A SECOND TREE SPECIES OF *AMPELOZIZYPHUS* (RHAMNACEAE), FROM THE UPPER CUYARÍ RIVER BASIN, GUIANÍA (COLOMBIA)

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Abstract. *Ampelozizyphus kuripacorum* from the upper río Cuyarí, Guianía department, Colombia, is described, illustrated, and its relationship with related species discussed. This new species differs from *A. guaquirensis* (the only other tree species in the genus) by its larger petioles, elliptic leaves, the domatia located only in the base the midrib on the lower surface, the glands (nectaries) on the leaf blades different in form, place and size, and the shorter, few- to single-flowered inflorescence. Updated keys to identify the genera of Rhamnaceae of Colombia and the species of *Ampelozizyphus* are provided.

Keywords: Amazonia, *Ampelozizyphus,* Upper Río Negro basin, Río Cuyarí, Rhamnaceae, Colombia

Resumen. Se describe e ilustra *Ampelozizyphus kuripacorum*, una especie del alto río Cuyarí, departamento del Guianía, Colombia. Este nuevo taxon se diferencia de la otra especie arborescente del género (*A. guaquirensis*) por sus pecíolos más largos, las hojas elípticas, domacios solamente en la base del nervio medio en el envés, glándulas (nectarios) en las hojas situados arriba de la base, diferentes en forma y tamaño, y las inflorescencias más pequeñas, con pocas flores hasta una flor solitaria. Se presenta claves para los géneros de Rhamnaceae de Colombia y de las tres especies de *Ampelozizyphus*.

Yaakuti iipenaa (Kuripaco). Pakaite linakuapanaa jnite likapakanaa jliaji *Ampelozizyphus kuripacorum*, aapana jaiko Kuwiali jiiwidaapulikudali pauketa, Guainía, Colombia liko. Jliaji waline jaiko tekojledalitsa liuyani jliaji aapana jaikuna jlipepe (*A. guaquirensis*) lima jliaji yapipjaka lipje ikawanaa irukaruna, yapikujniadali lipje, ipirati yufakarudape (Domacios) litajmete linitakawa lipamuyuaka lipje, litupa (glándulas) irukape yenunsre liuya linitakawa jliaji lipje, tekojleperi nauyawaka nakapakana jnite namakadalika, jnite tsudalipepja jnaji liiwi, padapenaaperi papiape apadatsa liiwi. Wajñata naapuwanaa (claves) nasrowalewa jnaji jaikolima nauyawaka papuko Rhamnaceae Colombia liko jnite madalida nauyawaka jnaji jaiko irukape *Ampelozizyphus* liko. Wajñata jliaji yaakuti iipenaa Kuripako liko, naaku jnaji yufakape oopitsa nini, jnite liyutsakja wajñata kanakaidalika lisro jliaji botánica neotropical jliaji idejnikjeti awakadaliko aji kurikaawa padiajni nisre jliwidaapuliko jliaji Río Negro nayu jnaji idejnikjeti Compensation International Progress S.A.–Ciprogress Greenlife-jnite inaikitsa yufakape nini yapiyaperi.

Ampelozizyphus Ducke (Rhamnaceae) was long thought to include a single species, *A. amazonicus* Ducke, the plants of which are vining shrubs or high-climbing lianas found mainly in the Amazon basin of Brazil, Colombia (also in Chocó), Ecuador, Perú, the Orinoco river basin in Venezuela (Bolívar, and southern Apure states), and the Guianas (Vásquez, 1997; Steyermark and Berry, 2004; Tortosa, 2015). This species grows in either riparian habitats or in *terra firme* lowland forests at an altitude range of 50–300 m.

Ampelozizyphus amazonicus is called "Saracura-Mirá" or "Mado" in Brazil, and "Saracura" or "Palo de culebra" in Venezuela; it is well known as an Amazonian medicinal plant used to treat infections, diseases (i.e., malaria, stomach pain, liver disorders, gastritis, inflammation of the prostate, and rheumatism), snake bites, and also as a fortifying tonic and even as an aphrodisiac (Krettli et al., 2001; Revilla, 2002; Krettly & Andrade-Neto, 2004; Santos et al., 2005; Rodrigues, 2006; Andrade-Neto et al., 2008; Silva et al., 2009; Oliveira et al., 2011; 2012). A drink of "Saracura" is prepared scraping the bark from a section of the stem, close to the ground, and/or roots, mixed with water, and stirred; this concoction has a rather bitter taste, and due the high saponin content of the bark, it yields copious foam when shaken. This foam, in Brazil, is the origin of other names asssociated with beer, such as "cervejinha," "cervejeira," "cerveja domato," "cerveja de índio," "cerveja de mico," and "cerveja de preto" (Torres Peçanha et al., 2013). Additionally, because of the foam produced in water, the bark is used to replace soap (Smith, 1939). Besides all these properties, "Saracura" also has been used in the last three decades as treatment of high blood pressure, diabetes, and to reduce high levels of cholesterol and triglycerides (information provided to G.A.A. by natives of Amazonas state, Venezuela). As a result, this species is in high demand and has been overharvested: currently its populations have been considerably reduced, especially in the Upper Rio Negro region (Pedro Maquirino, pers. comm. to G.A.A., 2013).

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Up to the early 21st century, the genus was characterized by a lianoid habit (without tendrils) and an elongate, paniculate inflorescence. Based on inmature fruits, Ducke (1935) described them as berry-like; notwithstanding, when mature fruits were found later, they were identified correctly as elastically dehiscent capsules (MacBride, 1956; Medan and Schirarend, 2004). Nonetheless, several author continued to describe the fruits of *Ampelozizyphus* as drupes (for a discussion see Meier and Berry, 2008).

A second species, *A. guaquirensis* Meier & P. E. Berry, was later discovered in the cloud forests of Venezuela's Coastal Cordillera (Meier and Berry, 2008). This new taxon has characters not previously reported in the genus, such as a tree habit, a subsessile inflorescence (versus pedunculate), deciduous calyx lobes in the fruit (versus persistent), and the presence of nectaries at the base of the leaf blades (versus absent); the lobed fruits of this new taxon clearly show their capsular nature.

During field work in the upper Cuyarí and Isana river basins, the Guianía Department, we collected a second arborescent species of *Ampelozizyphus* that shares several morphological features found in the species from the Venezuelan Costal Cordillera.

Ampelozizyphus kuripacorum Aymard & Castro-Lima *sp. nov*. TYPE: COLOMBIA. Guianía: Corregimiento Campo Alegre (Panapana): Caño Guaviarito, afluente del río Cuyarí, ca. 3 km aguas arriba de Campo Alegre, aprox. 01°52'N, 69°00'W, 200 m, 04 Mayo 2014 (fl and fr), *Francisco Castro-Lima, Gerardo Aymard C., Vladimir Minorta-C., Marcela González, Adela Lozano & Carolina Villegas-V. 18256* (Holotype: COL; Isotype: COAH). Figs. 1–2.

This new species is morphologically similar to *A. guaquirensis* Meier & P. E. Berry, from which it differs by having petioles 1.5–3.3 cm long, elliptic leaves, the tufted hair clusters (domatia) only located in both side at the base of the midrib lower surface, the glands (nectaries) orbicular, 3–3.4 × 1–1.6 mm, located ca. 5 mm from the base of the leaf blades, the inflorescence a cyme, 0.5–2.2 cm long, few to single-flowered, and the flowers with a bifid stigma.

Small *tree* 6–12 m tall, young *branches* and twigs covered with appressed yellow-brown hairs, glabrescent when mature, stipules ca. 20 × ca. 5 mm, lanceolate, covered with yellow-brown hairs externally, glabrous internally and at the tip, early caducous. *Leaves* alternate, distichous, petioles 1.5–3.3 cm long, densely covered by hairs similar to the young twigs, canaliculate along the length of upper side; lamina elliptic, 8–19 × 5–14 cm, subcoriaceous, base obtuse, apex shortly acuminate, glabrescent on the upper surface, with scattered appressed hairs on the lower surface, 3-veined from the base, midvein sunken, the other primary veins impressed on the upper surface of the lamina, elevated on the lower surface, and covered with appressed hairs like the petiole on both surfaces, secondary veins external to the two lateral veins weakly plane on both surfaces of the lamina; two conspicuous lateral glands (extrafloral nectaries) located ca. 5 mm from the base of the leaf blade (sometimes two glands in each side), each gland orbicular, 2–3.4 × 0.5–1.6 mm, glabrous, the *domatia* 1–2 mm long, oblong, only located at the both sides at the base of the midrib on the lower surface. *Inflorescence* axillary, shortly pedunculate (ca. 0.5 mm long in flower, to 1–2.2 cm long in fruit), few-flowered cymes to single flowered, these 1–2 times dichotomous, rachis, pedicels and sepals externally densely covered with appressed hairs similar to the leaves and young twigs; pedicels ca. 5 mm long at anthesis, to 8–10 mm long in fruit. *Flowers* cream-colored to greenish–yellow; *calyx tube* shortly turbinate, 5-lobed, lobes thick, triangular, 3–3.5 × ca. 2 mm (in the middle), glabrous internally; *petals* 5, inserted on the margin of the disk, cucullate at apex, unguiculate at the base, 2–2.5 × 1–1.5 mm, glabrous on both sides; *stamens* 5, opposite the petals, *filaments* 1.5–2 mm long, glabrous, *anthers* basifixed, ca. 0.5 mm long; ovary semi-inferior, 3-carpellate, with a thick nectariferous annular disk on the upper surface, ovules one per locule; style ca. 0.5 mm long and wide, glabrous with an apical bifid stigma. *Fruit* a trilobed capsule ca. 2.5 cm × ca. 1.4 cm diam when mature, the calyx lobes deciduous; endocarp hard when mature, 1.5–2 cm long, glabrous on both sides, covered the seed completely, explosively dehiscent when dried. *Seeds* one per locule, ca. 11 × ca. 10 mm, oblong, brown, shiny and glabrous.

Additional specimens examined: COLOMBIA. Guianía: Corregimiento Campo Alegre (Panapana): same locality as the type. *Marcela González, Francisco Castro-Lima, Gerardo Aymard C., Vladimir Minorta-C., Adela Lozano & Carolina Villegas V. 675* (COL).

Eponymy: *Ampelozizyphus kuripacorum* is named after the Kuripaco Indigenous people, a nation that has lived for centuries in the upper Rio Negro area (González Náñez, 1987, 2005, 2013), largely a pristine region with a diverse and unique flora and fauna.

The biological exploration of the upper Cuyarí river had been limited. Nevertheless, the Isana, Guianía, and Inirída rivers were explored by the famous ethnologist T. Koch-Grünberg between 1903–1905 (Kraus, 2004), by Hamilton A. Rice and P. P. Bauer in 1912–1913 (Rice, 1914), F. von Luetzelburg in 1928–1929 (Lopes de Sousa, 1959), and by R. E. Schultes with J. Murça Pires and F. López in 1947 and later in 1952, and R. Lemos Fróes and G. A. Black also in 1947 and later in 1952 (Kirkbride Jr., 1980; Fantz, 1982).

Relationships: Because of its arborescent habit, petioles and inflorescences covered with appressed yellow-brown hairs, the presence of glands on the leaf blades, short inflorescences, and deciduous calyx lobes in the fruit, this new species is most similar to *A. guaquirensis*, however *A. kuripacarum* differs from the latter and from *A. amazonicus* Ducke based on the characters indicated in the following key.

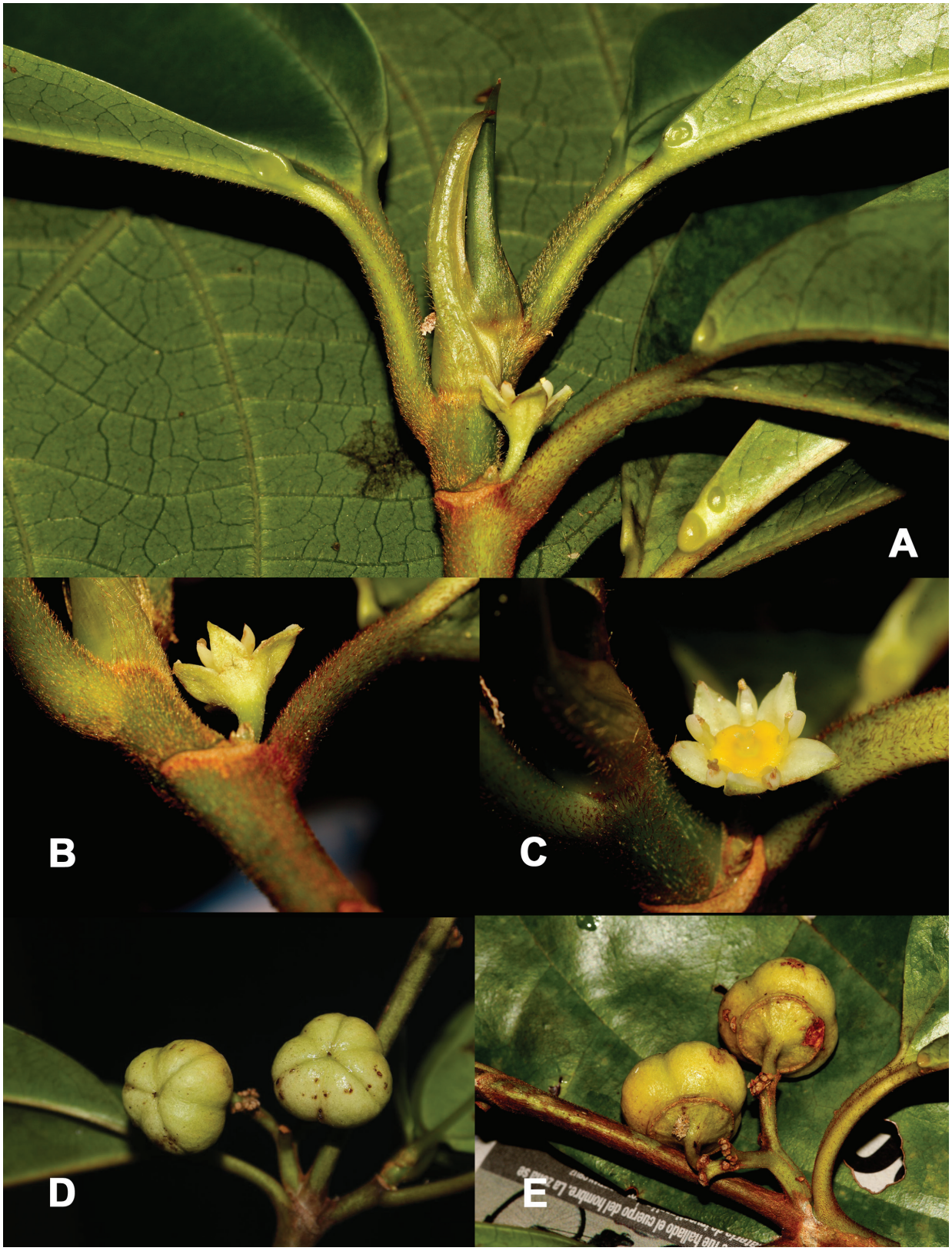

FIGURE 1. *Ampelozizyphus kuripacorum* Aymard & Castro-Lima. **A**, apex of a vegetative shoot, showing domatia on the lower surface of several leaves and a flower; notice the indument on leaf sheaths and petioles; **B**, side view of flower; **C**, flower viewed from above; **D–E**, two views of the fruits. Photographs by F. Castro-Lima based on the Holotype.

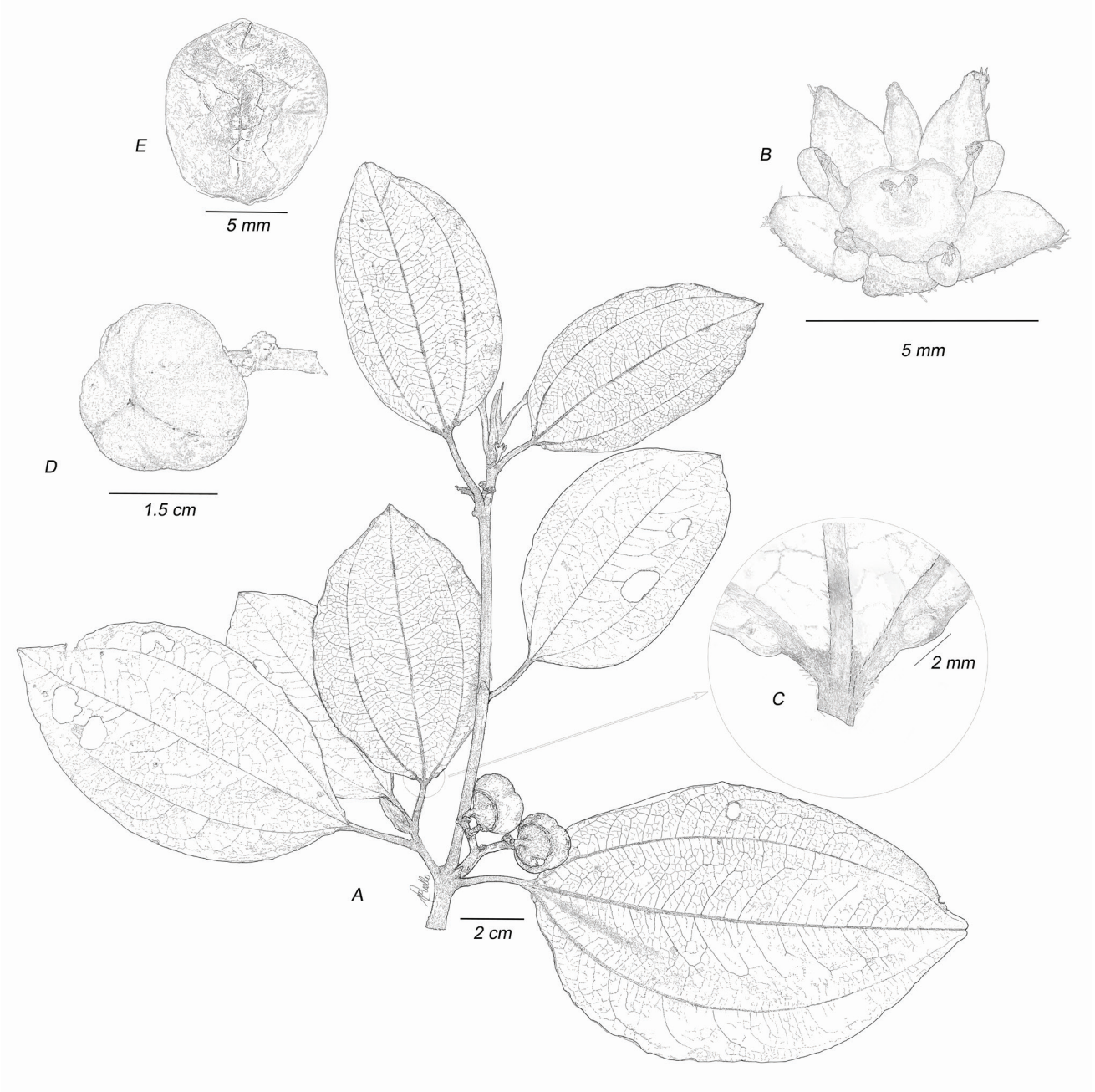

FIGURE 2. *Ampelozizyphus kuripacorum* Aymard & Castro-Lima. **A**, habit showing the branch with the young fruits; **B**, flower from above; **C**, nectary glands and domatia at the base of the leaf; **D**, young fruit; **E**, seed. Drawn by N. Cuello based on the Holotype.

KEY TO THE SPECIES OF *AMPELOZIZYPHUS*

1a. Habit lianoid; nectaries at the base of the leaf blades absent; inflorescence pedunculate, many-flowered; calyx lobes absent in fruit . . . . . *A. amazonicus*

1b. Habit arborescent, nectaries at the base of the leaf blades present; inflorescence subsessile, many- to single-flowered; calyx lobes present in fruit 2

2a. Petioles 1.5–2.2 cm long; leaves oblong-elliptic, base acute, the lower surface with clusters of tufted hairs (acarodomatia) present at the junction of the secondary and central vein and at the junction of the two lateral veins with the external secondary veins on the lower leaf surface, lateral glands (nectaries) located at the base of the leaf blades, elliptical, swollen, 0.4–0.7 × ca. 0.5 mm; inflorescence a many-flowered, 3.7–10 cm long cyme; stigma trifid . . . . . *A. guaquirensis*

2b. Petioles 1.5–3.3 cm long, leaves elliptic, base obtuse, the acarodomatia only located at the both sides at the base of the central vein on the lower surface, lateral glands (nectaries) located ca. 5 mm away from the base of the leaf blades, orbicular in shape, 3–3.4 × 1–1.6 mm; inflorescence a few- to single flowered, 0.5–2.2 cm long cyme, stigma bifid . . . . . *A. kuripacorum*

Phenology: Specimens of *Ampelozizyphus kuripacorum* bearing flowers and immature fruits were collected during the start of the rainy season (April–May).

Habitat and distribution: This new species is known from the margins of flooded forests drained by black water river of Caño Guaviarito, an affluent of the upper Cuyarí river, near the village of Campo Alegre, Guianía department, Colombia, at altitudes between 100–300 m. This new species probably has a wider distribution in moist Amazon forests of the upper Río Negro basin, an area scantily explored botanically.

The discovery of this new species and the recent description of *A. guaquirensis* clearly indicate that the description of tribe Ampelozizipheae (Richardson et al., 2000a,b) and additional taxonomic work on Rhamnaceae (Steyermark and Berry, 2004: Medan and Schirarend, 2004; Fernández-Alonso and Arbeláez, 2008) should be amended.

The following key, where the newly found morphological features of *Ampelozizyphus* have been incorporated, and can be used to identify the genera of Rhamnaceae found in Colombia.

Key to the Genera of Rhamnaceae of Colombia (based on Fernández-Alonso and Arveláez, 2008)

1a. Lianas or scandent plants with or without tendrils . . . 2
1b. Trees, erect shrubs, rarely scandent plants, always without tendrils . . . 4
2a. Plants with circinnate tendrils; ovary inferior; fruit a longitudinally 3-winged dry mericarp . . . *Gouania*
2b. Plants without tendrils; ovary superior o semi-inferior; fruit a drupe or an explosive capsule without wings . . . 3
3a. Plant armed; leaves opposite or subopposite, pinnately veined; fruit a drupe . . . *Sageretia*
3b. Plant unarmed, leaves alternate with 1 to 3 main pairs of lateral veins at the base, fruit a trilocular capsule . . . *Ampelozizyphus*
4a. (1b) Fruit an explosive capsule . . . 5
4b. Fruit a drupe . . . 8
5a. Shrubs, leaves up to 1 cm long; petals absent . . . *Colletia*
5b. Shrubs or trees, leaves longer than 2.5 cm long; petals present . . . 6
6a. Leaves densely clustered at the tip of the branches; petioles with bilobed glands located at or close to the base; inflorescences terminal, longer than the leaves . . . *Araracuara*
6b. Leaves not clustered at the tip of the branches, with or without glands located in the lower blade or at the base of the leaves; inflorescences axillary, shorter than or equal to the leaves . . . 7
7a. Plant armed or unarmed; leaves alternate or opposite; pinnately veined or 3-veined from the base, margins entire, serrate or crenate, with or without glands located in the lower blade or at the base of the leaves; flowers sessile to shortly pedunculate, hypanthium cup dish-shaped, ovary 3(4)-locular; capsules 4–15 mm long, opening loculicidally; seeds with abundant endosperm . . . *Colubrina*
7b. Plant unarmed; leaves distichous, always entire, alternate, 3-veined from the base and with glands located in the lower blade or at the base of the leaves; flowers pedunculate, hypanthium shortly turbinate, ovary 3-locular; capsules 20–25 mm long, opening septicidally; seeds with little endosperm . . . *Ampelozizyphus*
8a. (4b) Fruit with only one pyrene . . . 9
8b. Fruit with 2-4 pyrenes . . . 13
9a. Plants armed; leaves alternate or in fascicles . . . 10
9b. Plants unarmed; leaves opposite, rarely subopposite . . . 11
10a. Leaves clustered in small fascicles, pinnately veined; flowers solitary or in axillary fascicles; petals absent . . . *Condalia*
10b. Leaves alternate; 3-5-veined; inflorescences cymes or short thyrses; petals present . . . *Zizyphus*
11a. (9b) Flowers without petals . . . *Krugiodendron*
11b. Flowes with petals . . . 12
12a. Inflorescences umbelliform cymes with more than 5 flowers, flower long-pedunculate . . . *Rhamnidium*
12b. Inflorescences cymes with 2–4 flowers, flower short-pedunculate . . . *Karwinskia*
13a. (8b) Plants unarmed (if spines present, these never recurved and located at the end of the branches); leaves and branchlets alternate (rarely opposite); ovary superior . . . *Rhamnus*
13b. Plants armed; leaves and branchlets opposite (sometimes subopposite); ovary semi-inferior . . . *Scutia*

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