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Original Paper

A new species of *Macrocentrum* (Melastomataceae: Merianieae) from Pará, Brazil

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Abstract

We describe *Macrocentrum aurimontium* (Melastomataceae: Merianieae), a new species that has been collected twice in the state of Pará, Northern Brazil. *Macrocentrum aurimontium* closely resembles *M. latifolium*, a species from French Guiana, due to its isomorphic leaves and 4-merous flowers, but differs from it by the eglandular trichomes up to 4 mm long on the adaxial foliar surface (*vs.* glabrous or deciduously strigulose, then the trichomes 0.1–0.2 mm long in *M. latifolium*), denticulate to denticulate-serrulate, always ciliate leaf margin (*vs.* minutely serrulate, eciliate), sepals 0.5–0.7 mm long, triangular to broadly triangular, with an obtuse to rounded apex, the external teeth projecting 0.2–0.5 mm above them (*vs.* sepals ca. 0.1 mm long, oblate, the external teeth with the same size as the sepals) and the fruits shorter and narrower (2.7–3.7 × 1.2–1.4 mm *vs.* 4–5.5 × 3.1–4 mm).

Key words: Amazon, Bertolonieae, biodiversity, Monte Dourado, taxonomy.

Resumo

Aqui descrevemos *Macrocentrum aurimontium* (Melastomataceae: Merianieae), uma nova espécie coletada duas vezes no estado do Pará, no norte do Brasil. *Macrocentrum aurimontium* se assemelha a *M. latifolium*, uma espécie da Guiana Francesa, por suas folhas isomórficas e flores 4-meras, e dela difere pelos tricomas eglandulares de até 4 mm de comprimento na superfície foliar adaxial (*vs.* glabra ou com tricomas decíduos, com 0,1–0,2 mm de comprimento em *M. latifolium*), margens das folhas denticuladas a denticulado-serruladas, sempre ciliadas (*vs.* diminutamente serrilhadas, eciliadas), sépalas com 0,5–0,7 mm de comprimento, triangulares a amplamente triangulares, com ápice obtuso a arredondado, e com dentes externos projetando-se 0,2–0,5 mm (*vs.* sépalas com cerca de 0,1 mm de comprimento, oblatas e com dentes externos com o mesmo tamanho das sépalas) e os frutos mais curtos e estreitos (2,7–3,7 × 1,2–1,4 mm *vs.* 4–5,5 × 3,1–4 mm).

Palavras-chave: Amazonia, Bertolonieae, biodiversidade, Monte Dourado, taxonomia.

Introduction

Macrocentrum Hook.f. is a genus with 25–26 species (Michelangeli & Goldenberg 2018; Bacci *et al.* 2019) occurring through northern South America, from Colombia (Almeda *et al.* 2016) to Peru (Michelangeli & Goldenberg 2018), Venezuela (Wurdack 1973), Guianas (Wurdack *et al.* 1993) and northern Brazil (Michelangeli & Goldenberg 2020). There are six species of *Macrocentrum* recognized in Brazil up to now, most of them growing on moist rock outcrops or mossy ground at medium to high elevations (BFG 2018; Michelangeli & Goldenberg 2020).

Along with *Bertolonia* Raddi, *Monolena* Triana *ex* Benth. & Hook.f., *Salpinga* Mart. *ex* DC. and *Triolena* Naudin, it has been traditionally placed in the neotropical tribe Bertolonieae (Triana 1872; Cogniaux 1891) or the pantropical Sonerileae (Renner 1993), neither of them monophyletic (Bacci *et al.* 2019). It seems that

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Macrocentrum may not be monophyletic either, since all the species that have been considered in *Macrocentrum* until now were recovered as three distinct lineages inside a broader Merianieae (*i.e.*, including *Adelobotrys* DC., *Axinaea* Ruiz & Pav., *Centronia* D.Don, *Graffenrieda* DC., *Meriania* Sw. and *Salpinga*) (Dellinger *et al.* 2019; Bacci *et al.* 2019). The species of *Macrocentrum* are herbs, with dimorphic or isomorphic leaves, 4–5-merous flowers, the stamens with a dorsal, basal appendage, (2–)3(–4)-locules in the ovary, and funnelform fruits (Bacci *et al.* 2019).

In the course of work at the US herbarium we came across two specimens of *Macrocentrum* from northern Brazil, one undetermined and the other determined as *M*. aff. *cristatum* (DC.) Triana by John Wurdack. After careful analysis and comparisons with known species we decided that they corresponded to a species that has not been previously described. The species described here occurs in a mountainous area in northern Amazonia, and was collected only twice, in 1986 and 1987. The logistics that are necessary for expeditions to collect in places like these are usually very complex, so we were unable to return to this locality in order collect more specimens. Nevertheless, since one of the specimens is complete (*i.e.*, with flowers and fruits), in a very good state, has good duplicates, and also due to the fact that their features are very distinctive, we decided to describe this species here.

Material and Methods

Morphological description and measurements were taken from dried herbarium specimens. Terminology followed other works on *Macrocentrum* (Wurdack 1973; Wurdack *et al.* 1993; Michelangeli & Goldenberg 2018, 2020). Flower measurements were taken from rehydrated flowers from the holotype. We checked several herbaria (IAN, INPA, MBM, MG, NY, RB, UPCB, US) looking for other specimens that could belong to this new species, either in the Melastomataceae indets, in *Macrocentrum* or even in other genera such as *Monolena*, *Salpinga*, and *Triolena*.

Results and Discussion

Macrocentrum aurimontium R.Goldenb. & Michelang., *sp.nov*. Fig. 1

Type: BRAZIL. PARÁ: Almeirim, Monte Dourado, Estação Ecológica do Jari (SEMA), beira de lagoa; tipo de substrato: rocha; vegetação: campo rupestre alagado, 00º32'S, 52º51'W, 12.XI.1986, fl. and fr., *M.J. Pires & N.T. Silva 1446* (holotype: MG!; isotypes: INPA!, JARI!, US!).

Macrocentrum aurimontium differs from *Macrocentrum latifolium* Wurdack due to the presence of eglandular, persistent trichomes up to 4 mm long on the adaxial foliar surface (*vs.* glabrous or with deciduous trichomes, then these 0.1–0.2 mm long in *M. latifolium*), denticulate to denticulate-serrulate, always ciliate leaf margin (*vs.* minutely serrulate, eciliate), sepals 0.5–0.7 mm long, triangular to broadly triangular, with an obtuse to rounded apex, the external teeth projecting 0.2–0.5 mm (*vs.* sepals ca. 0.1 mm long and oblate, the external teeth with the same size as the sepals) and the fruits shorter and narrower (2.7–3.7 × 1.2–1.4 mm *vs.* 4–5.5 × 3.1–4 mm).

Reptant herb, with adventitious roots on leafless nodes or sometimes axillary. Young branches sharply quadrangular to subterete, sparsely covered with minute, globose, sessile glands, and also sparsely covered with trichomes up to 0.3 mm long, unbranched, mostly eglandular, but sometimes with a few dark glandular heads on the nodes; interpetiolar lines very thin, sometimes inconspicuous. Leaves opposite, equal to slightly unequal in each pair; the leaves on the erect branches (except for the first distal pair, right below the inflorescence) larger, with petioles 6–12 mm long, with the same sessile glands as the branches, but these sometimes short (up to 0.1 mm long) pedunculate, and also sometimes with sparse trichomes up to 3 mm, erect, unbranched, eglandular, on its distal portion right below the base of the blade, blades 2–4.6 × 1.6–3.5 cm, thinly membranaceous, broadly ovate to deltoid, apex obtuse to acute, base truncate to subcordate, margins denticulate to denticulate-serrulate, always ciliate, cilia 0.5–1.5 mm long, the midrib barely visible on the adaxial surface, flat to slightly prominent on the abaxial surface, one pair of basal acrodromous nerves plus an additional submarginal pair of secondary nerves, these incomplete, reaching 1/3–2/3 of the blade length, usually confluent at the base (*i.e.*, reaching the inner acrodromous nerves before reaching the midrib), both pairs barely visible on the adaxial surface, flat to slightly prominent on the abaxial surface, tertiaries (transversals) flat on the adaxial surface, inconspicuous on the abaxial surface, areoles not visible on both surfaces; the leaves on the reptant branches, axillary buds, and the first distal pair on the erect branches (right below the inflorescence)

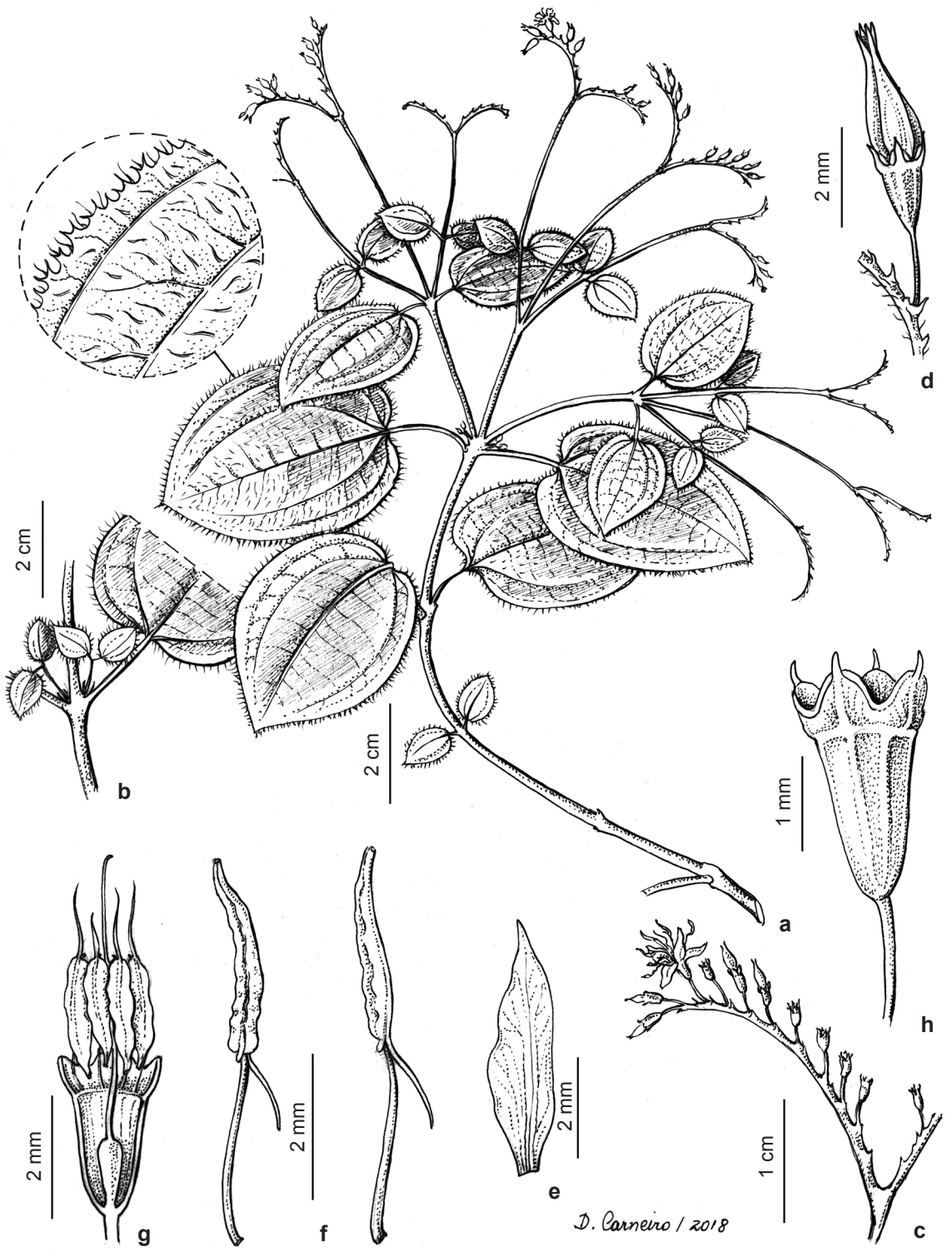

Figure 1 – a-g. *Macrocentrum aurimontium* – a. fertile branch; b. nodal region of the stem, with two pairs of axillary branches bearing small leaves; c. inflorescence with buds, flowers and young fruits; d. flower bud; e. petal, adaxial surface; f. stamen, ventral (left) and lateral-dorsal (right) views; g. flower bud, longitudinal section, with petals removed; h. fruit. (a-h. from the holotype *Pires & Silva 1446* MG).

smaller and slightly different from the ones described above from the erect branches, with petioles 1–3 mm long, blades 0.5–0.7 × 0.3–0.5 cm, elliptic, base obtuse to rounded, apex rounded to obtuse, with a single pair of acrodromous, basal nerves, otherwise similar (including their margins) to the bigger leaves described above; adaxial surface (in both bigger and smaller leaves) with sparse to moderate trichomes 1–4 mm long, appressed, unbranched, eglandular, translucent, somewhat denser and shorter near the margins, and also with the same sparse, sessile, globose glands described for the branches, abaxial surface with the same sparse sessile glands, otherwise glabrous or with very sparse trichomes similar to the ones on the adaxial surface, mostly on tertiary nerves or reticulation. Inflorescences consisting of 1–3 apical peduncles 1.7–4.8 cm long, topped with a single or paired uniparous cymes 1.1–2.8 cm long (the length of them varying according to the flower/fruit stage: shorter when in buds and flowers, then longer when in flower and fruits and then fruits), moderately covered with the same sessile glands as the branches; bracteoles 0.3–0.4 mm long, triangular-subulate, persistent at anthesis and sometimes persisting in fruits. Flowers 4-merous, on pedicels 1.4–2.5 mm, the glands here slightly denser and sometimes shortly (up to 0.1 mm long) pedunculate. Hypanthium 1.2–1.7 × 0.6–0.8 mm, long-campanulate to subterete, strongly costate, inner surface and torus glabrous, outside with the same glands as the pedicels. Sepals regular, persistent, 0.5–0.7 mm long (from the torus line to the apex), erect, triangular to broadly triangular, with an obtuse to rounded apex, margins entire, papillose-granulose, fused at the base in a tube 0.2–0.4 mm long; external teeth continuing from the apex of a rib on the back of the sepal, projecting 0.2–0.5 mm above the sepals (in adaxial view), subulate. Petals light pink, 3.4–5.5 × 0.7–1.8 mm, lanceolate, apex long and narrowly acuminate to shortly apiculate, margins eciliate and undulate but granulose-papillose at the apex, glabrous but apically granulose-papillose on both surfaces. Stamens 8, isomorphic, glabrous, color unknown, but the anthers purplish in dry flowers; filaments 2.5–2.8 mm long; connective prolonged ca. 0.2 mm below the thecae, with a dorsal appendage 1.1–2 mm long, subulate; anthers 2.8–3 mm long, narrowly subulate, apex attenuate, straight to slightly dorsally curved at the apex, slightly corrugate, with a minute, single pore ca. 0.1 mm wide, apical, not ventrally nor dorsally inclined. Ovary ca. 1 mm long, completely free, elliptic, apex glabrous, 3-locular; styles 4.5–6 mm long, linear, curved at the apex, glabrous, stigmas punctiform. Capsules 2.7–3.7 × 1.2–1.4 mm, long-campanulate, beige, with persistent sepals. Seeds not seen. **Paratype**: BRAZIL. PARÁ: Estação Ecológica do Jari, Projeto Reserva Genética, SEMA; primary terra firme forest near cliffs; growing in crevices near waterfall, 17.X.1987, fr., *H.T. Beck et al. 127a* (INPA!, NY!, US!).

The plant has been collected only twice, in the Brazilian Amazon, both inside a protected area in the state of Pará, the "Estação Ecológica do Jari" (Fig. 2). From what we can understand from specimen labels, it was collected once in open vegetation on rocky outcrops, near a lake and apparently subject to seasonal flooding, and the second time in rock crevices near a waterfall. The plants were collected with flowers in November, and with fruits in October and November.

The epithet refers, in Latinized form, to the only locality where it has been collected, Monte Dourado.

Due to lack of information, since this species has been collected only twice, this species was not

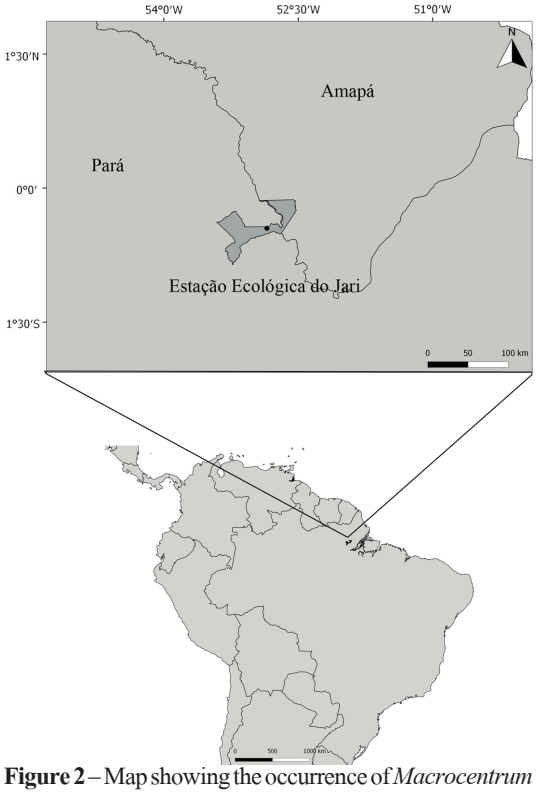

Figure 2 – Map showing the occurrence of *Macrocentrum aurimontium* in the state of Pará, Brazil.

assigned to any conservation status category and should be considered data deficient (DD) following IUCN recommendations (IUCN 2012).

Macrocentrum aurimontium is morphologically close to *M. gracile* Wurdack and *M. latifolium* Wurdack, due to the caulescent habit (not acaulescent and scapigerous), stem nodes lacking stipule-like appendages, leaves equal to slightly unequal in each pair, adaxial leaf surfaces with slender trichomes (usually longer than 1 mm), well-developed inflorescences (flowers not solitary), and 4-merous flowers. In fact, it would key out with *M. gracile* in the key to *Macrocentrum* for the Guianas (Wurdack 1993). On the other hand, the overall morphology of *M. aurimontium* seems more similar to *M. latifolium,* and that is why the latter was chosen to be compared in the diagnosis. *Macrocentrum aurimontium* also shares with *M. latifolium* the leaf shape and the presence of a long anther dorsal appendage, although this is 1.2–2 mm long in the former, *vs.* 2–2.2 mm long in the latter. In addition to the characters in the diagnosis, *M. aurimontium* also differs from *M. latifolium* by its thinner leaves and less robust inflorescence (in part due to the smaller flower and fruit sizes). *Macrocentrum aurimontium* differs from *M. gracile* due to the leaf blades thinly membranaceous, but not translucent (*vs.* translucent in *M. gracile*), broadly ovate to deltoid (*vs.* narrowly ovate to lanceolate), 2–4.6 cm long (*vs.* 6–10 cm long), the apex obtuse to acute (*vs.* narrowly acuminate to shortly caudate), margins denticulate to denticulate-serrulate (*vs.* entire to obscurely denticulate), flowers on short pedicels, 1.4–2.5 mm long (*vs.* 5–10 mm long), stamens with a slender, 1.1–2 mm long, subulate dorsal appendage (*vs.* short, ca. 0.4 mm long and narrowly triangular in *M. gracile*). Additionally, in *M. gracile* the whole plants, leaves and inflorescences are more robust than in *M. aurimontium*; the inflorescences seem to be more branched, sometimes even paniculiform or with three or more paraclades per node in *M. gracile*; the uniparous cymes in the inflorescences of *M. gracile* are also shorter, with fewer flowers (up to 3, *vs.* 6–11 in each scorpioid branch in *M. aurimontium*). It should be noted that the number of specimens for *M. latifolium* and *M. gracile* is also very low, each of them known only from two collections, making some comparisons hard to make. *Macrocentrum latifolium* has been found in central French Guiana: the type, *de Granville 30356* (CAY, P, US) and *Cremers 6591* (CAY, P, US). *Macrocentrum gracile* has been found in Guyana: the type, *Maguire 32117* (K, NY, RB, US) and *Boom 9190* (NY, US).

Up until now six species of *Macrocentrum* have been reported for Brazil, none of them endemic: *M. brevipedicellatum* Wurdack, *M. cristatum* (DC.) Triana, *M. fasciculatum* (DC.) Triana, *M. fruticosum* Gleason, *M. minus* Gleason, and M. *neblinae* Wurdack (see Michelangeli & Goldenberg 2020 for an identification key). Among these, *M. fruticosum* also has isomorphic leaves, 4-merous flowers, triangular sepals with a tooth projecting above it and a long dorsal descending connective appendage. However, it differs from *M. aurimontium* by the erect shrubs (*vs.* reptant herbs), with the leaf abaxial surface with very sparse and caducous trichomes, these less than 1 mm long (*vs.* with sparse to moderate trichomes, these denser towards the margin, persistent, and up to 4 mm long), the leaf margins only obscurely ciliate-serrulate in the distal half (*vs.* obviously ciliate and denticulate throughout), and larger flowers with the hypanthium 3.5–4 mm long and petals ca. 8 mm long (*vs.* hypanthium 1.2–1.7 mm long and petals up to 5.5 mm long). *Macrocentrum cristatum* also have isomorphic leaves and 4-merous flowers, but differs from *M. aurimontium* by the oblate sepals with the teeth not projecting above them (*vs.* triangular to broadly triangular sepals, with teeth projecting 0.2–0.5 mm above them) and larger, up to 7 mm long fruits (*vs.* 2.7–3.5 mm long). *Macrocentrum aurimontium* also superficially resembles *M. fasciculatum* (DC.) Triana, but that species is 5-merous (*vs.* 4-merous in *M. aurimontium*), has short pedicels and the sepals are oblate, with external teeth not projecting above them (*vs.* triangular sepals with external teeth obviously projecting above them), as well as much shorter inflorescences. *Macrocentrum fasciculatum* has been collected in the same locality as *M. aurimontium* (*Pires 1538* at INPA, MG, US; *Pires 1705* at INPA, MG, NY, US).

As stated above, *Macrocentrum* has been found to be polyphyletic, the species sampled to date grouping in three distinct clades (*Macrocentrum* I, II, and III sensu Bacci *et al*. 2019), with *Macrocentrum* I resolved as sister to *Salpinga* (albeit poorly supported). Unfortunately, nor *M. aurimontium* neither the two species we have compared it with have been sampled in molecular analyses. The isomorphic leaves, 4-merous flowers and the glabrous ovary apex are present in some species of both the *Macrocentrum* I and III clades. Adding to this taxonomic problem is the

issue that the type of *Macrocentrum* has not been designated and only one of the taxa that could be designated as lectotype has been sampled to date (*M. fasciculatum*), thus, it cannot yet be ascertained which of the three clades would retain the name if all of them were ultimately resolved as different genera. Therefore, we consider that the best solution at this time is to describe this new species in *Macrocentrum*, and to wait for clarification of the taxonomy and systematics of this poorly collected genus.

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