

Endemism in two new species of *Dendrophthora* (Viscaceae) from Cerro Jefe, Panama

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ABSTRACT

Two new species, ***Dendrophthora fortis*** J. Kuijt, **sp. nov.** and ***D. perlicarpa*** J. Kuijt, **sp. nov.**, are described and illustrated from the Cerro Jefe area, Panama. At least *D. fortis* is distinctive in having a dichotomous branching habit, the apex aborting following the formation of one pair of leaves. *D. fortis* is related to *D. obliqua* with which it has been confused in the past. The two species are known only from the Cerro Jefe area except for *D. fortis*, of which there are two records from El Valle de Antón. Published on-line www.phytologia.org *Phytologia* 97(2): 139-144 (April 1, 2015). ISSN 030319430.

KEY WORDS: *Dendrophthora fortis*, *D. perlicarpa*, Viscaceae, Cerro Jefe, endemism.

The large neotropical genus *Dendrophthora* (Viscaceae) includes an assemblage of species of strikingly robust habit, its only well known species being *D. obliqua* (Presl) Wiens. The group ranges from Peru to Venezuela and Panama and, like nearly all continental congeners, prefers high altitudes. Until fairly recently, all of the species of this group were thought to belong to the closely allied genus *Phoradendron*. The documented presence of unilocular anthers of several entities has led to their transfer to *Dendrophthora*.

A prominent structural feature of *D. obliqua* and several others is a dichotomous habit in which each innovation bears one pair of distal leaves, below which stand several pairs of large cataphylls. The apex of the innovation aborts, and new innovations emerge in the axils of the foliage leaves. Inflorescences also develop from the foliar nodes (See the illustration in Kuijt 1986, Fig. 43).

The taxonomic problems in studying this assemblage are several. With the possible exception of *D. obliqua* and one of the species here introduced, the species are poorly represented in major herbaria and, due to their coarseness and rigidity, are often in fragmentary condition. Fruit color and shape, which sometimes are of pivotal taxonomic value, are not ascertainable from herbarium specimens and are only rarely included in label information. Male and female flowers are similar and, consequently, the distribution of the sexes is often not clear. Confusingly, some entities appear to combine both dichotomous and percurrent habits. Several entities described in the past inhabit inaccessible areas such as the summits of tepuis.

An attempt was made earlier (Kuijt, in Kuijt & Kellogg 1996) to analyze the complex, but this attempt will need revision if and when more material becomes available. Our present contribution focuses on the northernmost elements as they occur in Panama, almost entirely in the Cerro Jefe area. The collections in the past from this mountain range have mostly been identified as *D. obliqua*. Our recent field and herbarium studies have established, however, not only that *D. obliqua* does not occur in Panama

but also, surprisingly, that two different undescribed species of the assemblage are present on Cerro Jefe, at least *D. fortis* with a strictly dichotomous habit. It is the purpose of our contribution to describe and illustrate these new species.

DENDROPTHORA FORTIS J. Kuijt, *sp. nov.* **Figs. 1 & 2.**

Diagnosis Plants bright green, leaf blades symmetrical, elliptical, flat, shiny when fresh, apex rounded; venation palmate, with 8--10 veins, evident; dioecious. Inflorescence with mostly 6 fertile internodes, flowers 9--12 per fertile bract. Fruits globular, 3 mm in diameter, light pink.

Description **Very stout, glabrous, bright green plants**, dichotomous by abortion of the shoot apex after forming one pair of foliage leaves; innovations with 3 or 4 pairs of blunt cataphylls, the basal ones ca. 4 mm above the base, the upper ones about halfway to the foliage leaves. **Internodes terete**, 5--20 cm long, nodes somewhat swollen, to 2 cm thick in age. **Foliage leaves** coriaceous, shiny when fresh, with blades 7--15 cm long and 6--10 cm broad, ovate-elliptical to nearly orbicular, symmetrical, petiole massive, flat, 6--7 mm, often red, base of blade mostly obtuse, apex rounded, venation palmate, the 8--10 veins very prominent and reddish when fresh, margins leathery, brown. Dioecious, female plants predominating. **Female inflorescence** to 9 cm long, turning reddish or orange in age, consisting of a short (6--7 mm) double peduncle followed by (3--5) 6 fertile internodes each ca. 10 mm long, the apical ones shortest; fertile internodes slightly swollen, flowers triseriate, somewhat sunken in the rachis, 9--12 above each fertile bract, the terminal internode with as few as 3 flowers. **Male inflorescence** of similar size and construction, also triseriate, flowers ca. 18 per fertile bract. **Fruits** 3 mm in diameter, globular, light pink.

TYPE: PANAMA. PANAMÁ: ca. 23 km from turn off to Los Altos de Cerro Azul from "Fucer," reached from town of "24 Diciembre" off Inter-American Hwy.; station along road about halfway between Cerro Jefe towers and Vistamares overlook; cloud forest, 900 m, 09°14'6.45"N, 79°23'10.92"W, on *Clusia* sp., 28 Jun 2014, J. & L. Harrison 639 (Holotype UCH; Isotypes PMA, US).

In general aspect *Dendrophthora fortis* is similar to, and probably closely related to, *D. obliqua*, which is known especially from Ecuador. Both species (and a number of other species in *Dendrophthora* and the related genus *Phoradendron*) demonstrate a consistently dichotomous habit characterized by the abortion of the apex of the innovation. The inflorescences are developed especially on older nodes, often in clusters. *D. fortis* differs from *D. obliqua* most obviously in its elliptical, symmetrical, round-tipped leaf blades with red veins and petioles, while *D. obliqua* leaves at least at maturity have a characteristically asymmetrical shape and acute apex. *D. obliqua* has 20--40 flowers per fertile bract, but the number is about half that in *D. fortis*. *D. obliqua* is monoecious, the sexes said to be on separate spikes at least in Ecuador, but *D. fortis* is dioecious. Curiously, out of the 22 collections studied, 20 were female and only 2 were male; nevertheless, nearly every female flower appears to develop into a fruit, suggesting apogamy.

The name *Dendrophthora obliqua* has, in the past, mistakenly been applied to Mesoamerican plants, including some from Cerro Jefe (Kuijt 1978, 1990), partly because of the confusion with a species of *Phoradendron* of similar branching habit (*P. nitens* Kuijt; Kuijt, 1964: 275, 316). The possibility suggested in Kuijt (1990: 136) that the Cerro Jefe material is taxonomically distinct from *D. obliqua* is thus confirmed. The true *D. obliqua* is probably limited to the northern Andean region.

Dendrophthora fortis appears to be an endemic to Cerro Jefe except for a localized population in the El Valle area (Churchill 3925, 3926, Dwyer10556). In fact, the citations below show *D. fortis* to be limited to a small area on the mountain; the majority of known collections are from essentially the same location. Cerro Jefe is well known for its high degree of endemism (De Seda M. et al. 2010). Of the 1260

species thus far believed to be endemic to Panama, 222 (ca. 18%) are present on Cerro Jefe and 66 (5.2%) are limited to the locality.

Etymology: The epithet “*fortis*” refers to the stout structure of the plant.

ADDITIONAL SPECIMENS EXAMINED: **PANAMA. COCLÉ**: Area of El Valle, 2 km E of La Mesa, N slope of Cerro Gaital, dwarf *Clusia* forest, 8°38'N, 80°7'W, on Guttiferae, 800 m, 24 Nov 1983, *H.W. Churchill* 3925 (MO), 3926 (MO); 8.4 km from village of El Valle, vicinity of La Mesa, 30 Mar 1973, *J.D. Dwyer* 10556 (MO). **PANAMÁ**: 200 m de la torre de telecomunicaciones en Cerro Jefe, 09°13'13.0"N, 079°22'28.4"W, 17 Nov 2003, on *Clusia*, *FLORPLAN*, *De Gracia*, *Martínez*, *Cabrales-Alin*, *Burman* 6406 (PMA); summit of Cerro Jefe and along road on E slope, 9°15'N, 79°30'W, 900--1000 m, 5 Apr 1982, *S. Knapp* & *M. Huft* 4581 (MO); Cerro Jefe: on *Clusia*, 12 Sep 1985, *L. Carrasquilla* 2125 (MO); 1000 m, 21 Sep 1986, on *Clusia*, *Valdespino* & *Aranda* 147 (MO, PMA); near tower, 2400 ft, 23 May 1980, *Antonio* 4724 (MO, PMA); trail leading west from summit, 24 Sep 1975, *J.T. & F. Witherspoon* 8505 (MO); in *Clusia* forest, 2700--3000 ft, 27 Jan 1966, *E.L. Tyson*, *J. Dwyer*, & *K. Blum* 3193 (MO), 3282 (MO, 2x); cloud forest dominated by *Clusia* & *Colpothrynx cookii*, 1000 m, 14 Jul 1975, *S. Mori* 7123 (MO); along trail on ridge running NE from summit, 1000 m, 18 Dec 1974, *S. Mori*, *J. Kallunki*, and 5 others 3766 (MO); along trail on ridge running NE from summit, 1000 m, on *Clusia*, *S. Mori* & 5 others: *Cochrane*, *Hansen*, *Kowal*, & *Nee* 3766 (MO); forested slopes near radio tower, 950 m, 9°15'N, 79°30'W, 11 Oct 1985, *G. McPherson* 7141 (MO); E slope, dirt track near radio tower, 9°15'N, 79°30'W, 950--1000 m, *S. Knapp* & *J. Mallet* 5181 (MO, UC); road N from summit, 9°14'N, 79°23'W, 20 Jan 1984, *H.W. Churchill* 4307 (MO); summit, 900--1000 m, 4 Apr 1982, *M. Huft* & *S. Knapp* 1720 (MO); summit near radio towers, dwarf *Clusia* forest, on *Clusia*, 9°4'N, 79°23'W, 1000 m, *W.H. Churchill* 3947 (MO); 800--1000 m, 23 Feb 1977, *J.P. Folsom*, *R. Lantz*, & *J. Atwood* 1856 (MO); *Clusia* forest, 2700--3000 ft, 27 Jan 1966, *E.L. Tyson*, *J. Dwyer*, & *K. Blum* 3193 (MO), 3282 (MO, 2x); top of Cerro Jefe, at tower, 950 m, 22 May 1980, *J.P. Folsom*, *J.D. Mauseth*, & *T. Antonio* 7800 (MO); 2700--3000 ft, 9 Jul 1966, *E.L. Tyson*, *J. Dwyer*, & *K. Blum* 4340 (MO).

DENDROPHTHORA PERLICARPA J. Kuijt, sp. nov. Fig. 3 & 4.

Diagnosis. Bright green, dichotomous and percurrent plants, leaves ovate, standing sideways, flat and coriaceous, shiny, apex ca. acute, venation palmate but obscure when fresh; dioecious. Female inflorescence 3--5 cm long, with 2 or 3 sterile basal internodes followed by 5 or 6 fertile internodes each with 6 or 7 flowers in triseriate pattern. Fruit 5--6 mm in diameter, spherical, pearly white.

Description. **Bright green, dichotomous and percurrent plants**, each innovation apically aborting and bearing a single pair of leaves or terminating in an inflorescence. **Internodes stout, terete**, smooth; innovations bearing 3--5 pairs of obtuse basal cataphylls, the uppermost pair placed halfway or slightly lower to the foliar node above; similar intercalary cataphylls present on percurrent shoots. **Leaf blades** 5--7 cm long, 3.5--5 cm wide, ovate, shiny, coriaceous, apex acute or nearly so, base obtuse, petiole 3 mm long, stout, the youngest leaves almost sessile; venation palmate but obscure when fresh, with 3 or 5 veins. Leaf margin brown, often irregularly granular when young. Dioecious, only the female known. **Female inflorescence** 3--5 cm long at early anthesis, elongating slightly in fruit, each with 2(3) sterile internodes basally, these followed by 5 or 6 fertile internodes. Flowers triseriate, 6 or 7 per fertile bract on the larger internodes, at first deeply immersed in the swollen rachis, whitish, red inside, the adjacent internodal area red. **Fruit** spherical, 5--6 mm in diameter, clear pearly white, the petals half closed, brown, lightly tomentose also on the adjacent part of the fruit.

TYPE. PANAMA. PANAMÁ: Los Altos de Cerro Azul, close to Cerro Jefe, midway along El Cantar trail near first rain shelter (starting from El Fortin trail head at end of Calle Andorra), premontane forest, ~ 850 m, 9°13'50.938"N, 79°24'10.493"W, 23 Jan 2015, *J. & L. Harrison* 680 (Holotype: UCH).

The leaves of *Dendrophthora perlicarpa* provide the most obvious contrasts with those of the only other known Cerro Jefe congener, *D. fortis*. The leaf blades of the former are ovate, with an acute or nearly acute apex and an obscure major venation of 3--5 veins, while those of *D. fortis* are mostly elliptical or nearly so, with rounded apices, and showing 8--10 strongly marked veins. Additional differences are seen in the female inflorescences that in *D. perlicarpa* bear 6 or 7 flowers per fertile bract, but in *D. fortis* 9--12. Finally, the white fruits of *D. perlicarpa*, being 5--6 mm in diameter, contrast with those of *D. fortis* that are 3 mm in diameter and light pink.

Because only a single specimen was collected (a much younger plant was seen nearby), it is not certain that the unusual terminal inflorescences here reported are standard equipment in *D. perlicarpa*. No other leafy Mesoamerican species of the genus are known to have terminal inflorescences. Its unusual floral color pattern may be unique in the genus generally.

Etymology. The epithet “*perlicarpa*” refers to the pearly luster of the fruit.

DISCUSSION

In contrast to most previously described elements of the assemblage, the sex distribution of both new species is clearly of a dioecious type. The only specimen available of *D. perlicarpa* bears fruits or female flowers, or the remainder of their infructescences demonstrates large floral cavities in which fruits have been present in the past, documenting its dioecious status. The situation in *D. fortis* initially was puzzling because only female specimens seemed available. Eventually, however, two purely male specimens were located, as listed above, so that we can be certain that this species is also dioecious. Curiously, however, the number of female specimens we have studied greatly outnumbers the male ones (20 to 2). Infructescences regularly bear fruits in all positions, a feature that raises the possibility of apogamy. One of the male specimens of *D. fortis* (*Knapp & Mallet 5181*, UC) has previously been documented to have unilocular anthers, confirming its generic status.

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Fig. 1. General habit of the type of *Dendrophthora fortis*.

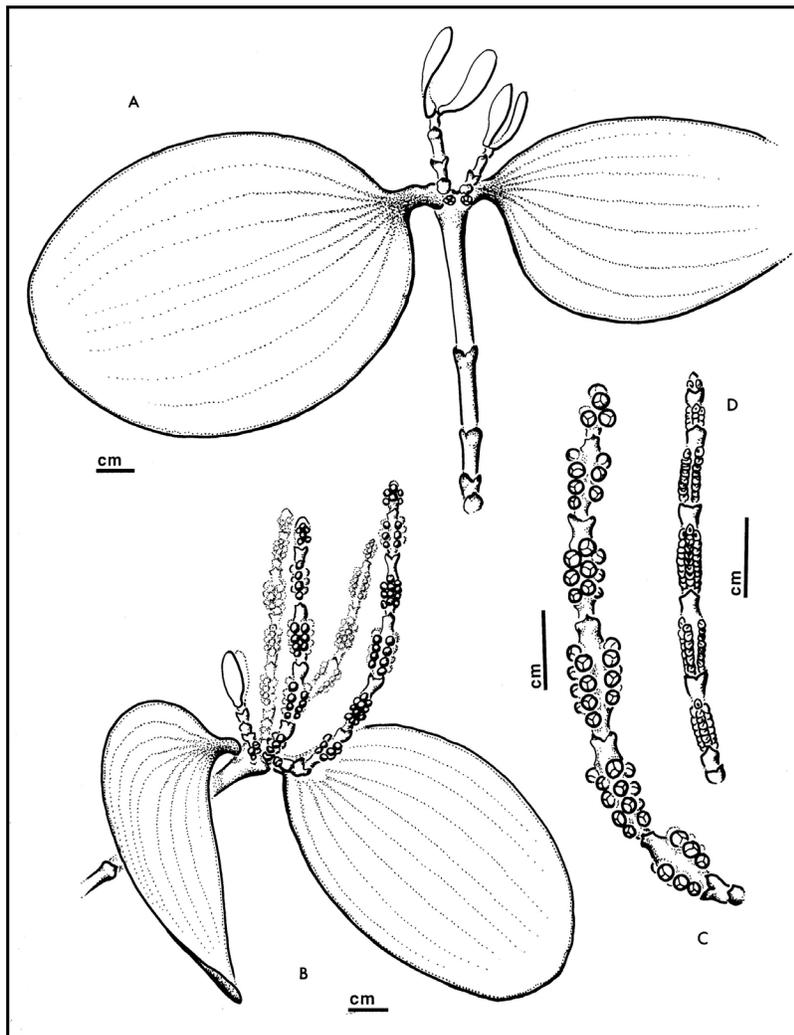


Fig. 2. *Dendrophthora fortis*. A--C: Harrison & Harrison 639 (UCH). D: Knapp & Mallet 5181 (MO). A. Young innovation. B. Innovation bearing inflorescences and young shoot. C. Female inflorescence. D. Male inflorescence.

Fig. 3. Flowers and inflorescences of the type of *Dendrophthora perlicarpa*.

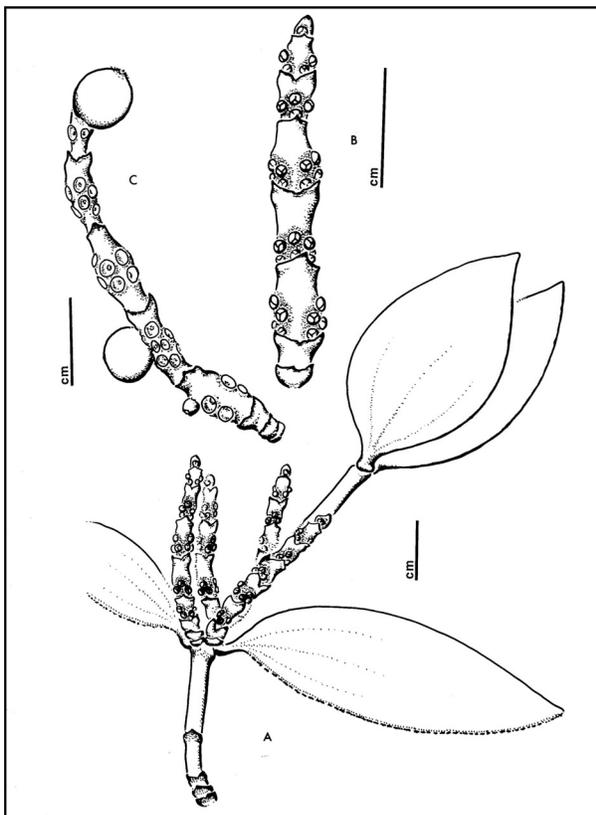


Fig. 4. *Dendrophthora perlicarpa*. Harrison & Harrison 680 (UCH). A. Habit. B. Young female inflorescence. C. Infructescence.