New Taxa of Rubiaceae from Amazonian Colombia, Ecuador, and Peru

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ABSTRACT. The new taxa *Coussarea linearis* C. M. Taylor, *Palicourea macarthurorum* C. M. Taylor, and *P. quadrifolia* subsp. *leticiana* C. M. Taylor are described based largely on material collected during floristic inventories of several biological reserves in northwestern Amazonia.

During preparation of floras of the Parque Nacional Natural Amacayacu in southern Amazonas Department, Colombia, and several biological reserves near Iquitos, Peru, the following undescribed taxa were discovered.

Coussarea linearis C. M. Taylor, sp. nov. TYPE: Peru. Loreto: Maynas, Iquitos, Allpahuayo, Estación Experimental del Instituto de Investigaciones de la Amazonía Peruana (IIAP), 04°10′S, 73°30′W, 150–180 m, 18 Jan. 1991 (fl), *R. Vázquez 15853* (holotype, MO 4069962; isotype, AMAZ). Figure 1.

Haec species a congeneribus pubescentia adpresso-puberula, inflorescentia fasciculata reducta bracteis linearibus 4–8 mm longis munita ac lobulis calycinis linearibus 4–8 mm longis distinguitur.

Shrubs or subshrubs flowering at 0.5 m tall, to 4 m tall; stems terete, densely appressed-pilosulous sometimes becoming glabrescent with age. *Leaf blades* elliptic, 7.5–15 cm long, 1.5–8 cm wide, at apex acute to acuminate with slender tips 8–15 mm long, at base acute, papyraceous, sparsely to moderately appressed-pilosulous on lamina above and below and similarly but more densely so on costa and secondary veins on both sides; secondary veins 8–12 pairs, usually looping to interconnect, without or with 1(–2) intersecondary veins present between pairs of secondary veins, without domatia, the costa and secondary veins plane to thickened above and prominulous below; *petioles* densely appressed-pilosulous, 3–23 mm long; *stipules* in bud ovoid, deltoid to rounded, persistent or falling off before the leaves, leaving a truncate remnant, moderately to densely appressed-pilosulous, becoming glabrescent and indurate with age, 1.5–3.5 mm long, entire to somewhat erose, enclosing colleters 0.5–2 mm long. *Inflorescences* terminal, congested to somewhat open, densely appressed-pilosulous, peduncles 1–3, fasciculate, 2–8 mm long, the flowers 1–3 on each peduncle, sessile, bracts 2–4 per flower, narrowly triangular to linear, appressed-pilosulous, acute, 4–8 mm long; *flowers* with hypanthium cylindrical to ellipsoid, densely appressed-pilosulous to -pilose, ca. 1.3 mm long; *calyx* limb densely appressed-pilosulous, with tube 1.8–2 mm long, lobes 4, linear, 4–8 mm long, acute; *corollas* salverform, in bud yellow-green to whitish, externally densely appressed-pilosulous, tubes ca. 12 mm long, lobes 4, narrowly triangular to lanceolate, ca. 13 mm long, acute; style ca. 9 mm long, stigmas 2, linear, ca. 3 mm long. *Fruits* ellipsoid to obovoid, 11–13 mm long, 7–9 mm diam., appressed-pilosulous, white, probably spongy; seed solitary, ellipsoid.

Distribution, habitat, and phenology. Amazonian Colombia and Peru, in terra firme forest at 100–180 m. Collected in flower in January and October, in fruit January through September.

This species is distinguished by its densely appressed-pilosulous pubescence on the stems, leaves, stipules, and inflorescences; fasciculate and rather reduced inflorescences; externally appressed-pilosulous to -pilose corollas; numerous linear inflorescence bracts; and linear relatively long stipule lobes. The corollas are known only in bud; because in many species of *Coussarea* the flowers are nocturnal and the corolla tubes and sometimes also the lobes elongate markedly just before anthesis, the sizes given above are minimums, and no reliable estimate of the mature flower size can be made at present.

Although the stipules of this species may appear glandular-fimbriate, the condition that distinguishes *Rudgea*, the glands in *Coussarea linearis* are colleters borne internally to the stipules and exposed when the stipules fall, rather than glands attached to the stipule apices as in *Rudgea*. The placement of this species in *Coussarea* is indicated by the four-parted calyx limb and corolla, stipules that enclose the buds in an imbricated apically rounded conformation, and spongy white fruits containing one ellipsoid seed with a papyraceous testa, in con-

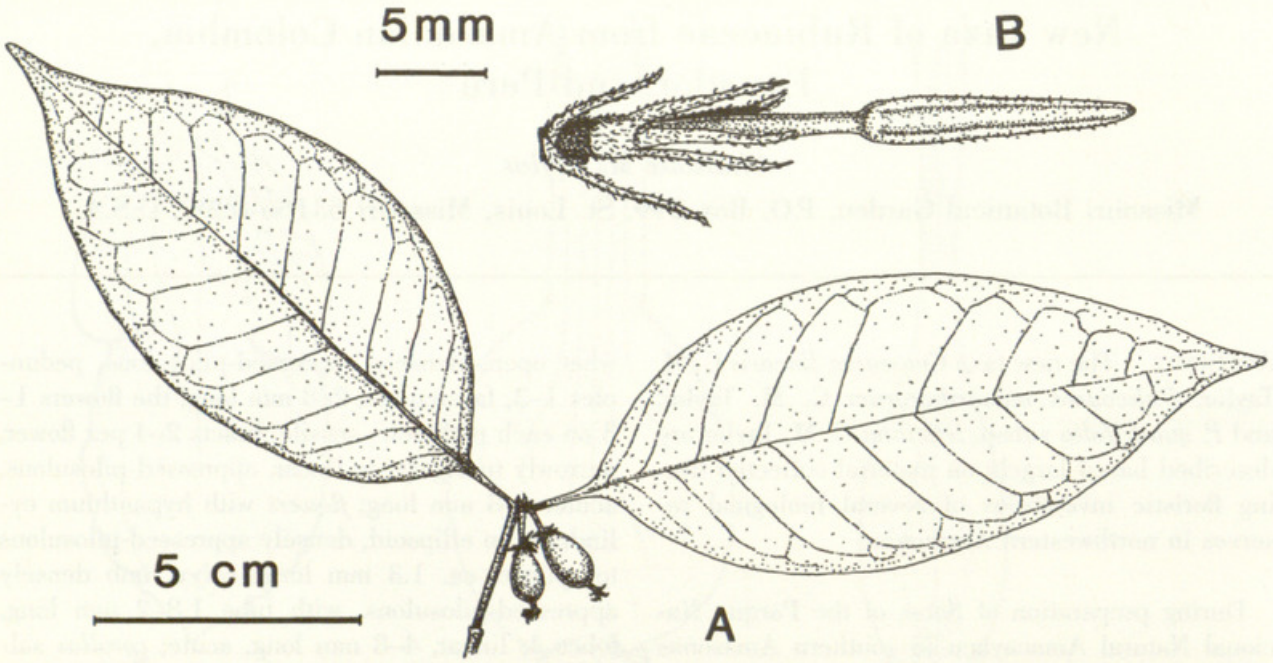

Figure 1. *Coussarea linearis* C. M. Taylor. —A. Habit. —B. Flower bud. A to 5-cm scale; B to 5-mm scale. A from *Vásquez & Jaramillo 16520* (MO); B from *Vásquez 15853* (MO).

trast to the usually five-parted calyx and corolla and fruits with two hard planoconvex pyrenes in *Rudgea* and *Psychotria*, and aristate or mucronate stipules with their apical projections usually crossed in *Faramea*.

This species can be confused with several other pubescent species of *Coussarea* with well-developed calyx lobes, in particular *C. flava* Poeppig & Endlicher, which also has subsessile and congested to subcapitate inflorescences, but which can be separated by its oblanceolate to narrowly elliptic leaves 8–28 cm long and 4–6.5 cm wide, and its stems and flowers with spreading pilosulous trichomes to 3 mm long; and *C. enneantha* Standley, with the calyx limb composed of a tube 4–12 mm long and narrowly triangular lobes 2–6 mm long, the stem and inflorescence pubescence spreading, the inflorescences branched at least once, and the bracts 3 mm long or shorter or sometimes lacking.

Paratypes. COLOMBIA. **Amazonas:** Parque Nacional Natural Amacayacu, near Tikuna village of Mocagua, 03°48′S, 70°18′W, *Gentry & Villa-Lopera 60830* (COL, MO); Parque Amacayacu, Centro Administrativo Amacayacu, *Pipoly et al. 15080* (COL, MO), *15117* (COL, MO); Parque Amacayacu, Centro Administrativo Mata-matá, *Pipoly et al. 15681* (COL, MO), *Rudas et al. 1297* (COL, MO), *1579* (COL, MO); Parque Amacayacu, *Vásquez et al. 12598* (AMAZ, MO). PERU. **Loreto:** Maynas, Iquitos, Allpahuayo, Estación Experimental del Instituto de Investigaciones de la Amazonía Peruana (IIAP), *Rueda & Ruíz 648* (AMAZ, MO), *Vásquez & Jaramillo 16520* (AMAZ, MO), *Vásquez 16798* (AMAZ, MO).

Palicourea macarthurorum C. M. Taylor, sp. nov. TYPE: Colombia. Amazonas: Municipio de Leticia, Corregimiento de Tarapacá, Parque Nacional Natural Amacayacu, Cabaña Pamaté (extremo nor-occidental del Parque), trocha que sale de la cabaña, paralela al Caño Pamaté, 03°11′S, 70°20′W, 100 m, 1 July 1991 (fl), *A. Rudas et al. 2725* (holotype, COL; isotype, MO). Figure 2.

Haec species a *Palicourea longiflora* (Aublet) L. C. Richard foliis utrinque glabris, pedunculo 0.5–3 cm longo, inflorescentiae bracteis reductis, corolla extus glabra ac fructu 10–11 mm longo distinguitur.

Shrubs to 3 m tall; stems glabrous, becoming terete. *Leaves* paired, *blades* elliptic to elliptic-oblong or somewhat ovate, 10–16 cm long, 2.8–6 cm wide, at apex acute to often acuminate with slender tips 1–2 cm long, at base acute to usually cuneate, papyraceous, glabrous throughout; secondary veins 7–12 pairs, looping broadly to interconnect, with 1–2 weak intersecondary veins usually present between pairs of secondary veins, costa and secondary veins thickened to prominulous above and below, the lesser venation sometimes slightly thickened; *petioles* glabrous, 8–12 mm long; *stipules* glabrous, united around the stem into a low continuous sheath 0.5–1 mm long, entire, broadly concave, interpetiolarly bilobed, lobes deltoid to ligulate, obtuse to rounded, 0.8–1.5 mm long, entire. *Inflorescences* corymbiform, erect; peduncles 0.5–3 cm long; panicles 2–4 cm long, 3–4.5 cm wide, with 1

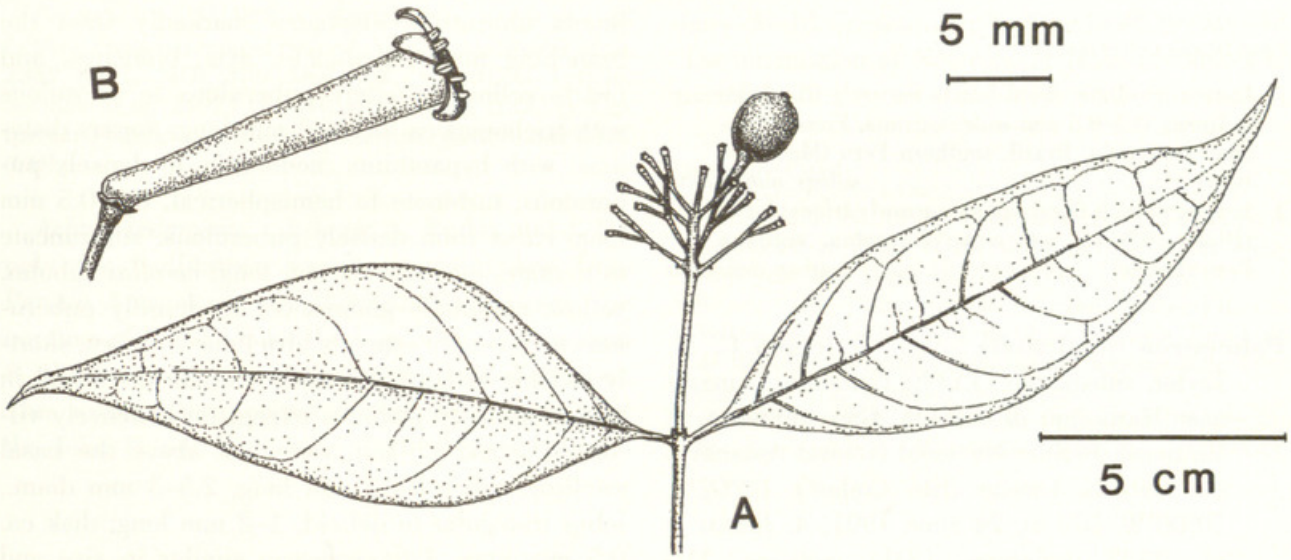

Figure 2. *Palicourea macarthurorum* C. M. Taylor. —A. Habit. —B. Flower bud. A to 5-cm scale; B to 5-mm scale. A from *Rubio 94* (MO); B from *Rudas et al. 2725* (MO).

pair of weakly developed lateral branches, these and pedicels ascending, with flowers pedicellate in open cymules of 2–5 or occasionally one flower per cymule subsessile; bracts rudimentary or lacking, those subtending larger branches usually displaced from the branching point, 0.2–0.5 mm long, rounded; pedicels 0.5–11 mm long; peduncle, axis, branches, bracts, and pedicels glabrous to minutely puberulous, yellow; *flowers* with hypanthium ca. 1 mm long, cylindrical to turbinate, minutely puberulous; *calyx* limb ca. 0.3 mm long, puberulous, broadly shallowly lobed, ciliolate; *corollas* funnelform, yellow, swollen and gibbous at base, strongly bent here but generally straight in the tube, glabrous externally, internally glabrous except for a densely pilose ring 1–1.5 mm wide just above the basal swelling, tube ca. 17 mm long, ca. 1.5 mm diam. just above the pilose ring, ca. 3 mm diam. at mouth, lobes narrowly triangular, ca. 3 mm long, acute and slightly thickened at apex; disk ca. 0.8 mm high. *Infructescences* similar in size to inflorescences, the branches and pedicels often more spreading, becoming red; *fruits* ellipsoid, 11–13 mm long, 10–12 mm wide, laterally somewhat flattened, glabrous; *pyrenes* with 3–5 broadly angled low ridges.

Distribution, habitat, and phenology. Amazonian Colombia and Ecuador, in wet forest at 100–1200 m. Collected in flower March, April, and July, in fruit April and November.

This species is distinguished within *Palicourea* by its relatively small stipules, short corymbiform inflorescences with well-developed pedicels and rudimentary bracts, yellow and externally glabrous corollas, and distinctive, large fruits with the pyrenes nearly smooth. The fruit color is unknown but those of most *Palicourea* species are blue-black. This species is similar to *P. longiflora* (Aublet) L. C. Richard, which is common further east in Amazonia and can be distinguished by its leaves puberulous to pilosulous abaxially, inflorescences with 2–3 pairs of lateral branches and bracts 0.5–7 mm long borne on peduncles 2.5–10 cm long, corollas puberulous externally, and fruits 4–5 mm long and 5–6 mm wide with the pyrenes distinctly and sometimes rather sharply longitudinally ridged.

The specific epithet commemorates John D. and Catherine T. MacArthur, whose foundation has sponsored floristic inventories of several important sites in Amazonian Peru and Colombia, including the Parque Amacayacu.

Paratypes. COLOMBIA. **Amazonas:** Municipio de Leticia, Parque Nacional Natural Amacayacu, *Pipoly et al. 15319* (COL, MO), *15299* (COL, MO), *15353* (COL, MO), *15902* (COL, MO), *Rudas et al. 3442* (COL, MO). **Putumayo:** Vereda Medio Afán, camino Medio Afán–Churumbelo, ca. 2.5 horas de Mocoa hacía el oriente, *García et al. 64* (CUVC, MO). ECUADOR. **Morona-Santiago:** Cordillera Cutucú, toward the Itzintza, ca. 02°40′S, 78°W, *Camp E-1352* (S). **Napo:** carretera Hollín–Loreto, Km 40, 00°43′S, 77°36′W, *Hurtado et al. 208* (MO, QCNE), carretera Hollín–Loreto, Km 40–50, *Hurtado 550* (MO, QCNE). **Pastaza:** vía Auca, 115 km al sur de Coca, cerca del río Tigüino, carretera de PETRO-CANADA en construcción, 01°15′S, 76°55′W, *Rubio 94* (MO, QCNE).

Palicourea quadrifolia (Rudge) de Candolle, Prodr. 4: 529. 1830.

Steyermark (1972: 760) presented synonymy and a discussion of this species.

KEY TO THE SUBSPECIES OF *PALICOUREA QUADRIFOLIA*

1. Leaves quadrate; floral bracts narrowly triangular to linear, 0.2–0.5 mm wide; Guyana, French Guiana, Venezuela, Brazil, southern Peru (Madre de Dios) . . . . . subsp. *quadrifolia*
1. Leaves paired; floral bracts narrowly triangular to elliptic, 0.3–1.2 mm wide; Colombia, northern Peru (Loreto) . . . . . subsp. *leticiana*

Palicourea quadrifolia subsp. **leticiana** C. M. Taylor, subsp. nov. TYPE: Colombia. Amazonas: Municipio de Leticia, Corregimiento de Tarapacá, Parque Nacional Natural Amacayacu, Cabaña Lorena (Río Cothué), 03°02′S, 70°00′W, 100 m, 24 June 1991, *A. Rudas et al. 2437* (holotype, COL; isotypes, MO 3933506, MO 4258973).

Palicourea lucentifolia Standley, Publ. Field Columbian Mus., Bot. Ser. 8: 223. 1930. Syn. nov. TYPE: Peru. Loreto: La Victoria on the Amazon River, 29 Aug. 1929, *L. Williams 2906* (holotype, F 604457).

Haec varietas a varietate typica foliis binatis ac bracteis floralibus ex linearibus anguste ellipticis 0.3–1.2 mm latis differt.

Flowering at 1.5 m tall, to 5 m tall; stems glabrous to sparsely puberulous. *Leaves* paired, with *blades* narrowly elliptic to elliptic, 10.5–35 cm long, 3–11.5 cm wide, acute to usually acuminate at apex with slender tips 5–28 mm long, cuneate to usually acute and sometimes tapering at base, papyraceous, glabrous and usually shiny above, glabrous to minutely puberulous below; secondary veins 11–28 pairs, sometimes looping to interconnect distally or usually uniting with the margin, usually with 1–3 weak intersecondary veins between each pair of secondary veins; *petioles* glabrous to sparsely puberulous, 3–15 mm long; *stipules* glabrous to sparsely puberulous, united around the stem into a triangular to truncate continuous sheath 2–6 mm long, enclosing and often exceeded by colleters and appearing ciliate, sometimes splitting to base, interpetiolarly bilobed, the lobes triangular to usually subulate, 0.5–3 mm long. *Inflorescences* corymbiform, flat-topped to broadly rounded, erect; peduncles 4–11.5 cm long, subtended by a truncate stipule sheath that lacks leaves or bears reduced leaves and terminates a reduced or unexpanded internode; panicles 4.5–9 cm long, 6–12 cm wide, lowermost branches paired, ascending; flowers sessile in congested to open and dichasial cymules of 3–7, each subtended by 1–2(–3) bracts, these free or slightly fused, linear to narrowly elliptic, acute, 1.2–3 mm long, 0.3–1.2 mm wide, ciliolate, on principal branches the bracts absent or displaced markedly from the branching nodes; peduncle, axis, branches, and bracts yellow, minutely puberulous to pilosulous with trichomes ca. 0.1–0.3 mm long; *flowers* distylous, with hypanthium moderately to densely puberulous, turbinate to hemispherical, 0.3–0.5 mm long, *calyx* limb densely puberulous, subtruncate to dentate, ca. 0.2–0.3 mm long; *corollas* tubular, yellow, externally glabrescent to densely puberulous and usually sparsely hirtellous on lobes, shortly swollen at base, generally straight there and in tube, internally glabrous except for a densely villous ring ca. 1.5 mm wide just above the basal swelling, tubes 8–12 mm long, 2.5–3 mm diam., lobes triangular to deltoid, 1–2 mm long; disk ca. 0.5 mm high. *Infructescences* similar in size and proportion to inflorescences or sometimes more expanded with the branches spreading more widely, becoming orange to red; *fruits* ellipsoid, ca. 3 mm long, ca. 5 mm wide, somewhat didymous, glabrescent; *pyrenes* 2, hemispherical to subglobose, smooth.

Distribution, habitat, and phenology. Amazonian Colombia and Peru, in wet forest at ca. 100 m. Collected in flower in June and August to September.

Palicourea quadrifolia subsp. *leticiana* differs from subspecies *quadrifolia* only its paired rather than quadrate leaves and wider floral bracts; otherwise it falls within the range of variation seen in the latter subspecies. Paired leaves are occasionally found in some verticillate-leaved species (see descriptions in Steyermark, 1974), and may become fixed in local populations, as in *P. triphylla* de Candolle in Cuba (Taylor, 1993). This feature, together with the consistently relatively broad floral bracts, suggests that the plants segregated here as subspecies *leticiana* are isolated from more eastern and southern populations of *P. quadrifolia*. The lack of any observable difference in reproductive characteristics between these two morphological forms and their complementary geographic ranges suggest that subspecific status is more appropriate than varietal or specific recognition. The epithet refers to the geographic area from which these plants were first known.

Standley described *Palicourea lucentifolia* based on a single specimen that was collected in the stage in which the corollas have all fallen and no fruit development is evident. Because conclusive identification of *Palicourea* species is based on corolla characteristics, it is preferable to have a type specimen that bears mature flowers, as does *Rudas et al. 2437*, which also has several duplicates.

Paratypes. COLOMBIA. **Amazonas:** municipio de Leticia, Parque Nacional Natural Amacayacu, *Rudas et al. 2352* (COL, MO); Río Amazonas, vicinity of Leticia, *Schultes et al. 24023* (ECON, MO), *24032* (ECON). **Caquetá:** Florencia, cerro de La Sardina, *Cuatrecasas 8891* (COL).

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