New Species and a New Combination in Rubiaceae from Central and South America

Charlotte M. Taylor

Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri, 63166-0299, U.S.A.

ABSTRACT. The new combination Alibertia utleyorum (Dwyer) C. M. Taylor is made, and the new species Alibertia premontana, Pentagonia involucrata, Remijia uniflora, and Rudgea sanblasensis are described and illustrated.

During the review of specimens of neotropical Rubiaceae for preparation of floristic treatments for Mesoamerica and the Venezuelan Guayana and identification of materials for institutional inventory projects, the need for the following new combination became evident, and several undescribed species were discovered.

NEW COMBINATION

Alibertia utleyorum (Dwyer) C. M. Taylor, comb. nov. Basionym: Duroia utleyorum Dwyer in Burger & Taylor, Fieldiana, Bot., n.s. 33: 127. 1993. TYPE: Costa Rica. Puntarenas: adjacent to airfield, Rincón de Osa, 6-7 Feb. 1974, R. Liesner 1774 (holotype, CR; isotype, MO 3030387).

This distinctive species was described in Duroia (Gardenieae) based primarily on its dense pilosulous pubescence on all parts, including the stipules, and its solitary sessile pistillate flowers and fruits. With more material now available that includes vegetative stem apices, it is evident that this species clearly lacks the calyptrate caducous stipules that distinguish Duroia, and thus cannot be retained in this genus. Neotropical generic limits in Gardenieae are not completely resolved, and the correct placement of this species is not clear. Based on the distinctions outlined by Steyermark (1974), this species could be placed in either Alibertia or Borojoa. The corollas are six-parted as in Borojoa, but the inflorescences lack the other feature that distinguishes Borojoa: the characteristic two to three pairs of subtending, leafless, invovlucral stipules. Duroia utleyorum agrees with Alibertia in all characters except the six-parted rather than three- to five-parted corollas. Duroia utleyorum is here transferred to Alibertia because of its greater agreement with the characteristics of this genus.

This species is now known from wet forest at 20-200 m elevation in eastern Costa Rica, as well as from the Osa Peninsula.

Additional specimens examined. COSTA RICA. Hereedia: near Puerto Viejo along road near Río Sucio, Croat 35728 (MO); along bank of Río Toro, about 10 km upstream from the confluence with the Río Sarapiquí, Hartshorn 1486 (MO). Limón: hills between headwaters of Quebrada Mata de Limón and upper branches of Quebrada Tigre, Finca Anai, 9°34'N, 82°40'W, Grayum et al. 4459 (CR, MO); cantón de Talamanca, Ambrú, camino al noreste del pueblo, entre Katsi y Sheuab, 9°31'30"N, 82°55'30"W, Hammel et al. 17526 (CR, MO); cantón de Talamanca, Ambrú, margen derecho del Río Lari, lomas aledañas a Cachabri, 9°29'30"N, 82°59'40"W, G. Herrera 3059 (CR, MO).

NEW SPECIES

Alibertia premontana C. M. Taylor, sp. nov. TYPE: Costa Rica. Alajuela: Reserva Biológica Monteverde, Valle del Río Penas Blancas, fila de Toro, sendero Pipilacha y Campo Tres, 10°N, 84°W, 900-1100 m, 21 Jan. 1991 (fr), W. Haber & E. Cruz 10630 (holotype, MO 4234216; isotype, CR not seen). Figure 1.

A congeneris mesoamericanis stipulis 4-7 mm longis, limbo calycino ca. 3 mm longo, corolla ex tubo 14—17 mm longo ac lobulis quatuor 11-12 mm longis constante distincta; sylvam premontanum humidum habitat.

Small trees, flowering at 2 m tall, to 18 m tall; stems glabrous. Leaf blades elliptic, 6—12 cm long, 2.5-5.5 cm wide, at apex acute to somewhat acuminate with rather slender tips 5—15 mm long, at base acute, chartaceous to subcoriaceous, glabrous except for tuft domatia in the leaf axils, adaxially matte or dull to occasionally rather shiny; secondary veins 6-7 pairs, ascending, occasionally looping to interconnect near apex; petioles 5-20 mm long, glabrous; stipules interpetiolar and also shortly fused intrapetiolarly, deciduous with or before the leaves, typically breaking off to leave a line or short truncate base, glabrous, the interpetiolar portion triangular to deltoid, 4—7 mm long, acute, ciliate; apical buds typically resinous. Staminate inflorescences terminal, capitate, sessile, ebracteate.
Figure 1. Alibertia premontana C. M. Taylor. —A. Habit; based on Folsom & Dressier 5606 (MO). —B. Staminate flower; based on Folsom et al. 4743 (MO).

(subtended by the vegetative stipules at the subtending node); flowers 3–9, sometimes with stipes to 1 mm long; calyx green, glabrous to puberulous, limb ca. 3 mm long, subtruncate to 5-denticulate or with 5 separated linear lobes 1–1.2 mm long; corolla salverform, white to cream, externally densely tomentose throughout, internally glabrous in lower half of tube, densely velutinous in upper half, tube slightly funnelform, 14–17 mm long, ca. 1.2 mm diam. at base, ca. 3 mm diam. at top; lobes 4, lanceolate, 11–12 mm long, ca. 4 mm wide, acute to acuminate; stamens 4, included, attached in top part of tube, anthers sessile, 8.5–9 mm long; pistillode ca. 11 mm long. Pistillate inflorescences and flowers not seen. Fruits solitary, terminal, sessile, globose, on dried specimens 2.5–4 cm diam., fleshy throughout with pericarp smooth, often rather shiny, leathery to perhaps ligneous, ca. 1–2 mm thick; seeds angled, to at least 8 mm long, with testa brown, finely striate. Collected in flower August, September, November, in fruit December–February, April, May, and November.

Distribution and habitat. In wet premontane forest at 800–1700 m, Costa Rica (Cordillera Tilarán) to western Panama (Chiriquí).

This new species is distinguished among Central American species of Alibertia by its relatively short stipules, leaves that are usually dull or matte on the upper surface, and relatively long calyx limb and corolla lobes, in contrast to stipules 7–20 mm long and leaves that are generally shiny and smooth on the upper surface in A. edulis (L. C. Richard) A. Richard ex DC., and a calyx limb 1 mm long or shorter and corolla lobes 1.5–3 mm long in A. garapatica Karsten. These last two species are generally found in moist to usually dry forest from sea level to 500 m, or rarely to 1000 m in the case of A. edulis, which is typically found along watercourses.

This new species is placed in Alibertia based on its dioecious, sessile, terminal inflorescences with the corollas four-parted, solitary pistillate flowers and fruits, and lack of leafless involucral stipules subtending the inflorescence (Steyermark, 1974).
Paratypes. COSTA RICA. Alajuela: Bosque Eterno de Los Niños, Río Peñas Blancas, Quebrada Gata, raihuelo de Fernando Villalobos, 10°23'N, 84°42'W, Bello et al. 2172 (CR, MO); Bosque Eterno de Los Niños, Río Peñas Blancas, Quebrada Gata, Los Pérez, 10°23'N, 84°42'W, Bello et al. 2191 (CR, MO); Bosque Eterno de Los Niños, Reserva de Arenal, Río Peñas Blancas, Quebrada Agua Caliente, Finca Villalobos, Bello et al. 2216 (CR, MO); Reserva Forestal de San Ramón, 10°12'54"N, 84°36'28"W, G. Herrera & Mora 195 (CR, MO). PANAMA. Bocas del Toro/Chiriquí Border: Cerro Colorado, road to Bocas del Toro, end of mountain access road, just above face of mine, Folsom et al. 4743 (MO); vicinity of Cerro Colorado, along mining road on [continental] divide, 8°35'N, 81°50'W, McPherson 13644 (MO). Chiriquí: Cerro Colorado, along mining road 24 km above bridge over Río San Félix (N of village of San Félix), Croat 49477 (MO); Cerro Colorado, top, Bocas Road, Folsom & Collins 1740 (MO); Fortuna Dam site, Folsom et al. 5606 (MO); vicinity of Fortuna Dam, in valley S of lake, McPherson & Aranda 10120 (MO); valley of El Hornito, vicinity of Fortuna Dam, McPherson 12525 (MO).

Pentagonia involucrata C. M. Taylor, sp. nov.

TYPE: Ecuador. Esmeraldas: cantón de San Lorenzo, parroquia Ricaurte, Centro Pambilar, 01°06'N, 78°36'W, 500 m, 21 Jan. 1993, C. Aulestia & M. Aulestia 998 (holotype, MO 4671395; isotype, QCNE). Figure 2.

A congeneris foliis 19—31 X 6—9.5 cm nervos secondarios 15—20-jugatos gerentibus, floribus solitariis, pedunculos 3.5—7.5 cm longo, bracteis foliaribus 13—22 X 9—12 mm, limbo calycino 25—35 mm longo in lobulos quinque ellipticos ad lanceolatos desinente distincta.

Small trees flowering at 4 m tall, to 10 m tall, branched, glabrous throughout; stems rather succulent, quadrato-cylindrical, strongly 4-ridged when dry. Leaf blades entire, narrowly elliptic, 19—31 cm long, 6—9.5 cm wide, at apex acute to slightly acuminate, at base cuneate, papyraceous to chartaceous, adaxially smooth, abaxially finely striate and perhaps pale; secondary veins 15—20 pairs, extending to near the margins, sometimes looping weakly to interconnect; petioles 2—4.5 cm long; stipules strongly twisted and somewhat resinous or mucilaginosus in bud, caducous or sometimes persisting with the leaves, narrowly triangular, 3—4.5 cm long, acute to slightly acuminate. Flowers not seen. Fruits solitary in leaf axils with flexuous peduncles 3.5—7.5 cm long, pendulous at maturity, subtended by 2—4 cycles of bracts, the proximal pair sometimes reduced and borne near the middle of the peduncle, the distalmost 1—2 pairs acaceous, elliptic to ovate, 13—22 mm long, 9—12 mm wide, obtuse to rounded, longitudinally finely striate or perhaps finely parallel-veined; berry ellipsoidal, 3—3.5 cm long, 2.5—3 cm diam., glabrous to moderately hirsutulous, smooth to minutely lenticellate, becoming coffee-brown, with persistent calyx limb glabrous, with

Figure 2. Habit of Pentagonia involucrata C. M. Taylor; based on Aulestia & Aulestia 998 (MO).
tube 5–10 mm long, with lobes 5, chartaceous, elliptic to lanceolate, 20–24 mm long, imbricated, obtuse to acute. Collected in fruit January, March, and October.

Distribution and habitat. In wet forest in northeastern Ecuador at 250–500 m.

This new species is placed in Pentagonia based on its succulent habit, camose baccate fruits, and leaves with the abaxial surfaces finely striate. Within this genus, P. involucrata is distinguished by its combination of branched habit, relatively small leaves, fruits solitary on well-developed peduncles and subtended by several cycles of bracts, and relatively long, regularly lobed calyx limb. The specific epithet refers to the bracts that subtend the fruits. Although Pentagonia is characterized as "usually unbranched pachycaul treelets" with the leaves “very large, usually 50 cm or more long” (Gentry, 1993), several previously described species are also well-branched shrubs or small trees that may reach 18–20 m in height and generally have leaves that are 10–40 cm long (e.g., P. costaricensis (Standley) W. Burger & C. M. Taylor and P. parvifolia Steyermark). Pentagonia involucrata is similar to P. parvifolia Steyermark, which can be distinguished by its leaves with 5–6 pairs of secondary veins, ebracteate flowers and fruits that may be solitary but are more often 2–3 per axil, peduncles 5–10 mm long, and a calyx limb 8–10 mm long that is lobed to the base.

Paratypes. ECUADOR. Esmeraldas: cantón Elroy Alfaro, parroquia Luis Vargas Torres, Reserva Ecológica Cotacachi-Cayapas, río Santiago, estero Pote, 00°49'N, 78°45'W, Tirado et al. 578 (MO, QCNE), 594 (MO, QCNE); cantón San Lorenzo, Reserva Indígena Awd, cañon del río Mira, comunidad “La Unión,” 01°02’N, 78°26’W, Rubio et al. 1148 (MO, QCNE); cantón de San Lorenzo, parroquia Ricaurte, centro Pambilar, 01°08’N, 78°36’W, C. Aulestia & M. Aulestia 903 (MO, QCNE).

Remijia uniflora C. M. Taylor, sp. nov. TYPE: Venezuela. Amazonas: al margen meridional de la Sierra Cuao-Sipapo, 04°59’N, 67°18’W, 650 m, 16 Feb. 1993, A. Gröger 753 (holotype, MO 4619867; isotype, VEN not seen). Figure 3.

A congeneris floribus fructibusque subsessilibus solitariis, foliis glabris coriaceis nervos secundarios vix manifestos gerentibus, stipulis ca. 53 mm longis, capsula gabra 4–4.5 cm longa distincta.

Shrubs 2–3 m tall; stems densely hirsutulous to pisolulosus, becoming glabrescent with age. Leaves paired; blades elliptic, 13.5–17.5 cm long, 4.7–5.5 cm wide, at apex acute to slightly acuminate, at base cuneate, glabrous, coriaceous; secondary veins ca. 15 pairs, hardly evident, the minor venation equally pronounced and finely reticulated;
petioles 10–13 mm long, glabrous; stipules held flat against each other in bud, caducous, subcoriaceous, ligulate, ca. 53 mm long, ca. 12 mm wide, at apex acute, sparsely to moderately pilosulous, somewhat costate. Flowers not seen. Fruits solitary in axils, subsessile; capsules ellipsoid-oblong, 4–4.5 cm long, ca. 1 cm diam., with a stipe 5–8 mm long, chartaceous to rather ligneous, glabrous, smooth, septicidally and basipetally dehiscent, entire at apex; seeds erect, imbricated, flattened, nu-
merous, elliptic, 5–6 mm long, 2.5–3 mm wide, flattened, with a membranaceous brown circumferential wing rather irregularly 1–4 mm wide, entire.

**Distribution and habitat.** Known only from the type collection.

This species is placed in *Remijia* based on its axillary capsular fruits with numerous winged flattened seeds that are erect and imbricated. Within *Remijia* this species is distinguished by its solitary subsessile flowers and fruits, and its coriaceous leaves with the secondary veins hardly discernible among the finely reticulated minor venation. Solitary subsessile flowers are otherwise only found in *R. reducta* Steyermark, which is easily distinguished by its dense hirsute pubescence on all parts, leaves with well-marked secondary veins, stipules 10–17 mm long, and obovate to broadly oblong capsules 13–32 mm long.

**Rudgea sanblasensis** C. M. Taylor, sp. nov. **TYPE:** Panama. San Blas: río Playón Chico, Dukandi, vecindad de la Isla Playón Chico, 09°15'N, 78°15'W, 30 m, 6 Sep. 1993, H. Herrera et al. 1358 (holotype, MO 4671394; isotype, PMA).

A *Rudgea raveniana*, *R. skutchii*, et *R. trifurcata* stipulis 11—15 mm longis, limbo calycino 4—7 mm longo, tubo corollino ca. 12 mm longo, lobulis corollinis 12–14 mm longis appendicibus apicalibus ca. 2 mm longis mutitis distincta.

Shrubs ca. 5 m tall; stems glabrous. Leaves paired; blades elliptic, 21–34 cm long, 8–13 cm wide, at apex acute to slightly acuminate, at base acute to cuneate, papyraceous to chartaceous, glabrous throughout, perhaps pale below; secondary veins 8–13 pairs, usually looping to interconnect in the distal part of the blade, without domatia; petioles 13–35 mm long, glabrous; *stipules* interpetiolar and also shortly fused intrapetiolarly, deciduous before the leaves, glabrous, the interpetiolar portion triangular, 11–15 mm long, obtuse to rounded or shortly truncate, with 5–15 closely set acicular glandular fimbriae 1—1.5 mm long. *Inflorescences* terminal, paniculiform-cymose, glabrous; peduncles 3–5 cm long, strongly flattened, subtended by a reduced stipule 1–3 mm long with persistent fimbriae; cymes pyramidal, 1.5–2.5 cm long and wide, branched 1–2 times, axis and branches strongly flattened, bracts minute; *flowers* subsessile in cymes of 2–3; calyx glabrous, hypanthium turbinate, 2–4 mm long, limb 4–7 mm long, truncate; corolla salverform, white, carnose, glabrous, tube ca. 12 mm long, lobes narrowly triangular, 12–14 mm long, acute, triangular in cross section, with apical appendages ca. 2 mm long; anthers linear, partially exerted, ca. 7 mm long; style ca. 5 mm long, stigma branches 2, linear, included, ca. 1 mm long. Immature *fruits* ellipsoid, to at least 17 mm long and 13 mm diam, glabrous, smooth, with calyx limb persistent, with pedicels elongating to 2–4 mm long. Collected in flower in September, in immature fruit in October.

**Distribution and habitat.** In moist or wet forest at 30–450 m in northeastern Panama.

This species is placed in *Rudgea* based on its stipules with well-developed glandular fimbriae, valvate corolla lobes, and drupaceous fruits with two pyrenes. Within *Rudgea* this species is distinguished by its relatively large leaves that are apparently pale abaxially, relatively long stipules, and well-developed calyx limb. It is similar to and probably closely related to *R. skutchii* Standley and *R. trifurcata* Gómez-Laurito, both of which can be distinguished by their leaves 5–18 cm long and stipules 3–10 mm long, and also to *R. raveniana* W. Burger, which can be distinguished by its stipules 2–2.5 mm long, calyx limb 3–4 mm long, and corollas with tubes ca. 4 mm long and appendaged lobes ca. 6 mm long.

**Paratypes.** PANAMA. San Blas: río Playón Chico, vecindad de Neba Dummat, caminando por el filo del sureste, 09°14.5'N, 78°15'W, H. Herrera et al. 1402 (MO, PMA).

**Acknowledgments.** I thank L. Andersson, P. Berry, M. Grayum, B. Hammel, and J. Kirkbride, Jr., for their invaluable comments, and R. E. Gereau for preparation of the Latin diagnoses.

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[https://doi.org/10.2307/3391924](https://doi.org/10.2307/3391924).

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