

## SIX NEW SPECIES OF *TETRAPTERYS* (MALPIGHIACEAE)

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Six new species of the Neotropical genus *Tetrapterys* (Malpighiaceae) are described and illustrated: *T. amazonica* C.E.Anderson (Brazil, Colombia and Peru), *T. andersonii* C.E.Anderson (Mexico), *T. callejasii* W.R.Anderson (Colombia), *T. molinae* W.R.Anderson (Honduras), *T. rzedowskii* W.R.Anderson (Mexico) and *T. steyermarkii* W.R.Anderson (Colombia and Venezuela). All have 4(–6)-flowered umbels as the ultimate inflorescence units, glabrous yellow petals, and samaras with a small dorsal wing in addition to the four large lateral wings.

*Keywords.* Honduras, Malpighiaceae, Mexico, South America, *Tetrapterys*.

### INTRODUCTION

The large and diverse Neotropical genus *Tetrapterys* Cav. is named for its samaras with four lateral wings. The flowers, with yellow or pink petals, are borne in umbels, corymbs or pseudoracemes, these often grouped in paniculate inflorescences. Small, interpetiolate stipules are usually present, either free or connate. The six species here newly described were discerned by the late William R. Anderson while working on *Tetrapterys* as part of a review of Malpighiaceae of Mexico and Central America, and in preparation for the recently published *Catálogo de Plantas y Líquenes de Colombia* (Anderson & Anderson, 2016). He left detailed notes for four of these: *Tetrapterys callejasii* (Colombia), *T. molinae* (Honduras), *T. rzedowskii* (Mexico) and *T. steyermarkii* (Colombia and Venezuela). For the other two, he only noted that they were undescribed: *Tetrapterys amazonica* (Brazil, Colombia and Peru) and *T. andersonii* (Mexico). Recent molecular work (e.g. Davis & Anderson, 2010) confirmed W. R. Anderson's long-held opinion that *Tetrapterys* as traditionally circumscribed is polyphyletic. The novelties presented here have 4(–6)-flowered umbels as the ultimate inflorescence units and glabrous yellow petals; they fall within *Tetrapterys* subg. *Tetrapterys*, as delimited by Niedenzu (1928).

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## SPECIES DESCRIPTIONS

*Mexico****Tetrapteryx andersonii* C.E.Anderson, sp. nov.**

*Tetrapteryx andersonii* differs from *T. schiedeana* Schltld. & Cham. in its velutinous-tomentose vesture, shorter petioles and larger stipules; from *T. molinae* W.R.Anderson and *T. argentae* Bertol. in its free stipules and its smaller, oblong, sagittate petals. – Type: Mexico, Chiapas: slope 5 miles S of Bochil along the road to Tuxtla Gutiérrez, 4500 ft, 8 viii 1967 (fl), Clarke 120 (holo NY; iso DS). **Fig. 1.**

Woody vine. Stems very densely velutinous-tomentose, the vesture eventually abraded. *Laminas* of larger leaves 4.5–7.5 × 1.8–3.2 cm, narrowly elliptical, apex acute and mucronulate to short-acuminate, base acute, adaxially tomentulose-sericeous but soon glabrous, abaxially tomentose, in age glabrescent, marginal glands (2–)3–5 in the proximal 1/4–1/3(–1/2) along each side, each gland 0.4–0.5 mm long; petiole 2.5–5 mm long, tomentose, eglandular; stipules free, 0.5–0.8 mm long, triangular, glabrous, usually hidden by the dense stem vesture. *Inflorescence* terminating in umbels of 4 (or 5) flowers, borne singly or in short panicles, tomentose; inflorescence bracts 5–14 mm long, 2.6–9 mm wide, broadly elliptical to ovate, with 1 or 2 prominent to stipitate glands per side on the margin near the base, deciduous in fruit; floriferous bracts 1.2–1.6 × 0.6–1 mm, narrowly triangular; peduncle (2.5–)3–6 mm long, tomentose; bracteoles 1–1.4 × 0.6–1 mm, oblong, inserted at apex of peduncle; pedicel 3–4 mm long, tomentose. *Sepals* 1.5–1.7 mm long beyond glands, 1.7–2 mm wide, apex rounded and ciliate, adaxially sericeous in distal 1/2, abaxially glabrous but with hairs between glands, the anterior eglandular, the lateral 4 biglandular, glands 2.5–3 mm long. *Petals* yellow, drying red, the lateral 4 with the claw 1.8–2 × c.0.5 mm, limb 4.5–5.5 × 3.5–4 mm, narrowly oblong to obovate, base sagittate, margin minutely denticulate to erose; posterior petal with the claw 2.5–3 × c.0.8 mm, limb 5–5.5 × 3.5–4 mm, oblong to narrowly obovate, truncate to briefly sagittate, margin minutely erose or erose-denticulate. *Filaments* 2.3–3.3 mm long, glabrous, connate in proximal 1/4(–1/2); anthers 1.2–1.3 mm long, subequal, glabrous. *Ovary* c.2 mm long, hirsute; styles 2–2.3 mm long, the anterior slightly longer and more slender than the posterior 2, glabrous, all with apex dorsally rounded or truncate and stigma at internal angle. *Samara* with the wings sericeous-tomentulose to glabrescent; lateral wings distinct and usually tapering towards an acute apex, 15–20 × 5–7 mm; dorsal wing 3–4 mm high, margin subentire; nut 4.5–5 mm diam., tomentose, between dorsal and lateral wings muricate and with a few outgrowths to 0.1 mm long but hidden by the dense vesture; areole 1.5–2 × c.1.5 mm; mature seed not seen.

*Distribution.* Mexico (Chiapas).

*Habitat.* Lower montane rain forests, oak and pine-oak forests, and brush; 600–1450 m.

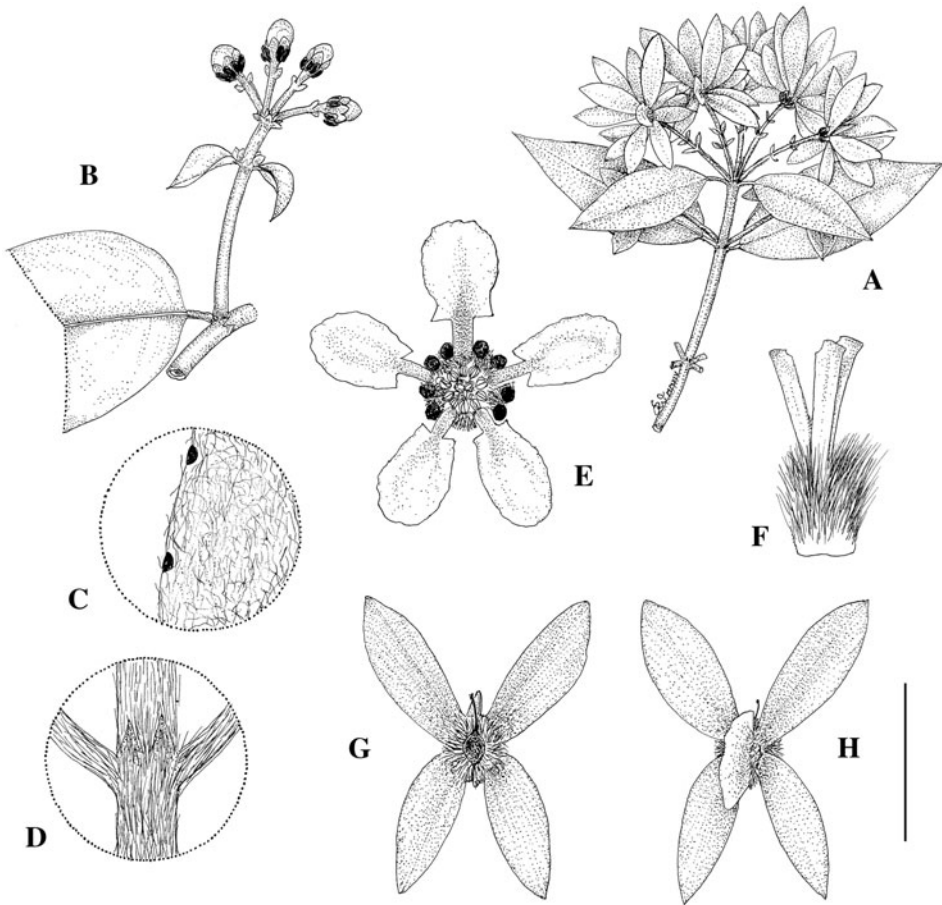


FIG. 1. *Tetrapteryx andersonii* C.E.Anderson. A, Fruiting branch; B, node with portion of leaf and inflorescence in bud; C, detail showing abaxial vestiture of lamina and marginal glands; D, detail of node showing a pair of stipules; E, flower, posterior petal uppermost; F, gynoecium, anterior style at left; G, samara, adaxial view; H, samara, abaxial view. Scale bars: A, 4 cm; B, 2 cm; C and D, 4 mm; E, 8 mm; F, 2.7 mm; G and H, 1.3 cm. A, D, G and H based on *Anderson & Laskowski* 4255 (MICH); B and C on *Breedlove* 10662 (DS); and E and F on *Clarke* 120 (DS).

*Etymology.* The specific epithet commemorates William Russell Anderson (1942–2013), who devoted his career to the study of the Malpighiaceae.

*Additional specimens examined.* MEXICO. **Chiapas:** 21 mi N of Mex hwy 195, road to Pichucalco, 1450 m, 19 xi 1966 (fr), *Anderson & Laskowski* 4255 (ENCB, MICH); Mpio. Tuxtla Gutiérrez, steep slope at El Sumidero, 22 km N of Tuxtla Gutiérrez, 4500 ft, 2 vii 1965 (fl), *Breedlove* 10662 (DS); Mpio. Ocozocoautla de Espinosa, 32 km NW of Ocozocoautla de Espinosa, 600 m, 27 viii 1972 (in bud), *Breedlove* 27497 (DS, MICH).

*Tetrapteryx andersonii* is distinctive in the white-tomentose vestiture that covers the young stems, axes, petioles and abaxial surface of laminas. It is reminiscent of

*Tetrapteryx argentea* Bertol. and *T. molinae* W.R.Anderson, but these have connate stipules; see detailed notes below under *T. molinae*. *Tetrapteryx andersonii* and *T. schiedeana* Schltdl. & Cham., which occurs from southern Mexico to Costa Rica and adjacent Panama, are sympatric in Chiapas. Both differ from members of the *Tetrapteryx mexicana* Hook. & Arn. complex in their smaller oblong petals, which are generally sagittate at the base and turn orange to red in age and on drying. They share leaf glands borne on the margin of the lamina and free stipules, but are easily separated by leaf vestiture.

- a. Leaves tomentose, abaxially glabrescent only in age; petioles 2.5–5 mm long, tomentose; stipules 0.5–0.8 mm long; lateral wings of samara mostly tapered towards an acute apex \_\_\_\_\_ *T. andersonii*
- b. Leaves with sessile to subsessile hairs only when very young, soon glabrescent to glabrous or with scattered hairs remaining on costa abaxially; petioles 4–10(–12) mm long, sericeous to glabrescent; stipules minute, to 0.3 mm long; lateral wings of samara rounded at apex \_\_\_\_\_ *T. schiedeana*

***Tetrapteryx rzedowskii* W.R.Anderson, sp. nov.**

*Tetrapteryx rzedowskii* differs from *T. schiedeana* Schltdl. & Cham. in its larger petals with a suborbicular limb remaining yellow in age and in the posterior petal differing from the lateral ones, from *T. heterophylla* (Griseb.) W.R.Anderson in having the bracteoles inserted at the apex of the peduncle and the absence of distinctive inflorescence bracts. – Type: Mexico, San Luis Potosí: Tamasopo Canyon, 6 viii 1890 (fl/fr), Pringle 3636 (holo MEXU; iso A, GH, MEXU, VT). **Fig. 2.**

Vining shrub to 2–3 m. Stems sericeous when young, soon glabrate to glabrous. *Laminas* of larger leaves 6–11.5 × 2.5–5.3 cm, elliptical, apex acuminate, base acute, initially sericeous, adaxially soon glabrous, abaxially soon sparsely and often patchily sericeous to glabrate or eventually glabrous, the hairs straight, appressed, marginal glands 3–7 in the proximal 1/4–1/2 along each side, each gland 0.2–0.4 mm long; petiole 0.6–1.5 cm long, sericeous to glabrescent, eglandular; stipules free, 0.3–0.6 × 0.3–0.5 mm, triangular, glabrous. *Inflorescence* terminating in umbels of 4–6 flowers, borne singly or in short panicles, sparsely sericeous to glabrate; inflorescence bracts absent or sometimes reduced leaves present; floriferous bracts 1–1.1 mm long, ovate to oblong; peduncle (2.5–)4.5–7.5 mm long, sericeous; bracteoles 0.6–1 mm long, ovate to oblong, inserted at apex of peduncle; pedicel 4.5–7 mm long, sericeous. *Sepals* (1.2–) 1.5–2 mm long beyond glands, 1.5–2 mm wide, apex broadly rounded and ciliate, adaxially glabrous, abaxially sparsely sericeous to glabrous, the anterior eglandular, the lateral 4 biglandular, glands 1.8–2.6 mm long. *Petals* yellow, the lateral 4 with the claw c.1.5 × c.0.5 mm, limb (4.5–)5–6 mm long and wide, orbicular, base cuneate to rounded, margin minutely denticulate to erose; posterior petal with the claw 3–3.2 × c.1 mm, limb 4–5 mm long and wide, ovate to suborbicular, base truncate to slightly cordate, margin minutely erose or erose-denticulate. *Filaments* 1.5–2.5 mm long, glabrous, connate at base; anthers 1–1.4 mm long, subequal, glabrous. *Ovary*

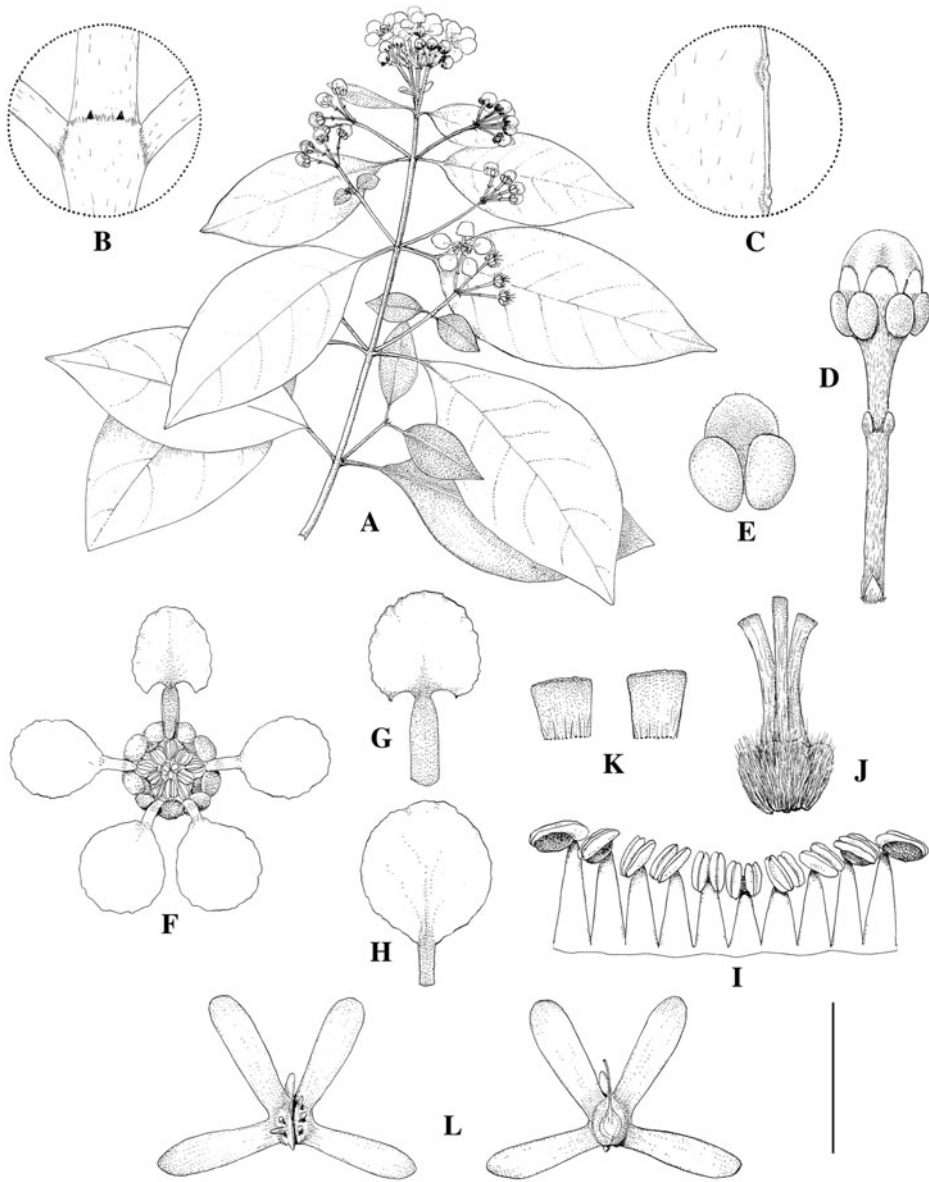


FIG. 2. *Tetrapteryx rzedowskii* W.R. Anderson. A, Flowering branch; B, node with interpetiolar stipules; C, glands on leaf margin, abaxial view; D, flower bud on pedicel subtended by peduncle with bracteoles at apex and floriferous bract at base; E, sepal, abaxial view; F, flower, posterior petal uppermost; G, posterior petal; H, lateral petal; I, androecium laid out, abaxial view with anthers reflexed, the stamen fifth from right opposite posterior petal; J, gynoecium, anterior style in centre; K, distal portions of styles, lateral (left) and anterior (right); L, samaras, abaxial view (left) and adaxial view (right). Scale bars: A, 4 cm; B and C, 4 mm; D, 5.7 mm; E, 4 mm; F, 8 mm; G and H, 5.7 mm; I and J, 2.7 mm; K, 1 mm; L, 2 cm. A–K based on *Rubio* 716, MICH; and L on *Loredo* M. 24, MICH.

c. 1.5 mm long, hirsute, styles 2.4–2.6 mm long, with scattered hairs, the anterior slightly longer and more slender than the posterior 2, stigmas terminal. *Samara* with the wings glabrate; lateral wings distinct, apex rounded, the upper 13.5–15 × 6–7 mm, the lower 12.5–15 × 4.5–6 mm; dorsal wing 3.5–5 mm high, margin coarsely dentate; nut c. 5.5 mm diam., sparsely sericeous, between dorsal and lateral wings muricate, often also with a few outgrowths and/or winglets; areole 2.5–3 × c. 2 mm; embryo spherical.

*Distribution.* Mexico (Hidalgo, Querétaro and San Luis Potosí).

*Habitat.* Oak, oak-*Liquidambar* and pine-oak forests; 800–1250 m.

*Etymology.* The species is named in honour of the eminent botanist Jerzy Rzedowski (b. 1926), in recognition of his invaluable contributions to Mexican botany, as scholar and collector, educator, editor and administrator, and in gratitude for his kindness and generosity.

*Additional specimens examined.* MEXICO. **Hidalgo:** Mpio. Chapulhuacán, Puerto Oscuro, 20 ix 1964 (fr), *González Q.* 1636 (DS, ENCB). **Querétaro:** Mpio. Pinal de Amoles, La Cuesta, 3 km al S de Escanelilla, 8 vi 1983 (fl), *Fernández N.* 1577 (MICH), 15 vii 1983 (fr), *Fernández N.* 1650 (MICH); Mpio. Jalpan, c. 4 km al N de La Parada, 21 vi 1989 (fl), *Loredo M.* 23 (MICH); Mpio. Jalpan, c. 7 km al N de La Parada, 2 vi 1989 (fl), *Loredo M.* 24 (MICH); Mpio. Landa, 1.5 km al SE de El Naranjo, 22 v 1989 (fl/y fr), *Rubio* 716 (MICH); Mpio. Landa, 25 km al NW de Agua Zarca, 29 vii 1989 (fr), *Rubio* 921 (MICH); Mpio. Landa, 1.5 km al NW de El Sabanito, 4 viii 1989 (fr), *Rubio* 940 (MICH); Mpio. Landa, 1.5 km al SE de Neblinas, 27 vi 1990 (fl), *Rubio* 1760 (MICH); Mpio. Landa, 2 km al SE de El Rincón, 6 viii 1990 (fl), *Rubio* 1858 (MICH); Mpio. Landa, 1.5 km al E de El Sabino, 23 vii 1991 (fl), *Rubio* 2484 (MICH); Mpio. Landa, Puerto de San Agustín, 10 viii 1991 (fr), *Rubio* 2533 (MICH); Mpio. Landa, 10 km al NE de Agua Zarca, sobre el camino a Neblinas, 23 vi 1988 (fr), *Rzedowski* 46848 (IEB); Mpio. Jalpan, 3–4 km al E de La Parada, 6 vi 1990 (fl/fr), *Servín* 328 (MICH).

*Tetrapteryx rzedowskii* belongs to the *T. mexicana* complex, in all of which the limbs of the lateral petals are c. 6 mm or more long, suborbicular and cuneate or rounded at the base, and yellow even in age or when dried. The posterior petal is strongly differentiated from the lateral four, having a thick red claw and a smaller limb, and the peduncle + pedicel are usually at least 10 mm long in flower and longer in fruit. *Tetrapteryx mexicana* and *T. cotoneaster* A. Juss. have the sepals abaxially ± densely hairy, at least proximally, whereas in *T. heterophylla* (Griseb.) W.R. Anderson and *T. rzedowskii* the sepals are abaxially glabrous or at most ciliate on the margin. The latter two species can be distinguished with the following couplet.

- a. Leaf hairs, if present, straight, strongly appressed, parallel; bracteoles borne at apex of peduncle; inflorescence bracts usually absent from node below umbel, if present resembling miniature petiolate leaves \_\_\_\_\_ *T. rzedowskii*
- b. Leaf hairs, if present, serpentine or twisted, often ± raised, not parallel; bracteoles borne well below apex of peduncle; inflorescence bracts borne at node below umbel, short and round, sometimes broader than long, sessile, quite different in shape from vegetative leaves \_\_\_\_\_ *T. heterophylla*

*Honduras****Tetrapterys molinae* W.R. Anderson, sp. nov.**

*Tetrapterys molinae* differs from *T. argentea* Bertol. in its persistent white-woolly vesture and its samara with a longer dorsal wing extending into a pronounced basal tooth and with the nut bearing outgrowths and winglets between the lateral and dorsal wings. – Type: Honduras, Intibucá: Los Baños, La Esperanza town, 1700 m, 12 iii 1970 (fl/fr), *Molina R. & Molina* 25532 (holo NY; iso BM, F, GH, MO, US).

**Fig. 3.**

Woody vine to 4 m. Stems and axes densely white-woolly, the vesture eventually thinning, and old axes glabrate to glabrous. *Laminas* of larger leaves 5.5–11.5 × 3–6 cm, elliptical, those near inflorescences often obovate, apex apiculate, base acute, adaxially and abaxially densely white-woolly, eventually the vesture thinning and patchily sloughed off, the hairs sinuous or curled and twisted, spreading, marginal glands (2–)3–7 in the proximal 1/4–1/2(–2/3) along each side, each gland 0.4–0.8 mm long; petiole 1.3–2 cm long, densely white-woolly, eventually glabrescent, eglandular; stipules connate, the smallest at distalmost nodes sometimes free, connate stipules 0.7–1.8 × 0.7–1.1 mm, triangular or bifid, free stipules 0.2–0.9 × 0.2–0.4 mm, square to oblong, all glabrous. *Inflorescence* terminating in umbels of 4 flowers, borne singly or in short panicles, white-woolly; inflorescence bracts 4.5–9(–13) × 2.5–4(–8) mm, elliptical, abaxially with 1–3 marginal glands on each side of costa proximally, deciduous in fruit; floriferous bracts 1–1.5 mm long, linear to narrowly triangular; peduncle 2.5–5 mm long, white-woolly; bracteoles 0.6–1.2 mm long, linear to oblong, inserted at apex of peduncle; pedicel 3.5–6 mm long, white-woolly. *Sepals* 1.3–1.5 mm long beyond glands, 1.3–1.5 mm wide, apex broadly rounded and ciliate, adaxially and abaxially white-woolly, the anterior eglandular, the lateral 4 biglandular, glands 1.6–2.2 mm long. *Petals* yellow, drying red, the lateral 4 with the claw 1.5–2 × c.0.5 mm, limb 5.5–6 mm long and wide, orbicular, base cuneate or briefly truncate, margin minutely erose-denticulate; posterior petal with the claw 3–3.3 × c.1 mm, limb 5–6 × 5.5–6 mm, broadly triangular but apex rounded, base truncate to slightly cordate, margin minutely erose-denticulate. *Filaments* 1.8–2.2 mm long, glabrous, connate at base but those of stamens opposing the posterior petal and posterior-lateral sepals up to 1/2 united; anthers 1–1.2 mm long, subequal, glabrous. *Ovary* 1.5–1.6 mm long, hirsute, styles glabrous, anterior style 2–2.5 mm long, stigma at internal angle, posterior styles 1.8–2.3 mm long, stigmas terminal and decurrent at internal angle. *Samara* with the wings thinly tomentulose to glabrescent; lateral wings distinct, apex rounded, the upper and lower subequal, 14–22 × (4–)5–6.5(–8) mm; dorsal wing 4–8 mm high, margin irregular-wavy, usually with an elongated tooth at base; nut 4–5.5 mm diam., white-woolly, between dorsal and lateral wings muricate and with outgrowths and linear winglets up to 10 mm long; areole 3–3.5 × 2–3 mm; mature seed not seen.

*Distribution.* Honduras (Francisco Morazán, Intibucá, Lempira).

*Habitat.* Mixed forests, pine-oak forests, and thickets, 1300–2000 m.

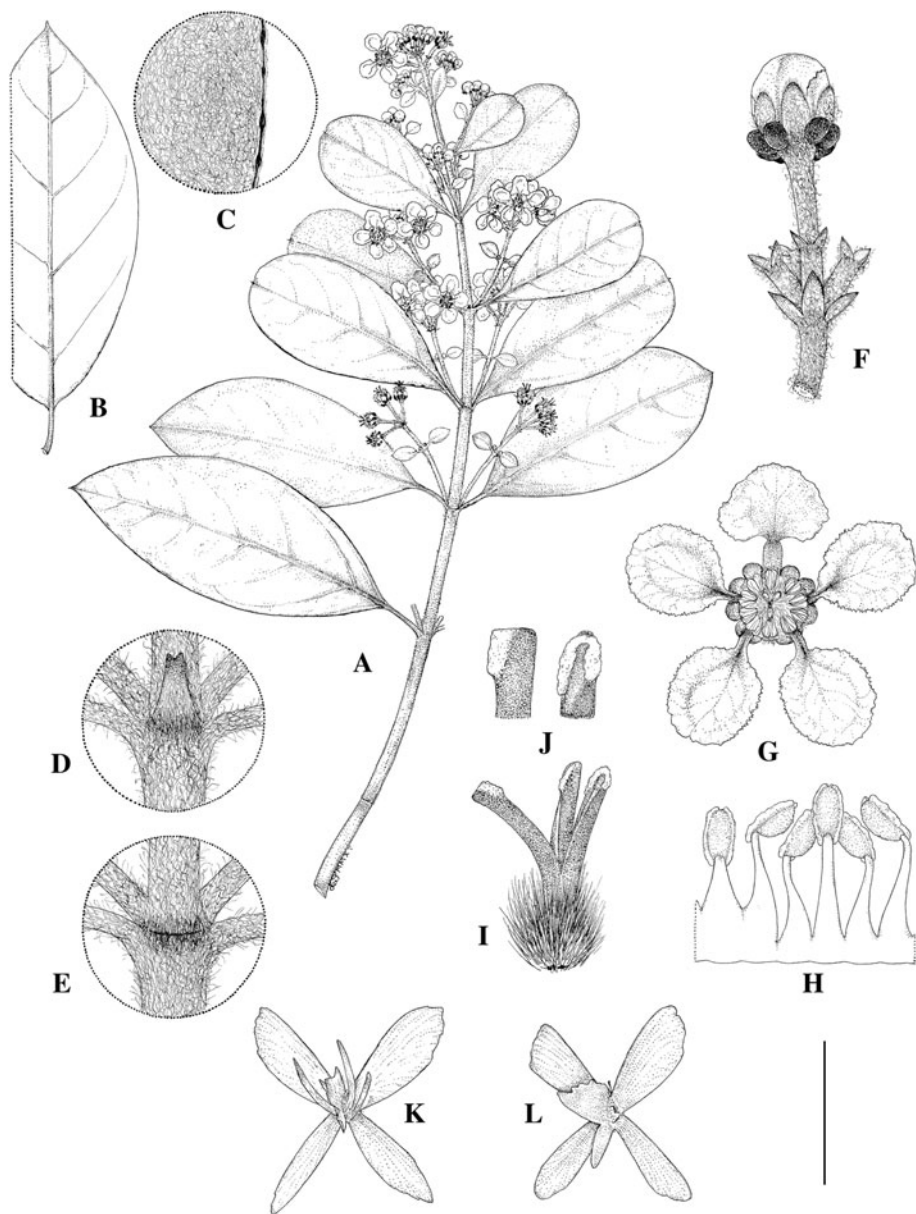


FIG. 3. *Tetrapterys molinae* W.R.Anderson. A, Flowering branch; B, large leaf, abaxial view; C, abaxial surface of lamina to show vestiture and marginal glands; D, node with triangular interpetiolar pair of connate stipules; E, node showing interpetiolar scar after fall of pair of connate stipules; F, flower bud in umbel of four; G, flower, posterior petal uppermost; H, portion of androecium laid out, abaxial view, stamen at left opposite posterior petal; I, gynoecium, lateral view, anterior style at left; J, distal portions of anterior style (left, lateral view) and posterior style (right, adaxial view); K and L, samaras from different plants, abaxial views. Scale bars: A and B, 4 cm; C–E, 4 mm; F, 6.7 mm; G, 8 mm; H and I, 2.7 mm; J, 1.3 mm; K and L, 2 cm. A–J based on *Molina* 25532, NY; K on *Molina* 6273, F; and L on *Molina* 24294, NY.



*Etymology.* The specific epithet honours José Antonio Molina Rosito (1926–2012), renowned student and prodigious collector of the Honduran flora.

*Additional specimens examined.* HONDURAS. **Intibucá:** Quebrada Honda, 24 ii 1987 (fl), *House* 14 (BM, MICH); región entre Las Pilas y camino a Yamaranguila, 6 iv 1956 (fr), *Molina R.* 6273 (F, GH, US); La Esperanza, 12 i 1969 (fr), *Molina R.* 23359 (BM, DS, F, GH, NY, WIS); Quebrada Lejarsia, between Km 9–11 on road La Esperanza–Marcala, 21 iii 1969 (fl/fr), *Molina R. & Molina* 24294 (BM, F, DS, NY); Cerro San Cristóbal, 2 km al S de La Esperanza, 26 iv 1989 (fr); *Peña* 180 (F). **Francisco Morazán:** along Lepaterique river, 5 km to Lepaterique, 29 v 1976 (fr), *Molina R. & Molina* 31498 (ENCB, F, MO). **Lempira:** east slopes of Quebrada Naranja, 10 km SE of Gracias, Celaque National Park, 14°33'N, 88°40'W, 29 i 1992 (fr), *Hawkins* 146 (MO).

*Tetrapteryx molinae*, known only from Honduras, is readily distinguished by the striking white-woolly vesture that covers all vegetative parts and is only gradually lost with age. Superficially it resembles *Tetrapteryx argentea* of Chiapas (Mexico), Guatemala and El Salvador, in which the young shoots and inflorescence-bearing axes are white-sericeous. The two species may be separated with the following couplet.

- a. Lamina originally densely white-woolly, the hairs twisted and spreading, eventually glabrescent, much sooner adaxially than abaxially; stems/axes densely and persistently white-woolly, eventually and gradually glabrescent; dorsal wing of samara 4–8 mm high, usually with an elongated tooth at base, margin sinuous, surface of nut between lateral and dorsal wings bearing numerous outgrowths and winglets \_\_\_\_\_ *T. molinae*
- b. Lamina subsericeous to sericeous, the hairs appressed, the vegetative leaves soon glabrate/glabrous, and only the reduced leaves associated with the inflorescence remaining silvery; stems/axes abruptly glabrate to glabrous and only the youngest branches and inflorescence-bearing axes remaining sericeous, such that a sericeous internode is adjacent to a glabrate/glabrous internode; dorsal wing of samara 1.1–1.4 mm high, without a tooth at base, margin grossly dentate, surface of nut between lateral and dorsal wings bearing a single winglet \_\_\_\_\_ *T. argentea*

#### *South America*

#### ***Tetrapteryx amazonica* C.E.Anderson, sp. nov.**

*Tetrapteryx amazonica* differs from *T. crispa* A.Juss. and *T. discolor* (G.Mey.) DC. in its densely golden-sericeous inflorescence, adaxially sericeous stipules, and presence of large basal glands on the abaxial surface of the lamina, from *T. crispa* also in the presence of winglets and outgrowths on the nut of the samara between the lateral and dorsal wings. – Type: Colombia, Amazonas: Parque Nacional Natural Amacayuna, Centro Administrativo Mata-Matá (Inderena) troche hacia San Martín en tierra alta, 03°47'S, 70°15'W, 135 m, 12 ii 1991 (fl), *Rudas & del Aguila J.* 1252 (holo MICH; iso COAH, MO). **Fig. 4.**

Woody vine to 20 m. Stems densely sericeous when young, soon glabrous. *Laminas* of larger leaves 8.5–18 × 3–8 cm, elliptical to broadly so or oblanceolate, apex acuminate,

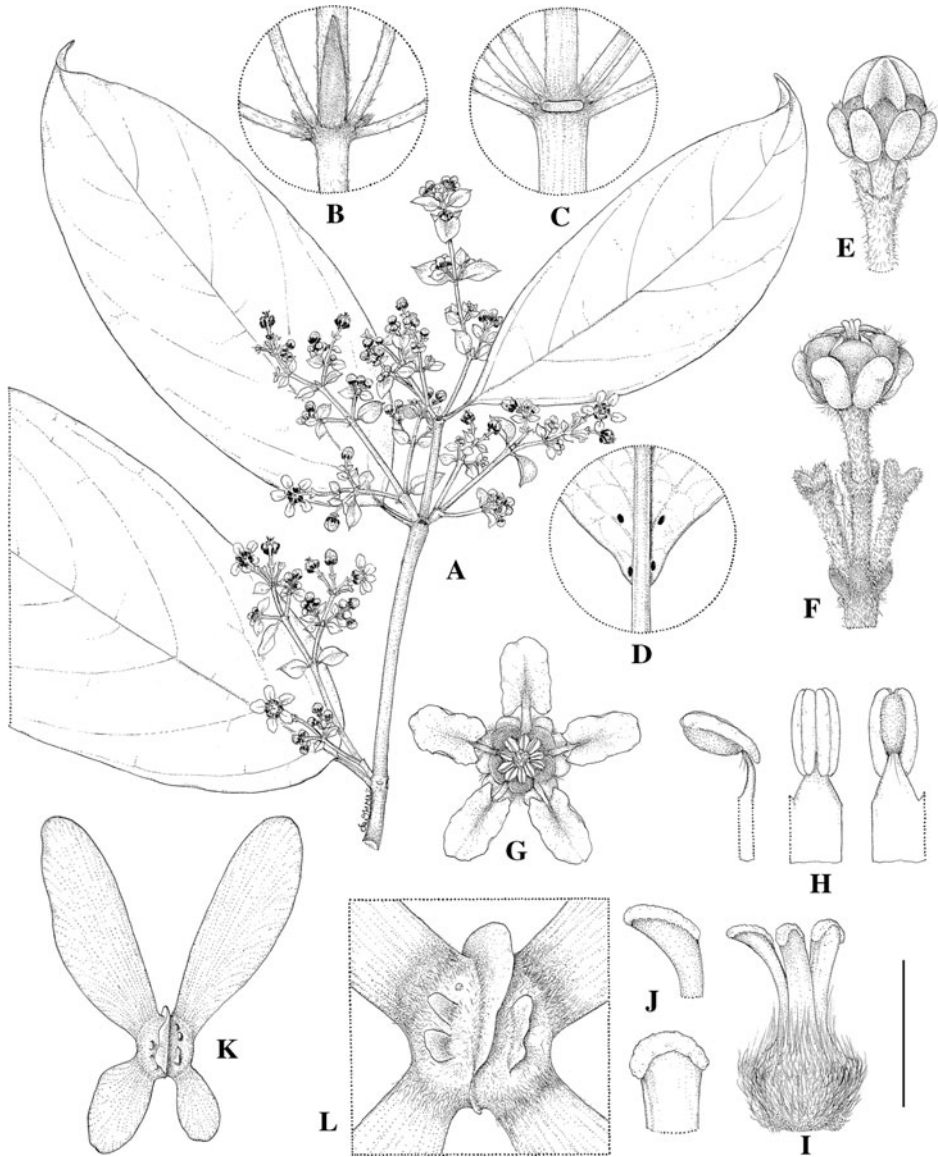


FIG. 4. *Tetrapteryx amazonica* C.E.Anderson. A, Flowering branch; B, node in inflorescence with connate pair of interpetiolar stipules; C, older node with scar from loss of connate pair of interpetiolar stipules; D, glands on abaxial base of lamina; E, flower bud to show keeled petals; F, umbel with three of the four flowers and petals removed; G, flower, posterior petal uppermost; H, stamens, lateral view (left), adaxial view (centre) and abaxial view (right); I, gynoecium, anterior style to left; J, lateral views of distal portions of styles, anterior style (above) and lateral style (below); K, samara, abaxial view; L, enlargement of nut of samara, abaxial view. Scale bars: A, 4 cm; B–D, 8 mm; E, 6.7 mm; F and G, 8 mm; H and I, 2 mm; J, 1.3 mm; K, 2 cm; L, 8 mm. A and C–J based on *Rudas & del Aguila* 1252, MICH; B on *Gentry et al.* 29818, MO; and K and L on *Prance et al.* 12387, NY.

base acute, adaxially and abaxially initially loosely sericeous but soon glabrous, abaxially on the surface with 1–3 glands on each side of costa widely spaced apart 1–3 mm from margin, glands 0.2–0.5 mm diam., also near base with (1 or) 2 larger glands on each side of costa, sometimes lower gland at base of lamina or apex of petiole, glands 0.4–0.7 mm diam.; petiole 8.5–10 mm long, densely sericeous in youngest leaves but soon glabrescent, eglandular; stipules connate, 3–5.2 × 1.5–1.8 mm, much shorter at the distalmost inflorescence nodes, narrowly triangular, adaxially in the proximal 1/3 to entirely sericeous, abaxially sparsely sericeous to glabrate. *Inflorescence* terminating in umbels of 4 flowers, paniculate, golden-sericeous; inflorescence bracts 3.5–17 × 3–6 mm, the larger elliptical, the smaller ovate, abaxially near base with (0–)1(–2) gland(s) on each side of costa, deciduous in fruit; floriferous bracts 1.5–2 mm long, ovate; peduncle 3–4.5 mm long, densely golden sericeous; bracteoles 1.2–1.5 mm long, ovate, inserted at apex of peduncle; pedicel 2.5–5 mm long, densely golden sericeous. *Sepals* 1.2–1.5 mm long and wide beyond glands, apex rounded and ciliate, adaxially and abaxially glabrous, the anterior eglandular or rarely glandular, the lateral 4 biglandular, glands 2.7–3.2 mm long. *Petals* yellow, posterior and lateral petals subequal, claw 1.5–2 × c.0.4 mm, limb (4–)4.5–5.5 × 3–3.5 mm, oblong, carinate, base briefly sagittate, margin subentire or minutely erose. *Filaments* 1.6–2 mm long, glabrous, connate in the proximal 2/3–3/4; anthers c.1 mm long, subequal, glabrous. *Ovary* 1.2–1.5 mm long, hirsute; styles glabrous, anterior style 1.7–2 mm long, stigma terminal and decurrent at internal angle, posterior styles 1.5–1.7 mm long, stigma terminal and slightly decurrent. *Samara* with the wings sericeous to sparsely so; lateral wings distinct, apex rounded, the upper 2–3.6 × 0.6–1.2 cm, the lower 1–2.2 × 0.5–0.7 cm; dorsal wing 2.5–4.3 mm high, margin shallowly erose; nut 6–9 mm diam., sericeous, between dorsal and lateral wings slightly muricate and with outgrowths/winglets; areole 2.5–3.5 × 2.5–3 mm; mature seed not seen.

*Distribution.* Brazil (Acre), Colombia (Amazonas), Peru (Amazonas, Loreto, Ucayali).

*Habitat.* In primary and secondary rain forests, varzea forest; 135–290 m.

*Etymology.* The specific epithet refers to the Amazonian range of this species.

*Additional specimens examined.* BRAZIL. Acre: Mpio. Santa Rosa, Alto Rio Purus, Igarapé Itaúba, upriver from Santa Rosa, right bank, c.09°29'13''S, 70°30'13''W, 21 iii 1999 (fr), *Daly et al.* 9905 (MICH); Mpio. Santa Rosa, Rio Chandless (tributary of Rio Purus), right bank, just downstream from Igarapé Canamarí, c.09°23'0.6''S, 69°57'18.1''W, 29 iii 1999 (fr), *Daly et al.* 10181 (MICH); Rio Chandless (tributary of Rio Purus), right bank, “Canamarí,” c.09°23'0.6''S, 69°56'41.7''W, 19 iii 2002 (fl), *Daly et al.* 11470 (MICH); Feijó, Porto Marque, village of Paraíso, E side of Rio Purus, 08°51'S, 71°14'W, 13 iv 2002 (fr), *Delprete et al.* 8299 (NY); Cruzeiro do Sul, vicinity of Serra da Moa, 24 iv 1971 (fr), *Prance et al.* 12387 (NY); Mpio. Marechal Traumaturgo, Rio Alto Juruá, Reserva Extrativista de Alto Juruá, N de São João do Breu, margem esquerda, Seringal Damião, colocação Belfort, 09°11'S, 72°41'W, 10 iv 1993 (fr), *Silveira* 521 (MICH). COLOMBIA. Amazonas: Peña Roja, 18 x 1993 (fl), *Leal* 6 (COAH, MICH); vicinity of Leticia, Rio Amazonas, ix 1946 (fl), *Schultes* 8361a (GH); Mpio. Puerto Santander, Rio Caquetá, entre comunidades indígenas de Villazul y Peña Roja, 11 xi 1995 (fl), *van Dulmen* 352 (COAH, COL). PERU. Amazonas: Río Santiago, 2 km astás de Caterpiza, 18 ix 1979 (fl),

*Huashikat* 993 (MO); Prov. Condorcanqui, Dtto. El Cenepa, Comunidad Aguarana Pagki-Suwa, Río Cenepa, 04°31'35"S, 78°10'34"W, 24 i 1997 (fl), *Vásquez et al.* 22249 (MICH). **Loreto:** Prov. Alto Amazonas, Andoas, Río Pastaza near Ecuador border, 02°48'S, 76°28'W, 15 viii 1980 (fl, y fr), *Gentry et al.* 29818 (MO); Prov. Alto Amazonas, Andoas, campamento petrolero, Río Pastaza, N de Iquitos, 02°55'S, 76°25'W, 21 xi 1980 (fr), *Vásquez & Jaramillo* 866 (MO); Prov. Alto Amazonas, Andoas (margen izquierda del Río Pastaza) Campamento OXI, 02°55'S, 76°25'W, 5 vi 1981 (fl), *Vásquez & Jaramillo* 1917 (MO). **Ucayali:** Prov. Purús, Dtto. Purús, Río la Novia, margen derecha del caserío natia San José, 10°12'S, 70°57'W, 26 ii 2002 (fl), *Schunke V. & Graham* S14903 (MICH).

*Tetrapterys amazonica* is listed as "*Tetrapterys* sp. nov. 1" in the *Catálogo de Plantas y Líquenes de Colombia* (Anderson & Anderson, 2016). The dense golden-sericeous vestiture of the inflorescence immediately separates *Tetrapterys amazonica* from all other Amazonian species of *Tetrapterys* with connate stipules, glabrous laminas and 4-flowered umbels. Another unusual character is the adaxial vestiture of the stipules. The widespread *Tetrapterys crispa* A.Juss. and *T. discolor* (G.Mey.) DC. share the glabrous laminas, but in both the stipules are abaxially glabrous, and the inflorescences bear shorter white hairs. The large basal glands on the abaxial surface of laminas also set *Tetrapterys amazonica* apart from *T. crispa* and *T. discolor*. In addition, the samara of *Tetrapterys crispa* lacks winglets and/or outgrowths between the lateral and dorsal wing.

***Tetrapterys callejasii* W.R.Anderson, sp. nov.**

*Tetrapterys callejasii* differs from *T. discolor* (G.Mey.) DC. in its elongate golden-sericeous inflorescence, smaller stipules, bracteoles inserted below the apex of the peduncle, and presence of a single winglet on the nut of the samara between the lateral and dorsal wings. – Type. Colombia, Antioquia: Mpio. San Luis, cañón del Río Claro, 05°53'N, 74°39'W, 25 xii 1983 (fl), *Cogollo* 1118 (holo MO; iso COL, HUA). **Fig. 5.**

Vine or shrub to 10 m. Stems densely sericeous when young, soon glabrous. *Laminas* of larger leaves 8–16.5 × 3–6 cm, narrowly to broadly elliptical, apex acuminate, base briefly truncate or acute, adaxially and abaxially glabrous, margin thickened, with scattered glands on the abaxial surface, glands 0.3–0.5 mm diam.; petiole 2–7 mm long, initially sericeous but soon glabrous, eglandular; stipules connate, 1–1.3 × 0.5–0.8 mm, narrowly triangular, adaxially glabrous, abaxially sericeous. *Inflorescence* terminating in umbels of 4 flowers borne on a long continuous main axis, singly or in small aggregates, golden-sericeous; inflorescence bracts 3.5–8 mm long and wide, orbicular or suborbicular or broadly ovate, with 0–1(–2) glands (0.3–)0.5–0.6 mm diam. on each side of costa, deciduous in fruit; floriferous bracts 1–1.3 mm long, triangular; peduncle 3–6 mm long, densely sericeous; bracteoles 0.7–1 mm long, broadly triangular to ovate, inserted at middle of peduncle to c.0.05 mm below apex; pedicel 2.5–4.5 mm long. *Sepals* 0.5–1.2 mm long and wide beyond glands, apex rounded and ciliate, adaxially glabrous, abaxially proximal 1/3 or less sericeous or all glabrous, abundantly pubescent between glands, apex rounded and ciliate, anterior sepal eglandular, the lateral 4

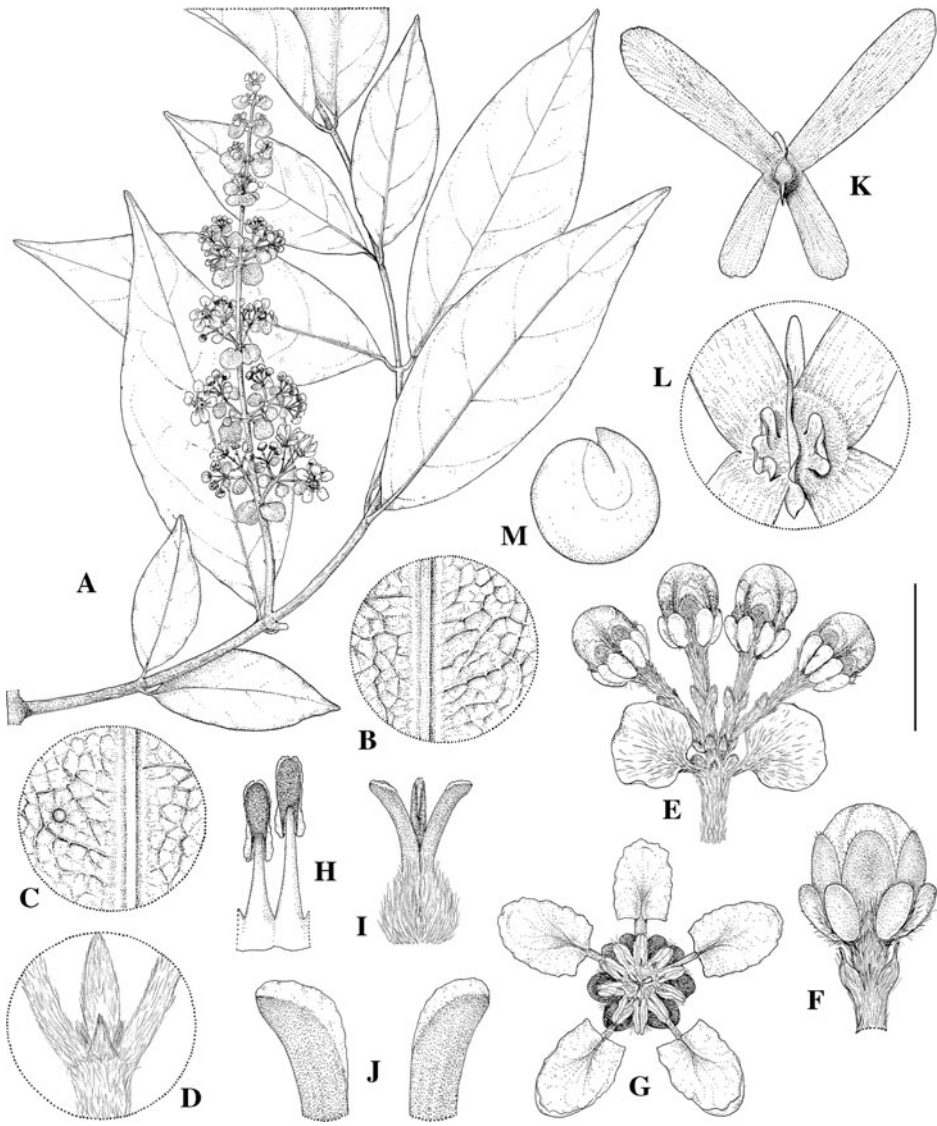


FIG. 5. *Tetrapteryx callejasii* W.R. Anderson. A, Flowering branch; B, adaxial surface of lamina enlarged; C, abaxial surface of lamina enlarged; D, node with connate pair of interpetiolar stipules; E, umbel of flower buds; F, flower bud; G, flower, posterior petal uppermost; H, two stamens, abaxial view, the one with longer filament opposite a sepal; I, gynoecium, anterior style in centre; J, distal portion of anterior style (left) and posterior style (right); K, samara, adaxial view; L, enlargement of nut of samara, abaxial view; M, embryo. Scale bars: A, 4 cm; B–D, 4 mm; E, 8 mm; F, 2.7 mm; G, 5.7 mm; H and I, 2.7 mm; J, 1 mm; K, 2 cm; L, 1 cm; M, 4 mm. A–J based on *Cogollo & Brand 367*, MO; and K–M on *Cárdenas et al. 2555*, MICH.

biglandular, glands 2.5–3 mm long. *Petals* yellow, lateral petals with the claw c.2 × c.0.3 mm, limb of anterior-lateral petals 4.5–5 × 3–4 mm, limb of posterior-lateral petals 5–5.5 × c.4 mm, claw of posterior petal c.2.5 × c.0.5 mm, limb c.4.5 × c.3 mm, all limbs oblong, slightly cucullate, base truncate or briefly sagittate, margin subentire or minutely erose. *Filaments* 1.5–2.5 mm long, glabrous, connate at base; anthers 1.2–1.5 mm long, subequal, glabrous. *Ovary* c.1.5 mm long, hirsute, styles glabrous, anterior style 1.5–2 mm long, posterior styles 1.5–1.7 mm long, stigmas terminal and decurrent at internal angle. *Samara* with the wings sparsely sericeous; lateral wings distinct or united for c.0.05 mm at base, apex rounded, the upper 2–3 × 0.8–1 cm, the lower 0.9–1.6 × 0.4–0.6 cm; dorsal wing 1.5–4.5 mm high, margin slightly undulate; nut 5–5.5 mm diam., sparsely sericeous, between dorsal and lateral wings with a winglet to 4 mm high; areole 3–3.5 × 2–2.5 mm; embryo spherical.

*Distribution.* Colombia (Antioquia, Chocó).

*Habitat.* Primary and disturbed forests; 70–800(–1500) m.

*Etymology.* The specific epithet honours the Colombian botanist Ricardo Callejas Posada (b. 1954) in recognition of his contributions to the study and conservation of the Colombian flora.

*Additional specimens examined.* COLOMBIA. **Antioquia:** Mpio. Anorí, Corregim. Providencia, 1991 (fl/fr), *Albert de Escobar* 49 (HUA); Mpio. Mutatá, colinas al E de la vereda Caucheras, 15 xii 1982 (old infl), *Bernal R.* 495 (COL); Mpio. Puerto Berrío, vereda Alicante, finca Penjamo, San Juan de Bedout–La Cabaña, 06°39'N, 74°32'W, 1 iii 1990 (fr), *Callejas et al.* 9242 (HUA, MICH); Mpio. Tarazá, Corregim. El Doce, 210 km NE de Medellín, Km 4 en la vía al caserío de Barroblanco, 1–2 km NW de la Finca Las Mercedes, Quebrada La Quebradona, 07°30'00"N, 75°20'00"W, 1998 (fl), *Callejas* 11045 (HUA); Mpio. San Luis, Corregim. el Prodigio, vereda “Las Confusas,” 06°03'N, 74°47'W, 7 iii 1990 (fr), *Cardenas L. et al.* 2552 (JAUM), 2555 (JAUM, MICH); Mpio. Puerto Berrío, carretera Cisneros–Puerto Berrío, sitio La Carlota, Quebrada El Vapor, 06°37'N, 74°27'W, 4 ii 2001 (fr), *Cardona et al.* 1057 (HUA, MO); Mpio. San Luis, autopista Medellín–Bogotá, 2 km de Río Claro hacia Río Samaná, 1 1983 (fl/fr), *Cogollo & Brand* 367 (JAUM, MO); Mpio. Zaragoza, carretera a Zaragoza entre Carrallao y Angostura, 13 i 1989 (fl), *Fonnegra G. & Roldán* 2576 (HUA, MICH, MO); Mpio. San Luis, quebrada “La Cristalina,” 06°N, 74°45'W, 22 i 1987 (fl), *Ramírez & Cárdenas L.* 363 (COL, HUA, JAUM, MO), 24 i 1987 (fr) 430 (COL HUA, JAUM, MO), 21 ii 1987 (fr), 572 (COL, HUA, JAUM, MO), 23 ii 1987 (sterile), 622 (MO), 25 v 1987 (fl), 1019 (COL, HUA, JAUM, MO); Mpio. Anorí, Corregim. Providencia, Buenos Aires, 21 x 1972 (fl), *Soejarto* 3417 (MICH); Anorí, between Providencia and Alhibe, 20–25 ii 1976 (fr), *Soejarto et al.* 4426 (HUA, MICH). **Cesar:** valle del Río Cesar (parte occidental), selva marginal del Caño Sagarriga, al W de Los Venados, 10°00'00"N, 73°45'00"W, 13 i 1983 (fl/fr), *Hernández et al.* 671 (COL). **Chocó:** Mpio. Riosucio, zona de Urabá, Cerro del Cuchillo, 17 i 1988 (fl/fr), *Cardenas* 1072 (JAUM, MO). **Santander:** Mpio. Suaita, vereda La Meseta, camino entre La Meseta y la cascada Los Caballeros, 06°10'N, 73°27'W, 27 iii 2004 (fl), *Betancur* 10639 (COL); Mpio. El Playón, vereda La Negraña, 07°29'N, 73°12'W, 16 ix 2003, *Galván* 1304 (HUA).

*Tetrapteryx callejasii* is listed as “*Tetrapteryx* sp. nov. 3” in the *Catálogo de Plantas y Líquenes de Colombia* (Anderson & Anderson, 2016). It is distinctive in its elongate inflorescence bearing the 4-flowered umbels, singly and grouped in cymes, and in its

samara with a single winglet placed on the nut between the lateral and dorsal wing. In the treatment of *Tetrapterys* for Colombia by Cuatrecasas (1958) *T. callejasii* keys to *T. discolor* (G.Mey.) DC., but it is easily separated from that species with the following couplet.

- a. Inflorescence an elongate continuous axis, golden-sericeous; bracteoles inserted at middle of peduncle to c.0.05 mm below apex; stipules  $1-1.3 \times 0.5-0.8$  mm; nut of samara bearing one winglet between lateral and dorsal wings \_\_\_\_\_ *T. callejasii*
- b. Inflorescence cymose-paniculate, white-sericeous; bracteoles inserted at apex of peduncle; stipules  $1.5-2.5(-3.5) \times 1-1.5(-2.5)$  mm; nut of samara bearing several narrow winglets and/or aculeate outgrowths between lateral and dorsal wings \_\_\_\_\_ *T. discolor*

***Tetrapterys steyermarkii* W.R. Anderson, sp. nov.**

*Tetrapterys steyermarkii* differs from *T. discolor* (G.Mey.) DC. and *T. seemannii* Triana & Planch. in its tree or shrub habit and its shorter petioles, from *T. discolor* also in its glabrous samaras, and from *T. seemannii* also in having the lateral wings of the samara only very slightly united. – Type: Venezuela, Falcón: 26–30 km al S de Coro, 25 i 1966 (fr), *Steyermark & Braun* 94706 (holo NY; iso US, VEN). **Fig. 6.**

Tree to 6 m or shrub; stems thinly sericeous when young, soon glabrous. *Laminas* of larger leaves  $7-15 \times 3-8.5$  cm, elliptical to broadly so, apex acuminate (or briefly so in smaller broad laminas), base acute or briefly truncate, adaxially and abaxially initially sericeous but very soon glabrous, with (2–)3–5(–6) glands  $0.3-0.5$  mm diam. borne on each side of costa on the abaxial surface; petiole  $3-6(-8)$  mm long, glabrous, eglandular; stipules connate,  $(1.5-)-2-4 \times 1-1.7$  mm, triangular to ovate, adaxially glabrous, abaxially sericeous or only proximally so to glabrate, at the distalmost inflorescence nodes shorter and sometimes apically notched. *Inflorescence* terminating in umbels of 4 flowers, paniculate, thinly sericeous to glabrescent; inflorescence bracts  $0.4-2.5(-3.5) \times 0.3-2(-2.3)$  cm, elliptical to ovate, usually with 1 or 2 glands borne on each side of costa on abaxial surface or at base, deciduous in fruit; floriferous bracts  $1-2.2$  mm long, narrowly triangular; peduncle  $(2.3-)-3-6$  mm long, densely sericeous; bracteoles  $0.9-1.1(-1.5)$  mm long, ovate, inserted at apex of peduncle; pedicel  $3.5-6$  mm long, sericeous or sparsely so. *Sepals*  $1.3-1.8$  mm long beyond glands, apex rounded and ciliate, adaxially and abaxially glabrous, the anterior eglandular, the lateral 4 biglandular, glands  $2-2.5$  mm long. *Petals* yellow, carinate, lateral petals with the claw  $1.5 \times c.0.4$  mm, limb  $5-5.7 \times 3.3-4$  mm, narrowly obovate, base briefly sagittate, margin subentire or minutely erose, claw of posterior petal  $1.5-2 \times 0.4-0.5$  mm, limb  $5-5.7 \times 3-4$  mm, oblong, base truncate or sometimes briefly sagittate. *Filaments*  $1.5-2.5$  mm long, glabrous, connate at base; anthers  $0.9-1.3$  mm long, subequal, glabrous. *Ovary*  $1-1.2$  mm long, hirsute, styles glabrous, anterior style  $1.7-2.5$  mm long, posterior styles  $1.5-2.3$  mm long, stigmas terminal and decurrent at internal angle. *Samara* glabrous; upper lateral wings distinct or united for up to  $2.5$  mm at base, apex rounded, the upper  $1.4-2 \times 0.6-0.7$  cm, the lower  $0.6-1 \times c.0.6$  cm; dorsal

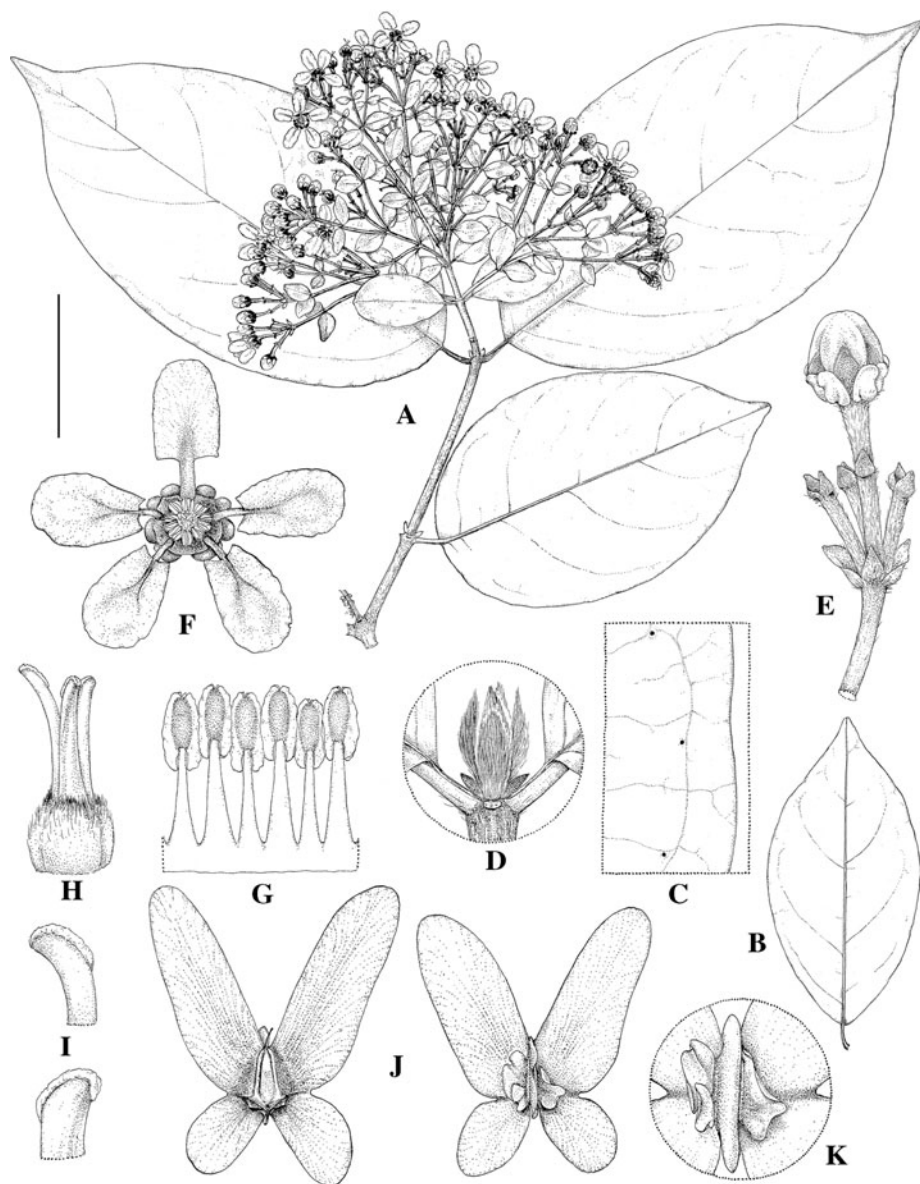


FIG. 6. *Tetrapterys steyermarkii* W.R.Anderson. A, Flowering branch; B, small leaf, abaxial view; C, lamina, abaxial view, showing tiny inframarginal glands; D, apical node, showing scar left by tiny stipule pair; E, umbel of four flower buds with three buds removed above bracteoles; F, flower, posterior petal uppermost; G, partial androecium laid out, abaxial view, the stamen third from left opposite posterior petal; H, gynoecium, anterior style at left; I, distal portions of styles, anterior style (above) and posterior style (below); J, samaras, adaxial view (left) and abaxial view (right); K, enlargement of nut of samara, abaxial view. Scale bars: A and B, 4 cm; C–F, 8 mm; G and H, 2.7 mm; I, 1.3 mm; J, 1.3 cm; K, 8 mm. A–I based on *Bunting* 5396, MICH; and J and K on *Steyermark & Braun* 94706, US.



wing 4.5–6 mm high, subentire; nut 5–5.5 mm diam., between dorsal and lateral wings smooth and with winglets; areole 4.5–5 × c.2.5 mm; embryo spherical.

*Distribution.* Colombia (Cesar, La Guajira, Magdalena) and Venezuela (Falcón, Lara, Zulia).

*Habitat.* Dry tropical forests and desert chaparral; sea level to 1200 m.

*Etymology.* The species is named for Julian Alfred Steyermark (1909–1988), indefatigable taxonomist, floristician and collector.

*Additional specimens examined.* COLOMBIA. **Cesar:** hoyá del Río Cesar (hoyá del Río Azucarbuena, región del Callao, 29 xi 1959 (fr), *Cuatrecasas & Romero Castaneda* 24965 (COL); Valledupar, ix 1938 (fl), *Haught* 2337 (A, COL). **Guajira:** Mpio. Macaio, 4–5 km N of Loma Chimbolo, on the Intercor railroad corridor, 19 v 1981, *Arboleda et al.* 650 (HUA, MEDEL); Proyecto El Cerrejón, entre Roche y Tabaco, sitio 11, 18 xi 1980, *Bunch P. s.n.* (HUA); highway near Villanueva, 11 ix 1944 (fl/fr), *Haught* 4354 (COL, GH); Mpio. Fonseca, Corregim. Distracción, sitio Las Casitas–El Socorro, 10°09'N, 72°59'W, 31 viii 1990, *Marulanda & Betancur* (sterile) 2112 (HUA), (fr) 2140 (COL, HUA, MICH, MO). **Magdalena:** Mpio. Santa Marta, vereda Neguanje, 11°15'22"N, 74°06'41"W, 10 xii 2008, *Botero B.* 1124 (MEDEL); Mpio. Santa Marta, Parque Nal. Tayrona, Bahía de Chengue, 29 xii 1974 (in bud), *López* 844 (COL); Mpio. Santa Marta, Parque Nacional de Tayrona, Ensenada de Neguanje, 9 ix 1976 (fl), *Lozano & Schnetter* 2775 (COL), 2777 (F), 14 ix 1976 (fr), 2821 (COL), 23 ix 1976 (fl), 2960 (COL); Parque Nacional Natural Tayrona, Gairaca, alrededores de la quebrada, ix 1979 (fr), *Moreno B.* 84 (COL). VENEZUELA. **Falcón:** Cerro Socopo, 30 vi 1979 (fr), *Liesner et al.* 8456 (MICH); cerca de Tiguaje, 22 x 1963 (fr), *Madriz* 20 (MY); Dtto. Mauroa, Caño Antiguo, 5 x 1977 (fr), *Ruiz Z. y Equipo de Ecología* 2125 (MICH); Dtto. Mauroa, La Antigua, 11 x 1977 (fr), *Ruiz Z. y Equipo de Ecología* 2249 (MICH); Dtto. Buchivacoa, Cerros de Flor Bonita, 3 xi 1977 (fr), *Ruiz Z. y Equipo de Ecología* 2392 (MICH). **Lara:** Dtto. Iribarren, Tierra Brava, carretera Barquisimeto–Churuguara, 8 xi 1979 (fl), *Marcano-Berti et al.* 366–979 (MICH, NY), 8 xi 1979 (fr), 373–979 (MICH); Duaca, 1893–94 (fl), *Mocquerys s.n.* (MICH, P); between Carora and Trentino, 16 i 1928 (fr), *Pittier* 12614 (G, NY, US, VEN); camino Barquisimeto–Churuguara, 10°05'N, 69°28'W, 22 i 1982 (fr), *Rutkis* 433 (MICH, VEN); Dtto. Palavecino, entre Terepaima y Cabudare, 5–10 viii 1970 (fl), *Steyermark et al.* 103433 (MICH, NY, VEN); Dtto. Iribarren, Mpio. Concepción, zona media de Loma de León, 20 ix 1950 (fl/fr), *Tamayo* 3745 (NY, VEN); Dtto. Iribarren, Cerro de Titicare, carretera a Río Claro, 22 ix 1950 (fl), *Tamayo* 3768 (NY, VEN); Barquisimeto, Loma de León, 13 vii 1954 (fl), *Vivas* 43 (VEN). **Zulia:** Dtto. Miranda, carretera Maracaibo–Altagracia, en el Km 4 al N del desvío a la carretera Maracaibo–Coro, 8 ix 1977 (fl), *Bunting* 5396 (VEN).

*Tetrapterys steyermarkii* is listed as “*Tetrapterys* sp. nov. 5” in the *Catálogo de Plantas y Liqueños de Colombia* (Anderson & Anderson, 2016). It is a small tree or shrub with thinly sericeous stems and inflorescences, which are soon glabrescent to glabrous, and leaves with very short petioles. The fruits are glabrescent as soon as the wings begin to enlarge; the mature samaras are glabrous. Most collections of *Tetrapterys steyermarkii* were left unnamed, but in Colombia some had been included in *T. discolor* (e.g. Cuatrecasas, 1958), and in Venezuela some had been misdetermined as *T. anisoptera* A.Juss., known only from Bahía, Brazil; both species are vines with the young inflorescences and fruits bearing abundant hairs. *Tetrapterys steyermarkii*

shares glabrous samaras with *T. seemanii* Triana & Planch. of Costa Rica, Panama, Colombia and Venezuela; they differ as follows.

- a. Shrub or small tree; petioles 3–6(–8) mm long; samara with lateral wings distinct or only slightly connate, the upper ones about 2–3 times as long as the lower, with 1 to several broad outgrowths between lateral and dorsal wings, the dorsal wing free from lateral wings at base and apex or only slightly fused with them \_\_\_\_\_ *T. steyermarkii*
- b. Woody vine, occasionally described as shrubby with elongated branches; petioles (6–)8–12 mm long; samara with lateral wings broadly confluent, the upper ones 3–5 times as long as the lower or longer, without outgrowths between lateral and dorsal wings or very rarely with 1 very small narrow one \_\_\_\_\_ *T. seemanii*

#### ACKNOWLEDGEMENTS

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#### REFERENCES

- ANDERSON, W. R. & ANDERSON, C. (2016). Malpighiaceae. In: BERNAL R., GRADSTEIN S. R. & CELIS M. (eds) *Catálogo de Plantas y Líquenes de Colombia*, 2: 1512–1535. Bogotá: National University of Colombia. Online. Available: <http://catalogoplantasdecolombia.unal.edu.co>
- CUATRECASAS, J. (1958). Prima Flora Colombiana. 2. Malpighiaceae. *Webbia* 13: 343–664.
- DAVIS, C. C. & ANDERSON, W. R. (2010). A complete generic phylogeny of Malpighiaceae inferred from nucleotide sequence data and morphology. *Amer. J. Bot.* 97(12): 2031–2048.
- NIEDENZU, F. (1928). *Tetrapterys*. In: Engler A. (ed.) *Das Pflanzenreich: Regni Vegetabilis Conspectus*, vol. IV. 141, pars 1 (Heft 91), pp. 155–224. Leipzig: Wilhelm Engelmann.

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