duplicates were not distributed prior to the HAO fire and so were destroyed at the same time as the holotype. The lectotype designated here is the illustration in the protologue (art. 9.12, ICN 2012), Fig. 12F, which is of high quality and allow the species to be identified unambiguously.

Larnax dilloniana S. Leiva, Quipuscoa & N. W. Sawyer (1998: 85)

Lectotype (designated here):—PERU. San Martín: Rioja, arriba del poblado Miraflores (ca. Nueva Cajamarca), 1260–1420 m, 3 November 1996, *S. Leiva, M. Dillon, I. Sánchez, V. Quipuscoa & P. Lezama 1919* (CONN 00066074!, isolectotypes: CONN 00066075!, CORD 00004043!, F 2183234!, HUT 031930!, MO 05097641!)

The selected lectotype has some buds, four flowers, one immature fruit and one mature fruit (Fig. 13 A), while no other specimen possesses fruits. The exerted stamens, mucronate anthers (Fig. 13 B), and wrinkled fruiting calyx (Fig. 13 C) are the diagnostic characters observable in this specimen; these features allow *L. dilloniana* to be distinguished from *L. subtriflora* (Ruiz López & Pavón) Miers (1849: 38) that grows in nearby areas.

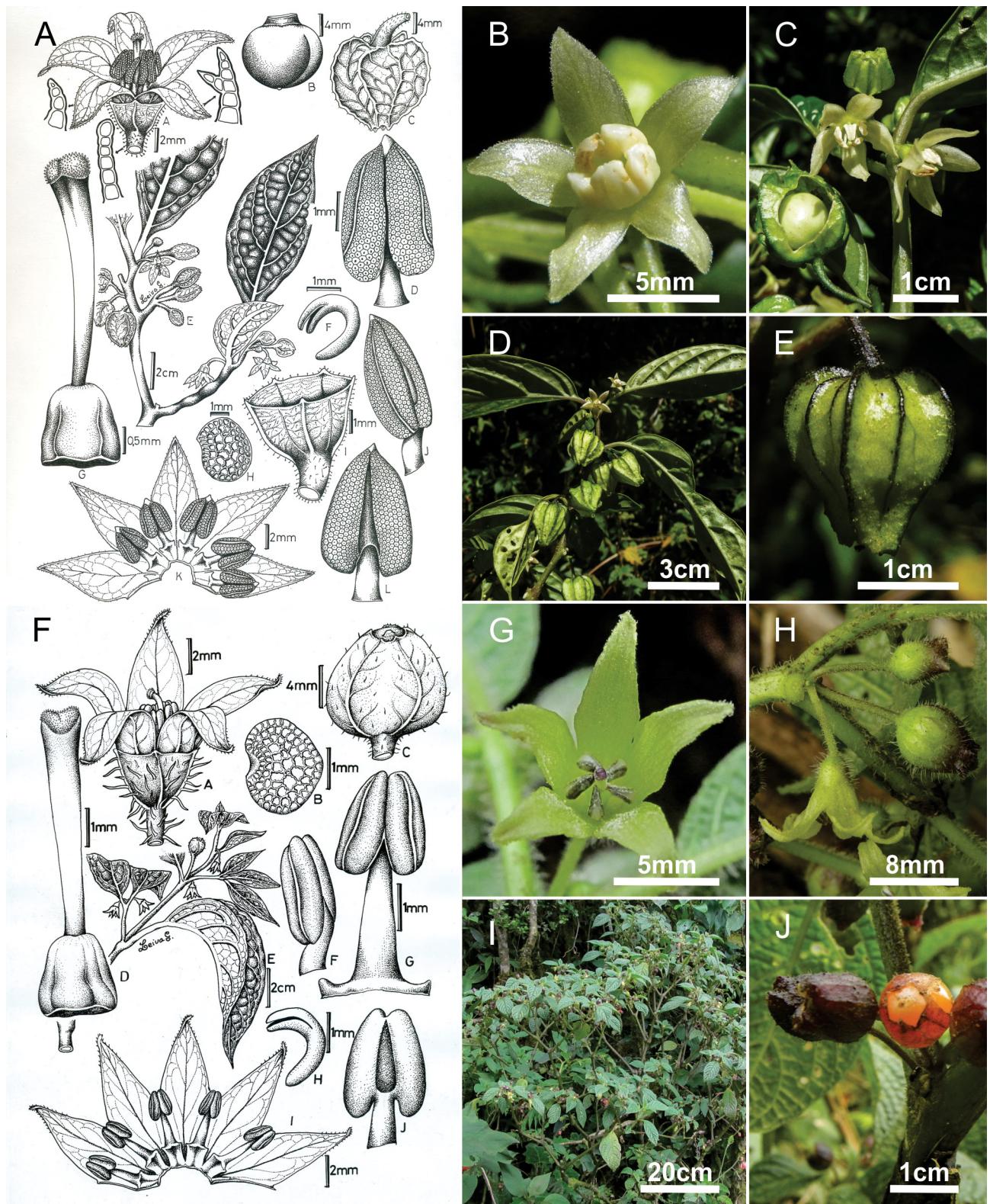


FIGURE 12. A–E. *Larnax bongaraensis*. A. Lectotype. B. Flower in anthesis. C. Flowers and fruit in lateral view. D. Flowers and fruits in a branch. E. Fruit. F–J. *Larnax chotanae*. F. Lectotype. G. Flower in anthesis. H. Flower and immature fruits in lateral view. I. Habit. J. Mature fruits. A and F reproduced with permission of *Arnaldoa*.

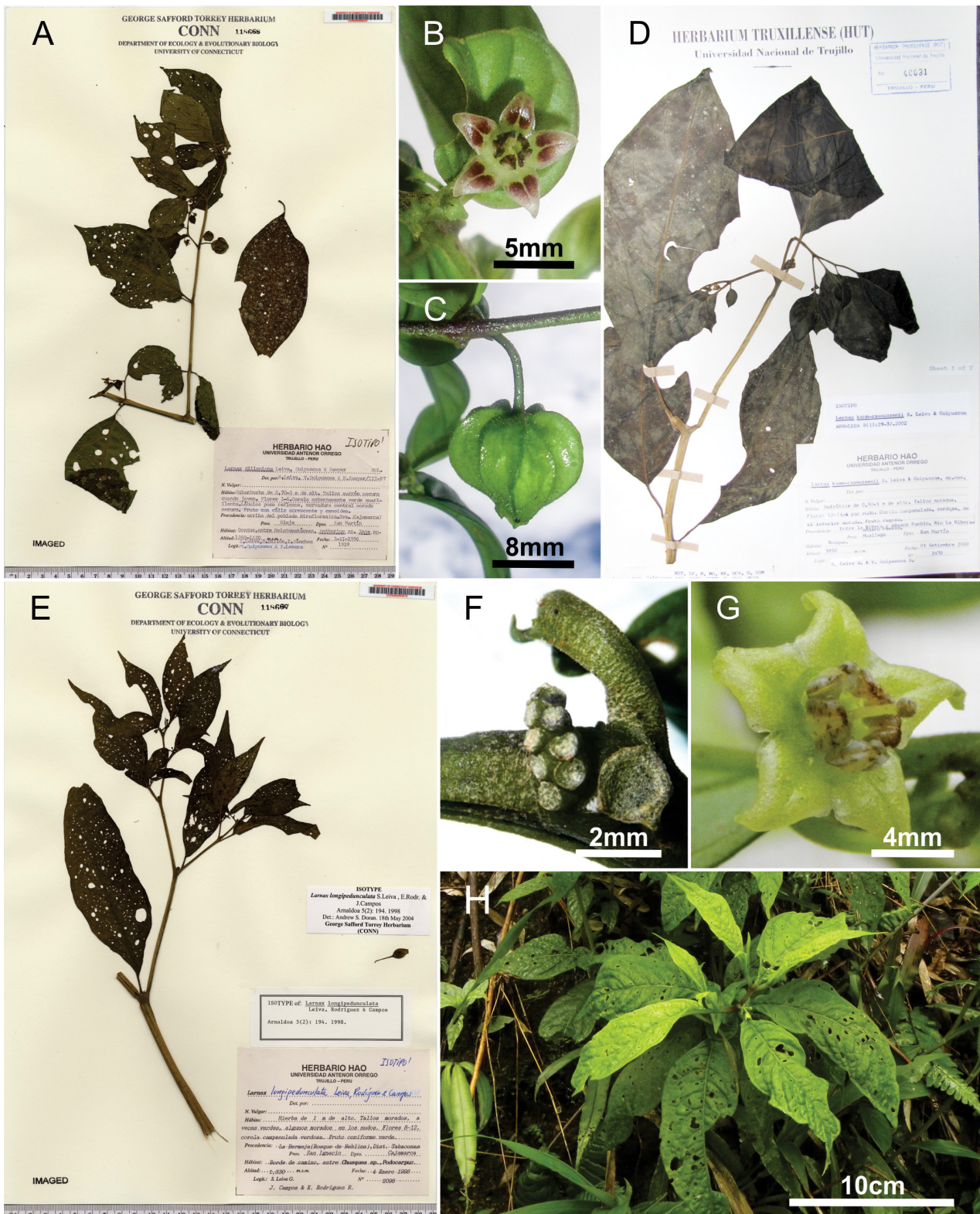


FIGURE 13. A–C. *Larnax dilloniana*. A. Lectotype (CONN). B. Flower in anthesis. C. Fruit. D. Lectotype *L. kann-rasmusseniorum* (HUT). E–H. *Larnax longipedunculata*. E. Lectotype (CONN). F. Peduncle. G. Flower in anthesis. H. Habit. A and E reproduced with permission of the George Safford Torrey Herbarium, University of Connecticut, and D reproduced with permission of Herbario Truxillense, Universidad Nacional de La Libertad-Trujillo.

Larnax kann-rasmusseniorum S. Leiva & Quipuscoa (2003: 29)

Lectotype (designated here):—PERU. San Martin: Huallaga, Entre la Ribera y Añazco Pueblo, 1850 m, 6°84.705'LS 77°48.440'LO, 1 September 2000, S. Leiva & V. Quipuscoa 2470 (HUT 40031! two sheets).

Only one isotype was found (HUT). This collection consists of a single specimen mounted on two herbarium sheets, labeled "sheet 1" and "sheet 2"; the first is a branch with two accrescent calyces and some buds (Fig. 13 D), while the second one possesses two mature and two immature fruits. Flowers, which are the most diagnostic character, are missing in both specimens. The cross-labelling between the two sheets indicates that they constitute a single specimen (art. 8.3, ICN 2012) reinforced by the fact that "sheet 2" lacks a label with collection data.

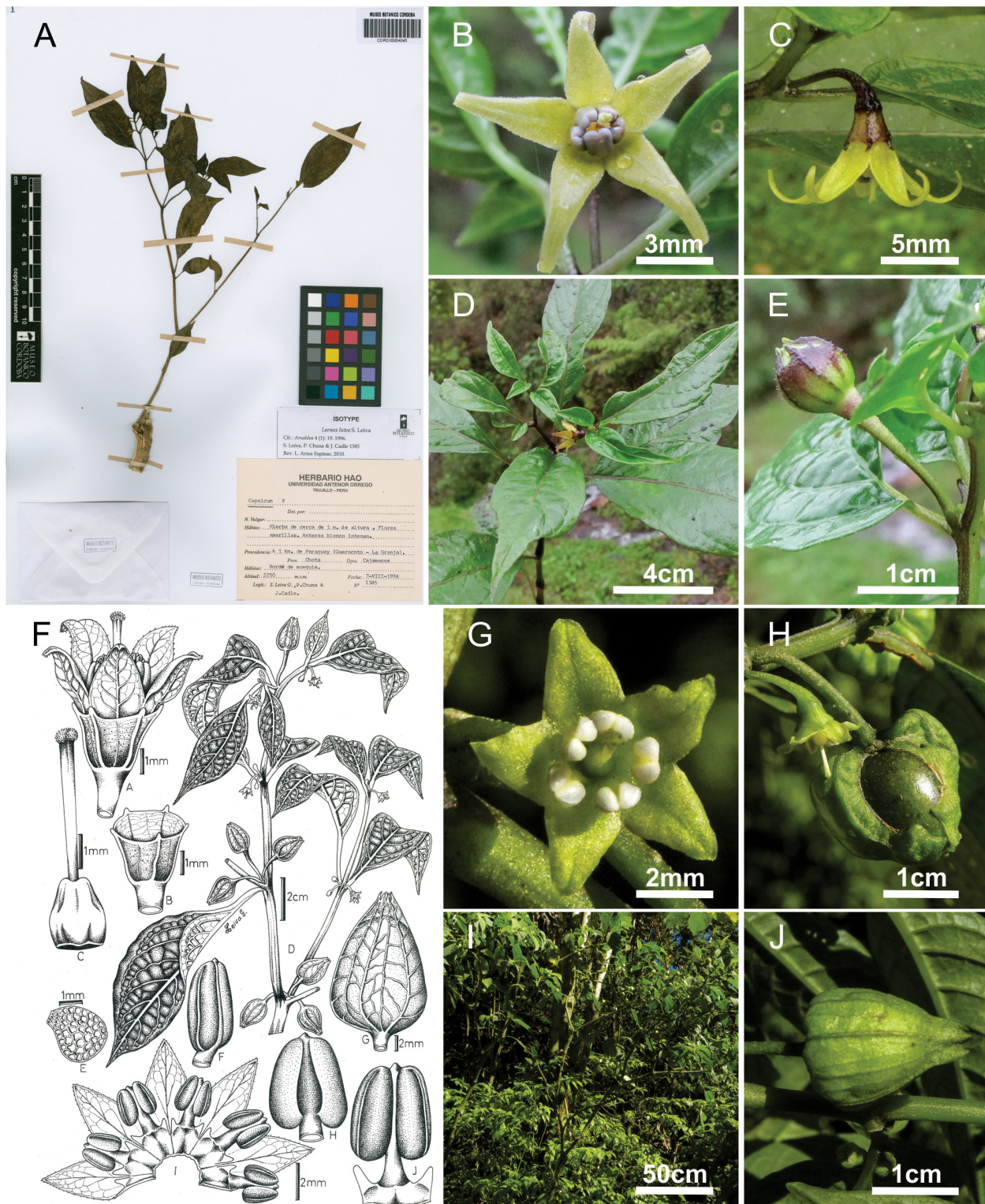


FIGURE 14. A–E. *Larnax lutea*. A. Lectotype (CORD). B. Flower in anthesis. C. Flower in lateral view. D. Branch. E. Fruit. F–J. *Larnax nieva*. F. Lectotype. G. Flower in anthesis. H. Flower and fruit in lateral view. I. Habit. J. Fruit. A reproduced with permission of the Museo Botánico de Córdoba, Universidad Nacional de Córdoba, and F reproduced with permission of Arnaldoa.

Larnax longipedunculata S. Leiva, E. Rodríguez Rodríguez & J. Campos (1998: 194)

Lectotype (designated here):—PERU. Cajamarca: San Ignacio, Caserío La Bermeja, bosques de neblina La Bermeja, Dist. Tabaconas, 1830 m, 4 January 1998, *S. Leiva, J. Campos & E. Rodríguez 2098* (CONN 00055675!, isolectotypes: CORD 00004044!, F 2198658!, HUT 031885!, MO 04906479!).

The designated lectotype is the most complete specimen, consisting of a small branch with buds, two flowers and a fruit detached from the branch (Fig. 13 E). Furthermore, the long peduncle (Fig. 13 G) and the tiny calyx lobes are important characters observable in this specimen. Among the isolectotypes, the specimen housed at HUT has numerous flowers per inflorescence (8–15) which sets this species apart from the most morphologically similar species, *L. nieva* S. Leiva & N. W. Sawyer (2003: 106) (Fig. 14 F–J).

Larnax lutea S. Leiva (1996: 19)

Lectotype (designated here):—PERU. Cajamarca: Chota, a 1 Km. del poblado de Paraguay (ruta Quercocoto-La Granja), 2250 m, 7 August 1994, *S. Leiva, P. Chuna & J. Cadle 1385* (CORD 00004045!, isolectotype: F 2177616!).

The specimen at CORD is designated here as lectotype. It has three complete flowers (Fig. 14 A) in contrast with the F material that is a poorer branch with some buds and one accrescent calyx. An unusual character for the genus is the presence of geniculate pedicels which is diagnostic in this species (Fig. 14 C). Unfortunately this character is not evident in the herbarium material.

Larnax nieva S. Leiva & N. W. Sawyer (2003: 106)

Lectotype (designated here):—Leiva González & Lezama Asencio, *Arnaldoa* 10(1): 108. Fig. 1. 2003.

Additional material examined:—PERU. Amazonas: Bongará, km 384 carretera Nueva Cajamarca-Pomacochas (Florida), borde de camino y puente de Río Nieva, 2086 m, 5°41'05.3''S 77°46'54.6''W, 21 July 2012 (fl, fr), *Deanna & Leiva 43* (CORD 00006787!, HAO!; Fig. 14 G–J).

This lectotypification is due to the fact that the duplicates were not distributed prior to the HAO fire and so were destroyed at the same time as the holotype. The lectotype designated here is the illustration in the protologue (art. 9.12, ICN 2012), Fig. 14F, which is of high quality and allow the species to be identified unambiguously.

Larnax pedrazae S. Leiva & Barboza (2009: 14)

Lectotype (designated here):—Leiva González, Bravi & Barboza, *Arnaldoa* 16(2): 16. Fig. 1. 2009.

Additional material examined:—PERU. Amazonas: Bagua, La Peca, puente El Arenal, camino La Peca-Arenal, borde de río, 1085 m, 5°36'03.6''S 78°24'32.9''W, 22 July 2012 (fl, fr), *Deanna & Leiva 47* (CORD 00006784!, HAO!); Puente El Arenal, a 3km camino La Peca-Arenal, borde de riachuelo, 1085 m, 5°36'03.6''S 78°24'32.9''W, 15 January 2013 (fl), *Deanna & Leiva 79* (CORD!; Fig. 15 B–E).

This lectotypification is due to the fact that the duplicates were not distributed prior to the HAO fire and so were destroyed at the same time as the holotype. The lectotype designated here is the illustration in the protologue (art. 9.12, ICN 2012), Fig. 15A, which is of high quality and allow the species to be identified unambiguously. Topotypes are cited because it was possible to collect the species again at the original collection locality.

Larnax peruviana (Zahlbruckner 1892: 7) Hunziker (1977: 9)

Lectotype (designated here):—[PERU. Cajamarca: Cutervo, La Ramada]. Tambillo, 29 July 1878, *C. de Jelski 54* (W 1891-0004186!).

Other original material examined:—[PERU. Cajamarca: Cutervo, La Ramada]. Tambillo, 29 July 1878, *C. de Jelski 55* (F 619475!).

The four syntypes housed at B have been destroyed. Nevertheless, a photograph and a fragment of *Jelski 55* exist at F (619475; barcode V0072747F) together with a photograph of *Jelski 54* (Field Museum Negative #33138). An isosyntype, *Jelski 54* (Fig. 15 F), was recovered from W which represents incomplete material with buds, one flower and some fruits in different stages of development. Furthermore, details of an anther, the flowering calyx, the fruit and an open corolla are drawn on the sheet. For this reason, we have selected this material as the lectotype.

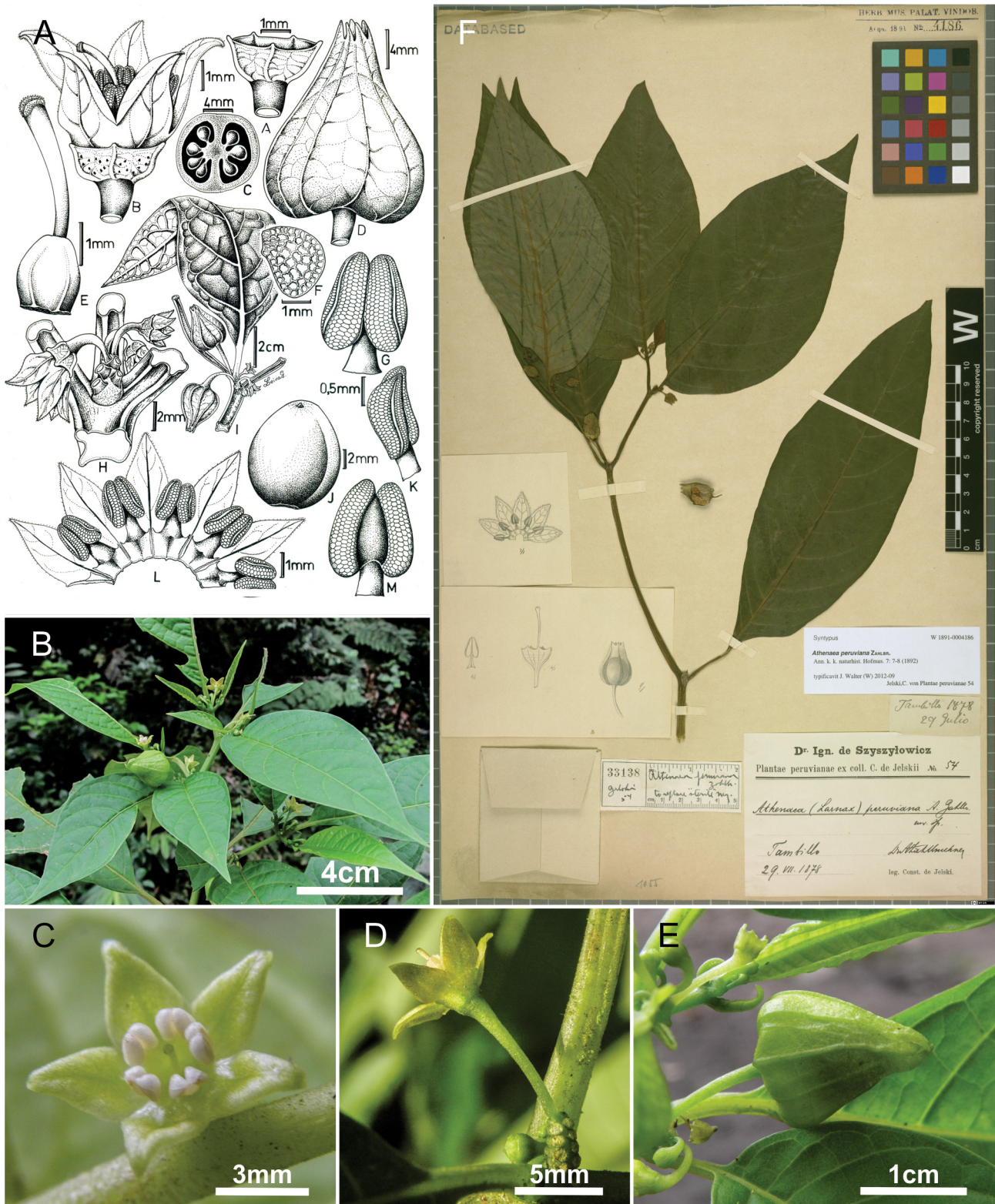


FIGURE 15. A–E. *Larnax pedrazae*. A. Lectotype. B. Flowers and fruits in a branch. C. Flower in anthesis. D. Flower and peduncle in lateral view. E. Fruit. F. Lectotype *L. peruviana* (W). A reproduced with permission of *Arnaldoa*, and F reproduced with permission of Herbarium of Naturhistorisches Museum Wien.

Larnax pilosa S. Leiva, E. Rodríguez Rodríguez & J. Campos (1998: 200)

Lectotype (designated here):—PERU. Cajamarca: San Ignacio, San José de Lourdes, Estrella del Oriente, 1600 m, 04°50'S 78°55'W, 8 January 1998, S. Leiva, J. Campos & E. Rodríguez 2108 (CONN 00051759!), isolectotypes: CORD 00004047!, F 2198655!, HUT 031894!, M 0171580!, MO 04908631!, NY 00328792!).

The pubescence, the long calyx lobes and the accrescent calyx closely appressed to the berry are some of the most important diagnostic characters of this species (Fig. 16 B–E), which are distinctive in the specimen selected as the lectotype. It consists of two branches with numerous flowers and both immature and mature fruits (Fig. 16 A).

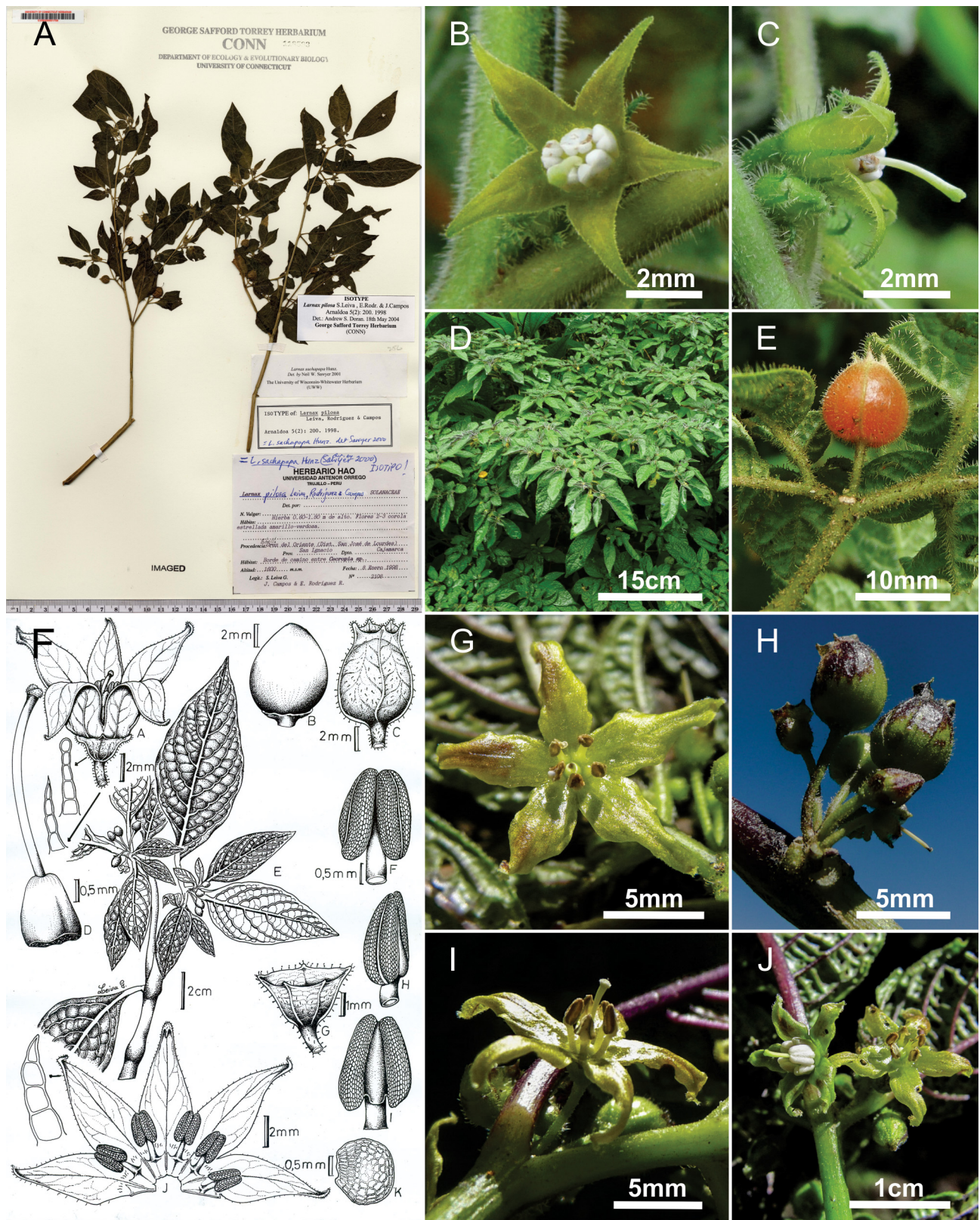


FIGURE 16. A–E. *Larnax pilosa*. A. Lectotype (CONN). B. Flower in anthesis. C. Flower in lateral view. D. Habit. E. Fruit. F–J. *Larnax pomacochaense*. F. Lectotype. G. Flower in anthesis. H. Fruits. I. Flower in lateral view. J. Flowers and buds. A reproduced with permission of the George Safford Torrey Herbarium, University of Connecticut, and F reproduced with permission of *Arnaldoa*.

Larnax pomacochaense S. Leiva (2006: 299)

Lectotype (designated here):—Leiva González & Rodríguez Rodríguez, *Arnaldoa* 13(2): 300. Fig. 5. 2006.

Additional material examined:—PERU. Amazonas: Bongará, km 328–329 carretera Bongará–Nuevo Cajamarca, arriba de Laguna Pomacochas, lado oriental, borde de bosque, 2430 m, 5°43'44.4"S 77°55'51.7"W, 21 July 2012 (fl, fr), *Deanna & Leiva* 33 (CORD 00006788!, HAO!; Fig. 16 G–J).

This lectotypification is due to the fact that the duplicates were not distributed prior to the HAO fire and so were destroyed at the same time as the holotype. The lectotype designated here is the illustration in the protologue (art. 9.12, ICN 2012), Fig. 16F, which is of high quality and allow the species to be identified unambiguously.

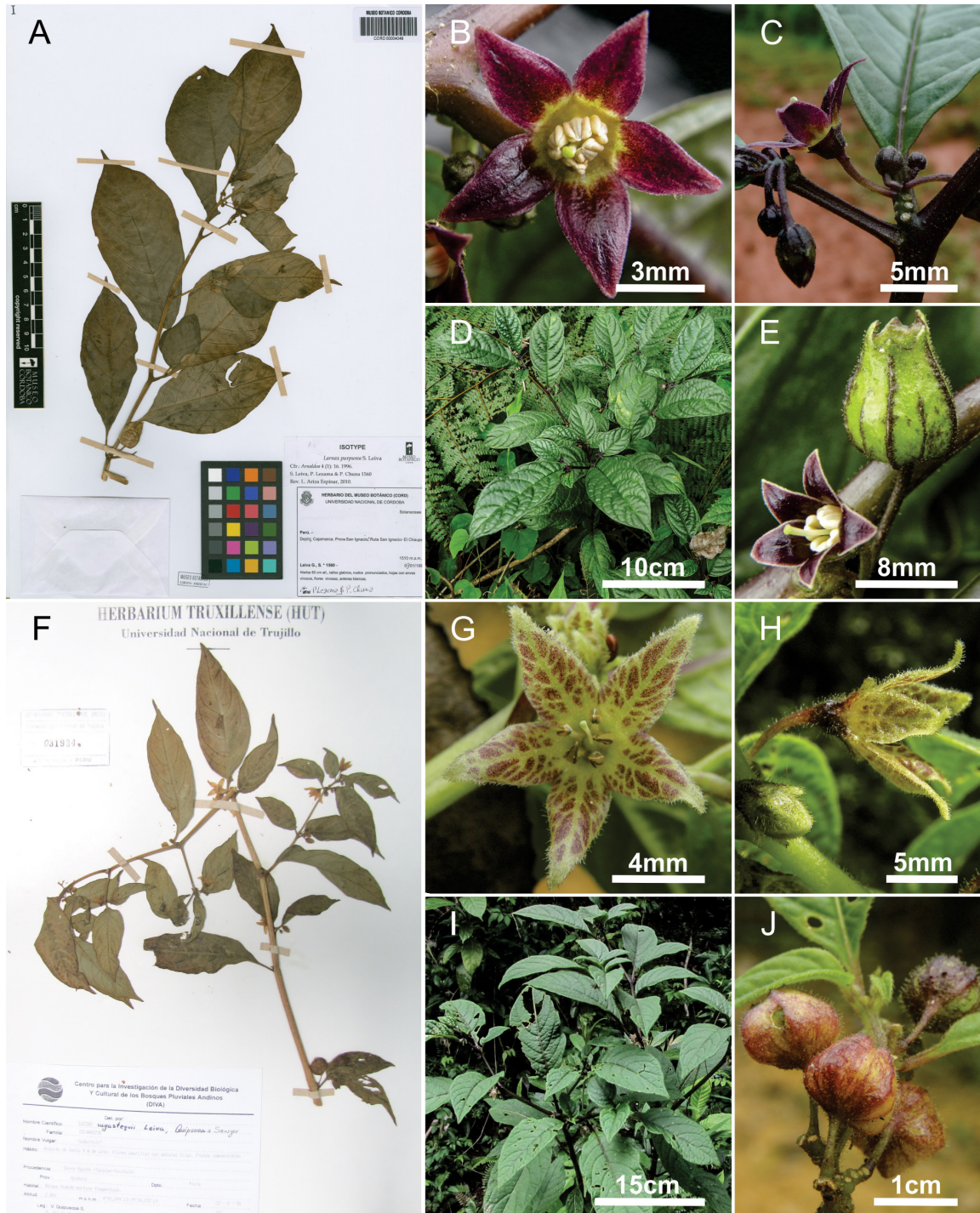


FIGURE 17. A–E. *Larnax purpurea*. A. Lectotype (CORD). B. Flower in anthesis. C. Flower in branch. D. Habit. E. Flower and fruit. F–J. *Larnax sagasteguii*. F. Lectotype (HUT). G. Flower in anthesis. H. Flower in lateral view. I. Habit. J. Fruits. A reproduced with permission of Museo Botánico de Córdoba, Universidad Nacional de Córdoba, and F with permission of Herbario Truxillense, Universidad Nacional de La Libertad-Trujillo.

Larnax purpurea S. Leiva (1996: 16)

Lectotype (designated here):—PERU. Cajamarca: San Ignacio: ruta San Ignacio – El Chaupe, 1510 m, 3 January 1995, S. Leiva, P. Lezama & P. Chuma 1560 (CORD 00004049!, isolectotypes: F 2177617!, HUT 031931!, MO 05077371!, NY 00076787!).

The selected lectotype is a branch with some buds, three flowers, two immature fruits and one mature fruit (Fig. 17 A), whereas the other specimens lack mature flowers or mature fruits. Moreover, the glabrous calyx, the mucronate anthers and the globose berry are diagnostic traits (Fig. 17 B–E) in *L. purpurea* S. Leiva (1996: 16), clearly visible in the specimen at CORD.



FIGURE 18. A–E. *Larnax sawyeriana*. A. Lectotype (HUT). B. Flowers in a branch. C. Branch. D. Flower in anthesis. E. Flower in lateral view and fruits. F. Lectotype *L. schjellerupiae* (HUT). A and F reproduced with permission of Herbario Truxillense, Universidad Nacional de La Libertad-Trujillo.

Larnax sagasteguii S. Leiva, Quipuscoa & N. W. Sawyer (1998: 86)

Lectotype (designated here):—PERU. Piura: Ayabaca, Cerro Aypate, 2800–2880 m, 4°42.94'S 79°34.25'W, 23 May 1996, *V. Quipuscoa S., O. Angulo Z. & R. Yahuana 601* (HUT 031934!).

The large corolla with heterodynamous stamens, the glandular pubescence of the flowering calyx and the fruiting calyx closely invested around the berry (Fig. 17 G–J) which are distinctive features of this species, are all observed in the only isotype found (Fig. 17 F).

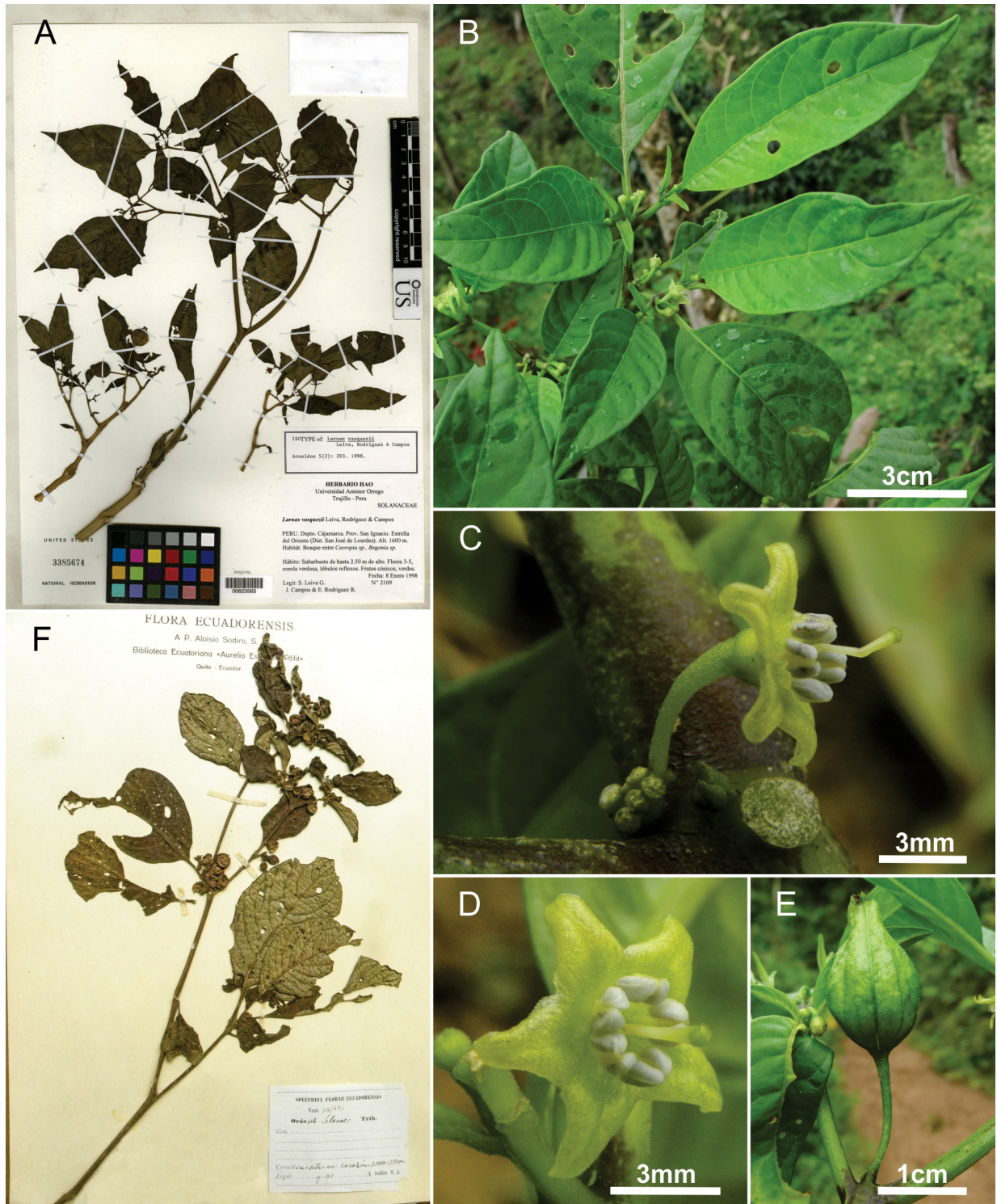


FIGURE 19. A–E. *Larnax vasquezii*. **A.** Lectotype (US). **B.** Branch with flowers and buds. **C.** Flower in lateral view. **D.** Flower in anthesis. **E.** Fruit. **F.** Lectotype *L. suffruticosum* (QPLS). **A** reproduced with permission of United States National Herbarium, Smithsonian Institution, and **F** reproduced with permission of Herbario Luis Sodiro, Ecuador.

Larnax sawyeriana S. Leiva, E. Rodríguez Rodríguez & J. Campos (1998: 203)

Lectotype (designated here):—PERU. Cajamarca: San Ignacio, Caserío La Bermeja, bosques de neblina La Bermeja, Dist. Tabaconas, 1830 m, 4 January 1998, *S. Leiva, J. Campos & E. Rodríguez 2097* (HUT 031884!, isolectotypes: CONN 00055668!, CORD 00004051!, F 2198659!, MO 04906480!).

The few flowers per node (2–4) and the fruiting calyx with conspicuous glandular pubescence appressed to the berry are the most important diagnostic characters (Fig. 18 B–E) visible in the selected lectotype (Fig. 18 A). The two branches with buds, abundant flowers and three fruits of the lectotype are perfectly preserved whereas the other specimens are poor.

Larnax schjellerupiae S. Leiva & Quipuscoa (2003: 32)

Lectotype (designated here):—PERU. San Martín: Huallaga, La Fila, entre Añazco Pueblo y Leguía, 2000 m, 10 September 2000, *S. Leiva & V. Quipuscoa 2479* (HUT 40030!).

The isotype at HUT is the only existing type specimen of *L. schjellerupiae* consisting of a branch with only three fruits: two well visible and the third hidden under the leaves (Fig. 18 F). This branch without any flowers could be assigned to any other *Larnax* species with inflated fruiting calyces. Fortunately, the illustration of the protologue shows the most representative characters of this species (Leiva González & Quipuscoa Silvestre 2002). Up to the present, *L. schjellerupiae* S. Leiva & Quipuscoa (2003: 32) has not been collected since 2000, probably due to its inaccessible habitat in the Peruvian forest in the Huallaga-Saposoa basin.

Larnax vasquezii S. Leiva, E. Rodríguez Rodríguez & J. Campos (1998: 206)

Lectotype (designated here):—PERU. Cajamarca: San Ignacio, Dist. San José de Lourdes, Estrella del Oriente, 1600 m, 04°50'S 78°55'W, 8 January 1998, *S. Leiva, J. Campos & E. Rodríguez 2109* (US 00623565!, isolectotypes: CONN 00055674!, CORD 00004050!, F 2198657!, M 0171574!, MO 04908632!, NY 00328793!).

The specimen designated as lectotype is the best one and consists of three branches with buds and some flowers (Fig. 19 A) that properly characterize the species. Furthermore, there are three berries enclosed by the accrescent calyx that appear to be subglobose but they are actually pyriform (Fig. 19 E).

Synonymy

Deprea orinocensis (Kunth) Rafinesque (1838: 57). *Physalis orinocensis* Kunth in Humboldt *et al.* (1818: 12).

Larnax suffruticosa (Dammer) Hunziker (1977: 8). *Ioichroma suffruticosum* Dammer (1905: 386) *synon. nov.* **Lectotype** (designated here):—[ECUADOR] Crescit in sylvis Montis Corozá, S.[odiro] n. 114/62—fl. et fr. Oct. 1891 (QPLS!, isolectotype: F 619431!).

Notes:—Dammer described *I. suffruticosum* Dammer (1905: 386) based on a Sodiro specimen deposited at B but this holotype was destroyed. The original specimens of Sodiro are thought to be deposited at QPLS and Q, both in Ecuador (Stafleu & Cowan 1985). No type specimen of *I. suffruticosum* was found in other herbaria (K, Q, B, BAF, NY, P, G, GH, MO, QCNE, QCA, USM, US) where Sodiro's collections also exist. Fortunately, we found an isotype in QPLS and a small fragment accompanying the photograph at F (619431, barcode V0093670F).

Sodiro collected the type specimen at Montis Corozá (= Monte Corazón, Ecuador), which is a highland area situated between Cotopaxi and Pichincha Provinces. The specimen at QPLS consists of a well preserved branch with two flowers and various fruits. For this reason we have chosen it as the lectotype (Fig. 19 F). The JSTOR database (<http://plants.jstor.org/specimen/ny00348284>) has erroneously loaded the specimen Jaramillo *et al.* 8766 as isolectotype for *I. suffruticosum* based on a typed label from the unpublished Sawyer Ph.D. dissertation (1999). Jaramillo's specimen belongs to *Larnax toledoana* Barboza & S. Leiva described in this article (see above).

Hunziker (1977) transferred *I. suffruticosum* to the genus *Larnax* and this name has remained in the literature until now. After a detailed analysis of the lectotype, the corolla shape and the ratio of corolla lobes to tube length demonstrate that it belongs to *Deprea*. The presence of branched hairs on the leaves and corolla, the ratio of corolla lobes to tube length (0.78:1), the length of pedicels shorter than 12 mm, and the conspicuous ribs in the accrescent calyx loosely enveloping the berry unequivocally match with *Deprea orinocensis*.

Identification key for *Larnax* species from Ecuador

Larnax dilloniana and *L. purpurea* have been recorded for Ecuador, but no collections have been cited (Leiva *et al.* 1998a; Jørgensen & León-Yáñez 1999). We did not find specimens of these species in the different herbaria revised and in the extensive fieldwork done in this country. For this reason, we do not include these species in the following key.

1. Fruiting calyx elliptic-fusiform 2
- Fruiting calyx pyriform, urceolate, globose or subglobose 5
2. Corolla greenish yellow externally, yellow to dull purple at the apex internally, 5.8–6.3 mm long; calyx purple with unequal lobes, 0.6–1.1 mm long; fruiting calyx blackish purple with copious long glandular trichomes... *L. purpureocarpa*
- Corolla whitish green or green, 7.5–12.5 mm long; calyx green with equal lobes, 0.1–0.6 mm long; fruiting calyx always green with mainly non-glandular trichomes 3
3. Flowers solitary, exceptionally paired; upper surface leaf glabrescent; anther non-mucronate; leaf length-width ratio 4–6 .
..... *L. steyermarkii*
- Flowers 2–4 per node; upper surface leaf pubescent; anther mucronate; leaf length-width ratio 2–2.5 4
4. Indumentum with abundant ochraceous trichomes; corolla very pubescent externally, 10.4–11.5 mm long; stamens heterodynamous, anthers 2.2–2.3 mm long *L. harlingiana*
- Indumentum with scattered whitish transparent trichomes; corolla glabrescent externally, 7.5–8.5 mm long; stamens homodynamous, anthers 1.6–1.85 mm long *L. hawkesii*
5. Corolla entirely deep purple, its lobes equalling the length of the tube *L. glabra*
- Corolla whitish green, yellow, or deep-purple with yellowish green apex, margins and veins, its lobes always longer than the tube 6
6. Calyx lobes > 1 mm long, corolla (9–) 12–22 mm long *L. sachapapa*
- Calyx lobes < 1 mm long, corolla 5–14 mm long 7
7. Plants glabrescent; leaves with short glandular trichomes on both surfaces, glabrous on veins and margins 8
- Plants pubescent to hirsute; leaves mainly with long non-glandular trichomes on both surfaces, pubescent on veins and margins 10
8. Shrubs 0.5–1 m tall; corolla 8.7–11.2 mm long, lobes deep-purple internally with yellowish green apex, margins and veins *L. pumila*
- Shrubs 1–3 m tall; corolla 4.2–8 mm long, lobes entirely dull greenish yellow or creamy white 9
9. Flowers 1–3 per inflorescence; anthers shortly mucronate; fruiting calyx globose tightly enveloping the berry.
..... *L. psilophyta*
- Flowers 2–7 per inflorescence; anthers non-mucronate; fruiting calyx urceolate loosely enveloping the berry.....
..... *L. peruviana*
10. Lower leaf surface markedly reticulately nerved; flowers 4–5 per inflorescence; trichomes in an annular ring on the inner corolla tube; fruiting calyx tightly investing the berry *L. toledoana*
- Lower leaf surface slightly not reticulately nerved; flowers solitary; trichomes absent on the inner corolla tube; fruiting calyx loosely investing the berry 11
11. Stems green; anthers shortly mucronate; berry greenish white, fruiting calyx bright green *L. macasiana*
- Stems deep purple; anthers apiculate; berry orange, fruiting calyx greenish white *L. andersonii*

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