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## Taxonomy of *Neopringlea* (Flacourtiaceae)

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**ABSTRACT.** In the first complete taxonomic treatment of *Neopringlea*, a group of shrubs widespread in Mexico and Guatemala, three species are recognized: *N. integrifolia*, *N. viscosa*, and *N. trinervia*. The taxonomic affinities of *Neopringlea* have long remained unclear; the genus is here treated as a member of the large tropical family Flacourtiaceae.

*Neopringlea* comprises a group of rather nondescript shrubs native to the sierras of eastern and southern Mexico and adjacent Guatemala and has long remained of uncertain taxonomic position. Since its original description (as *Llavea*) by Liebmann in 1853, *Neopringlea* has been allied with at least five different families: Celastraceae (Liebmann 1853; Bentham and Hooker 1862), Hippocrateaceae (Kuntze 1891), Simaroubaceae (Watson 1891), Sapindaceae (Standley 1924), and Flacourtiaceae (Hallier 1908; Hutchinson 1959). Scant attention has been paid to the genus by contemporary phylogenetic systematists. Neither Cronquist (1968, 1981) nor Takhtajan (1969, 1980) dealt with the placement of the genus; Thorne (1981), at the suggestion of the present author, placed *Neopringlea* in Flacourtiaceae.

This taxonomic confusion has doubtlessly resulted from a combination of factors including poor representation of the genus in most major herbaria and the lack of flowering material on those specimens that are available. Indeed, most collectors seem to have been attracted only to plants bearing the distinctive three-winged fruits and have virtually ignored or overlooked flowering material altogether. When collected, the minute flowers are seldom well-preserved and do not readily lend themselves to analysis of their structure.

The present study, based upon examinations of living and FAA-preserved material as well as herbarium specimens, provides the first complete descriptions of the three species. On the basis of anatomical and morphological data to be presented in a forthcoming paper, I feel that *Neopringlea* should no longer be treated as a *genus incertae sedis* but as a member of the large tropical family Flacourtiaceae, its closest

relationship being with the genera *Trimeria* and *Homalium*.

### TAXONOMIC TREATMENT

NEOPRINGLEA S. Watson, Proc. Amer. Acad. Arts 26:134. 1891.—TYPE: *Neopringlea viscosa* (Liebm.) Rose.

*Llavea* Liebm., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 5:95. 1853, non Lagasca, Gen. Sp. Pl. 16. 1816.—TYPE: *Llavea viscosa* Liebm.

*Henningsocarpum* Kuntze, Rev. Gen. Pl. 1:117. 1891.—TYPE: *Henningsocarpum viscosum* (Liebm.) Kuntze.

Shrubs much branched from the base or occasionally small trees. Leaves deciduous, alternate, 2-ranked, stipulate, petiolate, simple; blades narrowly elliptic to ovate, usually more or less oblique at the base, at the margins gland-toothed or entire and revolute, vestitured throughout. Stipules small, bristle-like, distally caducous, bases persistent. Plant dioecious, flowers small, borne in short terminal racemes. Staminate flowers 3- or 4-merous; sepals valvate, ovate, incurved, pubescent; petals valvate, obovate, notably cupped, similar in texture to the sepals, ciliate; stamens in fascicles of 3 opposite the petals and alternating with small, densely pilose nectariferous glands; no vestige of an ovary present. Pistillate flowers 5-merous; sepals 5, subequal, united for most of their length, velutinous; petals absent; ovary superior, 3-angled, short-stipitate, surrounded at the base by a pubescent nectariferous disk, unilocular; styles 3, distinct, filiform, stigmatic toward the apices; ovules 3(-6) on 3 supra-basal, parietal placentae, anatropous. Fruit a small tri-lobate samara, the wings thin and membranaceous. Seed solitary, erect, more or less trigonal

in cross section, glossy; embryo straight, surrounded by the abundant oily endosperm. Chromosome numbers unknown.

KEY TO SPECIES OF *NEOPRINGLEA*

- Leaf-margins entire, revolute; staminate flowers predominantly 4-merous . . . . . 1. *N. integrifolia*  
 Leaf-margins glandular-serrate; staminate flowers predominantly 3-merous.  
 Leaves, petioles, and young stems moderately to sparsely villous or glabrate; leaf-blades thin-textured . . . . . 2. *N. viscosa*  
 Leaves, petioles, and young stems very densely covered with spreading white hairs; leaf-blades thick-textured . . . . . 3. *N. trinervia*

1. *NEOPRINGLEA INTEGRIFOLIA* (Hemsley) S. Watson, Proc. Amer. Acad. Arts 26:135. 1891.—*Llavea integrifolia* Hemsley, Diag. Pl. Nov. 1:6. 1878.—*Henningsocarpum integrifolium* (Hemsley) Kuntze, Rev. Gen. Pl. 1:117. 1891.—TYPE: Mexico, Hidalgo, Zimapan, Coulter 868 (holotype: K!). Fig. 1.

Shrubs 1.5–7 m high, much branched from the base; main stems 1–3 cm in diameter, bark smooth, grayish-brown; young stems closely villous with wavy hairs 0.2–0.6 mm long. Petioles 2–6 mm long, moderately to densely villous with hairs 0.2–0.5 mm long. Leaf-blades elliptic-lanceolate to ovate, asymmetrical, 1.5–4(–6) cm long, 0.8–1.5 cm wide, rounded to acute at the tip, oblique at the base, at the margins entire, revolute, densely villous below with spreading white hairs 0.1–0.5 mm long, sparsely villous above. Stipules minute, bristle-like, 1.5–3 mm long, densely covered with stiff straight trichomes 0.1–0.3 mm long. Staminate flowers densely fasciculate on the axes of terminal racemes 1.4–2 cm long; pedicels 1.5–3.5 mm long, closely velutinous, jointed, each subtended by 1–2 minute bracteoles 0.3–0.5 mm long; sepals (3–)4, 1–1.5 mm long, pubescent; petals (3–)4, 2.5–3 mm long, puberulent; filaments 1–1.5 mm long, erect or slightly recurved, glabrous. Pistillate flowers densely fasciculate on the axes of short terminal racemes 0.4–1 cm long; pedicels 2–3.5 mm long, velutinous, jointed; calyx densely velutinous, the lobes 0.5–1 mm long; ovary 1.5–2 mm long; styles 0.4–0.6 mm long, filiform. Fruit 5–8.5 mm long with wings 2.5–3.5 mm wide, elliptic to orbicular in outline, chartaceous, tipped by the

persistent styles. Seed 2.5–3 mm long, 1.4–1.7 mm wide, brown, often with a dark macula near the apex.

*Neopringlea integrifolia* tends to be locally abundant on limestone soils at 100–400 m in the Sierra Madre Oriental of Mexico from eastern Coahuila, Nuevo León, and Tamaulipas to San Luis Potosí, Queretaro, and Hidalgo (fig. 2). Martínez y Ojeda and González-Medrano (1977) and Rzedowski (1978) noted that *N. integrifolia* is one of the principal components of the "matorral alto subinerme" or thorn scrub region of northeastern Mexico.

Representative specimens. MEXICO. **Coahuila:** mountain 24 mi NNE from Monclova, 1–6 Sep 1880, Palmer 183 (GH, MICH, US). **Hidalgo:** rocky mountainside, Jacala, 7 Jul 1939, Chase 7335 (GH, MICH); vicinity of Zimapan, 22 Jun 1947, Kenoyer 1059 (A). **Nuevo León:** closed thorn forest SE of Linares, 5 Aug 1942, Gentry 6692 (GH, US); Bustamante, Aug 1938, LeSueur 350 (TEX, US); trail between Potrero Redondo and Las Ajuntas, 24 Aug 1939, Muller 2975 (GH, LL); limestone hillside, western edge of Monterrey, 16 Nov 1958, Rollins and Tryon 5890 (TEX). **Querétaro:** 6 km from Higuierillas towards Vizarron, 25 Jun 1972, Chiang et al. 8120 (LL). **San Luis Potosí:** 6 mi W of Cd. del Maiz, 23 Oct 1959, Johnston and Graham 4454 (TEX); limestone hillside 3 mi SE of Presa de Guadalupe, 24 Nov 1962, Moran 10020 (GH, LL, MICH, US); limestone ledges, San José Pass, 12 Jul 1890, Pringle 3137 (GH, US); limestone ledges, San José Pass, 11 Oct 1890, Pringle 3248 (GH, MICH, US); limestone hills, Yillar, 14 Sep 1893, Pringle 5385 (GH, MICH, US); Minas de San Rafael, Nov 1910, Purpus 4899 (GH, US); 2 km al oeste de Nuñez, km 84 carretera S.L.P.-Antiguo Morelos, 22 Aug 1955, Rzedowski 6259 (MICH, TEX). **Tamaulipas:** Sierra de San Carlos, vicinity of Marmolejo, 3 Aug 1930, Bartlett 10807 (GH, LL, MICH, US); 9 km al E de Morelos y a 50 km del Rivereño, Dec 1964, González-Medrano 845 (F); 5 mi E of Casas on the Cd. Victoria-Soto la Marina highway, 28 Sep 1960, Johnston and Crutchfield 5777 (LL, TEX); along roadside km 803 of highway near Villagran, 25 Sep 1943, Lundell and Lundell 12479 (LL, MICH, US); vicinity of Victoria, May–Jun 1907, Palmer 514 (GH, US); 4 mi S of Jaumave, 2 Jul 1949, Stanford et al. 2236 (GH, US).

2. *NEOPRINGLEA VISCOSA* (Liebm.) Rose, Contr. U.S. Natl. Herb. 12:282. 1909.—*Llavea viscosa* Liebm., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 5:95. 1853.—*Henningsocarpum viscosum* (Liebm.) Kuntze, Rev. Gen. Pl. 1:117. 1891.—LECTOTYPE (here designated): Mexico, Puebla, Achapulco,

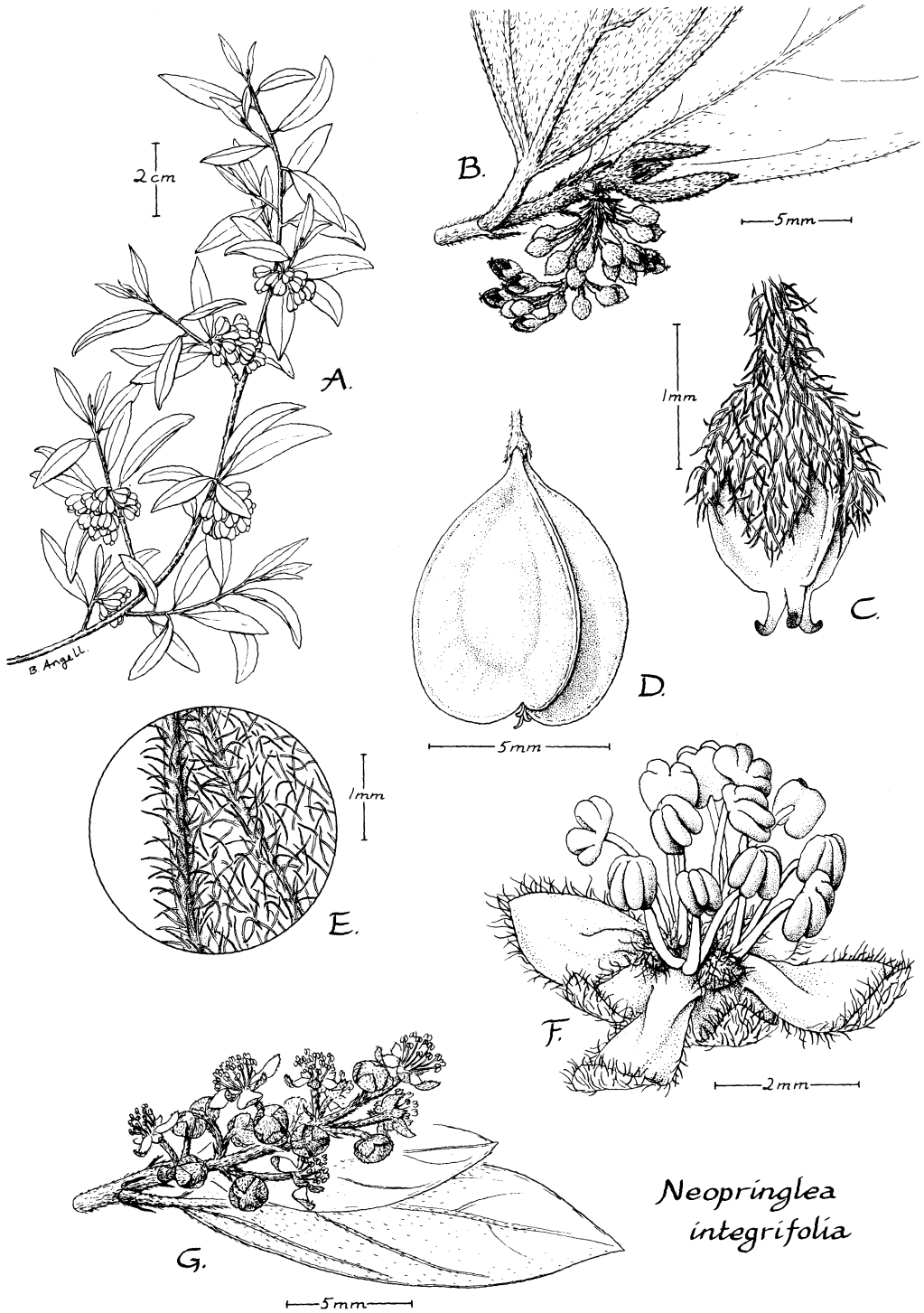


FIG. 1. *Neopringlea integrifolia*. A. Branch with mature fruits. B. Pistillate inflorescence. C. Pistillate flower. D. Fruit. E. Leaf, abaxial surface; note revolute margin. F. Staminate flower. G. Staminate inflorescence.

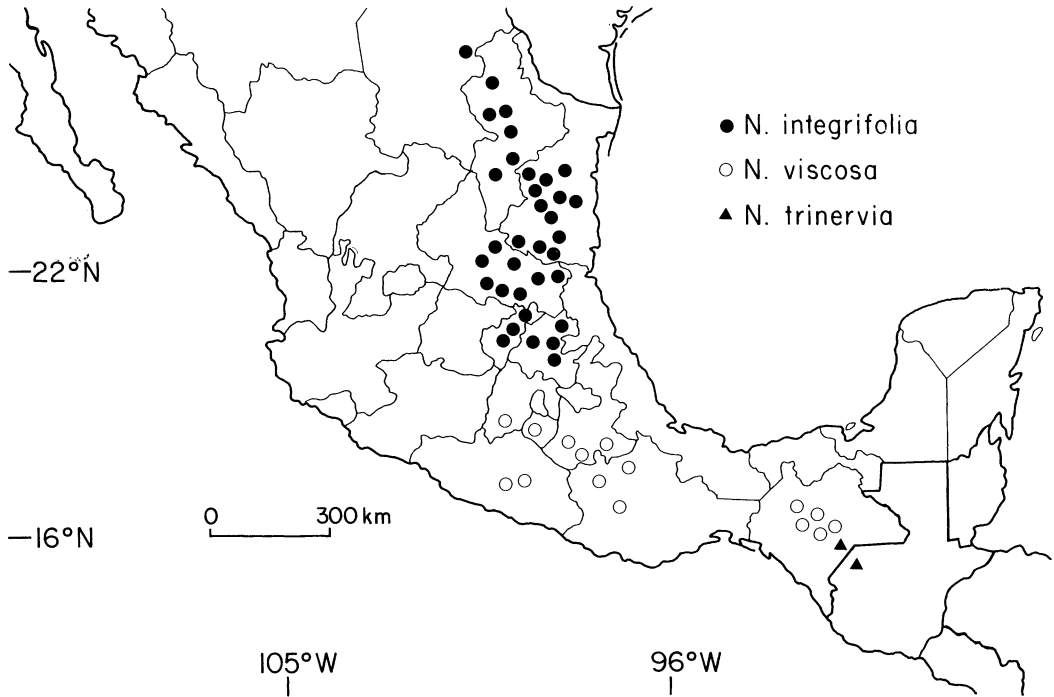


FIG. 2. Distributions of the species of *Neopringlea*.

Dec 1841, *Liebmann 3767* (C!; duplicate: C!). Two sheets in Liebmann's herbarium fit his protologue and are presumably the specimens upon which the original description was based. The better preserved of these has been annotated as the lectotype.

Shrubs much branched from the base or occasionally small trees, 1.5–10 m high; main stems 1–5 cm in diameter, bark smooth, brown, lenticels often prominent, particularly on the younger growth; young stems pubescent to puberulent with spreading white hairs 0.1–0.3 mm long, occasionally nearly glabrous. Petioles 2–9 mm long, sparsely villous with hairs 0.2–0.4 mm long. Leaf-blades elliptic-lanceolate to ovate, symmetrical, 2–5(–10) cm long, 1.4–2.5(–5.5) cm wide, acute or acuminate at the tip, slightly oblique at the base, at the margins glandular-serrate, sparsely to moderately villous below with spreading crooked hairs 0.3–0.5 mm long, sparsely villous to glabrous above. Stipules minute, bristle-like, 1–2.2 mm long, densely covered with stiff straight trichomes 0.1–0.3 mm long. Staminate flowers densely fasciculate on the axes of terminal racemes 1.2–

2.2 cm long; pedicels 2.5–4 mm long, closely velutinous, jointed, each subtended by 1–3 minute bracteoles 0.5–0.8 mm long; sepals 3(–4), 1–1.5 mm long, pubescent; petals 3(–4), 2.5–3 mm long, puberulent; filaments 1–1.5 mm long, usually recurved, white, glabrous. Pistillate flowers densely fasciculate on the axes of short terminal racemes 0.6–1 cm long; pedicels 2–3.5 mm long, velutinous, jointed; calyx moderately to densely covered with stiff, straight trichomes 0.2–0.3 mm long, the lobes 0.5–1 mm long; ovary 1.5–2 mm long; styles 0.4–0.6 mm long; fruit 6–8 mm long with wings 2.5–3.5 mm broad, elliptic to orbicular in outline, chartaceous, tipped by the persistent styles. Seed 2.5–3.5 mm long, 1.4–1.6 mm wide, brown.

*Neopringlea viscosa* is found primarily on limestone soils at ca. 600–1800 m in the states of Puebla, Morelos, México, Guerrero, Oaxaca, and Chiapas (fig. 2).

Representative specimens. MEXICO. **Chiapas:** El Chorreadero, 5.6 miles E of Chiapa de Corzo, 15 Aug 1966, *Breedlove 14950* (ENCB, LL); cliff faces and limestone bluffs at El Sumidero, 22 km N of Tuxtla Gutiérrez, 19 Aug 1972, *Breedlove 27151* (LL, MEXU, NY);

steep slope along stream 5 km S of Aguacatenango, 18 Nov 1972, *Breedlove and Dressler* 29675 (ENCB, F, LL, MEXU, NY); Rancho Carmen along the road from Acala to Venustiano Carranza, 23 Aug 1966, *Laughlin* 1654 (ENCB, LL); Cahauré, cerca Chiapa, 13 Nov 1949, *Miranda* 5689 (MEXU, US). **Guerrero:** road above Cañon de Zopilote 8 km E of Xochipala on way to Filo del Caballo from Milpillas, 9 Nov 1973, *Breedlove* 35997 (MEXU); road to Taxco, Alarcon, 27 Feb 1931, *Hunnewell* 11811 (GH); about 35 km NNW of Chilpancingo, rocky hills 3–5 km on road from Case Verde to Xochipala, 2 Feb 1965, *McVaugh* 22195 (ENCB). **México:** Ixtapan de la Sal, Dec 1950, *Paray* 401 (ENCB). **Morelos:** Cañon de Lobos, 24 Dec 1960, *Miranda* 9319 (MEXU). **Oaxaca:** Distrito de Nochitlan, 14 Jul 1920, *Conzatti* 4023 (MEXU, US); limestone hills along Mexican Hwy. 190, 4 km N of Huajuapán de León, 27 Aug 1979, *Lemke* 050 (TEX). **Puebla:** road from Huajuapán de León to Izúcar de Matamoros, 4 km from Oaxaca-Puebla border, ca. km 293, 2 Feb 1970, *Anderson and Anderson* 5643 (ENCB, MICH); between Acatlán and Piaxtla, 22 Nov 1894, *Nelson* 2004 (GH, US); limestone hills near Tehuacan, 27 Aug 1897, *Pringle* 6687 (GH, MEXU, MICH, US); vicinity of San Luis Tultitlanapa, Jul 1908, *Purpus* 2835 (GH, US); Tehuacan, Aug 1906, *Rose and Rose* 11279 (GH, US).

3. ***Neopringlea trinervia*** (Standley & Steyermark) Lemke, comb. nov.—*Xylosma trinervium* Standley & Steyermark, Publ. Field Mus. Nat. Hist., Bot. Ser. 23:178. 1944.—TYPE: Guatemala, Huehuetenango, along Río Cuilco between Cuilco and aldea of San Juan, 2.5 miles W of Cuilco, 1200–1300 m, 18 Aug 1942, *Steyermark* 50876 (holotype: F!; isotype: NY).

Shrubs or small trees 2–7 m high; bark smooth, dark grayish-brown, often with prominent lenticels; young stems densely pilose with spreading white hairs 0.1–0.3 mm long, becoming glabrous with age. Petioles 3–7 mm long, very densely covered with spreading hairs 0.2–0.4 mm long. Leaf-blades somewhat thickened, broadly to narrowly elliptic, occasionally slightly asymmetrical, 2–4(–5.5) cm long, 1.5–2.5 cm wide, acute or acuminate, more or less oblique at the base, at the margins glandular-serrate, very densely velutinous-pilose above and below with spreading white hairs 0.2–0.4 mm long. Stipules minute, bristle-like, 1.5–2 mm long, densely covered with stiff straight trichomes 0.1–0.2 mm long. Staminate flowers very densely aggregated on the axes of terminal racemes 1–2.5 cm long; pedicels 1.5–4 mm long, closely velutinous with white spreading

hairs 0.4–0.6 mm long, jointed, each subtended by 1–2 minute bracteoles 0.3–0.5 mm long; sepals 3(–4), 1–1.5 mm long, pubescent; petals 3(–4), 2.5–3 mm long, sparsely puberulent; filaments 1–1.5 mm long, erect or very slightly recurved, white, glabrous. Pistillate flowers loosely fasciculate on the axes of short terminal racemes 0.4–0.8 cm long; pedicels 2–4 mm long, velutinous, jointed; calyx velutinous, the lobes 0.5–1 mm long; ovary 1.5–2 mm long; styles 0.3–0.5 mm long, filiform. Fruit 7–9 mm long with wings 3–3.5 mm broad, elliptic in outline, chartaceous, tipped by the persistent styles. Seed 3–3.5 mm long, 1.4–1.8 mm wide, dark brown.

At present *N. trinervia* is known from only two localities: along the banks of the Río Cuilco in NW Guatemala and on steep slopes and along streams in tropical deciduous forest near La Trinitaria, Chiapas, Mexico (fig. 2). Further exploration of this poorly botanized region will doubtlessly show the species to be at least somewhat more widely distributed.

On the basis of a single collection bearing only staminate flowers, Standley and Steyermark (1944) originally assigned this species to *Xylosma*, one of the few other dioecious genera of Flacourtiaceae. Careful examination of the type specimen reveals, however, that its flowers possess the fascicles of stamens alternating with pilose nectar-glands typical of *Neopringlea* in contrast to the cyclically arranged stamens of *Xylosma*. An additional collection of this poorly known species from extreme southern Chiapas (*Breedlove* 42208) bears pistillate flowers and the characteristic tri-alate samaras.

Specimens examined. MEXICO. **Chiapas:** wooded creek bank 20 miles S of La Trinitaria along Mexican highway 190, 15 Aug 1965, *Breedlove* 11781 (F, GH, LL); steep slopes 6 km S of La Trinitaria along Mexican highway 190, 8 Dec 1976, *Breedlove* 42208 (LL, MEXU).

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