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Three new species of *Myrcia* sect. *Myrcia* (Myrtaceae) from South America

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Abstract

Three new species of *Myrcia* are described, illustrated and discussed. *Myrcia rionegrensis* from the Brazilian Amazon is related to *M. clusiifolia* from which it differs in having leaves with acute apex and ribbed fruits (vs. rounded apex and smooth fruits in *M. clusiifolia*); *Myrcia microcalyx* is similar to *Myrcia scytophylla* but differs in having pubescent staminal ring and ellipsoid fruits (vs. glabrous staminal ring and globose fruits in *M. scytophylla*) and *Myrcia peruviana* is related to *M. riverae*, but differs in having smaller leaves and flower buds and ellipsoid fruits (vs. globose in *M. riverae*).

Keywords: Campo Rupestre, Brazil, Peru, taxonomy, Myrteae

Introduction

Myrcia De Candolle (1827: 401; *sensu* Lucas *et al.* 2011) is one of the largest exclusively Neotropical genera of angiosperms, comprising about 750 species and distributed from California to Uruguay (WCSP 2020). The genus has received intensive study in recent years (e.g. Staggemeier *et al.* 2015; Santos *et al.* 2016a, Santos *et al.* 2016b, Amorim *et al.* 2019) and comprises an important part of the biotic diversity and ecological networks in the environments where it is present. Nevertheless, some groups of *Myrcia* remain taxonomically challenging and taxonomic revision is desirable to untangle difficult species circumscriptions, to establish conservation priorities and to understand the ecology and evolution of the environments in which they are found.

Myrcia is divided into nine sections (Lucas *et al.* 2018). One of these sections, *Myrcia* sect. *Myrcia,* is diagnosed by symmetrical and regularly branching inflorescences, triangular panicles, flowers with flat floral discs, densely sericeous staminal rings, short and internally pilose hypanthia, bi-locular ovaries and usually ellipsoidal fruits. It comprises approximately 100 species, one of the most diverse sections in the genus. The distribution of the section follows that of *Myrcia* distribution, but it is particularly diverse in the Amazonian phytogeographical region (WCSP 2020).

In preparation for the taxonomic review of this group and after extensive study of herbaria material in various Brazilian, American and European herbaria, three species from the Amazonian forests of Peru (*M. peruviana*) and Brazil (*M. microcalyx* and *M. rionegrensis*) were identified as new to the genus and are here described.

Material and methods

Morphological study was based on specimens from the following herbaria: FLOR, INPA, K, MG, MO, NY, SEL, SP,

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SPF, U and UFP (acronyms according to Thiers 2020). Living material was examined for *M. rionegrensis*. *Myrcia microcalyx* and *M. peruviana* are each described from a single gathering; while it is understood that this is not optimal, these species are considered so distinct that they are confidently described. The conservation status (where possible) and distribution maps were produced using available collection point coordinates in Geocat (www.kew.org/geocat). Terminology within the morphological description follows Lawrence (1956) and Radford (1974).

Taxonomy

1. *Myrcia microcalyx* Lima Santos & E. Lucas, *sp. nov*. Type:—BRAZIL. Acre: Cruzeiro do Sul, Estrada Alemanha, 15 April 1971 (fr), *G. T. Prance et al. 11940* (holotype: K 000342940!, isotypes: FLOR 39946!, INPA 30253-Image!, NY 00866719-Image!, S17-10727, SP 123595-Image!, U 1444093!, US01893194-Image!). Figure 1.

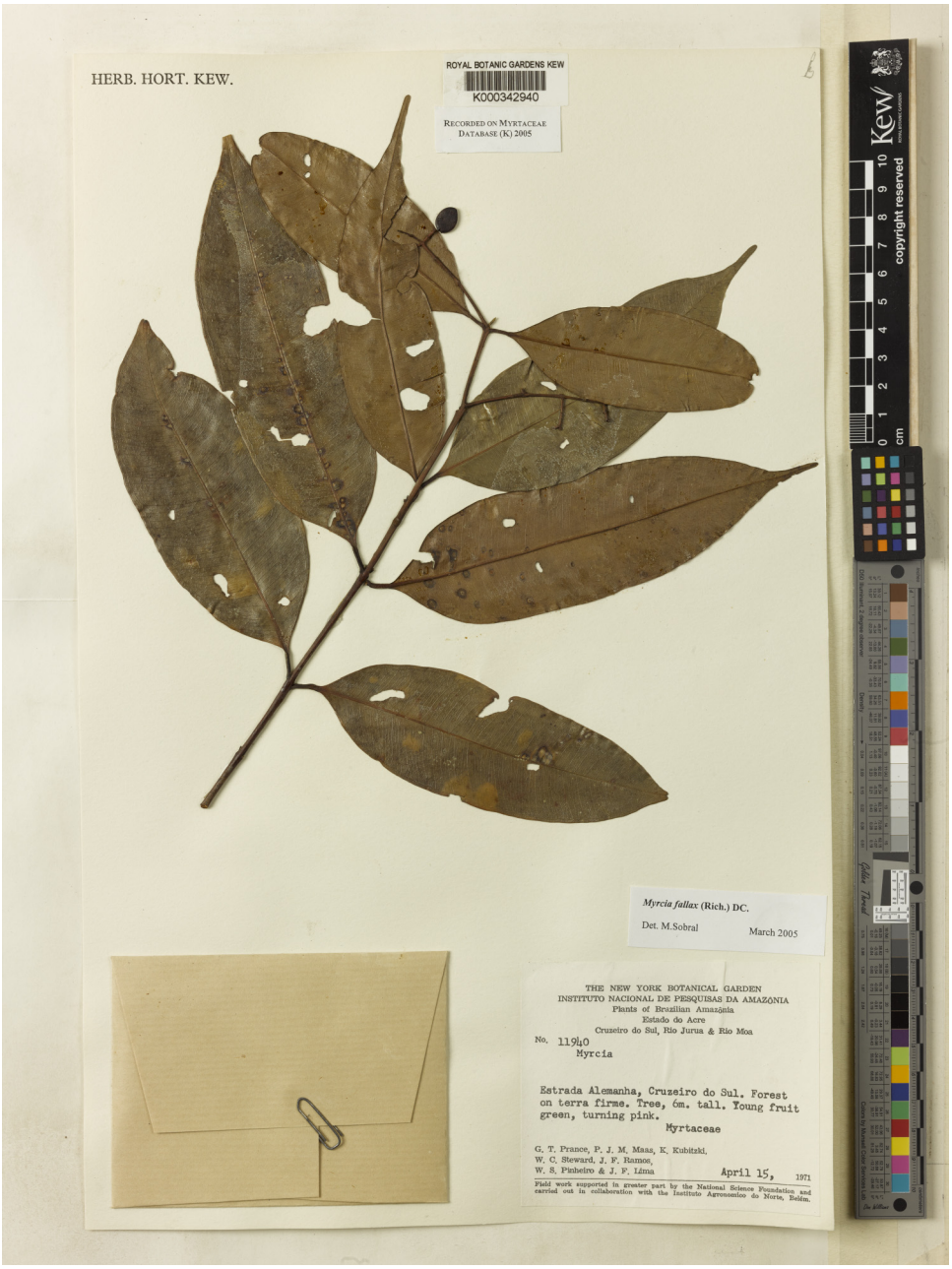

FIGURE 1. Holotype of *Myrcia microcalyx* (K000342904).

This species resembles *Myrcia scytophylla* (Diels) E.Lucas & C.E.Wilson (2016: 692; basionym: *Marlierea scytophylla* Diels, 1907: 187) in *Myrcia* sect. *Aulomyrcia*, from which it is distinguished by its externally pubescent hypanthium

and staminal ring (vs. glabrous in *M. scytophylla*), five calyx lobes (vs. four) and ellipsoid fruits (vs. globose). There is also a resemblance to *Myrcia splendens* (Sw.) De Candolle (1828: 244; basionym: *Myrtus splendens* Swartz, 1788: 79) in *Myrcia* sect. *Myrcia*, from which it differs in having protruding venation on the adaxial surface (vs. flat) and smaller sepals, never longer than 0.5 mm (vs. frequently longer than 0.5 mm).

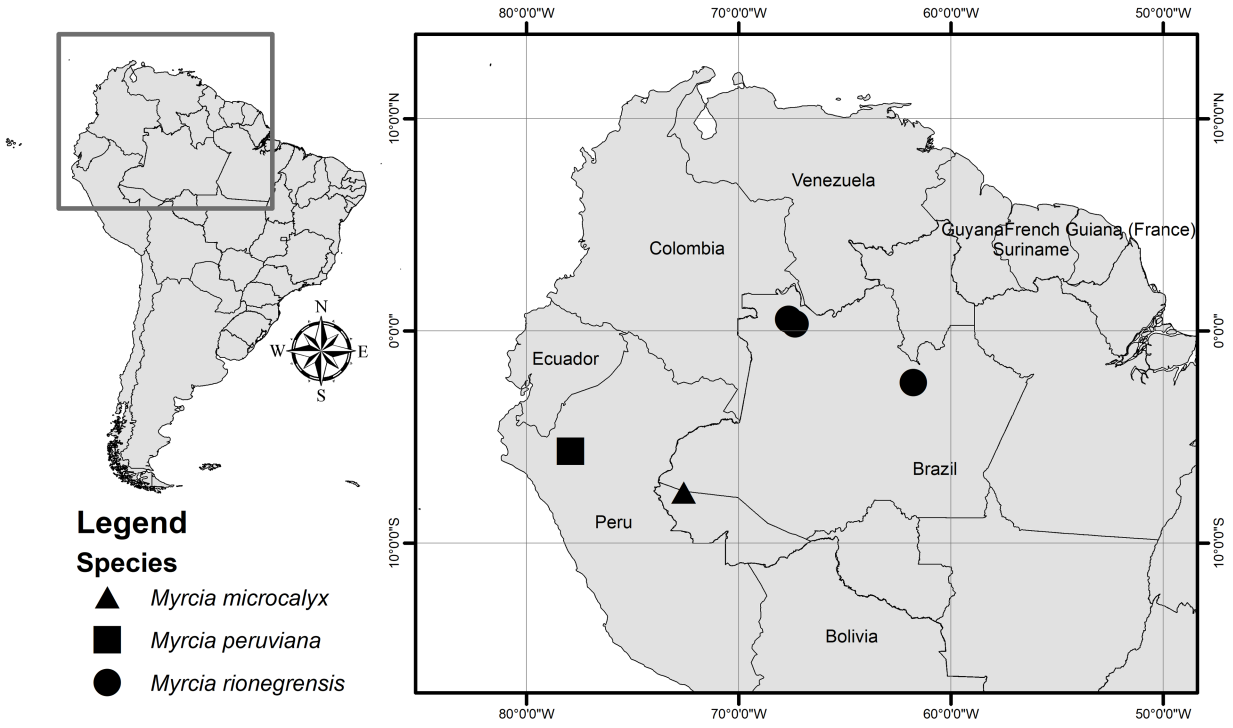

FIGURE 2. Distribution map of *Myrcia microcalyx*, *M. peruviana* and *M. rionegrensis*.

Tree to 6 m high. Twigs brownish, flattened, keeled when young, cylindrical at maturity, bark smooth, glabrous. Petioles 0.6–1.1 × 0.1–2 cm, canaliculate, glabrous at maturity; blades 9.7–16 × 3–5 cm, 3.2 times longer than wide, ellipsoid to oval, discolorous, coriaceous, glabrous adaxially, glossy, sericeous abaxially, indument persistent at maturity, glandular dots conspicuous on both surfaces, up to 7/mm^2, base cuneate, apex with acumen 1–2.2 cm long, margin plane when dry; midvein prominent on both surfaces; secondary veins 20–33 at each side, held at angles of 70–75° relative to the midvein, one or two marginal veins, the first 1.5–2 mm, the second 1–1.5 mm from the margin, tertiary veins conspicuous. Panicle ca. 5.7 × 8.5 cm, terminal or axillary, peduncles 0.5–0.8 mm long; rachis puberulent to glabrous, 2–3 branching at the base, branching opposite. Flowers not seen, floral characters observed in young fruits. Hypanthium (in fruits) extended 1 mm above the summit of the ovary, externally and internally pubescent; calyx 5-merous, unequal sized, distinct from the hypanthium, external lobes smaller than internal lobes, ovate, concave, base truncate, apex rounded, lobes ca. 0.5 × 0.4 mm, externally and internally pubescent; stamens not seen; staminal ring pubescent; ovary 2–locular, with two ovules per locule. Fruits 1.5–2.0 × 0.8–1.0 cm, ellipsoid, pilose, entirely covered with pellucid gland dots, green when immature, becoming pink on ripening.

Distribution, habitat and phenology:—*Myrcia microcalyx* is known only from the type specimen collected in Acre province, Brazil (Figure 2). It was collected in fruit in Amazon Forest in April.

Conservation:—It is impossible to precisely assess the conservation status of this species until the knowledge of the plant diversity of this area is better known. *Myrcia microcalyx* is here assessed as Data Deficient (DD), according to IUCN (2001) criteria.

Affinities—*Myrcia microcalyx* superficially resembles *Myrcia scytophylla* and *Myrcia splendens* but differs by the characters cited in the diagnosis. Recent phylogenetic studies based on molecular evidence (Santos *et al.* 2016b) note that one species of *Myrcia* (*Myrcia elevata* Santos (2015: 102)) that has characters of *Myrcia* sect. *Myrcia* as well as characters of *Myrcia* sect. *Aulomyrcia.* In that study, *Myrcia elevata* is nested in the *Myrcia* sect. *Myrcia* clade. In the case of *Myrcia microcalyx*, these 'aulomyrcioid' characters include the raised midvein, the small calyx lobes (ca. 0.5 × 0.4 mm) and an asymmetrically branched inflorescence. Further molecular phylogenetic work is required to better understand the relationship of these atypical species within *Myrcia* sect. *Myrcia*.

Etymology:—The specific epithet refers to the unusually small calyx lobes (0.5 × 0.4 mm) found in this species.

FIGURE 3. Holotype of *Myrcia peruviana* (K000331608).

2. *Myrcia peruviana* Lima Santos & E. Lucas, *sp. nov.* Type:—PERU. Bongara: 4 km N of Pomacochas on road to Rioja, trail down gorge to W of road, 77°55'W, 05°40'S, 2150–2200 m, 2 June 1986 (fl, fr), *S. Knapp et al. 7500* (holotype: K 000331608!, isotype MO 2028941-Image!). Figure 3.

This species is related to *Myrcia riverae* A. Estrada, D. Santamaria & Aguilar (2014: 452) by having dense brownish velutinous trichomes covering the plant and prominent venation on the abaxial surfaces, but differs in having leaf blades 5.2–15 × 2.8–6.5 cm (vs. 15.5–27.2 × 7–11.6 cm in *M. riverae*), flower buds 2–3 mm long (vs. 4.5–5 mm long) and fruits ellipsoid (vs. globose).

Shrub to 1.5 m high. Twigs terete, densely covered with velutinous brownish simple trichomes 0.7–1 mm long. Internodes 3.3–7.5 cm. Petioles 4–9 × 2–3 mm, adaxially sulcate, tomentose; blades 5.2–15 × 2.8–6.5 cm, 1.8–2.3 times longer than wide, ellipsoid or oblanceolate, markedly discolorous, coriaceous, abaxially reticulate, covered with trichomes as are the twigs, mature adaxial surface glabrous, gland dots less than 0.1 mm in diameter, less than 10/mm^2, barely visible on both sides, bases acute, apices rounded or obtuse, margin plane when dry; midvein sulcate adaxially, raised abaxially; lateral nerves 8–7 pairs, barely visible adaxially and faintly salient abaxially leaving the midvein at angles ca. 70°; marginal vein 1–4 mm from the margin. Panicle triangular, 5–9 cm long, axillary or terminal, flowers 25–50. Flowers sessile; bracts not seen; bracteoles linear, 2–2.5 × 1 mm, concave, both surfaces pubescent; flower buds obovate, 2–3 × 2 mm, densely covered with yellowish trichomes 0.2–0.3 mm long, these more dense above the ovary; hypanthium extended 1 mm above the summit of the ovary, externally and internally pubescent; calyx 5-merous, slightly unequal, widely triangular to hemispheric, lobes 0.5–1.5 × 1–2 mm, pubescent with trichomes to 0.1 mm long adaxially and 0.3 mm long abaxially; petals 5, orbicular, 2 mm in diameter, adaxially glabrous, abaxially with trichomes to 0.1 mm long; stamens ca. 40, filaments 2 mm long, anthers ellipsoid, 1 mm long; staminal ring 2 mm in diameter, pubescent; styles 3–4 mm long, proximally with scattered trichomes to 0.1 mm long, stigma capitate; ovary 2–locular with two ovules per locule. Fruits 1.2–1.8 × 0.7–1.1 cm, ellipsoid, pubescent, pellucid gland dots covering whole surface, green when immature.

Distribution, habitat and phenology:—*Myrcia peruviana* occurs in the province of Bongara, Peru, in cloud forests (Figure 2). It was collected presenting flowers and fruits in June.

Conservation:—*Myrcia peruviana* is known only from the type collection from a poorly known botanical region. Data available is insufficient to provide a conservation status for this species and it is here recorded as Data Deficient (DD), according to IUCN (2001) criteria.

Affinities:—*Myrcia peruviana* resembles *Myrcia riverae,* a species from Costa Rica (for description see Santamaria Aguilar *et al.* 2014), in the dense brownish velutinous trichomes that cover the plant and having prominent venation on abaxial leaf surfaces, but differs by the characters cited in the diagnosis. *Myrcia peruviana* may be another atypical species of *Myrcia* sect. *Myrcia* with superficial similarity to *Myrcia* sect. *Aulomyrcia* because the hypanthium of *Myrcia peruviana* is extended above the ovary. However, the staminal ring of *M. peruviana* comprises ca. 50% of the total disc width, its disc is velutinous, its fruits are ellipsoid and its calyx lobes are regular, consistent with features of *Myrcia* sect. *Myrcia*.

Etymology:—The specific epithet refers to the country where the species was collected.

3. *Myrcia rionegrensis* Lima Santos & T.N.C. Vasconc., *sp. nov.* Type:—BRAZIL. Amazonas: Novo Airão, Parque Nacional de Anavilhanas, 60°45'33"W, 2°26'22"S, 19 September 2014 (fr.), *T. N. C. Vasconcelos et al. 307* (holotype: K 000276044!, isotypes: INPA!, NY!, SPF!, UFP!, SEL!). Figures 4 and 5.

This species is closely related to *Myrcia clusiifolia* (Kunth) DC. (1828: 255; basionym: Myrtus clusiifolia Kunth, 1823: 138), from which it can be distinguished by the leaves arranged along the branches (*vs.* leaves arranged at the apex of the branches), apex acuminate or acute (*vs.* apex rounded), puberulous in maturity (*vs.* glabrous in maturity), fruits ribbed and pubescent (*vs.* fruits smooth and glabrous).

Shrub to 3 m high, sparsely covered by simple, yellowish trichomes 1–1.5 mm long. Twigs brownish when immature, flattened, keeled; greyish at maturity, terete, bark slightly cracked, glabrescent to glabrous; branching sympodial, 2–3 branches per node. Petioles 0.9–1.5 × 0.2–0.3 mm, canaliculate, puberulous in maturity, arranged along the branches; blades 4.2–15.6 × 2–6.9 cm, 2.1–2.2 times longer than wide, ellipsoid, oval or lanceolate, discolorous, coriaceous, mature adaxial surface glabrous, mature abaxial surface sericeous, pellucid gland dots slightly conspicuous, less than 5/mm^2, base rounded or obtuse, apex acuminate or acute, margins plane when dry; midvein sulcate adaxially, prominents abaxially; secondary veins 20–27 pairs, held at angles of 70–80° relative to the midvein, one or two marginal veins, the first 1.5–2.0 mm from the margin, the second 0.5–0.8 mm from the margin, tertiary

veins conspicuous on both surfaces. Panicle ca. 3.5 × 9.9 cm, terminal; rachis puberulent to glabrous, 2–3 branching at the base, branching opposite. Flowers not seen, floral characters observed in young fruits. Hypanthium (in fruits) 1.5–2.5 mm extended above the summit of the ovary, externally sericeous, internally pubescent; calyx 5-merous, lobes 1.5–2 × 2–3 mm, distinct from the hypanthium, external lobes smaller than internal lobes, persistent, widely depressed ovate, concave, base truncate, apex rounded, externally and internally sericeous; stamens not seen; staminal ring pubescent; ovary 2–locular, with two ovules per locule. Fruits 6–8 × 6–7 mm, depressed globose or globose, ribbed, pubescent with golden hairs, pellucid glandular dots covering whole surface, green when immature, maturing red and black.

FIGURE 4. Holotype of *Myrcia rionegrensis* (K 000276044).

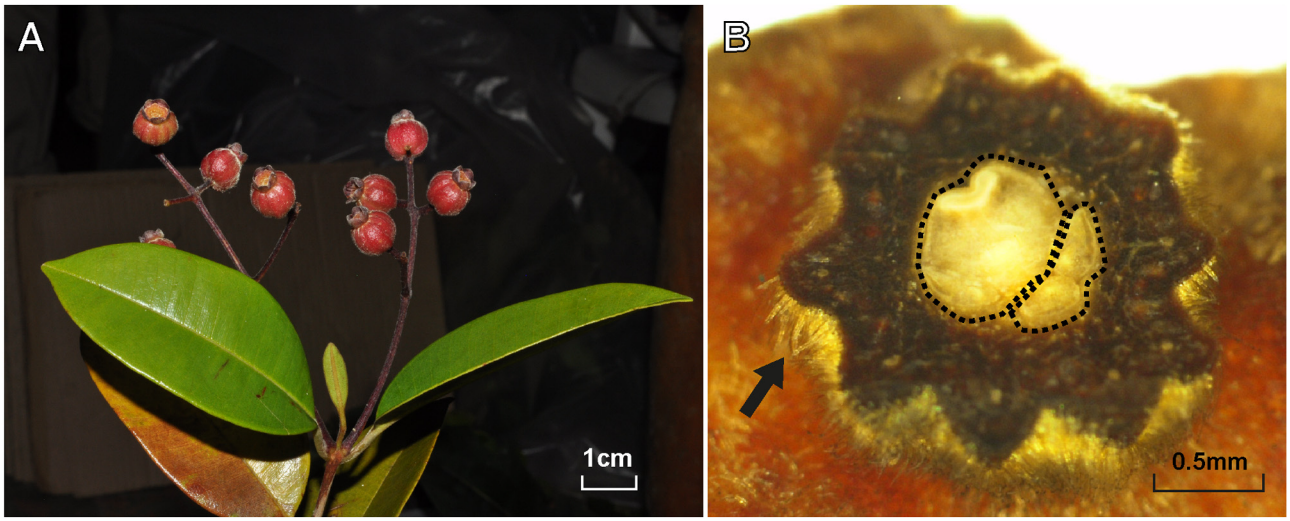

FIGURE 5. Morphological characteristics of *Myrcia rionegrensis*. A. Fruiting branch showing the red ribbed fruits in process of ripening (holotype voucher *T. Vasconcelos 307*); B. Transversal section of the ovary in old flower/ young fruit stage (*P.J.M. Maas 6904*). Arrow indicates golden hairs covering the outer ovary surface (persistent in fruit), the dashed line highlights the bilocular ovary.

Distribution, habitat and phenology:—*Myrcia rionegrensis* occurs in the Brazilian state of Amazonas (Fig. 2), frequently found on river margins at low altitudes (ca. 50 m). It was collected in fruit in September and November, during the dry season in the Amazon.

Conservation:—Information provided by Geocat based on three collection points classifies *Myrcia rionegrensis* as Endangered both in extent of occurrence (3,666 km²) and area of occupancy (12,000 km²). It is difficult to say if this species is common or not, since the areas along the Rio Negro are not well known.

Affinities:—*Myrcia rionegrensis* is morphologically similar to *M. clusiifolia* from which it can be distinguished by the characters listed in the diagnosis. Ribbed fruits in *Myrcia* sect. *Myrcia* have been described in *Myrcia antioquensis* Parra-Os. (2013: 293), *M. pentagona* McVaugh (1956: 193) and *M. pseudosplendens* Sobral & Mazine (2016: 36). These species occur respectively in the Colombian Andean forest and Venezuelan Amazon forests and Brazilian Cerrado. *Myrcia clusiifolia* is usually associated with sandy soils, in savanna vegetation, while *M. rionegrensis* occurs at the margins of rivers. Collections of *Myrcia rionegrensis* were also found under the identification of the Atlantic Rainforest endemic *M. pubipetala* Miquel (1846: 441). The former can be distinguished from the latter by having bilocular ovaries and a pubescent ovary summit (vs. trilocular ovaries and ovary summit with trichomes only at style base (Lucas *et al.* 2018)).

Etymology:—The specific epithet refers to the name of the river, Rio Negro, where the holotype and one of the paratypes were collected.

Paratypes:—BRAZIL. Amazonas: Barcelos, Margem direita do rio Jufari, 23 October 2008, *A.B. Junqueira 819* (HUFSJ, INPA!); Rio Negro, Rio Içana, aproximately 1 hour by motorboat upstream from mouth of Rio Cubate, 3 November 1987, *P. J. M. Maas 6904* (K!, MG!); Rio Tuari (afluente do rio Negro), lago Uirauiçu, Igapó próximo à Ilha de Aparecida, 13 November 1987, *M. L. Kawasaki 150* (INPA!, K!); São Grabriel da Cachoeira, Alto rio Negro, rio Tuari, afluente da margem direita do rio Negro, Piraianara, 13 November 1987, *H.C. Lima 3191* (HUESJ!, INPA!, RB!). Without municipality, 10 June 1970, *L.R. Marinho 499* (IAN!).

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