

Systematics, Morphology and Biogeography

A new species of *Machaerobia* Rübsaamen, 1915 (Diptera, Cecidomyiidae) from Brazil



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ABSTRACT

A new species of *Machaerobia* Rübsaamen, 1915 (Diptera: Cecidomyiidae) from Brazil. *Machaerobia* Rübsaamen, 1915 is a Neotropical genus, until now known from a single species, *M. machaerii* (Kieffer, 1913), described from Brazil (State of Santa Catarina). That species induces spherical leaf galls on *Machaerium* sp. (Fabaceae) and its geographical distribution is still restricted to the type-locality. A new galling species, *Machaerobia gemmae*, associated with *Machaerium macaense* (Fabaceae), is described and illustrated (larva, pupa, male, and female) based on material collected in the Parque Nacional da Serra dos Órgãos (State of Rio de Janeiro, Brazil). The new species is unique for its one or two-segmented palpi, deeply notched aedeagus, pupa with free dorsal abdominal spines, larva with reduced spatula and two apically sclerotized terminal lobes. We synonymize *Anadiplosis* Tavares, 1916 under *Machaerobia* Rübsaamen, 1915. Six wasp species (Hymenoptera) are associated with the galler: *Tanaostigmodes carinatus* La Salle 1987 and *Tanaostigmodes* sp. (Tanaostigmatidae), *Galeopsomyia* sp. (Eulophidae), *Calorylea* sp. (Eurytomidae), and two undetermined species of Eurytomidae.

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Introduction

Machaerobia Rübsaamen, is a Neotropical genus with until now a single species, *M. machaerii* (Kieffer, 1913) described from Brazil (Santa Catarina). It induces spherical leaf galls on *Machaerium* sp. (Fabaceae) and its geographical distribution is still known only from its type-locality.

The tribe Anadiplosini, where *Machaerobia* is included, comprises four other genera, all Neotropical: *Alexomyia* Felt, 1921, *Anadiplosis* Tavares, 1916, *Scopodiplosis* Felt, 1915, and *Ulella* Rübsaamen, 1908. The tribe is characterized by the placement of Rs beyond the midlength of R1, the slightly curved base of M, the short tibiae relative to the femora and tarsi, legs with ventroapical spine on the first tarsomere of each leg, the rudimentary empodia, and the uniquely modified ovipositor that is bulbous basally and tapered beyond. Larvae are distinctive for their caudal lobes, reduced or lost spatula, and reduced papillae. Male antennal flagellomeres have regular, short-looped circumfila and the distal node constricted between the two circumfila whorls. Female flagellomeres are long and constricted near the lower transverse circumfilar ring (Gagné, 1994). Adults of *Machaerobia* and *Anadiplosis* have

simple tarsal claws, two-segmented palpi, and bulbous ovipositor on the basal third, tapered beyond (Gagné, 1994).

Here, we describe a new species of *Machaerobia* based on material (larva, pupa, male and female) collected in the Parque Nacional da Serra dos Órgãos (State of Rio de Janeiro, Southeast Region of Brazil) from spherical, green, hairy, bud galls on *Machaerium macaense* Mendonça, Azevedo and Lima, 2011 (Fabaceae).

Machaerium Pers. is a diverse botanical genus, with about 74 described species in Brazil (Lista de espécies da Flora do Brasil, 2016). It is predominantly Neotropical, and commonly known as “jacarandá”. Its wood is used in civil and rustic constructions, carpentry and mainly as firewood and charcoal. It is also recommended for reforestation, helping in the recovery of degraded areas (Lorenzi, 2002). *Machaerium macaense* is an endemic species in Brazil, recorded only from the State of Rio de Janeiro, in ombrophilous forest (Atlantic Forest) (Lista de espécies da Flora do Brasil, 2016).

The Parque Nacional da Serra dos Órgãos (PARNASO) is situated in the central region of the State of Rio de Janeiro, in the Serra dos Órgãos’ massif and includes the municipalities of Guapimirim, Magé, Petrópolis, and Teresópolis (Fig. 1). The PARNASO comprises about 20,000 hectares of Atlantic Forest at an altitude ranging from 100 up to 2200 m a.s.l. (Radam Brasil, 1983), including the highest peaks of the Serra do Mar (Drummond, 1997). The flora is diverse, with about 2800 plant species. In altitudes of 100–1500 m, the vegetation is classified as montane forest, with trees reaching a height

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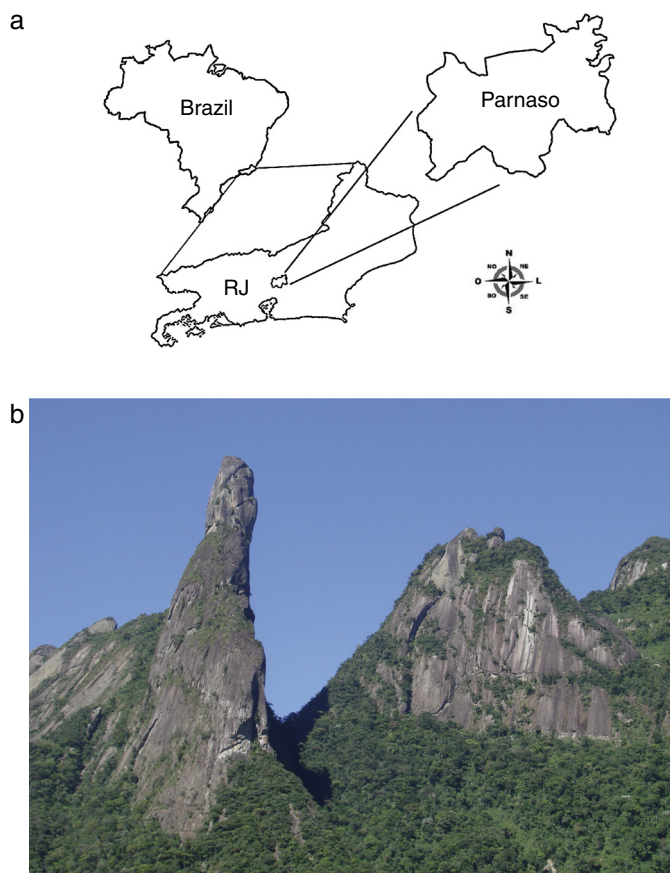


Fig. 1. Parque Nacional da Serra dos Órgãos (PARNASO). 1a. maps of localization; 1b. Panoramic view of the PARNASO.

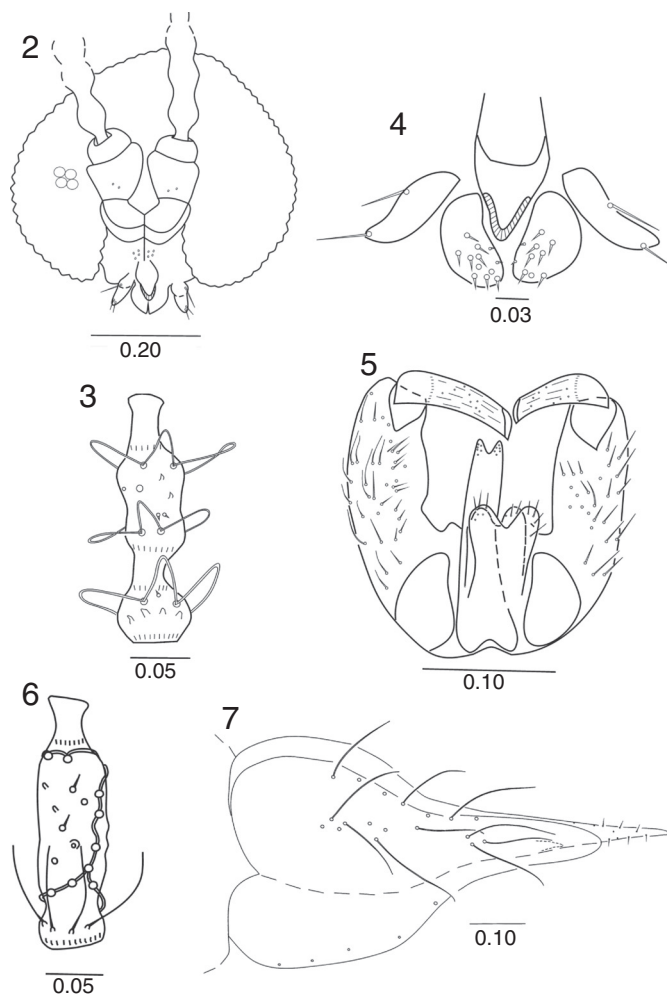
in 40 m. Above 2000 m, there is a predominance of grasses and rock-dwelling species.

Only two cecidomyiid species have been recorded from PARNASO: *Asphondylia moehnei* Skuhřavá, 1989 and *Contarinia ubiquita* Gagné, 2001 (Maia and Barros, 2009). Two other species, *Asphondylia glomerata* Gagné, 2001 and *Mikaniadiplosis annulipes* Gagné, 2001 have been recorded in Teresópolis, but it is unknown if they occur in the PARNASO (Gagné and Jaschhof, 2014).

Material and methods

Galled leaves were collected in September, 2012 and October, 2013 to January, 2014 in PARNASO, Municipality of Teresópolis (S22°25', W42°59') at an altitude of 900 m a.s.l. They were removed from the host plant and transported in plastic bags to the laboratory, where part of the sample was dissected to obtain the galling larvae and part was kept in plastic pots covered by a fine screen to obtain adults and pupal exuviae.

The specimens were first preserved in 70% ethanol and then mounted on microscope slides, following the method outline by Gagné (1994). The gall midge was identified based on the key in Gagné (1994) and on information given by Tavares (1916, 1920). The new species was compared to the descriptions of the known species of *Anadiplosis* and *Machaerobia*. The original drawings are enough to allow the comparison and segregation among them. The most important morphological characters were illustrated using light microscope with camera lucida. Measurements were made using a microscope slide with scale. The terminology of Gagné (1994) was adopted.



Figs. 2–7. *Machaerobia gemmae*, new species. 2. Male head, frontal; 3. male flagellomere 5; 4. male, mouth parts, frontal; 5. male terminalia, dorsal; 6. female flagellomere 5; 7. ovipositor, ventral. Scales in mm.

Type-material is deposited in the Diptera Collection of the Museu Nacional (MNRJ)/Universidade Federal do Rio de Janeiro. The field and laboratory works were done by R.F.M. and V.A.C.W., while the description of the new species was done by V.C.M.

Taxonomy

Machaerobia gemmae Maia, **sp. nov.** (Figs. 2–13)

Diagnosis: Adult: palpus one or two-segmented; tarsal claws simple; male hypoproct and cercus similar in shape; cercus slightly longer than hypoproct, aedeagus deeply notched; gonocoxites with rounded mesobasal lobe, ovipositor bulbous with long, flexible lateral setae, female cerci with some sensorial setae, the tapered cerci with a few short setae. Pupa: antennal horns short, abdominal tergites 6–8 with a row of three or four spines. Larva: spatula with two widely separated teeth and reduced shaft; mamelons absent; terminal segment elongate, tapered to apex, sclerotized apically, without apparent papillae.

Adult description. Male. Body length: 3.20–4.60 mm ($n=3$). Head (Fig. 2): eye facets circular, closely approximated. Antenna: scape about as long as large; pedicel: 0.50–0.55 times wider than long; flagellomeres binodal, distal node constricted at middle, tricuspid, circumfilar, circumfila with loops short and regular in length, neck bare (Fig. 3), flagellomere 12 with a setulose apical process. Frontoclypeus with 08–10 setae ($n=3$). Mouthparts (Fig. 4): palpus

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