Galls on ferns are poorly known in Brazil, where nine morphotypes are recorded on eight plant species, six genera and four families. They are induced by Eriophyidae, Diptera, Lepidoptera, Thysanoptera and Hemiptera (Table I). In this paper, the first record of a gall midge (Cecidomyiidae, Diptera) on ferns in Brazil is presented. The new species induces ovoid stem galls on *Microgramma vacciniifolia* (Langsd. & Fisch.) Copel. (Polypodiaceae), a Neotropical epiphyte and sometimes rupicolous fern that is widely distributed in the sandy coastal plains (restingas) of Rio de Janeiro State. The gall midge belongs to a new genus and species that is described here.

**MATERIAL AND METHODS**

Field work was carried out from June, 2008 to August, 2009 in the restinga of the Environmental Protection Area of Maricá (22°57'50"S e 42°50'44"W), Maricá, Rio de Janeiro State, Brazil. Ovoid galls on *Microgramma vacciniifolia* were collected and transported to the laboratory. Part of the sample was packed in transparent plastic bags with moist cotton and checked daily for adult emergence. The remaining galls were dissected under a stereoscopic microscope to obtain larvae and pupae. All specimens were first preserved in 70% alcohol and later mounted on slides following the methodology of Gagné (1994). The studied material (including the types) are incorporated in the Diptera collection of Museu Nacional (MNRJ), Rio de Janeiro, Brazil. Terminology of the adults follows McAlpine (1981) and that of the immature stages follows Gagné (1989). The description of the new taxa was done by V. C. Maia, and the field and laboratory work were done by M. G. Santos.

**RESULTS**

The gall midge that induces ovoid galls on *Microgramma vacciniifolia* belongs to the supertribe Cecidomyiidi based on the number (n = 12) and shape of the male flagellomeres (binodal), but it does not fit in any known tribe.

**Primadiplosis Maia, gen. nov.**

Diagnosis. Palpus three-segmented; male flagellomeres with two nodes and three separate circumfila, circumfilar loops irregular in length. Wing with R5 joining C beyond wing apex; tarsal claws one-toothed and bowed near basal third; empodia barely reaching beyond bend in tarsal claws. Male terminalia: gonocoxite with mesobasal lobes, gonostylus cylindrical, slightly tapered from base to apex, hypoproct concave apically, conspicuously longer and thinner than cerci. Ovipositor barely protrusible; cerci separate. Larval spatula absent.

Adult. Head: occipital process absent; palpus three-segmented; male flagellomeres binodal and tricircumfilar. Wing: R5 curved, joining C beyond wing apex; Rs absent or barely evident, present only at its junction with R5 and situated be-
A new genus and species of gall midge associated with Microgramma vacciniifolia

Table I. Data on galls on ferns in Brazil.

<table>
<thead>
<tr>
<th>Plant family</th>
<th>Host plant species</th>
<th>Number of morphotypes</th>
<th>Galler</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blechnaceae</td>
<td>Blechnum volubile Kaulf. [= Salpigochaen volubile (Kaulf.) I.Sm.]</td>
<td>1</td>
<td>Eriophyidae</td>
<td>Houard (1933)</td>
</tr>
<tr>
<td>Cyatheaceae</td>
<td>Cyathea sp.</td>
<td>1</td>
<td>Not determined</td>
<td>Maia et al. (2008)</td>
</tr>
<tr>
<td>Hymenophyllaceae</td>
<td>Hymenophyllum ciliatum (Sw.) Sw.</td>
<td>1</td>
<td>Diptera</td>
<td>Houard (1933)</td>
</tr>
<tr>
<td></td>
<td>Hymenophyllum lineare (Sw.) Sw.</td>
<td>2</td>
<td>Diptera</td>
<td>Houard (1933)</td>
</tr>
<tr>
<td></td>
<td>Polypodium crassifolium L. [= Niphidium crassifolium (L.) Lellinger]</td>
<td>1</td>
<td>Coccidae (Hemiptera)</td>
<td>Houard (1933)</td>
</tr>
<tr>
<td></td>
<td>Polypodium sp. (Serpoaulon sp.)</td>
<td>1</td>
<td>Thripsidae (Thysanoptera)</td>
<td>Houard (1933)</td>
</tr>
</tbody>
</table>

Primadiplosis microgrammae Maia, sp. nov.

(Figs. 1–17)

Adult. Length: male: 2.8–4.8 mm (n = 5); female: 4.0–4.5 mm (n = 2). Head (Fig. 1). Eye facets hexagonal, closely approximated. Antennae: scape obconic; pedicel globose; two first flagellomeres connate; male flagellomeres subequal in length, varying from 0.17–0.25 mm, binodal and tricircumfallar, circumfallar loops irregular in length, internodes entirely setulose and necks setulose only basally (Fig. 2); female flagellomeres cylindrical with ring-like circumfila (Fig. 3); 10th to 12th flagellomeres slightly shorter than the preceding ones (10th flagellomere: 0.14–0.15 mm of length; 11th flagellomere: 0.13–0.14 mm; 12th flagellomere: 0.14; 1st to 10th flagellomeres varying from 0.18–0.15 mm); necks setulose only basally (Fig. 3); 12th flagellomere with setulose apical process in both sexes (Figs. 4–5). Frontoclypeus with few long setae. Labrum triangular, long-attenuate, with two pairs of ventral sensory setae. Hypopharynx with anteriorly directed lateral setae. Labella subtriangular, each with lateral setae and two short mesal setae. Palpus: first segment with 0.03–0.04 mm of length; second segment with 0.03–0.05 mm of length; third segment with 0.04–0.06 mm of length.
Thorax. Anepisternum with setae. Wing length (from arculus to apex): male, 2.6–3.7 mm (n = 6); female, 3.3–3.5 mm (n = 2); Rs absent (Fig. 6) or barely evident, present only at its junction with R5 and situated slightly before midlength of R1 (Fig. 7). Tarsal claws one-toothed and bowed near basal third. Empodium barely reaching beyond bend in tarsal claws (Figs. 8–9).

Abdomen. Male (Fig. 10): tergites 1–6 rectangular with caudal setae along entire posterior margin, many setae at midlength, two anterior trichoid sensilla, and elsewhere with scattered scales; tergite 7 rectangular with rows of posterior and midlength setae, two anterior trichoid sensilla, and elsewhere with scattered scales; tergite 8 not sclerotized with only two anterior trichoid sensilla; sternites 2–7 rectangular, with setae posteriorly and at midlength, two anterior trichoid sensilla, and elsewhere with scattered scales; sternite 8 ovoid with scattered setae and scales o posterior two-thirds, and with anterior pair of trichoid sensilla; terminalia (Fig. 11):
gonocoxite wide, 2.3 times as long as wide; mesobasal lobes moderately developed, gonostylus relatively short, 0.5 as long as gonocoxite, 4.5–4.0 times as long as wide, setulose at basal third and ridged elsewhere; cerci rounded at apex; hypoproct slightly bilobed, conspicuously longer and thinner than cerci; aedeagus much longer than hypoproct, tapering to apex. Female (Fig. 12): tergites 1–7 rectangular with caudal setae along entire posterior margin, many setae at midlength, two anterior trichoid sensilla, and elsewhere with scattered scales; tergite 8 not sclerotized with only two anterior trichoid sensilla; sternites 2–7 rectangular, with setae posteriorly and at midlength, two anterior trichoid sensilla, and elsewhere with scattered scales, sternite 8 not sclerotized with only two anterior trichoid sensilla. Ovipositor short, barely protrusible; cerci separate and setose, all setae similar in length; hypoproct as long as wide, with several posterior setae (Fig. 13).

Pupa. Length: 2.8–4.2 mm (n = 6). Head (Fig. 14): apical setae almost inconspicuous with 0.01 mm of length (n = 4); antennal bases rounded apically; lower facial papillae with seta very short (0.005 mm of length, n = 3). Thorax: prothoracic spiracle digitiform (length: 0.10–0.14 mm, n = 5) (Fig. 15). Abdomen: tergites 2–8 uniformly spiculose.

Larva. Length: 3.2–3.3 mm (n = 2); full complement of lateral papillae; terminal segment with four pairs of setose papillae, two shorter than the others (Fig. 16).

Gall (Fig. 17). 4.4–8.8 mm long and 4.1–5.9 mm broad (n = 6); ovoid; green; one-chambered; covered by scattered scales that become imbricate at the apices of the gall, lanceolate, filiform tip, peltately attached, white with a castaneous central point. Number of larva/gall: 01.

Biology. Pupation in the gall.

Type material. Holotype male, BRAZIL, Rio de Janeiro State, Maricá, APA Maricá, VI/2008, M. Guerra Santos col., MNRJ.

Paratypes: same data as holotype, 1 male and 1 pupal exuvia; same locality and collector, 16.VII.2008, 1male, 1
female and 2 pupal exuviae; 15.VIII.2008, 1 male; 17.VIII.
2008, 1 male and 1 pupal exuvia; VIII.2009, 2 larvae; I.2009,
1 male, 1 female and 2 pupal exuviae; MNRJ.

Etymology. The name *microgrammae* is the genitive of
the host plant genus.

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**REFERENCES**

Description and life history of an unusual fern-feeding tortricid moth
(Lepidoptera: Tortricidae) from Brazil. *Annals of the Entomological
Society of America* 97: 865–871.


Gagné, R.J. 1994. *The gall midges of the Neotropical region.* Ithaca,
Cornell University Press. 352 p.


Houard, C. 1933. *Les Zoocécidies des Plantes de L'Amérique du Sud et

entomogenous stem galls of *Microgramma squamulosa* (Kauf.) Sota

terização de galhas de insetos em áreas de restinga de Bertioga (São

McAlpine; B.V. Peterson; G.E. Shewell; H. J.Teskey; J.R. Vockeroth &
27, Ottawa, Research Branch, Agriculture Canada, 674 p.

(Diptera:Muscidae) a gall maker on *Pteridium aquilinum* Kunh. (Pterido-