

New record of *Youngomyia pouteriae* Maia, 2001 (Diptera, Cecidomyiidae) in *Pouteria caimito* (Ruiz & Pav.) Radlk. (Sapotaceae) in the Peruvian Amazon

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Abstract. We report for the first time cylindrical galls of *Youngomyia pouteriae* Maia, 2001 (Diptera, Cecidomyiidae) on *Pouteria caimito* (Ruiz & Pav.) Radlk. (Sapotaceae) in Peru. *Youngomyia pouteriae* were exclusively found in the Atlantic Forest biome, in restinga areas of Rio de Janeiro state, Brazil. In this study, the geographic distribution of this galling species is extended to the western Amazon lowland rainforest in Peru.

Key words. Gall, gall midge, Iquitos, Lopesinii, rainforest

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INTRODUCTION

Youngomyia Felt, 1908 (Diptera, Cecidomyiidae) is a genus within the tribe Lopesinii, found in the Nearctic, Oriental, and Neotropical regions (Gagné and Jaschhof 2021). So far, seven species have been identified, four of which are found in the Neotropics: *Y. cinctipes* (Felt, 1915); *Y. knabi* (Felt, 1912); *Y. pouteriae* (Maia, 2001a); and *Y. matogrossensis* (Proença & Maia, 2019). While most species live asinquilines, they can also induce galls (Gagné and Jaschhof 2021). Of these, only two species, *Y. pouteriae* and *Y. matogrossensis*, are known to induce galls on the leaves of *Pouteria* Aubl. (Sapotaceae).

Pouteria caimito (Ruiz & Pav.) Radlk. is a medium-sized tree found across a wide range of habitats, from Costa Rica through northern and northwestern tropical America to central Amazonia, as well as in coastal Brazil, from Pernambuco to Rio de Janeiro (Pennington 1990). In coastal Brazil, it is also found in beach forests (restingas) (Fabris and Peixoto 2013) within the Atlantic Forest biome. The species occurs from sea level to 1500 m in altitude, occasionally reaching elevations of up to 1800 m (Pennington 1990).

In this study, we identify and report the occurrence of *Youngomyia pouteriae* for the first time in Peru, contributing to the knowledge of its geographic distribution.

METHODS

We investigated *Pouteria caimito* individuals at the “Centro de Investigación Fernando Alcántara Bocanegra” (CIFAB) of the “Instituto de Investigaciones de la Amazonía Peruana” (IIAP) (Figure 1A), located at km 4.5 in the department of Loreto, Peru (03°49'02.35"S, 073°19'14.43"W). Galled branches of host plant were photographed, collected and transported to the Natural Products Chemistry Laboratory. Some samples were dissected using a stylet to obtain the immature insects (larvae and pupae), while others were placed in a closed transparent plastic pot with moistened paper at the bottom until adult emergence. All insects were preserved in 70% alcohol.

The specimens were later mounted on slides for microscopy, following the methodology outlined in Gagné (1994). We then used Gagné's (1994) keys to identify the gall midge genus. As there is no key to segregate the Neotropical species of *Youngomyia*, we used the original descriptions to compare morphologically our specimens to the known species. All voucher material was deposited in the collection of Instituto de Investigaciones de la Amazonía Peruana (IIAP).



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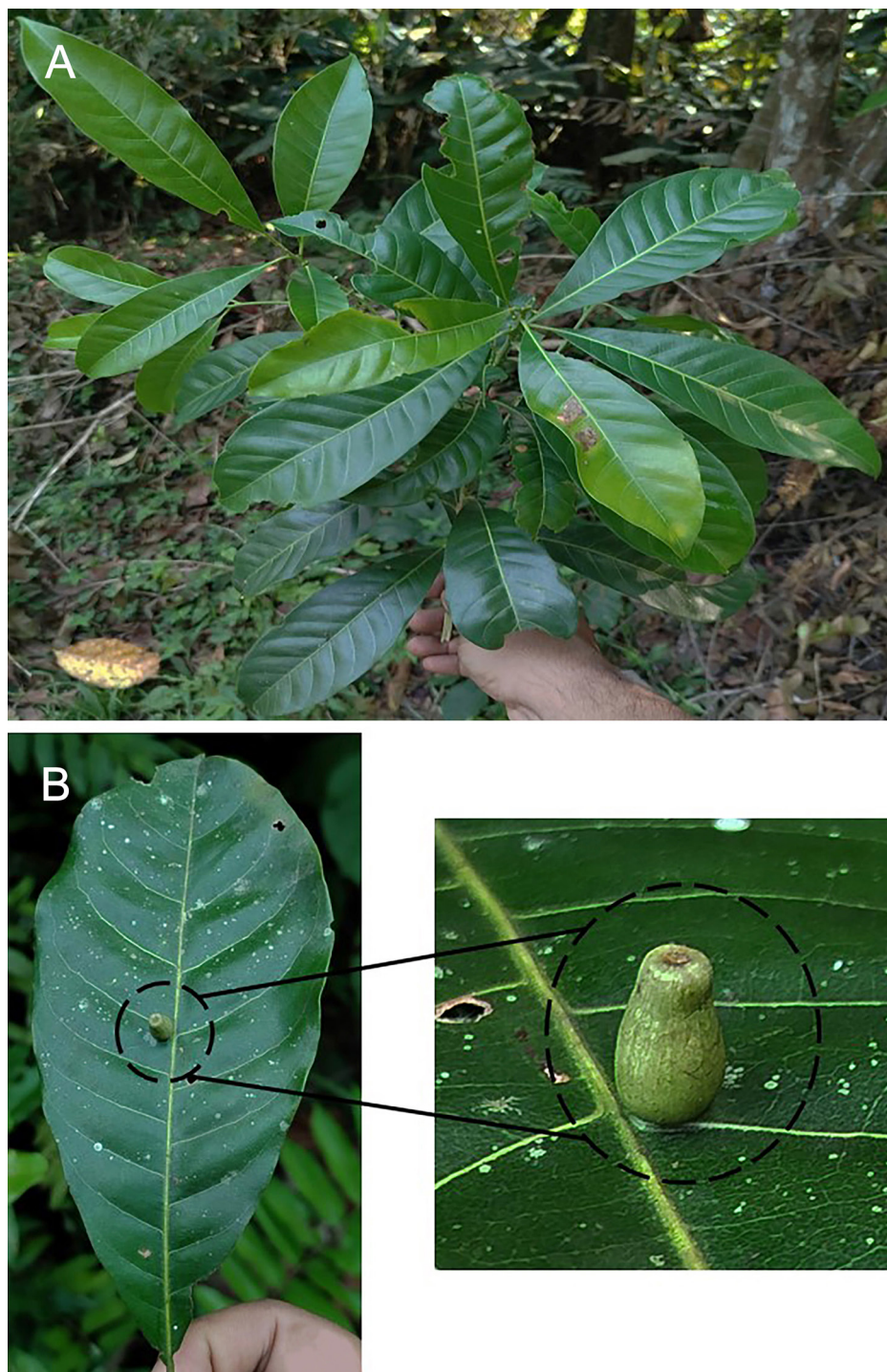


Figure 1. A. *Pouteria caimito* (Ruiz & Pav.) Radlk. (Sapotaceae) in the Centro de Investigación Fernando Alcantara Bocanegra of the Instituto de Investigaciones de la Amazonía Peruana (Peru). **B.** Gall induced by *Youngomyia pouteriae* Maia, 2001 (Diptera, Cecidomyiidae) on leaves of *Pouteria caimito* (Ruiz & Pav.) Radlk. (Sapotaceae).

RESULTS

The galls of *Youngomyia pouteriae* are cylindrical, green, one-chambered, and glabrous, except for the presence of trichomes at the apex (Figure 1B). These galls can be found on both young and mature leaves, occurring at the same time the adaxial and abaxial surfaces, but are more abundant on the abaxial surface. Additionally, parasitoids from the family Scelionidae, identified as *Trissolcus* sp., were found.

Material examined. PERU – IQUITOS • Centro de Investigación Fernando Alcántara Bocanegra (CIFAB) of the Instituto de Investigaciones de la Amazonía Peruana (IIAP); 03°49'02.9"S, 073°19'16.9"W; 110 m alt.; 28.III.2022; J. Grandez leg; 2 ♂ CRBIIAP-A-01604, CRBIIAP-A-01605; 3 ♀ CRBIIAP-A-01606, CRBIIAP-A-01607, CRBIIAP-A-01608; 3 pupae, 1 slide, CRBIIAP-A-01609; 5 pupal exuviae, 1 slide, CRBIIAP-A-01610; 5 larvae of 3rd instar, 1 slide, CRBIIAP-A-01611.

BRAZIL – RIO DE JANEIRO • Maricá; 22°54'00"S, 042°53'23"W; 412 m alt.; 15.VIII.2000; Maia & Azevedo leg.; 1 ♂ MNRJ-ENT1-67749 (paratype); 1 ♀ MNRJ-ENT1-67751 (paratype); 1 pupa MNRJ-ENT1- 67753 (paratype); 06.XII.1997; V. Maia leg.; 4 larvae MNRJ-ENT1-67744 (paratypes).

Identification. *Youngomyia pouteriae* can be recognized by the following morphological characters: 1) adults: with flagellomeres 1–2 connated and neck of the flagellomeres setulose; wing with Rs bent at its juncture with R5; tarsal claws sclerotized and two-toothed. 2) male: gonostylus smaller than gonocoxite, with strongly pronounced striae, delimiting elongated cells, each one with a bristle at its base; separated cerci, setose in all length, with six pairs of longer setae at the apex; aedeagus elongated and claviform. 3) female: tergites rectangular with an irregular row of setae at distal margin and two trichoid sensilla; sternites rectangular with a row of setae at distal margin; ovipositor barely protrusible and cerci oval. 4) pupa: antennal bases short, triangular; cephalic seta short; two pairs of lower facial papillae, one setose and one asetose; prothoracic spiracle long, triangular, strongly sclerotized, and slightly serrated at the margin; abdominal segments 2–8 sclerotized dorso-anteriorly, sclerotized area contiguous with spines. 5) larva: prothoracic spatula with four-toothed (inner teeth longer than outer ones, inner teeth not close); two pairs of setose lateral papillae on each side of spatula; sternal and ventral papillae asetose; terminal segment rounded, with four pairs of papillae, three setose and one asetose.

DISCUSSION

Youngomyia pouteriae was previously known only from the restingas of Rio de Janeiro, specifically from Barra de Maricá and Itaipuaçu, both in the municipality of Maricá, as well as from Arraial do Cabo, Brazil (Maia 2001b; Rodrigues et al. 2014). In Peru, this species occurs in the western Amazon lowland rainforest (new record), extending its geographic distribution approximately 3,000 km to the west (Figure 2). This new record highlights the ecological plasticity of this species, suggesting its ability to thrive in distinctly different environments.

Other insects, such as *Trotteria quadridentata*, an inquiline in galls induced by *Y. pouteriae*, have been reported on *Pouteria caimito* in Atlantic Forest (restinga) within a protected area of Maricá municipality, known as APA de Maricá (Maia 2001a). However, we did not find this inquiline in our study area. This genus, which comprises 23 species, occurs in the Holarctic, Neotropical, and Afrotropical regions. Most *Trotteria*

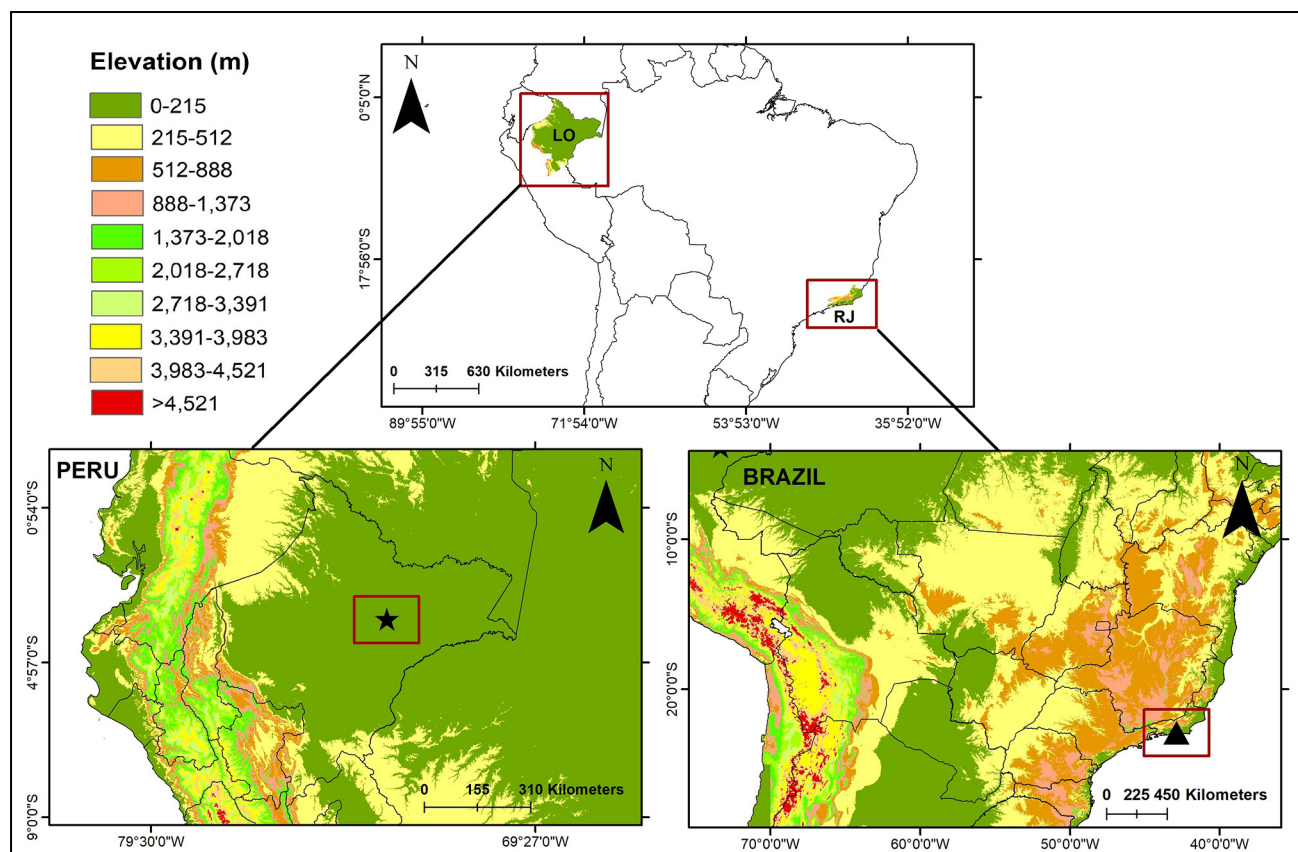


Figure 2. Geographic distribution of *Youngomyia pouteriae* Maia, 2001 (Diptera, Cecidomyiidae) in western Amazon lowland rainforest, Peru-Loreto (LO) and in the restingas of Rio de Janeiro (RJ), Brazil. ▲ = previous record; ★ = new record.

species are inquilines that develop in galls induced by other gall midges, primarily those belonging to the tribe Asphondyliini (Gagné and Jaschhof 2021).

Various parasitoids, including *Xanthobium* sp. (Eulophidae), Eupelmidae, Platygasteridae, and *Torymoides sulcius* (Walker, 1839) (Torymidae) have been recorded on *Y. pouteriae* in the restingas of Rio de Janeiro, Brazil (Araújo and Maia 2021). These findings highlight the diverse parasitoid community associated with this gall midge. In contrast, our research in the Peruvian Amazon revealed that only *Trissolcus* sp. (Scelionidae) was observed as a parasitoid of *Y. pouteriae*. This discrepancy suggests regional differences in parasitoid assemblages and underscores the need for further investigation into the parasitoid communities of *Y. pouteriae* in different geographic locations.

Maia (2001a) described *Y. pouteriae* on *P. caimito* var. *laurifolia* (Gomes) Baehni, which is now synonymous with and included within *P. caimito*. According to Pennington (1990), this species has a small-leaved form that predominates in the southeastern Brazilian beach forests (restinga), but it also occurs in many other parts of its range, occupying a variety of habitats from montane Peru to lowland Amazonian Brazil. This species likely has more distribution points between the two records documented here, highlighting a gap in knowledge about the occurrence of gall midges in Neotropical ecosystems. Thus, our study emphasizes the importance of conducting inventories of galls and gall midges to better characterize the Neotropical fauna.

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ADDITIONAL INFORMATION

Conflict of interest

The authors declare that no competing interests exist

Ethical statement

No ethical statement is reported.

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Author contributions

Conceptualization: JMGR, WSA, VCM. Data curation: JMGR, VCM. Formal analysis: JMGR, WSA, VCM. Visualization: JMGR, WSA, VCM. Writing – original draft: JMGR, WSA, VCM. Writing – review and editing: JMGR, WSA, VCM.

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Data availability

All data that support the findings of this study are available in the main text

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