



## *Clusia nitida*, a new species of *Clusia* (Clusiaceae) from the Brazilian Amazon

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### Abstract

In this paper we describe and illustrate *Clusia nitida*, a new species from the Amazon with resin-producing flowers, similar to *C. microstemon* and *C. myriandra*.

### Introduction

*Clusia* Linnaeus (1753: 510) (Clusiaceae s.s., tribe Clusieae) has about 300 exclusively neotropical species. Due to the poor knowledge of the Amazonian flora (Hopkins 2007, Schulman *et al.* 2007), the actual number may be much higher. Many species still not described also occur in the Andes (M. Gustafsson, pers. comm). For Brazil so far 67 species are listed (Bittrich 2013), but several undescribed species exist, for which only one of the sexes is known, impeding their formal description (pers. obs.).

Clusias are trees, shrubs and hemi-epiphytes, usually dioecious, with the leaves more or less fleshy, and showy flowers, offering various types of rewards, including floral resin. The ovary locules have (1–)2 to many ovules. The fruits are septifragal fleshy capsules with usually two or more seeds per locule, the seeds are more or less completely covered by a non-vascularized aril. Due to the great variability of the male androecium, the species are generally much easier to recognize with male than with female flowers or with fruits. Therefore, the infrageneric classification of the genus, mostly confirmed as natural by modern data, was based especially on the morphology of the male androecium (Planchon & Triana 1860).

In this paper we describe a new species of *Clusia* for the Amazon, apparently belonging to the section *Phloianthera* Planchon & Triana (1860: 319). Molecular data are still needed to confirm this placement, as there is some confusion in the literature concerning the delimitation of sections *Phloianthera* and *Cordylandra* Planchon & Triana (1860: 319). Sect. *Cordylandra* was even synonymized under sect. *Phloianthera* by Pipoly *et al.* (1998), but molecular data (Gustafsson *et al.* 2007) clearly indicates that these sections are not closely related. The new species here described belongs to a group of species with a flat disk-like androecium in the staminate flowers, covered by a resin-pollen mixture, as occurs in *Clusia renggerioides* Planchon & Triana (1860: 350) and other species of sect. *Cordylandra*. None of these species supposedly belonging into sect. *Phloianthera* was hitherto included in a molecular phylogenetic study.

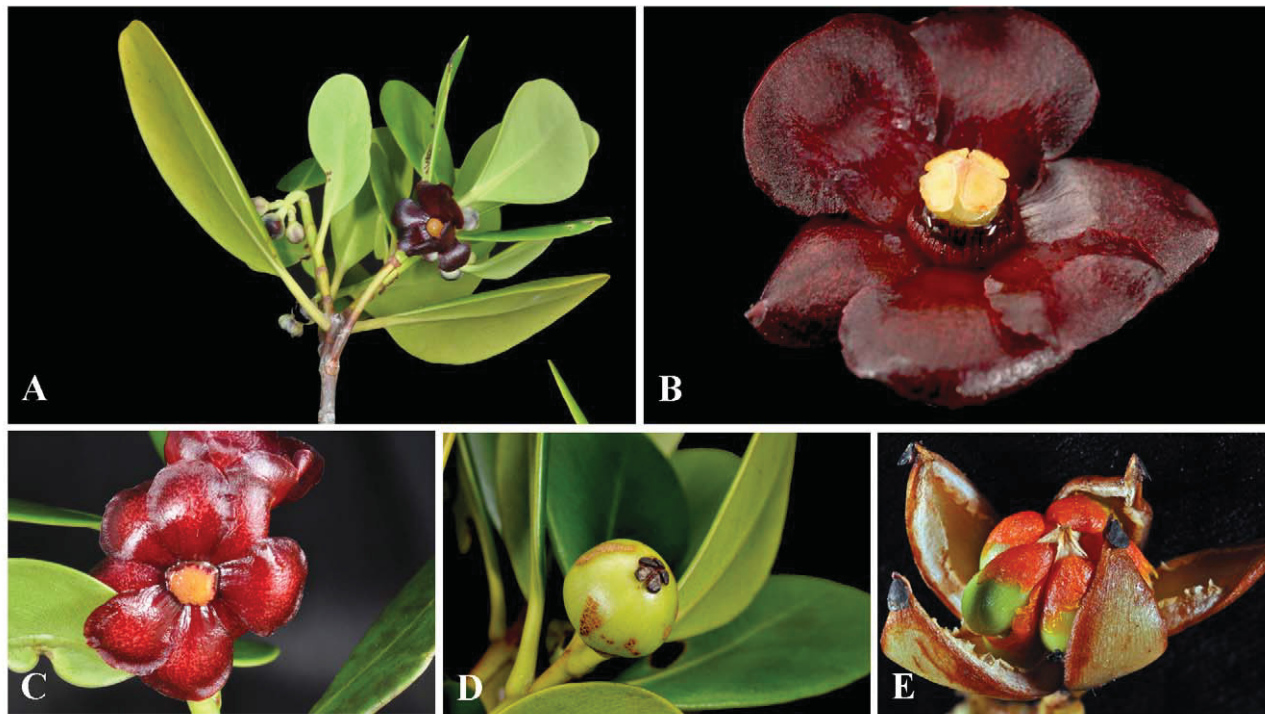
### Taxonomy

*Clusia nitida* Bittrich & F. N. Cabral, *sp. nov.* (sect. *Phloianthera*) (Fig. 1 & Fig. 2)

Diagnosis: Similar to *Clusia microstemon*, but dry leaves are darker coloured and generally have a shiny surface, the latex channels are denser on the adaxial surface, the midrib is conspicuous as far as to the apex, the petal colour is

different and anthers are absent on the lateral part of the disk-like androecium. The new species is also similar to *Clusia myriandra* from which it differs by the leaf shape, the visibility of the latex channels on the leaves, the shorter peduncle and basal internodes in the inflorescence, the size of the fruits and the lesser number of seeds.

Type:—BRAZIL. Roraima: Caracará, Parque Nacional do Viruá, White-sand vegetation, 1°24'50.7"N, 60°59'16.5"W, 59 m, 15 October 2010, *F.N. Cabral & V.S. Santos 298* (holotype INPA!).



**FIGURE 1.** A. Disposition of leaves and inflorescences, *F.N. Cabral 49* (Photo F.N. Cabral). B. Pistillate flower, *F.N. Cabral 123* (Photo F.N. Cabral). C. Staminate flower, *F.N. Cabral 5* (Photo F.N. Cabral). D. Immature fruit, *F.N. Cabral 197* (Photo F.N. Cabral). E. Mature fruit, *N. Dávila 6129* (Photo N. Dávila).

Trees, small trees or shrubs up to 6 m tall; sometimes with prop roots. Plants dioecious, latex white or cream; young branches cylindrical or more frequently subangular, surface not rugulose, but finely sulcate or with tiny longitudinal foldings, linear colleters present in the petiole axils, deciduous with the leaves. Petiole 4.0–16.0(–17.0) mm long, margin flat to revolute. Leaf blade coriaceous, discolorous, adaxial surface dark brown and shiny *in sicco*, oblong-elliptic, 40–85(–108) mm long and (18–)21–49(–53) mm wide, apex rounded, base attenuate, margin revolute; midrib prominent on the adaxial surface and conspicuous as far as the apex, secondary veins prominent on both surfaces, with (9–)12–26(–29) pairs, 1.5–4.0 mm distant from each other and at an angle of 35°–40° with the midrib, basal veins inconspicuous; latex canals concolorous on the adaxial surface or slightly darker than the blade, immersed, 0.3–0.7 mm distant from each other, flat to protruding on the abaxial surface, 0.8–1.0 mm distant from each other, forming an angle of about 25° with the midrib. Inflorescence cymose, compact, 3–9-flowered (staminate plants) or 3–7-flowered (pistillate plants), bracts and bracteoles united at the base, hemiorbicular, ca. 2 mm long, pedicels very short, ca. 2 mm long, quadrangular. Epicalyx bracts 2 (+2), united at base, sepals 4 (2+2), rarely 5 or 6 (2+3, 3+3), ± suborbicular, ca. 4–8 mm long and 4–8 mm wide. Petals 5–8, 6–13 x 6–12 mm, dark bordeaux or blood-red. Staminate flower with the androecium forming a thick, circular, flat disk, ca. 3–6 mm wide, composed of about 300 densely compact stamens, the upper surface covered by a mixture of resin and pollen during anthesis, filaments 2.3–3.0 mm long, lateral region of the disk without anthers, anther dehiscence by apical or transverse slits. Pistillate flower with 3 or 4 series of staminodes around the base of the ovary, secreting resin at the apex; staminodes linear, 1.3–2.0 mm long, truncated at the apex, without sterile anthers; stigmas 4 or 5,

apical, yellowish, obtusely triangular, flat, 2.5 mm long; ovary yellow, ovules 1 or 2(–3) per locule. Immature fruit oval to hemispherical, 15–22 x 13–19 mm, usually finely longitudinally striate with latex canals; sepals, staminodes and stigmas persistent, valve endocarp not conspicuously hardened. Seeds 1 or 2(–3) per locule, 5.0–9.0 x 3.5–5.0 mm, green, aril orange.



**FIGURE 2.** A. Disposition of leaves and inflorescences. B. Leaf venation and latex channels. C. Pistillate flower. D. Detail of pistil and staminodes. E. Longitudinal section of ovary. F. Staminate flower. G. Detail of androecium. H. Disposition of leaves and fruit. I. Immature fruit. J. Seed. A, F–G from *F.N. Cabral 82*; B–E & H–J from *F.N. Cabral 23*. Drawing by Klei Souza.

**Comparison:**—The most similar species is *C. microstemon* Planchon & Triana (1860: 331), which sometimes occurs sympatrically, and with which *C. nitida* has been confused. It has a wide distribution in the Amazon. The main difference between the species is the male androecium, which in *C. microstemon* has anthers at the lateral side of the androecial disk, whereas *C. nitida* has anthers only on its top. Other differences include the darker colour and the glossy appearance of the leaf surfaces *in sicco* in *C. nitida*; the androecium size, which is larger in *C. microstemon*; the flower colour, in *C. microstemon* the petals are reddish to pinkish-purple in the centre and white-pink on the edge and the calyx is white-pink, while in *C. nitida* the petals are dark bordeaux or blood-red and the calyx is green; *C. microstemon* has 4 or 5 ovules per locule, whereas *C. nitida* has only 1 or 2(–3) ovules per locule; the fruits of *C. microstemon* are slightly ovoid and in *C. nitida* they are generally cylindrical, and finally, *C. microstemon* has a lower density of latex channels on the leaves than in *C. nitida* and the midrib becomes invisible in the apical part of the leaves.

Another similar species is *C. myriandra* (Bentham 1843: 368) Planchon & Triana (1860: 332) from the Guianas, which has a very similar androecium. However, *C. myriandra* has elongated and oblanceolate leaves, unlike *C. nitida*, which has shorter and more rounded broader leaves; the latex channels of the leaves, which are easily visible in *C. nitida*, are invisible in the strongly coriaceous leaves of *C. myriandra*; the peduncle and the basal internodes in the inflorescence are much longer in *C. myriandra*, positioning the inflorescence above the foliage and *C. myriandra* has more elongated and larger fruits than *C. nitida* with 10 or more seeds per locule, while the fruit locules of *C. nitida* have only 1 or 2(–3).

**Etymology:**—Latin *nitidus* = shiny, because the dried leaves generally have a conspicuously shiny surface, different from those of *C. microstemon*, the leaf surface of which is typically dull.

**Distribution and habitat:**—In Brazil, *Clusia nitida* is known from the North Region, in the states of Amazonas and Roraima. Apparently, it has not yet been collected outside of Brazil. It mainly occurs in white-sand vegetation and at river margins in Amazonian lowlands.

**Additional specimens examined (paratypes):**—BRAZIL. Amazonas: 2 km from Rio Cuieiras at km 2 below mouth of Rio Branquinho, 02°45' S, 60°47' W, 14 September 1973, *G.T. Prance et al. 17912* (GH!, INPA!, K!, MO!, NY!, S!, U!, US); Rio Cuieiras just below mouth of Rio Branquinho, 2°45' S, 60°27' W, 25 September 1971, *G.T. Prance et al. 14848* (MO, R!); Rio Cuieiras, 2 July 1975, *A.B. Anderson 140* (INPA!, MG!, UEC!); s.loc., 27 April 1975, *A.B. Anderson 177* (INPA!, NY!, UEC!); Rio Cuieiras, 9 October 1988, *S. Mori & C. Gracie 19270* (INPA!); Manaus–Caracará km 130, 26 September 1974, *G.T. Prance & F. Ehrendorfer 22749* (INPA!), 26 September 1974, *G.T. Prance & F. Ehrendorfer 22750* (INPA!); Manaus–Caracará km 131, 1°59' S, 60°16' W, 1 December 1974, *A. Gentry 12961* (GH!, INPA!, MG!, MO!, NY!); km 140, 27 September 1973, *C.C. Berg et al. P18180* (INPA!); km 125, 22 September 1977, *W.A. Rodrigues & M.F. Silva 9765* (INPA!); km 115, 28 August 1977, *W.A. Rodrigues 9717* (INPA!); Barcelos, margin of Rio Aracá next to mouth of Rio Jauari, 00°30' N, 63°30' W, 2 July 1985, *I. Cordeiro 118* (INPA!, NY, UEC!); 3 km S Central Massif of Serra Aracá, 00°49' N, 63°17' W, 18 July 1985, *G.T. Prance et al. 29676* (INPA!, NY, UEC!); margin of Rio Aracá near Serrinha, 00°25' N, 63°23' W, 25 July 1985, *G.T. Prance et al. 29767* (INPA!, NY, UEC!); foothills of Central Massif of Serra Aracá, 00°49' N, 63°20' W, 12 July 1985, *G.T. Prance et al. 29502* (INPA!, NY, UEC!); 5 km S Central Massif of Serra Aracá, 00°49' N, 63°17' W, 20 July 1985, *G.T. Prance et al. 29699* (NY, UEC!). Roraima: 7 km south of Equator, BR 174, 00°05' S, 60°40' W, 14 June 1985, *I. Cordeiro et al. 30* (INPA!, NY!); Manaus–Caracará km 522–524, 01°18' S, 60°35' W, 25 August 1987, *C.A.C. Ferreira 9147* (INPA!, NY, UEC!); Parque Nacional do Viruá, 1°16' N, 60°58' W, 25 November 2009, *F.N. Cabral et al. 5* (INPA!, UEC!); Parque Nacional do Viruá, 1°29' N, 61°02' W, 26 November 2009, *F.N. Cabral et al. 23* (INPA!, UEC!); Parque Nacional do Viruá, 1°29' N, 61°02' W, 26 November 2009, *F.N. Cabral et al. 26* (INPA!, UEC!); Parque Nacional do Viruá, 1°28' N, 60°57' W, 29 November 2009, *F.N. Cabral et al. 49* (INPA!, UEC!); Parque Nacional do Viruá, 1°26' N, 61°01' W, 2 December 2009, *F.N. Cabral et al. 82* (INPA!, UEC!); Parque Nacional do Viruá, 1°23' N, 60°59' W, 5 December 2009, *F.N. Cabral et al. 123* (INPA!, UEC!); Parque Nacional do Viruá, 1°16' N, 60°58' W, 29 January 2010, *F.N. Cabral et al. 197* (INPA!, UEC!); Parque Nacional do Viruá, 1°14' N, 60°58' W, 5 March 2010, *N. Dávila et al. 6129* (INPA!).

Probably also *R.L. Fróes 25319*, Rio Urubú, Peixe Boi, 02°05' S, 60°05' W, 20 September 1949 (IAN!) belongs to *Clusia nitida*, but the androecium of this specimen is hemispherically bulged similar as in *Clusia hilariana* Schlechtendal (1833: 181).

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