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New species and a new combination of *Erythroxylum* (Erythroxylaceae) from Amazonian Peru. Contribution to the study of the flora and vegetation of Peruvian Amazonia. XIV

TIMOTHY PLOWMAN

RESUMEN

PLOWMAN, T. (1988). Nuevas especies y una nueva combinación de *Erythroxylum* (Erythroxylaceae) de la Amazonia peruana. *Candollea* 43: 421-430. En inglés, resúmenes español e inglés.

Tres especies nuevas, *Erythroxylum lorentense* Plowman, *E. vasquezii* Plowman y *E. ruryi* Plowman, están descritas e ilustradas, y una nueva combinación, *E. macrophyllum* Cav. var. *macrocnemium* (Mart.) Plowman, está propuesta.

ABSTRACT

PLOWMAN, T. (1988). New species and a new combination of *Erythroxylum* (Erythroxylaceae) from Amazonian Peru. Contribution to the study of the flora and vegetation of Peruvian Amazonia. XIV. *Candollea* 43: 421-430. In English, Spanish and English abstracts.

Three new species, *Erythroxylum lorentense* Plowman, *E. vasquezii* Plowman and *E. ruryi* Plowman, from Amazonian Peru are described and illustrated, and a new combination, *E. macrophyllum* Cav. var. *macrocnemium* (Mart.) Plowman, is proposed.

Continuing studies of Neotropical *Erythroxylum* have revealed several new species from Amazonian Peru and adjacent areas. Two of these are found in the Reserva Forestal de Jenaro Herrera, an area currently under intensive study by R. Spichiger, F. Encarnación, and colleagues at the Conservatoire et Jardin botaniques of Geneva.

***Erythroxylum lorentense* Plowman, spec. nov. (Fig. 1).**

Frutex vel arbor parva, ramulis rectis lenticellis productis. Cataphylla sparsa, remota, stipulis foliaribus similia. Stipulae foliaries persistentes, triangulari-ovatae, non-striatae, coriaceae, nigrescentes, apice 2-setulosae. Folia in ramulis dispersa, disticha, petiolata, persistentia, laminis ellipticis vel oblongis, apice acutis vel breviter acuminatis, basi acutis vel obtusis, chartaceis, opacis, ubique impolitis. Flores pauci e ramulis annotinis in axillis foliorum deciduorum vel cataphyllorum nati. Pedicelli apice pentagoni ubique squamis cereis producti. Petali lamina ovato-oblonga, ligula bilobata munita. Urceolus stamineus tribus quartis partibus longitudinis calycis aequalis vel calycem aequans, margine 10-denticulatus. Styli liberi. Drupa oblonga, recta, cinerascenti-purpurea, endocarpio oblongo, inaequaliter 6-sulcato, triloculari, loculis vacuis duobus parvis, loculo fertili magno endospermio abundante. Embryo cotyledonibus lineari-lanceolatis apice obtusis provisus.

Type: Peru, Dept. Loreto, Prov. de Maynas, Caño Yarina, Reserva Nacional de Pacaya, Río Pacaya (Río Ucayali), 24 Mar 1977 (fl, fr), *F. Encarnación 1075* (holotype: F 1949368; isotypes: K, F 1969394, NY, US 2905577).

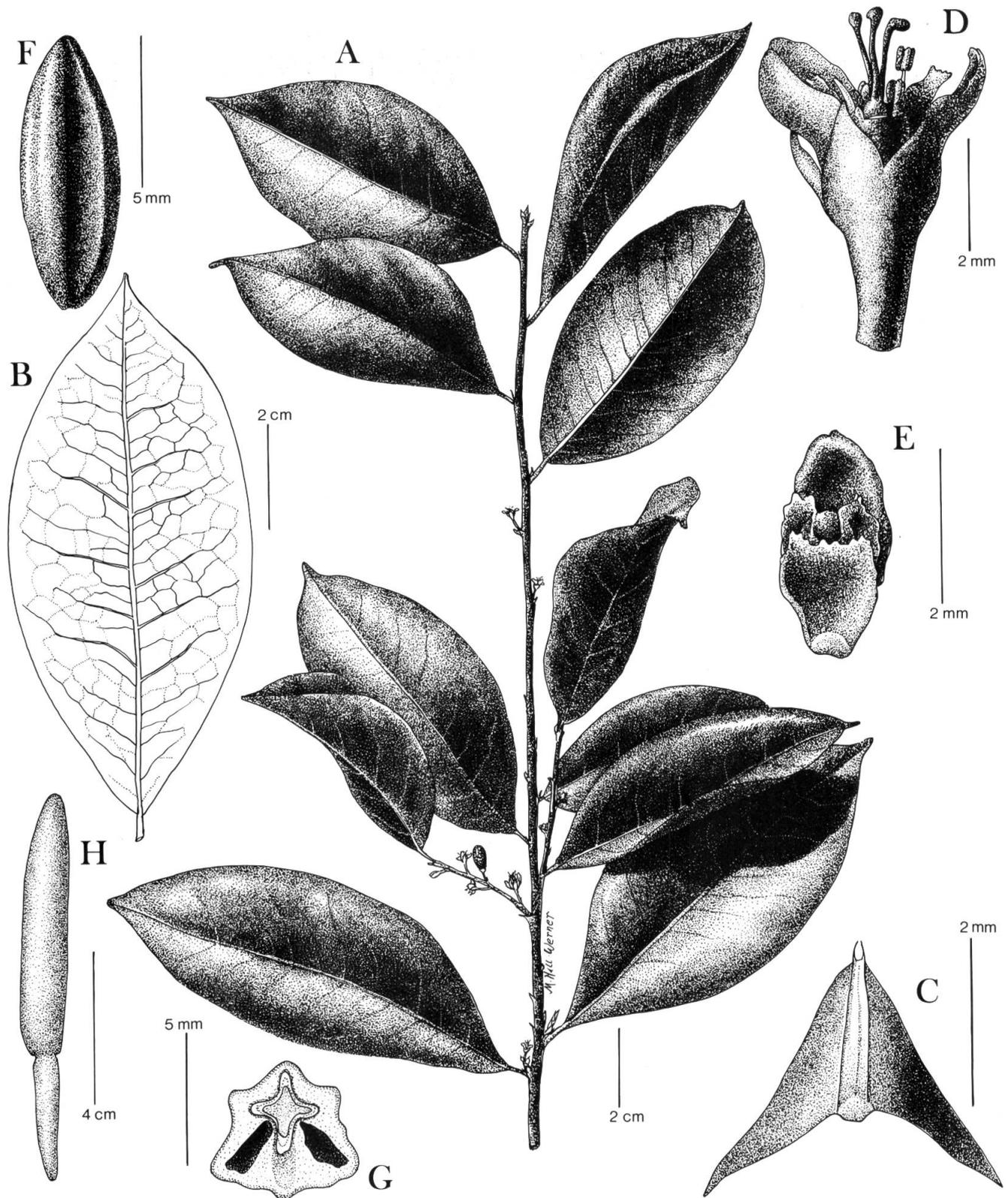


Fig. 1. — *Erythroxylum lorentense*.

A, habit, flowering branch; B, leaf showing venation; C, stipule; D, dolichostylous flower; E, petal; F, endocarp, longitudinal view; G, endocarp, cross-section; H, embryo. A, B, D, E from *Peters 38*; C, F, G, H from *Davidson & Jones 9557*.

Shrub or small tree to 6 m tall. Branchlets slender, diverging from stem at 40°-70°, 1.5 mm in diameter, compressed at apex, reddish brown, abundantly furnished with punctate lenticels, turning greyish brown with age. *Internodes* 1-20 mm long. *Cataphylls* ca. 5-7, scattered at base of shoots, similar to foliar stipules in size and shape, persistent, turning black on drying, the spinule erect, flattened dorsally, 1-1.5 mm long, black. *Foliar stipules* persistent, distichous, erect and appressed to stem, triangular-ovate, 2-3 mm long, coriaceous, smooth, not striate-nerved, drying black, revolute at margin, obtuse at apex, 2-setulose, the setae short, stiff, black, 0.3-0.5 mm long, often coherent and appearing as one. *Leaves* persistent, scattered along branchlets, short-petiolate, the lamina elliptic to oblong, 6-10 cm long, 2.5-4.5 cm wide, at apex acute to short-acuminate, at base acute or obtuse, rarely rounded, chartaceous, the upper surface smooth, drying dark leaden grey or brown, matte, the adaxial midrib sulcate-impressed, the lower surface drying ferruginous-brown, matte, not bilineate nor with distinct central panel, the lateral nerves 9-12, straight, diverging at 50°-80° from midrib, arching-anastomosing 3-5 mm from margin, obscure on upper surface, faintly distinct on lower surface, the veinlets obscure. *Petiole* (1-2)3-5 mm long, ca. 1 mm in diameter, subterete, adaxially canaliculate, drying tan or light brown. *Flowers* few in leafless axils of cataphylls on current or year-old shoots, up to 5 flowers per node, opening sequentially, white. *Bracteoles* 1-1.5 mm long, broadly ovate to triangular ovate, eccentrically 1-keeled, at apex obtuse or rounded, minutely 1-setulose. *Pedice*l 1.5-2 mm long in flower, 0.5 mm in diameter, 2-3.5 mm long in fruit, 5-ribbed toward apex, subterete toward base, usually covered with fine white waxy flakes. *Calyx* 2-2.5 mm long, divided to $\frac{3}{4}$ its length, the lobes 1-1.5 mm long, narrowly triangular to lanceolate, narrowly acute at apex. *Petal* lamina ovate-oblong, concave, ca. 2 mm long, 1 mm in diameter, the claw ca. 1 mm long, 1 mm wide, the ligule bilobed, ca. 0.8 mm long, each lobe consisting of an ovate, 2-3 lobed posterior auricle, ca. 0.5-0.7 mm long, and a short, cuff-like anterior auricle. *Staminal tube* $\frac{3}{4}$ to nearly equaling the calyx, ca. 1.2 mm long, the margin 10-denticulate, the teeth triangular. *Brachystylous flowers*: filaments ca. 1.5 mm long, the anthers ovate to elliptic, ca. 0.4 mm long; styles 0.2-0.4 mm long, free; stigmas capitellate, 0.3 mm long. *Dolichostylous flowers*: antisepalous filaments ca. 0.5 mm long, the anthers ca. 0.5 mm long, the antipetalous filaments ca. 1(-1.5) mm long; styles ca. 1.5 mm long, free; stigmas capitellate, 0.3 mm long. *Ovary* oblongoid, obtusely trigonous near apex, ca. 1.4 mm long, a little longer than staminal tube. *Drupe* oblong, 12-13 mm long, ca. 5 mm in diameter, "greyish purple" (*vide* Encarnación), the mesocarp 0.3-0.5 mm thick, the endocarp oblong, unequally 6-ribbed, 3-locular, two locules small, empty, the fertile locule larger, cruciform, the endosperm occupying ca. 75% of fertile locule. *Embryo* 10 mm long, without chlorophyll; cotyledons linear-lanceolate, 6 mm long, 1 mm wide, 0.2 mm thick, obtuse at apex; radicle 3 mm long, 0.5 mm in diameter.

Specimens examined

Peru. Loreto: Prov. Alto Amazonas, Río Huallaga, Yurimaguas, alt. 155-210 m, "motelo caspi," 6.11.1929 (fl), *Ll. Williams 4639* (F, US), 4664 (F, MADw). Prov. Loreto, Quebrada "Cuninico" [= Río Cuinico or Río Cunincu, 4°42'S, 75°06'W], 7.7.1972 (fr), *T. Croat 17751* (MO). Prov. Requena: río Ucayali, Jenaro Herrera, Caño Supay, 4°55'18''S, 73°40'36''W, 22 Jan 1985 (fl, fr), *C. Peters 38* (F-2, NY). Prov. Maynas: Dtto. Bajo Amazonas, Río Amazonas, Cedro Isla, 6.11.1976 (fr), *M. Rimachi 2668* (F, MO, NY); Dtto. Iquitos, Río Nanay, Quebrada de San Pablo de Cuyana, above Santa Clara, 13.12.1977 (fl, fr), *M. Rimachi 3292* (F, MO, NY); Iquitos, "Río Masano (Itaya)", 3.5.1929 (fr), *Ll. Williams 56* (F); Iquitos, alt. 120 m, 29.3.1930 (st), *Ll. Williams 8049* (F); Río Yanayacu, tributary of Río Amazonas, ca. 15 km down the Amazon from Iquitos, 3.12.1979 (fr), *C. Davidson & J. Jones 9557* (F, MO, NY). **Brazil. Amazonas:** Município de Maraã, Rio Atí Paraná (southern tributary of Rio Japurá), ca. 15 km west of Maraã, approx. 1°52'S, 65°44'W, 6.12.1982 (fl), *T. Plowman & al. 12264* (COL, F, G, INPA, K, MO, NY, US, others to be distributed); Rio Japurá, environs of town of Maraã, headwaters of Lago Maraã, approx. 1°47'S, 65°37'W, 7.12.1982 (fl), *T. Plowman & al. 12367* (F, G, INPA, K, MO, NY, US, others to be distributed); Parintins, 10.3.1946 (fl), *J. M. Pires & G. A. Black 1140* (IAN). **Pará:** Rio Tocantins, Marabá, 9.6.1949 (fl), *R. L. Fróes & G. A. Black 24338* (IAN).

Etymology. — The specific epithet refers to the Peruvian Department of Loreto, where the species was first discovered and where most of the specimens have been collected.

Distribution. — Known from Amazonian Peru and Brazil, from Yurimaguas east to the Rio Tocantins.

Ecology. — *Erythroxylum lorentense* is an element of seasonally inundated primary forest along the Amazon and its tributaries. In Brazil it occurs on the banks of both whitewater and black-water rivers.

Phenology. — This species appears to have a long flowering period from November to May; apparently only one flower opens per node per day.

Vernacular name. — *motelo caspi* (Yurimaguas).

Relationships. — *Erythroxylum lorentense*, a member of Sect. *Archerythroxylum* O. Schulz, is recognized by the persistent, coriaceous stipules and cataphylls, the apiculate flower buds, and especially the oblong, unequally 6-sulcate endocarps. The collections from the eastern Amazon differ somewhat in having more narrowly oblong leaves that tend to be rounded at the base; when better known, these populations may prove to be a separate species.

Erythroxylum lorentense is clearly most closely related to *E. ruizii* Peyr., a narrow endemic in the low hills on the coast of Ecuador. Until the fruits of the latter were collected in 1986, it was difficult to separate these two species with confidence. The endocarps of *E. ruizii* are obtusely trigonous, while those of *E. lorentense* are clearly 6-sulcate. Furthermore, in *E. ruizii* the stipules are only sparingly setulose, the staminal tube is equal to or longer than the calyx lobes, the styles are connate (vs. free) in the dolichostylous flowers, and the drupe is smaller (9-10 mm vs. 12-13 mm long).

Erythroxylum lorentense may also be confused with *E. kapplerianum* Peyr., which occurs in similar habitats in northernmost Brazil, in the Guianas, and in Venezuela west to the Rio Negro drainage (but not collected in Peru). *Erythroxylum kapplerianum* differs in having larger (3.5-4 mm vs. 2-3 mm long) stipules and cataphylls that are less persistent and usually fimbriate (vs. entire) at margins, longer flowering pedicels (3.5-6 vs. 1.5-2 mm long), entire (vs. apiculate) flower buds, and terete (vs. markedly 6-sulcate) endocarps.

***Erythroxylum vasquezii* Plowman, spec. nov. (Fig. 2).**

Frutex vel arbor parva, ramulis paucis crassis rufescentibus lenticellis productis. Cataphylla pauca stipulis foliaribus similia nigrescentia decidua. Stipulae foliariae deciduae laeves subcoriaceae apice 2-setulosae. Folia sparsa petiolata, laminis magnis oblongo-ellipticis vel oblongo-obovatis, apice breviter acuminatis, basi obtusis vel rotundatis, subcoriaceis. Flores fasciculati numerosi e ramulis annotinis in foliorum vel cataphyllorum axillis nudis nati. Pedicelli longi apice incrassati. Urceolus stamineus calyce paulo brevior, margine integer. Drupa oblongoidea recta, endocarpio oblongo-ellipsoideo tereti, apice obtuso vel acuto, maturitate uniloculari, endospermio nullo, embryo magno crasso.

Type: Peru, Dept. Loreto, Prov. Loreto, Quebrada Saragosa (carretera Nauta-Iquitos), 4°29'S, 73°35'W, alt. 150 m, bosque primario, colinas medias, 8.6.1983 (fr), R. Vásquez 4195 (holotype: F 1925935; isotype: MO 3305582).

Shrub or tree to 10 m tall. *Branchlets* sparse, distichous, straight, stout, 4-5 mm in diameter, lightly compressed toward apex, reddish brown the first year, becoming greyish brown or tan with age, furnished with punctate lenticels. *Internodes* 5-15 mm long. *Cataphylls* about 5, distichous, similar to foliar stipules, 5-8 mm long, deciduous, the spinule not observed. *Foliar stipules* erect-appressed, triangular-ovate, 4.5-6 mm long, smooth, not striately nerved, subcoriaceous, turning black with age, at apex obtuse or rounded, 2-setulose, the setae filamentous, (0.5-)1-1.5 mm long, the keels slender, subulate, the margins entire, straight or undulate, the stipules deciduous the first season. *Leaves* persistent, scattered on present year's shoots, weakly distichous, petiolate, the lamina oblong-elliptic to oblong-obovate, at apex short-acuminate, at base obtuse to rounded, 18-24 cm long, 8-10 cm wide, subcoriaceous, the adaxial surface dull, drying leaden or brown, the abaxial surface drying dull, lighter brown or ferruginous, sometimes appearing pruinose, elineate with no distinct central panel, the adaxial midrib a slender ridge, sulcate-impressed in surface, the lateral

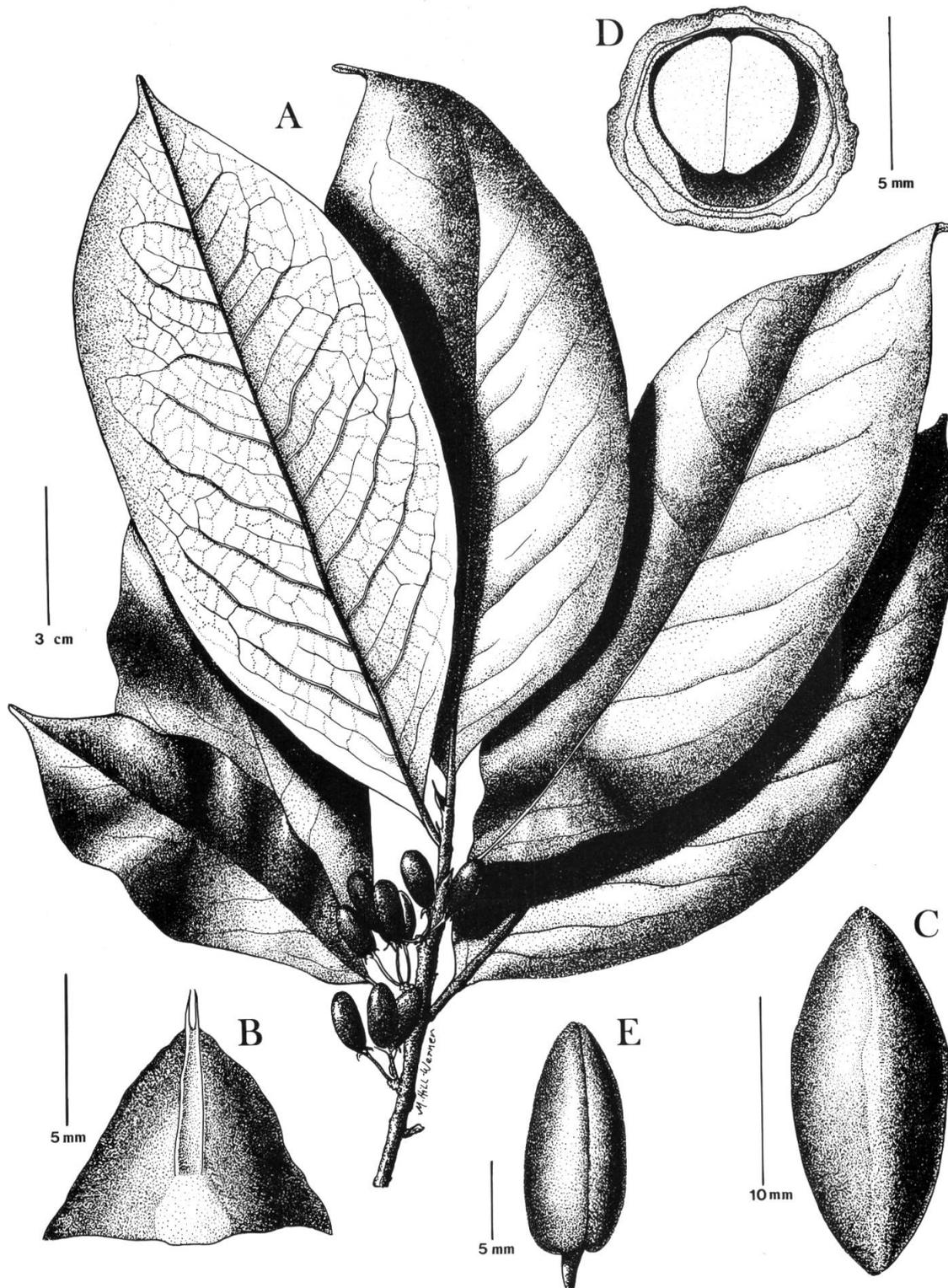


Fig. 2. — *Erythroxylum vasquezii*.
 A, fruiting branch; B, stipule; C, endocarp, longitudinal view; D, endocarp, cross-section; E, embryo, dorsal view. A, D, E from Vásquez 4195; B from Spichiger & al. 1621; C from Vásquez & al. 2081.

nerves 11-12, more or less parallel and straight, diverging 45°-50° from midrib, arching and anastomosing 5-10 mm from margin, slender and obscure on adaxial surface, prominulous on abaxial surface. *Petiole* 7-12 mm long, 2-3 mm in diameter, subterete, adaxially canaliculate, drying black. *Flowers* fasciculate in axils of leaves or cataphylls of year-old shoots, 5-15 flowers per node, the inflorescence axis sometimes elongating to 3 mm long. *Bracteoles* persisting, wearing away, transversely triangular-ovate, ca. 1.5 mm long, 1-keeled, at apex obtuse or short-acuminate, briefly 1-setulose or entire. *Pedicele* in young fruit 7-9 mm long, elongating to 10-13 mm in fruit, ca. 1 mm in diameter, obtusely 5-angled in cross-section, thickened at apex into calyx; flowering pedicel shorter, ca. 6-8 mm. *Calyx* 2-2.5 mm long, divided at least $\frac{3}{4}$ its length, the lobes triangular, 1.5 mm long, acute at apex, strongly reflexed in fruit. *Petals* not seen. *Staminal tube* a little shorter than calyx, 1.5 mm long, entire at margin. *Brachystylous flowers*: styles persistent at apex of drupe, ca. 1 mm long; stigma depressed-capitate, 0.3 mm long. *Drupe* oblong-ellipsoid, straight, 16-18 mm long, 6-8 mm in diameter, "red", the mesocarp 0.5-1 mm thick, the endocarp oblong-ellipsoid, tapered at both ends, at apex obtuse or acute, at maturity unicellular, without endosperm. *Embryo* 13-15 mm long; cotyledons oblong-ovoid, convex, subcordate at base, ca. 12 mm long, 5 mm wide, 2 mm thick; radicle 2-2.5 mm long, 0.5 mm in diameter.

Specimens examined

Peru. Loreto: Prov. Requena, Jenaro Herrera, 4°50'S, 73°45'W, alt. ca. 170 m, 2.7.1981, *R. Vásquez, K. Young & N. Jaramillo 2081* (F, MO); Reserva Forestal de Jenaro Herrera, 4°55'S, 73°45'W, alt. 125 m, tree No. 3 R 160, 3.1983 (fl bud), *R. Spichiger & al. 1983* (F, G); same locality and date, tree No. 1-152, *R. Spichiger & al. 1984* (F, G); same locality, 3.1984 (young fr), *R. Spichiger 1621* (F, G).

Etymology. — With pleasure I dedicate this species to Sr. Rodolpho Vásquez, productive collector in Amazonian Peru, who first collected the plant in 1981.

Distribution. — Known only from five collections from a small area in the central Peruvian Amazon, including the Reserva Forestal de Jenaro Herrera between Iquitos and Requena.

Ecology. — *Erythroxylum vasquezii* grows in primary, terra firme forest, sometimes on low hills or sandy soil.

Phenology. — Collected in fruit during March, June and July and in flower bud in March.

Relationships. — *Erythroxylum vasquezii* belongs to Sect. *Archerythroxylum* based on the non-striate stipules. It is readily distinguished from related species by the stout branchlets, the large leaves, and large, terete endocarps. *Erythroxylum vasquezii* may be related to *E. roraimae* Klotzsch ex O. Schulz, a species known mainly from the southern rim of the Guayana highlands (Rio Negro to French Guiana). One population is known from the lowland Colombian Amazonian "Trapezio" ("Quebrada" Agua Preta, *Schultes & Black 46-385*, IAN).

Owing to the large leaf blades and non-striate stipules, *Erythroxylum vasquezii* may also be confused with *E. squamatum* Sw., which can be distinguished by the conspicuous distichous cataphylls and by the large, markedly sulcate endocarps.

***Erythroxylum ruryi* Plowman, spec. nov.** (Fig. 3).

Frutex ramulis laevibus, rufescentibus. Cataphylla pauca stipulis foliaribus similia. Stipulae foliariae oblongo-ovatae laeves non striato-nervosae, apice valde 2- vel 3-setulosae, setis lateralibus ligulatis. Folia persistentia breviter petiolata laminis oblongo-ellipticis, apice acutis, apice ipso obtuso, basi acutis, chartaceis, subtus e-lineatis plerumque areolatis fuscatis. Flores e ramulis annotinis vel hornotinis in axillis cataphyllorum vel foliorum nati. Urceolus stamineus calycem aequans margine integro. Drupa oblongo-ellipsoidea, fusiformis, rubra, apice acuta, excentrica, endocarpio subtereti, reticulato-nervoso, endospermio nullo, embryo magno, viridi.

Type: Bolivia, Dept. Cochabamba, Prov. Chapare, Todos Santos, 300 m, "arbusto consistente 1.5 a 2 m, frecuente, entre la foresta en sombra", 23.10.1966 (fl, fr), *R. F. Steinbach 425* (holotype: US 2533350; isotypes: F 1645044, GH, MICH, MO 2177224, NY, U, WIS).

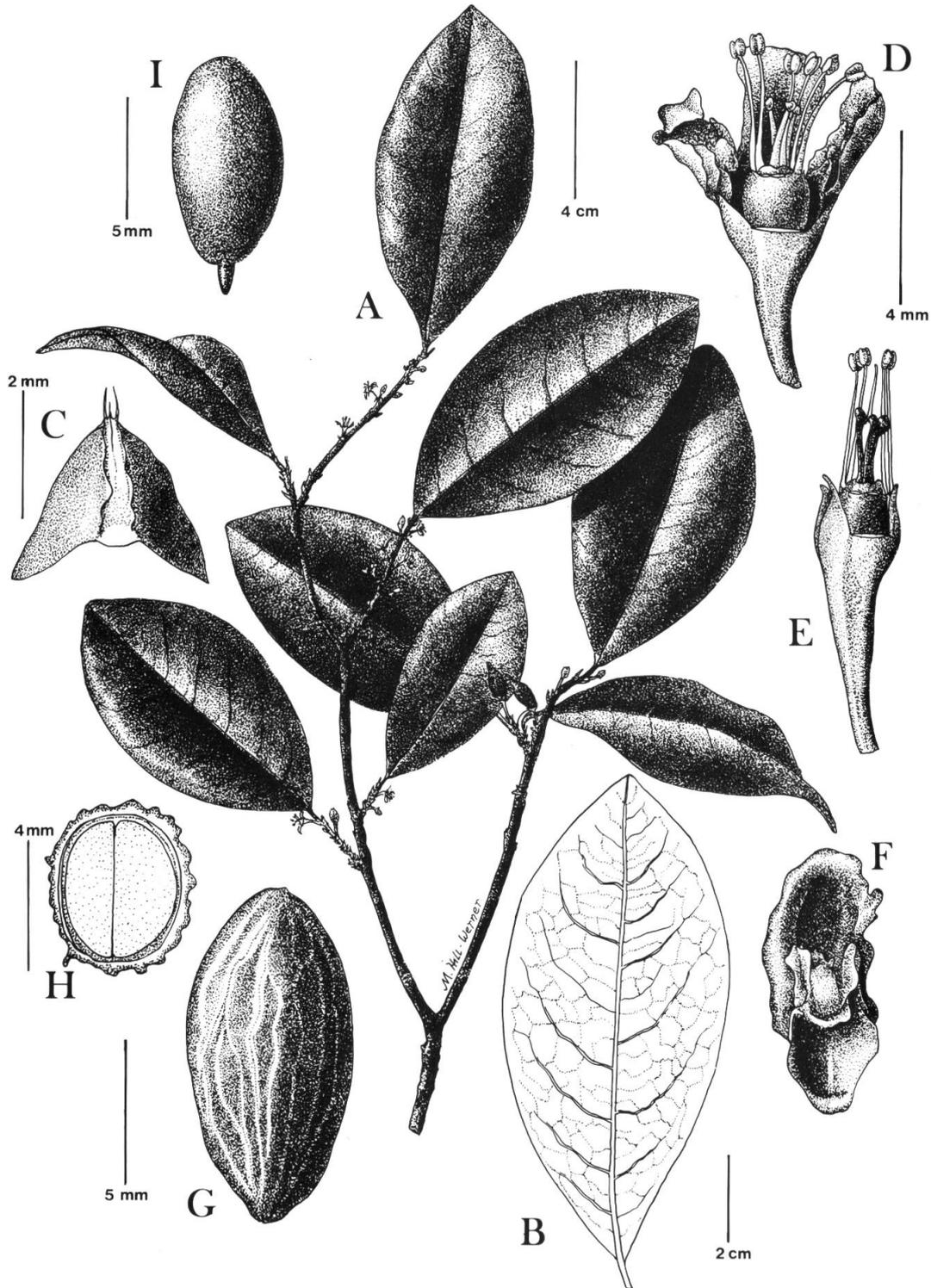


Fig. 3. — *Erythroxylum ruryi*.

A, flowering and fruiting branch; B, leaf showing venation; C, stipule; D, brachystylous flower; E, brachystylous flower, petals removed, same scale as D; F, petal, same scale as C; G, endocarp, longitudinal view; H, endocarp, cross-section; I, embryo. A, B, C, D, E, F from Steinbach 425; G, H, I from Maas & al. 6128.

Shrub 1.5-5 m tall. *Branchlets* compressed toward apex, becoming subterete, 1-2 mm in diam, dark reddish brown, longitudinally wrinkled or striate, lacking distinct lenticels. *Internodes* on extension shoots 1-25 mm long, lacking short shoots. *Cataphylls* few, 3-5 scattered or congested along stem at base of new shoots, distichous, similar to but slightly larger than foliar stipules, 3.5-4.5 mm long, reddish brown, turning black with age, persistent, the spinule erect, ca. 1.5 mm long, black, sharp-pointed at apex. *Foliar stipules* diverging from axis ca. 45°, broadly ovate to oblong-ovate, 3-4 mm long, subcoriaceous, nonstriate, drying ferruginous and often turning black with age, obtuse or truncate at apex, 2 or 3-setulose, the lateral setae 0.7-1.5 mm long, strap-shaped, sharp-pointed, the medial seta if present filamentous, ca. 0.5 mm long, the margin entire, often somewhat revolute, the keels subalate, undulate. *Leaves* persistent, short-petiolate, the lamina plane, elliptic-oblong, 6.5-12 cm long, 3.5-6 cm wide, obtuse or acute at apex, if acute the tip itself obtuse, chartaceous, the upper surface drying dull leaden or grayish green, the lower surface drying ochreous or ferruginous, not bilineate but sometimes with a discernible central panel marked by more prominent and darker venation, the adaxial midrib sulcate-impressed, with or without a slender medial ridge, the abaxial midrib conspicuous, drying very dark brown, the lateral nerves 9-11 per side, arising at wide acute angles from midrib, then arching and anastomosing 4-6 mm from margin, inconspicuous and sometimes sulcate-impressed on adaxial surface, prominulous on abaxial surface, the veinlets reticulate, usually inconspicuous. *Petiole* 3-6 mm long, ca. 1 mm in diameter, drying dark reddish brown, canaliculate on adaxial surface. *Flowers* appearing on current or year-old twigs in axils of cataphylls or leaves, 1-10 per node, white or greenish white, sometimes forming a short axis to ca. 4 mm long with successive production of flowers. *Bracteoles* persistent, ovate-cymbiform, 1-2 mm long, acuminate and 1-setulose at apex, the seta 0.5-1 mm long. *Pedicele* 5-ribbed, 2-6 mm long, 0.5 mm in diam., gradually thickened at apex into calyx. *Calyx* 1.5 mm long, divided half its length, the lobes triangular-ovate, 0.75 mm long, acuminate or acute at apex, the lobe or the lobe apices gently recurving at anthesis. *Petal* lamina oblong, concave in distal half, rounded at apex, 2.3-3 mm long, 1-1.5 mm wide, the claw 1-1.5 mm long, the ligule bilobed, ca. 1 mm long, the posterior auricles oblong, folded inwards, 0.5 mm long, the anterior auricles short, 0.2 mm long. *Staminal tube* equaling the calyx, 1.2-1.5 mm long, entire and slightly constricted at margin. *Brachystylous flowers*: filaments 2.5-3 mm long, the anthers suborbicular, 0.4-0.5 mm in diam.; styles free, 1-1.4 mm long, rather persistent, the stigmas depressed-capitate, 0.2-0.4 mm long. *Ovary* oblong-ovoid, 1.5 mm long, 1-1.4 times length of staminal tube. *Drupe* oblong-ellipsoid, ca. 12 mm long, 5-7 mm in diam., bright red at maturity, the mesocarp ca. 0.3 mm thick, the endocarp ca. 11 mm long, oblong-fusiform, subterete or a little compressed, acute or obtuse at apex, the apex itself eccentric, the surface with raised reticulate nerves, unilocular, without endosperm. *Embryo* filling endocarp, chlorophyllous, 9.5-10 mm long; cotyledons ovate-oblong, rounded at apex, shallowly subcordate at base, 8.5 mm long, 4 mm wide, 2 mm thick; radicle short, stout, 1.3 mm long, 0.6 mm in diam.

Specimens examined

Peru. Madre de Dios: Prov. Manú, Parque Nacional de Manú, Río Manú, Cocha Cashu Station, 11°50'S, 71°25'W, 350 m, 31.8.1979 (fr), *R. B. Foster* 6940 (F); same locality, floodplain forest, 350 m, 18.7.1984 (fl), *R. B. Foster* 9649 (F); same locality, 11°53'S, 71°23'W, 350 m, 12.9.1986 (fl, fr), *R. B. Foster* 11372 (AAU, B, F, G, GH, INPA, K, LPB, MO, NY, P, U, UC, US, USM). Prov. Manú, Cerro de Pantiacolla, Río Palotoa, 10-15 km NNW of Shintuya, transect to ridgetop, lower mountain slopes, 12°35'S, 71°18'W, 500-650 m, 17.12.1985 (fl, young fr), *R. B. Foster*, *R. Fernández* & *E. Vivar* 11013 (F, K, MO, NY, US, USM). **Cuzco:** Prov. Paucartambo, near Pilcopata, 700-800 m, 23.10.1984 (fl, fr), *P. J. M. Maas*, *H. Maas*, *C. Roersch* & *L. Y. Th. Westra* 6128 (F, G, NY, U, US, USM).

Etymology. — *Erythroxylum ruryi* honors Phillip M. Rury, longtime colleague, friend and outstanding student of the *Erythroxylaceae*. His doctoral dissertation (RURY, 1982) on the systematic anatomy of this family is an extraordinary scholarly achievement and a rich source of basic data on *Erythroxylaceae* for future botanists.

Distribution. — *Erythroxylum ruryi* occurs in the drainage system of the upper Rio Madeira, in the eastern foothills of the Andes in the Depts. of Cuzco and Madre de Dios in southern Peru south to the Dept. of Cochabamba, Bolivia, from 300 to 800 m elevation.

Ecology. — This species grows in the understory of tropical moist forest, both in floodplain forest and on lower mountain slopes. It also occurs on open river banks.

Phenology. — Flowers are produced successively over a relatively long period; apparently only one flower per node appears per day. Flowers and fruits have been collected from July to December and both are often found on the same individual.

Relationships. — *Erythroxylum ruryi* is closely related to *E. ulei* O. Schulz, a species widespread in the tropical eastern Andes from Colombia south to Bolivia. Both species are best placed in Sect. *Archerythroxylum*. SCHULZ (1907) had originally considered *E. ulei* a member of his small section *Leptogramme*.

Erythroxylum ruryi differs from *E. ulei* in having larger leaves (6.5-12 cm vs. 3-8 cm long) and stipules (3-4 vs. 1.5-2 mm), and larger (12 mm vs. 8-9 mm long), bright red (vs. dark purple) drupes. In *E. ruryi*, the midrib and nerves are usually sulcate-impressed on the upper leaf surface, and the central panel and lateral nerves are more clearly evident on the lower surface.

***Erythroxylum macrophyllum* Cav. var. *macrocnemium* (Mart.) Plowman, comb. nov.**

= *Erythroxylum macrocnemium* Mart., Beitr. Erythroxylon. 122. 1840; Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 3: 402. 1841. **Type:** Peru, Huánuco, Cuchero, 1829, *Poeppig* (46) (lectotype chosen by Plowman, 1984: W; isolectotypes: LE, W).

Specimens examined

Peru. Amazonas: Río Santiago, 1 km atrás de la comunidad de Caterpiza, banda este de la Quebrada Caterpiza, trocha de metallar, 180 m, 27.8.1979 (fl), *V. Huashikat* 208 (F, MO); same locality, 700 m atrás de la comunidad de Caterpiza, 200 m, 3.9.1979 (fr), *V. Huashikat* 331 (F, MO). **Loreto:** Prov. Maynas, Dtto. Iquitos, Río Nanay, Caserío Picuruyacu, 11.2.1976 (fr), *J. Revilla* 105 (F, MO), same locality, ca. 150-170 m, 18.7.1979 (fr), *M. Rimachi* 4497 (F); Yurimaguas, carretera a Tarapoto km 15, 5°50'S, 76°08'W, alt. 170 m, 16.9.1981 (fl), *R. Vásquez & N. Jaramillo* 2511 (F, MO); Prov. Alto Amazonas, Shucushuyacu (Río Huallaga), 6°02'S 75°50'W, alt. 250 m, 12.9.1981 (fl), *R. Vásquez & N. Jaramillo* 2408 (F, MO); Yurimaguas, Jan. 1831, *E. Poeppig* 2166 (B, destroyed, F neg. 12627, W); lower Río Huallaga, Yurimaguas, 24.10.1929 (fl), *Ll. Williams* 4039 (F); Recreo, 25.10.1929 (fl), *Ll. Williams* 4149 (F); Fortaleza, 30.10.1929 (fl), *Ll. Williams* 4356 (F); Prov. Coronel Portillo, Granja del Sr. Barrera, noreste de la chacra de Cesar Vela (Aguaytia), 295 m, 17.10.1972 (fl), *J. Schunke* V. 5389 (F, NY). **San Martín:** Tarapoto-Yurimaguas road, km 17.5 (2.5 km N. of Cataratas de Ahuashiyacu), 6°27'S, 76°21'W, 850-1200 m, 7.8.1986 (fl), *S. Knapp & al.* 7897 (F, MO), same locality, Cerro de La Escalera, trail to television antenna, ca. 1200 m, 24.1.1987 (fl), *S. Knapp & J. Mallet* 8558 (F), same locality, 24.1.1987 (fl), *S. Knapp & J. Mallet* 8564 (F); Lamas, km 48 of Tarapoto-Yurimaguas road, 6°24'S, 76°18'W, alt. 380 m, 3.9.1986 (fl, fr), *S. Knapp & J. Mallet* 8248 (F, MO); km 47.9 of Tarapoto-Yurimaguas road, first concrete bridge S. of Pongo de Cainarachi, 6°24'S, 76°18'W, alt. 380 m, 1.10.1986 (fl), *S. Knapp & J. Mallet* 8478 (F, MO), same locality, 8.1.1986 (fr), *S. Knapp & J. Mallet* 8548 (F); near km 55 Yurimaguas-Tarapoto road, N.E. of Pongo de Canarachi, 6°15'S, 76°15'W, alt. ca. 230 m, 10.10.1985 (fr), *A. Gentry & al.* 52279 (F, MO). Prov. Mariscal Cáceres: Dtto. Uchiza, Azpuzana, near San Martín-Huánuco border, 20.4.1976 (st), *T. Plowman* 5935 (ECON, F, G, GH, K, NCU, NY, USM); Dtto. Tocache Nuevo, carretera al Río Tocache, "auca coca", 14.4.1970 (fl), *J. Schunke* V. 3904 (F), Palo Blanco, al oeste del Puente, alt. 700-800 m, 19.12.1981 (fl), *J. Schunke* V. 5749 (F, NY), same locality, 12.12.1981 (fl), *T. Plowman, J. Schunke* V. & *P. M. Rury* 11315 (F, GB, GH, K, NY, U, USM), 13.12.1981 (fl, fr), *T. Plowman, J. Schunke* V. & *P. M. Rury* 11376 (ECON, F, USM); desembocadura del río Mishollo, margen izquierda del río Huallaga, 8.2.1971 (fr), *J. Schunke* V. 4711 (F), same locality, alt. 510-540 m, "auca coca", 1.4.1976 (fr), *T. Plowman & H. Kennedy* 5800 (COL, ECON, F, GH, HTIN, K, NCU, U, US, USM); Quebrada de Cañuto, cerca a la Chacra de Lizardo Aliaga,

alt. 500 m, 8.5.1979 (fl), *J. Schunke V. 10941* (F); Puerto Pizana, alt. 300 m, 6.3.1978 (fl), *M. Balick, D. Allon & J. Schunke V. 1162* (F); Quebrada de Cascarilla, noreste de Puerto Pizana, alt. 350-370 m, 30.7.1973 (fl), *J. Schunke V. 6545* (F). **Huánuco:** Cachicote, alt. 800 m, 13.4.1963 (fl), *F. Woytkowski 7870* (F, MO).

Relationships. — *Erythroxyllum macrophyllum* Cav. is a wide-ranging, polymorphic species that occurs from Mexico south to Brazil and Bolivia. Although a number of segregate species, such as *E. lucidum* Kunth and *E. floribundum* Mart., are now placed in synonymy (PLOWMAN, 1984), I intend to recognize several of the most distinctive taxa within this complex at the varietal level. One of the most distinctive segregates of the *E. macrophyllum* group is the largest-leaved *Erythroxyllum*: *E. macrocnemium* Mart., proposed above as a new combination. This plant, with leaves often more than 30 cm long, occurs in the Huallaga Valley of eastern Peru eastward to the Iquitos area, and northward to the Ecuadorean border. Apparently related and probably distinct large-leaved taxa reappear in Central America as *E. multiflorum* Lundell in Central Panama and *E. skutchii* Standley in the tropical lowlands of Costa Rica, and another remarkable new large-leaved variety has recently been collected in eastern Ecuador.

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