New Species of Siparuna (Monimiaceae) I.
Four New Species from Ecuador and Colombia

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Abstract. Siparuna croatii and S. palenquensis from central and Pacific Ecuador, respectively, S. gigantotepala from Pacific Colombia and Ecuador, and S. harlingii from the eastern Andean slopes of Colombia and Ecuador are described, illustrated, and discussed as to their relationships with morphologically similar species.

Comprising an estimated 150 species, Siparuna is the largest and least understood genus of the Monimiaceae. The genus was last revised by Perkins (1901, 1911), whose typological species concept overstates diversity in certain areas, such as planaltan and southeastern Brazil. In Colombia, Ecuador, and Peru, however, increased collecting activity over the past 20 years has turned up numerous new species, and it now appears that most species of Siparuna are Andean in distribution. Material in the major relevant herbaria (acronyms following Holmgren et al., 1990), such as AAU, BM, COL, F, G, GB, GH, GOET, K, M, MA, MJG, MO, NY, OXF, P, QCA, QCNE, S, SEL, TCD, UC, US, W, WU, and Z, currently amounts to over 2500 collections representing approximately 100 species from the Andes. Continued discovery of new taxa in upper Amazonia strongly suggests the need for additional collecting. As a result of ongoing work toward a monograph of Siparuna, we herein describe four new species in order to make their names available for the forthcoming treatment of the Monimiaceae for the Flora of Ecuador. Work on the Peruvian species is still in progress, rendering description of several apparently new species extending south beyond Ecuador inadvisable.

Flowers of Siparuna are small and unisexual, and plants are monoecious or dioecious (Perkins, 1901; Feil, 1992). The flowers have an obconical or urceolate floral cup in which the free carpels or stamens are more or less completely enclosed (e.g., Figs. 1A, and 4B and F) and usually minute (1-4 mm) tepals. A feature characteristic of the genus is that the floral apex forms a roof, called a velum, with a central pore through which the upper parts of the stamens or styles protrude (for details of floral ontogeny and a morphological interpretation of the velum, see Endress, 1980). In the male flowers, the velum is more or less raised at anthesis and the pore is relatively large (Fig. 1A); in the female flowers, the inner margin of the velum is always distinctly raised and the pore is narrower (Fig. 1C).

The stamens are sessile and initiated centripetally, the innermost ones often remaining small or even staminodial. The anthers are two-locular and open around the perimeter of both pollen sacs except at the distal end (Figs. 1B, G, N; 4G; compare also Endress & Hufford, 1989, figs. 97-100). Dehiscence results in a flaplike structure that is hinged distally and bent upward. In fully anthetic male flowers, these flaps usually can be seen with the unaided eye.

Anthesis typically lasts 9-16 days in male flowers and 16-24 days in females (Feil, 1992), and the fertilized flowers then expand. Measurements of floral parts and descriptions of their shape are therefore of limited value. More diagnostically useful are the shape, color, and pubescence of the leaves and the number of stamens and styles.

Siparuna croatii Renner & Hausner, sp. nov.
TYPE: Ecuador. Cotopaxi: 63.4 km SE of Quevedo, 4 km NW of El Corazon, primary forest on steep slopes near a waterfall above Rio Angamarca, 1030 m, 4 Apr. 1983 (female, fl), T. B. Croat 55752 (holotype, QCNE; isotypes, AAU, MO, QCA). Figures 1A-D, 2.

Species ramulis quadrangularis valde sulcatibus et foliis late ellipticiis (18-42 × 10-20 cm) a congeneribus diversa.

Diocieous shrub or tree, 4-5 m tall, partly with a liana-like habit, the twigs quadrangular, deeply sulcate, and khaki-colored due to a dense indumentum of minute stellate hairs. Leaves opposite, the petioles 4-5 cm long; the lamina drying brownish to olive-green, chartaceous, elliptic to broadly elliptic, 18-42 × 10-20 cm, the base obtuse or subacute, the apex shortly acuminate, the lower surface with minute appressed stellate hairs, the upper sur-
face scantly stellate-pubescent to glabrescent and rather smooth, with 22–24 pairs of secondary veins, the secondary and tertiary veins distinctly prominent and yellow below, the margin inconspicuously denticulate. Cymes of both sexes axillary in groups of 2–4, ample and multiflorous, 3–5 cm long, with minute yellowish khaki stellate hairs. Male flower at anthesis 1.9–2.1 × 1.8–2.1 mm, the floral cup urceolate to globose with minute stellate hairs, the floral roof moderately raised, glabrous and drying dark brown, the 4–5 tepals obtusely triangular and 0.4–0.6 mm long, when fresh greenish; stamens 6, fleshy and containing white globules (large oil cells), the 4 outer ones slightly exerted at anthesis. Female flowers at anthesis of the same size and shape as the males but the floral roof raised to a cylindrical bulge separated by a distinct groove from a second innermost tube sheathing the style bases; the styles 5–7, basally united. Fruit fleshy and red when fresh; mature fruit and seeds unknown.

**Distribution, habitat, and phenology.** Endemic in central Ecuador; growing in primary montane forest on steep slopes and in secondary scrub at elevations of 1000–1400 m; collected flowering and with young fruits in April and May.

*Siparuna croatii* differs from all other species in the genus in its khaki-colored, deeply sulcate, quadrangular branchlets, olive-green leaves with secondary and tertiary veins distinctly raised below, and, for the genus, ample, khaki-colored inflorescences with small flowers.

**Paratype. ECUADOR. Manabí:** trail from El Corazón to Facundo Velo, 1–3 km S of El Corazón, 1400 m, 17 May 1980 (male, fl), Harling & Andersson 19216 (AAU, GB, MJG, QCA). Figures 1K–N, 3.

*Siparuna palenquensis* Renner & Hausner, sp. nov. **TYPE:** Ecuador. Pichincha: Hcda. Covadonga on Río Pilatón, 1000 m, 2 July 1955 (male, fl), E. Asplund 16764 (holotype, S; isotypes, MJG, QCA). Figures 1K–N, 3.


**Distribution, habitat, and phenology.** Restricted to Pacific Ecuador and described by collectors as infrequent or rare; growing in disturbed premontane forests on steep slopes or on cliffs; sea level to 1200 m; collected flowering and fruiting mainly from April to September.

The suggested relative, *Siparuna eggersii* Hieronymus, has smaller, obovate leaves (usually 12–15 × 8–10 cm) with cuneate bases. The two species have previously been confused, as, for example, in the floru of the Río Palenque Biological Station by Dodson & Gentry (1978), which describes and illustrates specimens of *S. palenquensis* as *S. eggersii*.

**Paratypes. ECUADOR. Esmeraldas:** NE across Río Blanco from Quininde, Little 6230 (F, K, US). **Los Ríos:** Río Palenque Biological Station, Dodson 5134 (AAU, F, MO, QCA, SEL, US), Dodson 5723 (MO, QCA, SEL, —

Figure 2. Female specimens of *Siparuna croatii* Renner & Hausner (*Croat 55752*). —A. AAU isotype. —B. MO isotype.
Figure 3. Female specimens of Siparuna palenquensis Renner & Hausner. —A. Croat 55702. —B. Ølgaard 98054, AAU, paratype.
US), Dodson 5930 (MO, NY, SEL, US), Gentry & Dodson 17970 (MO, QCA). **Pichinchia**: Pichinchia, ca. 8 km SE of La Aurora, km 7 on Sto. Domingo-Quevedo rd., at bridge over Rio Baba, Biltonguard 98054 (AAU, QCA); Tinalandia, 9.6 km E of Santo Domingo de los Colorados, above Rio Toachi, Croat 55702 (AAU, MO); km 3 of Toachi–Las Fanpas rd., Dodson & Gentry 13708 (F, MO, QCNE, SEL); old rd. Quito–Santo Domingo, 2–9 km NE of turn-off to old rd. of Alurquin, Lateyn et al. 8736 (AAU, NY, QC, QCNE); Aloa–Santo Domingo, Toachi, at the confluence between Rio Pilatón and Rio Toachi, Sparre 13829 (MIG, S). **Cotopaxi**: island in Rio San Pablo, near La Maná, Webster 22727 (UC).

**Siparuna harlingii** Renner & Hausner, sp. nov.

**TYPE**: Ecuador. Morona–Santiago: 7–8 km N of Gualaquiza on rd. to Indanza, 1500 m, 16 Apr. 1985 (male, fl), G. Harling & L. Andersson 24175 (holotype, QCA; isotypes, AAU, GB), Figure 4.

Species *Siparanae asperae* (Ruiz & Pavón) A. DC. proxima, cujus flores folorumque texturam et colorum habet. Differ floribus fructibusque minus pubescentibus et pedicellis paullo incrassatis.

Dioecious tree or shrub, sometimes scandent, 2–6(-12) m tall, the young and older branchlets densely pubescent with stellate hairs, subangular. Leaves opposite and those of a pair slightly unequal in size, the petioles (2-)2.5–4(-7) cm long; the lamina drying dark green to dark brown, papery, brittle, and subbullate to rather smooth, elliptic to broadly elliptic, sometimes narrowly elliptic, 18–35 × 9–22 cm, the base truncate to cordate, occasionally rounded or acute, the apex acuminate, both surfaces densely stellate-pubescent, glabrescent on the upper surface, with (8–)12–13(-15) pairs of secondary veins, these distinctly visible on the upper surface and slightly raised and yellowish brown pubescent on the lower surface, the tertiary venation dense and distinctly visible, the margin finely denticulate. Cymes of both sexes axillary in groups of 2–4, much-branched (less so in the females), 2–5 cm long, with minute stellate hairs. Male flower at anthesis ca. 4–4.5 × 4–5 mm, the floral cup obconical with minute, pale yellowish stellate hairs, the floral roof distinctly raised, glabrous and drying black, the 4–5 tepals obtuse or triangular and 1–1.5 mm long, glabrous or occasionally with a few stellate hairs, when fresh greenish yellow to creamy white, turning red; stamens 6, often with 4 outer and 2 central ones, fleshy and containing whitish globules (oil cells), the outer stamens distinctly exerted at anthesis. Female flowers at anthesis of the same size and shape as the males but the floral roof centrally conspicuously raised; the styles 20–30, free. Fruit fleshy, 1.5 × 1.5 cm (when fresh to 2 cm diam.), when immature green with pink spots, when mature light red and with a strong lemon smell when crushed, glabrescent; the 20–30 seeds distinctly visible in dried fruits, verrucose, gray and with a red aril when fresh.

**Distribution, habitat, and phenology.** On the eastern Andean slopes from Putumayo and Caquetá in Colombia to Napo, Pastaza, Morona–Santiago, and Zamora–Chinchipe in Ecuador (and expected in Loja); usually collected in disturbed terra firme forest from 300 to 2000 m altitude; in Ecuador flowering and fruiting year-round.

**Siparuna harlingii** can only be confused with *S. aspera* from which it differs especially in the fruit and pedicels, which in fruit remain slender in *S. harlingii* and become fleshy and almost part of the fruit in *S. aspera*. The two also differ in pubescence, *S. harlingii* having generally much shorter hairs, and in the leaf venation, *S. harlingii* having (8–)12–13(-15) lateral nerves, *S. aspera* (15–)16–20(-26). Finally, the two may be distinguished by the number of styles (20–30 in *S. harlingii* vs. (10–)12–15(–18) in *S. aspera*).

As is the case with several species of *Siparuna*, the crushed leaves of this plant are rubbed on the body by the Quichua Indians in Ecuador to cure "mal aire," a general term used for various diseases of the nervous system and stomach. The Quichua name of the species is "Malaire panga," panga meaning leaf (Neill & Palacios 6993).

**Paratypes.** ECUADOR. Zamora–Chinchipe: horse-trail Guadalupe–San José de Yacuambi, along Rio Ya cuambi, potreros and riverside woods, Harling & Andersson 13937 (AAU, GB). **Tungurahua**: between Baños and Rio Verde, Acosta-Solís 10267 (F); Rio Topo, Harling et al. 10073 (AAU, GB); 30 km on rd. from Mera towards Baños, Lawesson et al. 43293 (AAU, QCA); Rio Margaritas, Penland & Summers 141 (F), NY). **Napo**: Tena, Asplund 8938 (QCA, S); Tena, rd. to Archidona, Harling 3660 (S); Mission Shandia, Jatun Yaku River, Barclay 4932 (COL); Puerto Napo, Bénoist 4757 (P); Puerto Napo, path to Latas, Harling 3537 (S), Cerón & Iguano 5518 (AAU, QCNE); 8 km downriver from Misahualli, Neil & Palacios 6993 (AAU, F, MO, QCNE); km 32–35 Puyo–Tena rd., Jørgensen et al. 61248 (AAU, QCA); Zatzayacu, Méxia 7097 (NY, UC, US). **Pastaza**: Mera, Asplund 18357 (S), Harling et al. 7807 (AAU, GB), 7840 (AAU, GB). Morona-

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Figure 4. **Siparuna harlingii** Renner & Hausner (A, Harling 928; B, Cuatrecasas 11167; C, Harling & Andersson 13937; D, Neil & Palacios 6993; E–G, Harling & Andersson 13917). — A. Habit. — B. Female flower. — C.
Young fruits. — D. Mature fruit. — E. Male inflorescence. — F. Male flower. — G. Stamen. The following parts share the same magnification: A, E; B, F; and C, D.
Santiago: rd. Limón–Macas, 96 km NE of Limón, Bohlin et al. 1477 (GB, QCA); near Méndez, Camp E-851 (NY, S), Harold 928 (S); Méndez–Límón rd., ca. 3.2 km S of turnoff to Méndez, Doré & Valdespino 6345 (AAU, NY, QCA, QCNE); Rio Tutanangosa, rd. Sucúa–Huanari, Holm-Nielsen 20508 (AAU). Zamora–Chinchepe: rd. Zamora–Zumba, km 5–12, Harold & Andersson 13917 (AAU, GB); 10 km S of Zamora on rd. along left shore of Rio Jambóe, Harold & Andersson 24014 (AAU, GB, QCA); rd. La Saqua–Yacuambi, 1 km N of Chapintza, Harold & Andersson 23893 (AAU, GB, QCA); Zamora, Harold 5930 (NY, S), Knight 713 (S); Cumbarratza, Jaramillo & Winnerskjold 5922 (NY, QCA). COLOMBIA. Putumayo: Rio Guamués, San Antonio del Guamues, 24014 (COL, NY). Figures 1E—I, 5.


Siparuna subscandens A. C. Smith tepalis longe acutatis (2–3 mm) conspicuis distinguendia.

 Dioecious shrub or treelet, 2–3(–5) m tall, branchlets densely covered with minute sessile stellate hairs, quadrangular and slightly sulcate. Leaves opposite, the petioles 2.5–4.5 cm long; the lamina drying umber, chartaceous, obovate, 18.5–33 × 8.5–14 cm, the base cuneate to acute, the apex distinctly raised to a central tube surrounding the floral roof distinctly raised, the (4–)5–6 tepals oblong, the petals 2.5–3 mm long, when fresh greenish cream or white; stamens 4–5(–6), the outer ones somewhat longer, the floral cup raised below, the margin doubly serrate or subentire. In this they resemble the western Ecuadorean S. eggersii Hieronymus, the western Colombian S. subscandens A. C. Smith, and the Panamanian S. domatia A. H. Gentry. All three differ from S. gigantotepala in lacking elongate tepals. Siparuna eggersii also has smaller, paler green-drying leaves that lack the pronounced drip tip of S. gigantotepala, S. subscandens has narrower leaves, and S. domatia has much larger domatia (as far as known) than S. gigantotepala. There is one Amazonian species, S. macrotepala Perkins, which has similarly conspicuous tepals. It differs in pubescence (simple hairs in S. macrotepala vs. stellate hairs in S. gigantotepala), number of secondary veins in the leaves (5–6–8 in the first vs. 9–10(–13) in the second), and number of styles (9–12 in the first vs. 5–8 in the second). Moreover, S. gigantotepala has free styles, while those of S. macrotepala are united into a tube.

The Coaiquer (Awá) Indians inhale the penetrating smell of the fruits and leaves of S. gigantotepala to clear the nasal passages (A. Barfod et al. 48903). The local names “Límón de monte” or “Diablo de monte limón” also refer to the strong smell of the fruits.

Paratypes. ECUADOR. Esmeraldas: Eloy Alfaro, Reserva Cotacachi–Cayapas, Parroquia Luis Vargas Torres, Río Santiago, Tiraú et al. 804 (QCNE); trail to Rio Mataje Awá encampment from Rio Palavi, Hoover et al. 4007 (AAU, MO, QCA); Reserva Awá, 25 km NW of El Chical, Municipio Maldonado, Rubio et al. 999 (AAU, MO, QCNE), Rubio et al. 1036 (AAU, MG, MO, QCNE); Reserva Awá, Mataje, Jorgensen et al. 65316 (AAU, QCA), Rubio & Quelal 1356 (AAU, MG, MO, QCNE).

Carchi: Reserva Forestal Awá, trail Gualpi bajo–Tarabita, Jørgensen et al. 65232 (AAU, QCA); Gaulpi Chico, Awá encampment, Hoover et al. 2602 (AAU, MO, QCA); Reserva Awá, Centro San Marcos, Méndez et al. 162 (QCNE); wet plateau above San Marcos de los Coaiquers, Ølgaard et al. 57274 (AAU, QCA), Ølgaard et al. 57584 (AAU, QCA). COLOMBIA. Choco: Quibdó–Tutunendo rd., 14 km E of Quibdó, Gentry & Rentería 24139 (MO); San José de Palmar, hoya del Rio Torito, Reserva Cotacachi, H. Eloy & Rendón 1127 (MB, MO, QCA); Reserva Cotacachi, Mora 4212 (AAU, QCA); Gaulpi Chico, Reserva Awa-Bajo, 25 km NW of El Chical, Municipio Maldonado, Rubio et al. 999 (AAU, MO, QCNE), Rubio et al. 1036 (AAU, MG, MO, QCNE); Reserva Awá, Mataje, Jørgensen et al. 65316 (AAU, QCA), Rubio & Quelal 1356 (AAU, MG, MO, QCNE).

Distribution, habitat, and phenology. Collected in very humid primary pluvial forests in Pacific Colombia and Ecuador at elevations of 20–1500 m; in Esmeraldas and Carchi collected flowering and fruiting from November to April.

Siparuna gigantotepala differs from all other Andean species in the elongate, oblong tepals that persist in fruit. A few specimens of S. gigantotepala (e.g., Forero et al. 6740) possess small domatia at the leaf bases. In this they resemble the western Ecuadorean S. eggersii Hieronymus, the western Colombian S. subscandens A. C. Smith, and the Panamanian S. domatia A. H. Gentry. All three differ from S. gigantotepala in lacking elongate tepals. Siparuna eggersii also has smaller, paler green-drying leaves that lack the pronounced drip tip of S. gigantotepala, S. subscandens has narrower leaves, and S. domatia has much larger domatia (as far as known) than S. gigantotepala. There is one Amazonian species, S. macrotepala Perkins, which has similarly conspicuous tepals. It differs in pubescence (simple hairs in S. macrotepala vs. stellate hairs in S. gigantotepala), number of secondary veins in the leaves (5–6–8 in the first vs. 9–10(–13) in the second), and number of styles (9–12 in the first vs. 5–8 in the second). Moreover, S. gigantotepala has free styles, while those of S. macrotepala are united into a tube.

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Carchi: Reserva Forestal Awá, trail Gualpi bajo–Tarabita, Jørgensen et al. 65232 (AAU, QCA); Gaulpi Chico, Awá encampment, Hoover et al. 2602 (AAU, MO, QCA); Reserva Awá, Centro San Marcos, Méndez et al. 162 (QCNE); wet plateau above San Marcos de los Coaiquers, Ølgaard et al. 57274 (AAU, QCA), Ølgaard et al. 57584 (AAU, QCA). COLOMBIA. Choco: Quibdó–Tutunendo rd., 14 km E of Quibdó, Gentry & Rentería 24139 (MO); San José de Palmar, hoya del Rio Torito, Reserva Cotacachi, H. Eloy & Rendón 1127 (MB, MO, QCA); Reserva Cotacachi, Mora 4212 (AAU, QCA); Gaulpi Chico, Reserva Awa-Bajo, 25 km NW of El Chical, Municipio Maldonado, Rubio et al. 999 (AAU, MO, QCNE), Rubio et al. 1036 (AAU, MG, MO, QCNE); Reserva Awá, Mataje, Jørgensen et al. 65316 (AAU, QCA), Rubio & Quelal 1356 (AAU, MG, MO, QCNE).

Distribution, habitat, and phenology. Collected in very humid primary pluvial forests in Pacific Colombia and Ecuador at elevations of 20–1500 m; in Esmeraldas and Carchi collected flowering and fruiting from November to April.
Figure 5. Female specimens of Siparuna gigantotepala Renner & Hausner. —A. Ølgaard et al. 57274. —B. Barfod et al. 48903, AAU isotype.
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Literature Cited


