

A new species of *Aetanthus* (Loranthaceae) from Colombia with notes on *A. engelsii*

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Abstract

MURILLO-SERNA, J.S., F.J. ROLDÁN-PALACIO, I. CARMONA-GALLEGO & F. ALZATE (2021). A new species of *Aetanthus* (Loranthaceae) from Colombia with notes on *A. engelsii*. *Candollea* 76: 71–76. In English, English and Spanish abstracts. DOI: <http://dx.doi.org/10.15553/c20121v761a6>

Aetanthus alternifolius F.J. Roldán, Carmona, Alzate & J.S. Murillo (Loranthaceae) is newly described and illustrated from the department of Santander in northeastern Colombia. This new mistletoe species, known only from the type locality, is discriminate by its indeterminate shoots, alternate or subopposite, obovate leaves, cymose inflorescences bearing three dyads, flower buds c. 9 cm long, with a finely toothed and sometimes fissured calyculus. Its morphological affinities are discussed especially in relation to *A. colombianus* A.C. Smith and *A. coriaceus* Patsch. The rediscovery of original material in P of the poorly known *Phyllostephanus engelsii* Tiegh. (= *Aetanthus engelsii* (Tiegh.) Engl.) is discussed. An emended description is provided and a lectotype is designated. An identification key to the ten species of *Aetanthus* (Eichler) Engl. occurring in Colombia is also presented.

Resumen

MURILLO-SERNA, J.S., F.J. ROLDÁN-PALACIO, I. CARMONA-GALLEGO & F. ALZATE (2021). Una nueva especie de *Aetanthus* (Loranthaceae) de Colombia, con notas en *A. engelsii*. *Candollea* 76: 71–76. En inglés, resúmenes en inglés y español. DOI: <http://dx.doi.org/10.15553/c20121v761a6>

Se describe e ilustra *Aetanthus alternifolius* F.J. Roldán, Carmona, Alzate & J.S. Murillo (Loranthaceae) del departamento de Santander, en el noreste de Colombia. Esta nueva especie de muérdago, conocida únicamente de la localidad tipo se diferencia por sus tallos indeterminados, hojas obovadas, alternas o subopuestas, inflorescencias cimosas portando tres diadas, botones florales c. 9 cm long. con un cálculo finamente dentado y ocasionalmente fisurado. Se discuten las afinidades morfológicas de *A. alternifolius*, especialmente con relación a *A. colombianus* A.C. Smith y *A. coriaceus* Patsch. Además se discute el redescubrimiento de material original en P del poco conocido *Phyllostephanus engelsii* Tiegh. (= *Aetanthus engelsii* (Tiegh.) Engl.). Se provee una descripción enmendada y se designa un lectotipo; también se presenta una clave de identificación para las diez especies de *Aetanthus* (Eichler) Engl. que ocurren en Colombia.

Keywords

LORANTHACEAE – *Aetanthus* – Colombia – Hemiparasitic plants – New species – Nomenclature

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Introduction

Aetanthus (Eichler) Engl. (Loranthaceae) is a genus of 17 species distributed in the Sierra Nevada de Santa Marta (Colombia) and the Andes of Colombia, Ecuador, Peru and Venezuela between 2000 to 4000 m (KUIJT, 2014; KUIJT & HANSEN, 2015). Colombia is the most species-rich country of this genus with ten known species: *A. alternifolius* F.J. Roldán, Carmona, Alzate & J.S. Murillo, *A. colombianus* A.C. Smith, *A. engelsii* (Tiegh.) Engl., *A. megaphyllus* Kuijt, *A. mutisii* (Kunth) Engl., *A. nodosus* (Desr.) Engl., *A. ovalis* Rusby, *A. sessilifolius* Kuijt, *A. trifolius* Kuijt and *A. validus* Kuijt (KUIJT, 2014; DUEÑAS, 2020). The region with the most species richness in Colombia is the northern part of the eastern Cordillera. *Aetanthus alternifolius*, *A. colombianus*, *A. megaphyllus*, *A. mutisii* and *A. validus* are endemic from this region. *Aetanthus nodosus* is widely distributed in Central and Western Cordillera, *A. ovalis* has been reported only from the Sierra Nevada of Santa Marta and *A. sessilifolius* is known only from the department of Antioquia, where *A. trifolius*, a species originally described from Venezuela, is also reported (KUIJT, 2014).

Aetanthus is distinguishable from other Loranthaceae genera by its isomorphic stamens and its needle-shaped, basifixed anthers, forming a direct continuation of the filament (KUIJT, 2009, 2014). Phylogenetic analyses place *Aetanthus* as the sister genus of *Psittacanthus* Mart., both belonging to tribe *Psittacanthinae* Engl. (VIDAL-RUSELL & NICKRENT, 2008; NICKRENT et al., 2010; KUIJT, 2009, 2014). The two genera differ morphologically by the anther structure: *Psittacanthus* has versatile, dorsifixed anthers with a blunt apex and *Aetanthus* has basifixed anthers with a needle-shaped apex (EICHLER, 1868; KUIJT, 2009, 2014).

A review of *Aetanthus* specimens allowed us to find a collection deposited in HUA (*Hinestroza et al. 182*) that did not match any currently known species. Nomenclatural types and representative specimens were examined through visits to COAH, COL, HUAZ, JAUM, MEDEL and UDBC Colombian herbaria. Other herbaria were consulted through JSTOR Global Plants website [<http://plants.jstor.org/search?plant>] and in F, G, GH, K, NY, P, S and US virtual herbaria. We therefore describe and illustrate here the new species *Aetanthus alternifolius* F.J. Roldán, Carmona, Alzate & J.S. Murillo.

Rediscovery of original material of *Phyllostephanus engelsii* Tiegh. (= *Aetanthus engelsii* (Tiegh.) Engl.) in P, allowed us to provide an emended description of this poorly known species not included in KUIJT (2014)'s monograph of the genus *Aetanthus*. Its taxonomic status is discussed and a lectotype is designated. A breakdown of diagnostic characters of the genus is also discussed and an identification key to the species known from Colombia is provided.

Key to the Colombian species of *Aetanthus*

Adapted from KUIJT (2014)

1. Shoots determinate (each aborting internode forming sympodia) 2
- 1a. Shoots indeterminate (at least three internodes per innovation) 8
2. Leaves whorled in mature stems (3 or 4 per node) 3
- 2a. Leaves paired in mature stems 6
3. Leaves in whorls of 4 *A. engelsii*
- 3a. Leaves in whorls of 3 4
4. Leaves orbicular to obovate; plants from the Sierra Nevada de Santa Marta *A. ovalis*
- 4a. Leaves ovate to lanceolate; plants occurring in the Andes 5
5. Leaves lanceolate, ovate or ovate-lanceolate, thin. Secondary venation inconspicuous and not pronounced; anthers c. 15 mm long *A. trifolius*
- 5a. Leaves ovate, thickened. Secondary venation conspicuous and pronounced; anthers c. 10 mm long *A. validus*
6. Inflorescence a triple dyad *A. megaphyllus*
- 6a. Inflorescence a double dyad 7
7. Leaves sessile *A. sessilifolius*
- 7a. Leaves petiolate *A. nodosus*
8. Leaves alternate or subopposite *A. alternifolius*
- 8a. Leaves whorled (3 per node) 9
9. Flowers > 15 cm long; calyculus strikingly dentate; terete young stems *A. mutisii*
- 9a. Flowers up to 10 cm long; calyculus smooth or finely dentate; young stems 3-ridged *A. colombianus*

Taxonomy

Aetanthus alternifolius F.J. Roldán, Carmona, Alzate & J.S. Murillo, **sp. nov.** (Fig. 1, 2).

Holotypus: COLOMBIA. **Dept. Santander:** municipality of California, [7°22'16" 72°55'29"], 2450 m, 25.I.2013, fl., *Hinestroza et al. 182* (HUA-191735!).

Aetanthus alternifolius F.J. Roldán, Carmona, Alzate & J.S. Murillo differs from all other *Aetanthus* species by the combination of a percurrent habit with indeterminate, slightly flattened shoots without angles, soon becoming terete, subopposite or alternate obovate leaves, cymose inflorescences composed by three dyads, and flowers c. 9 cm long, with a finely toothed and sometimes fissured calyculus.

Hemiparasitic plant, branch parasite. Shoots indeterminate, glabrous, black when dried with whitish lenticels. *Internodes* 0.7–4 × 0.3–0.5 cm, slightly flattened when young,

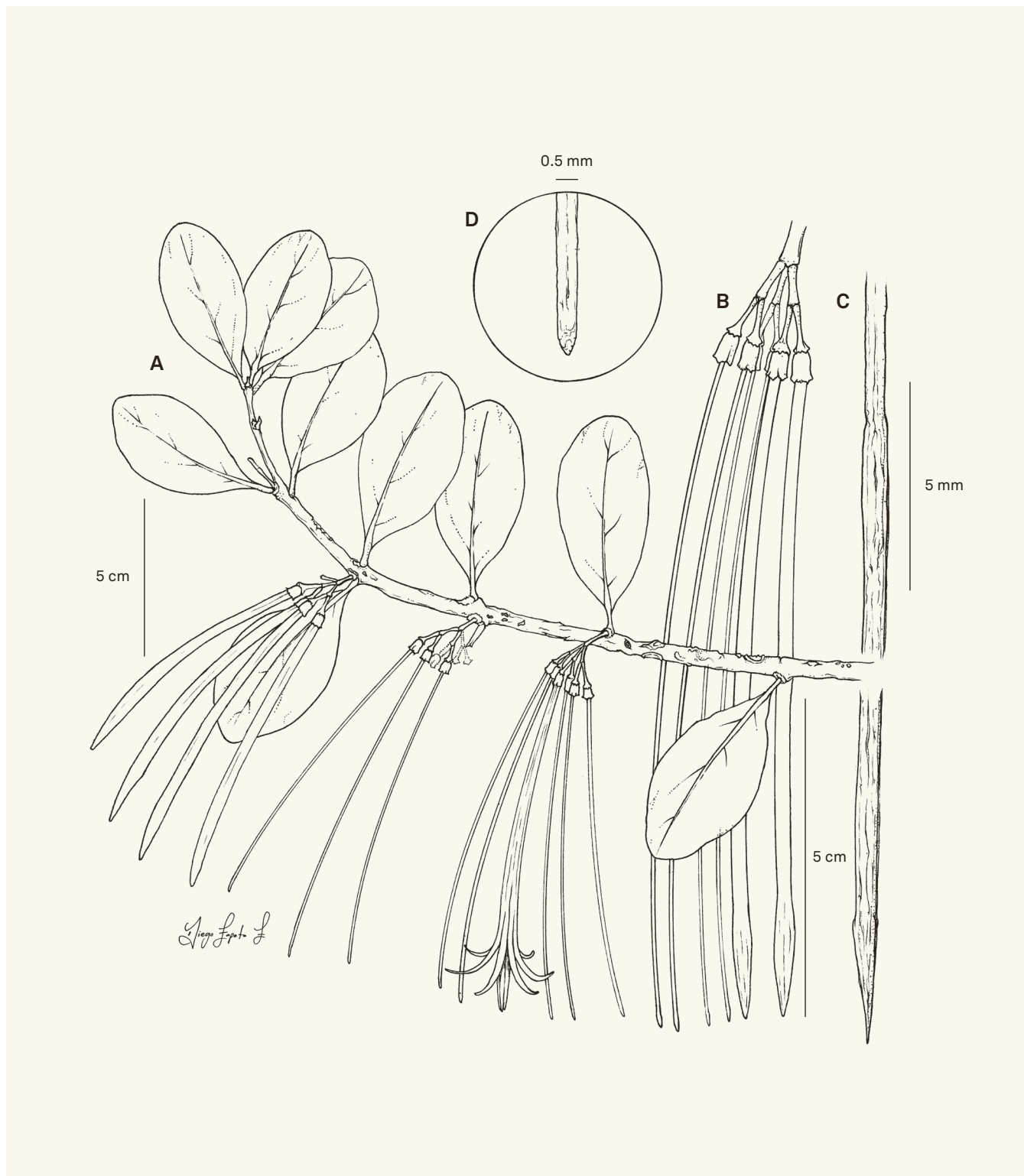


Fig. 1. – *Aetanthus alternifolius* F.J. Roldán, Carmona, Alzate & J.S. Murillo. **A.** Habit; **B.** Inflorescence; **C.** Detail of anther and filament union; **D.** Stigmatic region detail.
[Hinestroza et al. 182, HUA] [Drawings: D. Zapata]

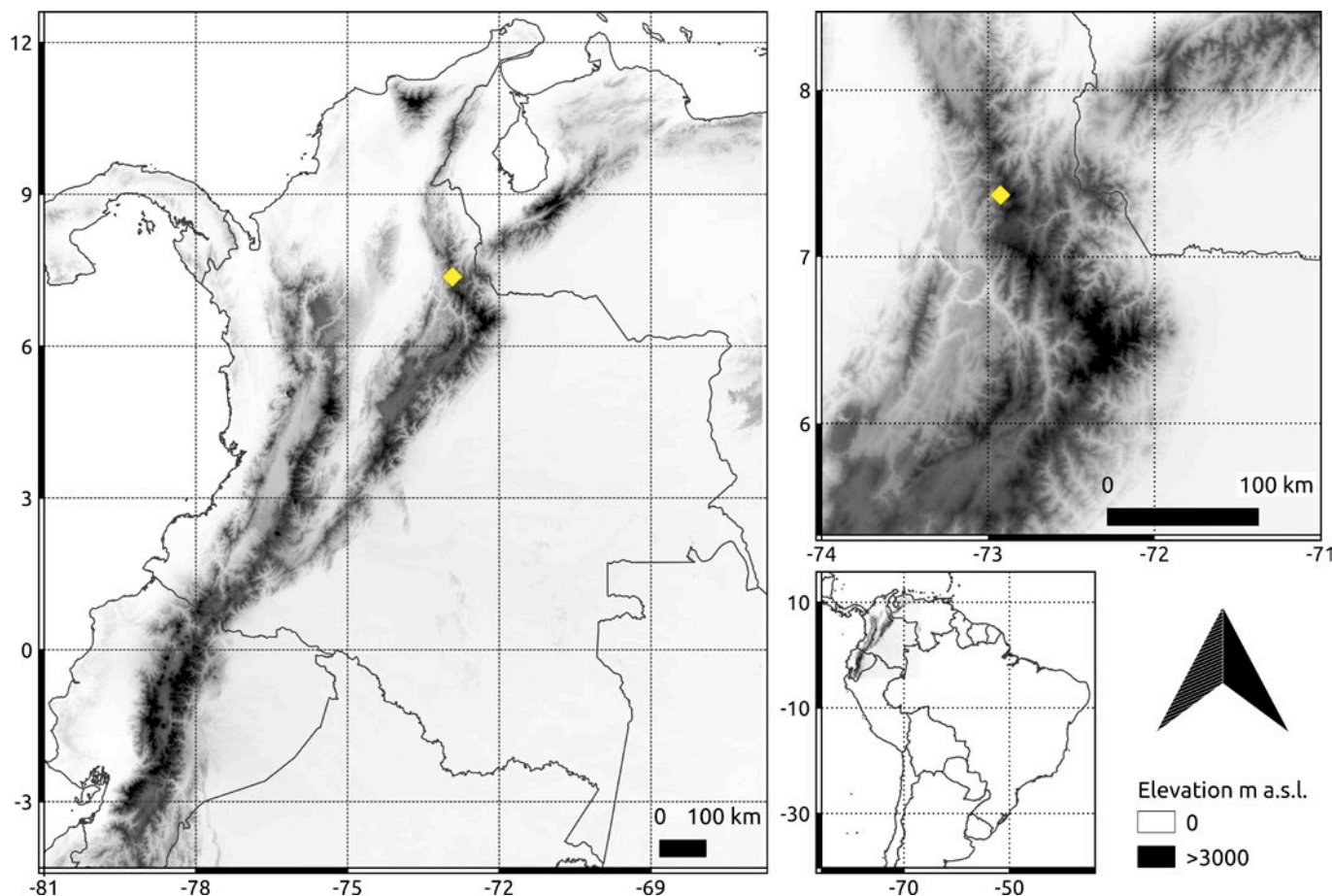


Fig. 2. – Geographical localization of *Aetanthus alternifolius* F.J. Roldán, Carmona, Alzate & J.S. Murillo (yellow diamond).

soon becoming terete, without angles. *Nodes* not swollen. *Haustorium* unknown. *Leaves* subopposite or alternate; leaf blade 4–7 × 2–4 cm, coriaceous, glabrous in both sides, margin entire, obovate, apex obtuse-rounded, base attenuate-cuneate; petioles 2.5–5 × c. 2 mm; venation pinnate, inconspicuous. *Inflorescence* triple dyads, pendulous, inserted in corky areas 3–6 mm in diameter, conspicuous and adjacent to leaf scars or leaf axils, glabrous, without bracts; inflorescence peduncle c. 6 × 1 mm, dyad peduncles c. 5 × 1 mm, crateriform pedicels, c. 6 mm long (without including the cupular portion), cupules c. 1 × 3 mm. *Flowers* tubular, red, glabrous; flower buds straight, c. 9 cm long and c. 1 mm in diameter in proximal portions, c. 2 mm in diameter towards distal portion; 6-merous, petals isomorphic, recurved distally in anthesis, medial and proximal portion remain intact. *Androecium* epipetalous, anthers isomorphic, 14–15 mm long, basifixed, needle-like, 4-loculed. *Ovary* 4 × 2 mm, cylindrical; *calyx* conspicuous, slightly toothed, sometimes fissured; *style* c. 9 cm long, 0.2–0.3 mm in diameter in proximal portion; *stigma* 0.3–0.5 mm in diameter, linear, inconspicuous, continuing as an extension of the style. *Fruits* not seen.

Etymology. – The epithet *alternifolius* refers to the phyllotaxy in mature shoots.

Distribution and habitat. – *Aetanthus alternifolius* is known only from a single specimen collected in the municipality of California, in montane oak (*Quercus humboldtii* Bonpl.) forests belonging to the surrounding area of the Páramo de Santurbán (Santander, Colombia) close to 2800 m. Host is unknown for this species.

Phenology. – This species was collected with several inflorescences in anthesis and flower buds at the end of January. Fruits remain unknown.

Conservation status. – *Aetanthus alternifolius* occurs in montane oak forests that are severely threatened by mining and agricultural activities (AVELLA & RANGEL, 2014). Nevertheless, additional studies are required for this mistletoe, especially regarding its host range, distribution and ecology. We suggest considering this species as “Data Deficient” [DD], according to the IUCN Red List Categories and Criteria (IUCN, 2012), awaiting the results of new studies.

Notes. – Species of the genus *Aetanthus* display a series of diagnostic characters that are useful to determine taxa at species level. Some of those are: ramification pattern (percurrent or indeterminate vs. aborted terminally or determinate); phyllotaxy (opposite-decussate or whorled), number of dyads per inflorescence and flower length. Some features are unique among *Aetanthus* species, as a strikingly dentate calyculus in *A. mutisii*, sessile leaves in *A. sessilifolius* (KUIJT, 2014) and the alternate phyllotaxy observed in *A. alternifolius*.

Aetanthus alternifolius has morphological affinities with *A. colombianus* and *A. coriaceus*, displaying similarities in growth habit and flower length. However, these three species can be distinguished by their phyllotaxy, inflorescence structure and stem shape. Most relevant characters to discriminate the three species are presented in Table 1.

Aetanthus alternifolius occurs sympatrically in the Central Cordillera, along with three additional species of the genus, which can be differentiated by the following morphological characters: *A. megaphyllus* has dichotomous branching and greater sized leaves with stout leaf blades and petioles; *A. validus* exhibits a dichotomous ramification with 3-whorled leaves and *A. mutisii* has a percurrent habit, whorled phyllotaxy and flowers ranging 15–22 cm long with a strikingly dentate calyculus.

KUIJT (2009, 2014) reports that it is common that *Loranthaceae* taxa are known only from a few localities and usually, taxonomic novelties are published based on a single gathering. This may be due to habit-imposed difficulties and collectors' taxonomic interests (CAVALLIN et al., 2016).

Notes on Aetanthus engelsii

Aetanthus engelsii (Tiegh.) Engl. in Engl. & Prantl, Nat. Pflanzenfam., Nachtr. 1: 136. 1897.

= *Phyllostephanus engelsii* Tiegh. in Bull. Soc. Bot. France 42: 358. 1895.

Lectotypus (designated here): **COLOMBIA:** *sine loco*, s.d., *Engels s.n.* (P [P05066078] image!; isolecto-: P [P05066079] image!).

Hemiparasitic plant, branch parasite. *Shoots* determinate, each innovation aborting terminally, tetratomic branching, glabrous. *Internodes* 3–15.5 × 0.2–0.5 cm. *Nodes* slightly swollen. *Haustorium* unknown. *Leaves* 4-whorled; leaf blade 2.5–11 × 2–6 cm, coriaceous, glabrous in both sides, margin entire, elliptic, apex obtuse-rounded, base attenuate-cuneate; petioles 3–5 × c. 2 mm; venation camptodromous, visible. *Inflorescence* unknown. *Flowers* tubular, glabrous; flower buds straight, up to 10 cm long. *Androecium* epipetalous, anthers isomorphic, c. 9 mm long, basifixed, needle-like. *Ovary* c. 3 × 2 mm, cylindrical; *calyculus* conspicuous, smooth to sinuate. *Fruits* unknown.

Notes. – VAN TIEGHEM (1895) described *Phyllostephanus engelsii* based on a collection by M. Engels in Colombia. Two sheets of original material have been located in P [P05066078, P05066079]. We designate here the specimen [P05066078] as lectotype, because it is the best preserved and most complete sheet including leaves, branches and flowers.

The precise geographic location of the type gathering is uncertain only referring to Colombia. The protologue was also very succinct just mentioning *A. engelsii* has 4-whorled leaves and tetratomic branching (VAN TIEGHEM, 1895).

Aetanthus engelsii, with 4-whorled leaves and determinate shoots resembles *A. prolongatus* Kujit, but it has dichotomous branching (vs. tetratomic in *A. engelsii*). Additionally, *A. prolongatus* is endemic to the Venezuelan Andes (KUIJT, 2014). *Aetanthus tachirensis* Kujit also has 4-whorled leaves but differs by its obscure venation pattern (vs. visible leaf veins in *A. engelsii*) and indeterminate shoots (vs. determinate in *A. engelsii*).

Table 1. – Distinctive characters between *Aetanthus alternifolius* F.J. Roldán, Carmona, Alzate & J.S. Murillo, *A. colombianus* A.C. Smith and *A. coriaceus* Patsch.

	<i>A. alternifolius</i>	<i>A. colombianus</i>	<i>A. coriaceus</i>
Young stems	slightly flattened, without angles	3-ridged	quadrangular
Phyllotaxy	subopposite-alternate	ternate	decussate
Petiole length [mm]	3–5	c. 5	c. 10
Inflorescence	triple dyad	double dyad	double dyad
Calyculus	finely toothed and sometimes fissured	smooth	fissured to smooth
Distribution	Colombia	Colombia	S. Ecuador, N. Perú

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References

- AVELLA, A. & O. RANGEL (2014). Oak forests types of *Quercus humboldtii* in the Guantiva-La Rusia-Iguaque corridor (Santander-Boyacá, Colombia). *Colomb. For.* 17: 100–116.
- CAVALLIN, E.K., C.B. MUNHOZ, S.A. HARRIS, D. VILLARROEL & C.E.B. PROENÇA (2016). Influence of biological and social-historical variables on the time taken to describe an angiosperm. *Amer. J. Bot.* 103: 2000–2012.
- DUEÑAS, H. (2020). Loranthaceae. In: BERNAL, R. et al. (ed.), *Catálogo de plantas y líquenes de Colombia*, Bogotá. [<http://catalogoplantasdecolombia.unal.edu.co>]
- EICHLER, A.W. (1868). Loranthaceae. In: MARTIUS, K.F.P. (ed.), *Fl. Bras.* 5(2).
- IUCN (2012). *IUCN Red List Categories and Criteria. Version 3.1*. Ed. 2. IUCN Species Survival Commission, Gland and Cambridge.
- KUIJT, J. (2009). Monograph of *Psittacanthus* (Loranthaceae). *Syst. Bot. Monogr.* 86.
- KUIJT, J. (2014). A monograph of the genus *Aetanthus* (Loranthaceae). *Pl. Divers. Evol.* 131: 1–51.
- KUIJT, J. & B. HANSEN (2015). Loranthaceae. In: KUBITZKI, K. (ed.), *The families and genera of flowering plants* 12: 73–119. Springer.
- NICKRENT, D.L., V. MALÉCOT, R. VIDAL-RUSSELL & J.P. DER (2010). A revised classification of Santalales. *Taxon* 59: 538–558.
- VIDAL-RUSSELL, R. & D.L. NICKRENT (2008). Evolutionary relationships in the showy mistletoe family (Loranthaceae). *Amer. J. Bot.* 95: 1015–1029.
- VAN TIEGHEM, P. (1895). Sur le groupement des espèces en genres dans la tribu des Psittacanthées de la famille des Loranthacées. *Bull. Soc. Bot. France* 42: 343–362.