



Two New Species of Lauraceae from Ecuador

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Abstract

Two species of Lauraceae of Ecuador are described: *Aniba magnifica* and *Ocotea granulosa*. *Aniba magnifica* is characterized by its large vegetative parts and its dense strigulose indumentum on the underside of its young leaves, inflorescences and bracts. *Ocotea granulosa* is distinguishable by the dense strigulose indumentum, mixed with amorphous blackish granules on the underside of the young leaves, peduncles, pedicels and receptacles, and by a flat or slightly recurved leaf base.

Key words: *Aniba magnifica*, *Ocotea granulosa*, granules, bracts, strigulose

Introduction

Lauraceae is one of the largest tree families, with dominance in tropical America and Australasia (Chanderbali *et al.* 2001). In Ecuador, it is probably the family richest in tree species (Palacios 2016), with approximately 40 new species described over the past 28 years (see Ulloa & Neill 2005, Neill & Ulloa 2011, Ulloa *et al.* in press). It is among the basal groups within the angiosperms (see APG IV, 2016). The family has approximately 50 genera (van der Werff 1991; Rohwer 1993a), two of which are *Aniba* Aublet (1775a: 327, t.126) and *Ocotea* Aublet (1775b: 780–781).

Aniba is distributed in moist forests, from lowlands to mountains (Kubitzki & Renner 1982). It is characterized by slightly obovoid flowers, generally < 2 mm long, with nine stamens distributed in three whorls, each stamen with two locules, and often a fourth whorl of staminodes; fruit a monospermous berry inserted for 1/2–1/3 of its length in a semi-woody, mostly lenticellate and rough cupule, sometimes with double margin (Kubitzki & Renner 1982). In the forest, most Ecuadorian species can be recognized by the fragrant and yellow wood, almost verticillate twigs, and bracts along the basal part of each growth unit; its leaves are mostly clustered, greenish–yellow, almost always glabrous, often with brochidodromous secondary venation and micro-reticulate higher-order venation (Palacios 2016). The genus has 45 species (da Matta, *et al.* 2016), including the last two species described of the genus in Ecuador (van der Werff 1994).

Ocotea is without doubt the largest genus of Lauraceae in the Neotropics. It is estimated that the number of species is between 350 and 400 (van der Werff 2011, 2012). In Ecuador, is possibly the largest genus of tree species (Palacios 2016). It is characterized by dioecious or bisexual flowers, with 9 fertile stamens, each stamen with four locules, the locules arranged in two superposed pairs, either without staminodes, or when present stipitiform, and the fruit seated in a shallow or deep cupule (van der Werff 2012).

Materials and Methods

In this study, the herbarium specimens deposited in QCA, MO and QCNE were examined. The Tropicos® (<http://www.tropicos.org>, 2015) and Jstor (<http://plants.jstor.org>, 2014) databases were consulted for publications on new species from the Neotropics in recent years, nomenclature of species, and images of types.

Taxonomy

Aniba magnifica W. Palacios, *sp. nov.* (Figs. 1, 2, 3)

Aniba magnifica can be recognized by its leaves, 30–60 cm long \times 8–16 cm wide, coriaceous and glabrous on the upper surface, densely strigulose on the lower surface; bracts 2–5 cm long, below the buds or at the base of the inflorescences; inflorescences 15–23 cm long, brown-puberulent; flowers 2.9–3.5 mm long, including the receptacle; fruit narrowly ellipsoidal, 3–3.7 cm long.

Holotype:—ECUADOR. Pichincha: Pedro Vicente Maldonado, Celica, near the town, humid forest, 0°10'N, 79°04'W, 450 m, 31 Jul 2010, *Palacios 17339* (QCNE, mounted as two preparations: 0241221! flowering branch, 0241222! leaf and infructescence; isotype MO!).



FIGURE 1. *Aniba magnifica*. A. habit, B. bracts, C. inflorescence, D. fruits (scale bar = 1.5 cm). Images from type collection (*Palacios 17339*).

Tree, up to 25 m tall (35 m according to *Vargas 510*, QCNE); with exfoliating bark (according to *Vargas 5625*, QCNE). Indumentum strigulose (appressed), very dense on young twigs, buds and bracts. Terminal branches cylindrical or angular, lenticels elongated, up to 4 mm long; the bracts at the base of the new growth, below terminal buds or along young branches, 2–5 cm long, oblong–lanceolate, conduplicate. Leaves clustered, spatulate, obovate or obovate-oblong, 30–60 long \times 8–16 cm wide, coriaceous, greenish–yellow when fresh; apex short apiculate or rounded; base obtuse–conduplicate; venation eucamptodromous to brochidodromous in the last third of the lamina; secondary veins 12–17 pairs, prominent below, sulcate above; tertiary veins irregularly scalariform; upper surface glabrous; lower surface densely strigulose; petiole 0.5–1.3 cm long, channeled. Inflorescence a panicle, 4–6 inflorescences at the base of the new growth or in the axils of bracts below the terminal bud, 15–23 cm long, brown-puberulent. Flowers obovoid, 2.9–3.5 mm long, including the obconic tube that represents $\frac{1}{2}$ of the length of the flower; tepals 6, ovate, concave, ciliate, strigulose, the outer three 1.9–2.1 mm long, the inner three 1.7–2 mm long; stamens 9, 1.4–1.6 mm long, filaments thinner than anthers, densely tomentose, anthers glabrous, flaps opening towards the connective, first and second whorls with introrse–ventral locules, third whorl with lateral locules and two basal glands per stamen; pistil

glabrous. Fruit narrowly ellipsoidal, smooth, 3–3.7 cm long, black to black-violet when ripening, inserted at $\frac{1}{2}$ – $\frac{1}{3}$ of its length in the cupule; cupule densely lenticellate, with warty appearance, 1.4–1.9 cm long \times 1.5–2.2 cm in diameter.



FIGURE 2. *Aniba magnifica*. Holotype (flowering part) QCNE 241221!, Palacios 17339.



FIGURE 3. *Aniba magnifica*. Holotype (leaf and infructescence) QCNE 241222!, Palacios 17339.

Distribution:—This species has been recorded at the Ecuadorian coast, between 0 and 1200 m, in humid or very humid forests, both in primary forests and in disturbed areas, from the northern border with Colombia to Molleturo in the province of Azuay where the humid forests of Ecuador end.

Phenology:—The flowering period has been recorded principally between January and April, although there are also records for September. The fruits have been collected mostly between April and June, but also in September. It should also be noted that flowers and fruits can appear at the same time (e.g. *Berg 87* and *Palacios 17339*, both in QCNE). Mature fruits become atropurpureous (*Aulestia 205* QCNE).

Etymology:—The name of the new species refers to its large vegetative parts that differentiate it from other known species.

State of conservation:—The species was found in an area of approximately 15,000 km², including the lower and middle part of the Cotacachi-Cayapas Ecological Reserve, the Mache Chindul Reserve and several protected forests, so it can be considered not endangered.

Common names and local uses:—*Suchi* (according to *Berg 9*, QCNE) or *suche* (*Vargas 5625*, QCNE). It is reported that the wood is used to manufacture tables and furniture (*Vargas 5625*, QCNE). In Mompiche, Esmeraldas, it is known as *nasde*, and is considered a fine wood.

Taxonomic relationship:—*Aniba magnifica* is characterized by the large size of its leaves, inflorescences and flowers, and the dense strigulose indumentum on the lower leaf surface, buds, bracts and inflorescences. The most similar species is *A. hostmanniana* (Nees) Mez (1889: 67), in which the leaves are similar in size, but differ in indumentum (minutely tomentellous on veins only) and size of flowers (2.9–3.5 in *A. magnifica* vs. 1.5–1.8 mm in *A. hostmanniana*). *Aniba magnifica* flowers are among the largest in the genus, only comparable with *A. robusta* (Klotzsch & Karsten in Klotzsch 1848: 497) Mez (1889: 75).

Additional specimens examined:—ECUADOR. **Esmeraldas:** San Lorenzo, Reserva Étnica Awa, Centro Guadualito, 1°15'N, 78°40'W, Jul 1992, fr., *Aulestia 205* (MO!, QCNE!), Quinindé, Bilsa Station Biological Station, 0°21'N, 79°44'W, 400–600 m, Feb 1996, fl., *Clark 2102* (MO!, QCNE!); Muisne, road Puerto Nuevo-San Salvador, 0°3'N, 79°56'W, 60 m, Mar 1995, fl., *Palacios 13729*, (MO, QCNE!); Feb 1996, fr. *Clark 1716*, (MO!, QCNE!). **Santo Domingo de los Colorados** (according voucher Pichincha): Vía Santo Domingo-Esmeraldas, Hostería Valle Hermoso, 0°12'S, 79°10'W, 400–500 m, May 1995, fr., *Núñez et al. 70* (QCNE!); Bosque Protector La Perla, km 41 of the road Santo-Domingo Quinindé, 0°49'S, 79°22'W, Jun 1990, fr., *Zak 5435* (QCNE!). **Los Ríos:** Quevedo-Pucayacu, hacienda Amazonas, km 42, 330 m, Mar 1982, fr., *Dodson 13012*, (QCNE!, S). **Azuay:** La Troncal, 0°34'S, 79°02'W, 350 m, Mar 1996, fl., *Neill 10528* (QCNE!); 1 km from town, *Vargas et al. 510*, Nov 1996, Mar 2005, fr., *Vargas & Defas 5625* (QCNE!). Cuenca, Molleturo, Manta Real, 2°34'S, 79°23'W, 300–1200 m, Mar 1992, fl., *Berg 3* (QCNE!), Apr 1992, fl., *Berg 9* (QCNE!), Sep 1992, fl., fr., *Berg 87* (QCNE!).

Ocotea granulosa W. Palacios, *sp. nov.* (Figs. 4, 5)

This species is similar to *Ocotea pautensis* from which it differs by a dense and strigulose indumentum and blackish amorphous granules on the lower leaf surface and 3–6 panicles arranged in the axils of foliage leaves or cataphylls beneath the terminal bud, or along the base of new growth.

Holotype:—ECUADOR. Sucumbíos: Parroquia Santa Bárbara, 1 km above from town. Humid montane forest, deep black soils, 0°38'N, 77°31'W, 2600 m, 13 Feb 2010, fl., *Palacios 17235* (QCNE 0241220!; isotype MO!).

Tree, up to 25 m tall and 45 cm DBH. Bark with scattered lenticels and irregularly wavy vertical rhytidoma stripes, inner bark brown with granular texture. Buds 1–1.4 cm long, brown, densely strigulose and with dispersed amorphous granules. Branchlets gray, terete or angular. Leaves simple, alternate, narrowly elliptic (the smallest elliptic), stiff, coriaceous, 14–22 cm long × 6–8 cm wide; upper surface glabrous in adult leaves, with appressed and dense hairs in young leaves; undersurface glabrous in adult leaves, brown or grayish (in the fresh leaves) and with dense strigulose indumentum combined with amorphous blackish granules in young leaves; apex acute to shortly acuminate; base acute, cuneate or obtuse, narrowly but distinctly recurved at the base; 8–11 pairs of secondary veins; tertiary venation predominantly scalariform; petiole 1–1.6 cm long, flattened or widely channeled. Indumentum dense, tomentulose and granulose, mixed with longer hairs on peduncles, pedicels and receptacle, when these parts are young. Inflorescence a panicle, 3–6 panicles arranged in the axils of mature foliage leaves and/or in the axils of cataphylls beneath the terminal bud or along the new growth between the group of young leaves and the group of mature leaves, 10–25 cm long; inflorescence branches 3–7 cm long; rachis angular; peduncle absent or up to 6 cm long; pedicels 3–5 mm long. Flowers bisexual; 6 tepals, obliquely erect, with only their tip curved outwards, connate at the base (detachment of the tepals as a unit), brown tomentulose-granulose on the outside, green or cream and granulose on the inside, the

outer three ovate with rounded apex, 2.8–3 mm long \times 1.3–2 mm wide, the inner three oblong with a narrower apex, 2.6–2.9 mm long \times 0.9–1.4 mm wide; stamens 9, glabrous; connective not prolonged; first and second whorl with 4 introrse-ventral locules, in a narrow arc, filaments 0.4–0.6 mm, glabrous, anthers broadly elliptic (twice as wide as the filaments), 0.7–1 mm long; third whorl with two almost lateral upper locules and two lower lateral-ventral locules, filaments 0.9–1.2 mm long, anthers 0.6–0.9 mm long, anthers oblong, 1.5 times wider than the filaments; locules opening towards the outer upper side; fourth whorl of filiform staminodes, slightly wider toward acute apex, about 0.9 mm long, $\frac{1}{2}$ – $\frac{1}{3}$ the size of the stamens, glabrous or with sparse hairs at the base; glands 6, yellow, attached to the base of filaments of third whorl; ovary ovoid, glabrous; receptacle urceolate, glabrous inside. Fruit unknown.



FIGURE 4. *Ocotea granulosa*. A. bark, B. underside of the leaf (note the amorphous granular excretions) (scale bar = 1.4 cm), C. base of the underside of the lamina (scale bar = 1.8 cm), and D. habit, E. flower (scale bar = 1 mm). Images from type collection (*Palacios 17235*).

Distribution:—*Ocotea granulosa* has been registered on the northeast flank of the Ecuadorian Andes, in humid or very humid forests, between 2300 and 2500 m, where other Lauraceae abound. It grows associated with *Nectandra obtusata* Rohwer (1993b: 111), *Juglans neotropica* Diels (1906: 398) and *Cedrela montana* Moritz ex Turczaninow (1858: 415).

Phenology:—The three collections examined in QCNE and MO were collected with flowers between December and February.

State of conservation:—*Ocotea granulosa* is known only from three collections from the eastern flanks of the Ecuadorian Andes, in the provinces of Pichincha and Carchi. Between these two provinces is the Cayambe-Coca

National Park, and to the South are other state protected areas with large forest areas, which make it likely that the species is not endangered.



FIGURE 5. *Ocotea granulosa*. Holotype QCNE 241220, Palacios 17235.

Etymology:—The name of the species refers to the presence of blackish granules on buds, terminal twigs and young leaves (especially on the underside).

Taxonomic relationship:—Some characteristics of *O. granulosa* correspond to the *Nectandra coriacea* group (Rohwer 1993b), which was recently recognized as a separate genus, *Damburneya* Rafinesque (1838: 136; see Trofimov *et al.* 2016). These characteristics include bisexual flowers, filaments much narrower than the anthers and anthers apically rounded to truncate; however, the anthers locules arranged in a narrow arc (first and second whorl) or in two pairs (third whorl) locate the new species in *Ocotea*. Species of *Nectandra* (Rolander ex Rottbøll 1778: 279) s.str. have anthers with a prolonged triangular apex or at least an apiculate tip, whereas this is never found in the *N. coriacea* group (Trofimov *et al.* 2016).

Ocotea granulosa is closely related to *O. pautensis* van der Werff (2013: 359). The differences between these two species are the indumentum (*O. granulosa* with dense strigulose indumentum combined with granular, and amorphous and blackish granules vs. dense velutinous indumentum on the lower leaf surface and inflorescences of *O. pautensis*) and the type of inflorescences (*O. granulosa* with 3–6 panicles arranged beneath the terminal bud, or in the axils of cataphylls at the base of new growth vs. panicles in the axils of foliage leaves along the recent growth in *O. pautensis*). The flowers of *O. granulosa* are bisexual, like many species of the genus.

The specimen *Palacios 9628* (QCNE!, MO) was previously determined by H. van der Werff as *Nectandra obtusata* Rohwer, however, the analysis of the floral and vegetative morphology determines that it corresponds to the new species.

The insertion of the inflorescence on the branch of *O. granulosa* can be seen in some species of *N. coriacea* group, but also in some species of *Ocotea*, such as *O. multinervis* van der Werff (2003: 353–354).

Additional specimens examined (paratypes):—ECUADOR. **Napo:** Quijos, Baeza-Cuyuja, 77°58'W, 0°23'S, 2400 m, Jan 1992, fl., *Palacios et al. 9628*, (QCNE!, MO!); Dec 2007, fl., *Palacios 16364* (MO!).

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