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Pachamama, an uncommon and distinctive new genus of Trichogrammatidae (Hymenoptera: Chalcidoidea) from tropical America

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Abstract

The new genus *Pachamama* Owen and Pinto is described from Central and South America. The genus is represented by one new species, *P. speciosa*. Hosts are unknown.

Key words: new genus, new species, New World tropics, *Pachamama*, parasitoid, species description, taxonomy

Introduction

Likely due to their small size and fragile nature, Trichogrammatidae (Hymenoptera: Chalcidoidea) remain inadequately sampled throughout the world and it is clear that we currently know but a small fraction of the true diversity of the family. Recent collections from around the world highlight our lack of understanding as most material cannot be identified to species, and many individuals cannot confidently be ascribed to recognized genera. In this paper, *Pachamama*, a new genus of Trichogrammatidae is described, with a single new species, *P. speciosa* (Fig. 1). Male genitalia place *Pachamama* in the tribe Trichogrammatini according to the classification of Viggiani (1971). This genus is uncommonly collected, and is known from only seven specimens, collected in Honduras, Costa Rica, and Ecuador. Its hosts remain undiscovered.

Terminology and Methods

All measurements for length and width represent maximum dimensions. Measurements

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were primarily taken using slide-mounted specimens, except for body length which was measured from a card-mounted individual. Most descriptive anatomical terms follow Doutt and Viggiani (1968). Terms and acronyms associated with antennal sensilla and setation are derived from those used for *Trichogramma* by Vincent and Goodpasture (1986) [=V/G], Olson and Andow (1993) [=O/A], and Pinto (1999) [=P]. These are as follows: APB = aporous sensillar trichodea B (socketed) [O/A]; PLS = placoid sensilla [P]; BPS = basiconic peg sensilla [P]; FS = flagelliform setae (unsocketed) [V/G, P] (also known as multiporous sensilla trichodea A [O/A]); UPP = uniporous pit pore sensilla trichodea D [O/A]; APA = aporous setae A [O/A] (also known as unsocketed setae [P]). Acronyms for forewing venation are as follows: SC = subcostal vein; PM = premarginal vein; MV = marginal vein; SV = stigmal vein. Segments of the antennal club or clava = C. Acronyms for deposition of type and other material examined are as follows: NMNH = National Museum of Natural History, Washington, D. C.; UCRC = University of California, Riverside Research Collection, Riverside, CA.

Pachamama Owen and Pinto, new genus

Type species. *Pachamama speciosa* Owen and Pinto, herein designated.

Diagnosis. The structure of the antenna and wings distinguishes this genus. Antenna without a funicle, club 3-segmented; C3 elongate, much longer than C1 and C2 combined; scape sexually dimorphic, enormously inflated in male (Fig. 4), unmodified in female (Figs. 5, 7). Forewing (Fig. 2) broad, with all veins confluent and sigmoid in arrangement, without a radial process; disk fumate except at apex, sparsely setose, RS1 absent; posterior margin with a distinct preretinacular lobe. Hind wing (Fig. 3) broad, subtriangular in shape, its anterior margin broadly V-shaped basal to hamuli. Male genitalia (Fig. 6) with aedeagus and genital capsule distinct, the latter bearing parameres and volsellae.

Etymology. Pachamama: Quechuan for mother earth, and the Incan earth god.

Description. Body (Fig. 1) compact, gibbose. Eyes red. Head broad, greatest width exceeding that of mesosoma; with a smooth plate on vertex; lateral ocelli adjacent to compound eyes; malar sulcus absent. Antenna sexually dimorphic; scape of male greatly enlarged, that of female unmodified; flagellum with two anelli and three club segments; C1 and C2 short, transverse; C3 elongate, subconical, much longer than C1 and C2 combined. Mandible (Fig. 8) with two acute and heavily sclerotized teeth posteriorly and a lanceolate, socketed, more lightly sclerotized tooth anteriorly, ental surface between anterior and posterior teeth subcrenate. Maxillary palp (Fig. 9) 1-segmented. Labial palp short but distinct, with two relatively long setae at apex. Midlobe of mesoscutum and scutellum each with two pair of setae. Forewing broad, widest near apex; posterior margin lobed immediately basal to retinaculum; disk fumate except at apex, with relatively sparse setation; RS1 and basal vein tracks absent; patch of foliate obovate sensilla on ventral surface

anterior to retinaculum; venation sigmoid, with SC, PM, MV, & SV all confluent; radial process absent; PM with two setae and a single campaniform sensillum at apex; PM curving precipitously up to wing margin and, with SC, delimiting a large costal cell; MV elongate; SV not constricted at base, relatively straight, diverging only slightly from margin of wing. Hind wing broad and subtriangular, with widest point at hamuli; anterior margin broadly V-shaped in basal half. Male genitalia as in Trichogrammatini (Viggiani 1971, 1984); aedeagus separate from genital capsule; genital capsule presumably open dorsally; parameres and volsellae present, intervolsellar process absent.

FIGURE 1. *Pachamama speciosa*, habitus (♀ from Ecuador: Napo: Reserva Etnica Waorani).

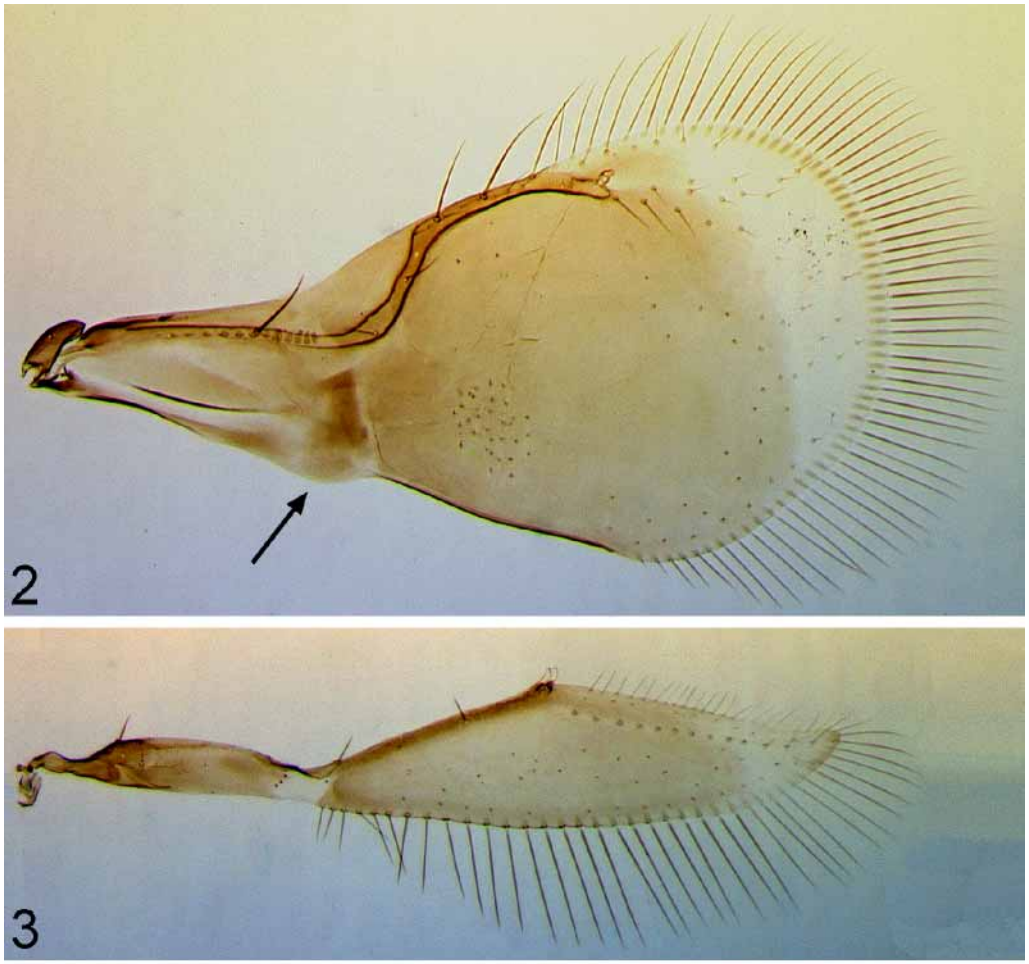
***Pachamama speciosa* Owen & Pinto, new species**

Type. Holotype ♂: ECUADOR. *Napo*: Tiputini Biodiversity Sta.; nr. Yasuni National Park; 220–250m; 00°37'55"S, 76°08'39"W; Lot # 1940; fogging terre firme forest; 26.x.1998; T. Erwin et al. Deposited in USNM.

Etymology. speciosus: Latin for beautiful, handsome, imposing.

Description. Body length 0.6mm (N=1; measurement of single card-mounted female); color golden-brown, with distinctly darker mesonotum; legs colored similarly to body, tending to be darker towards base; head light brown, with or without a near-white band immediately below eye; antennal scape and pedicel transversely banded with off-

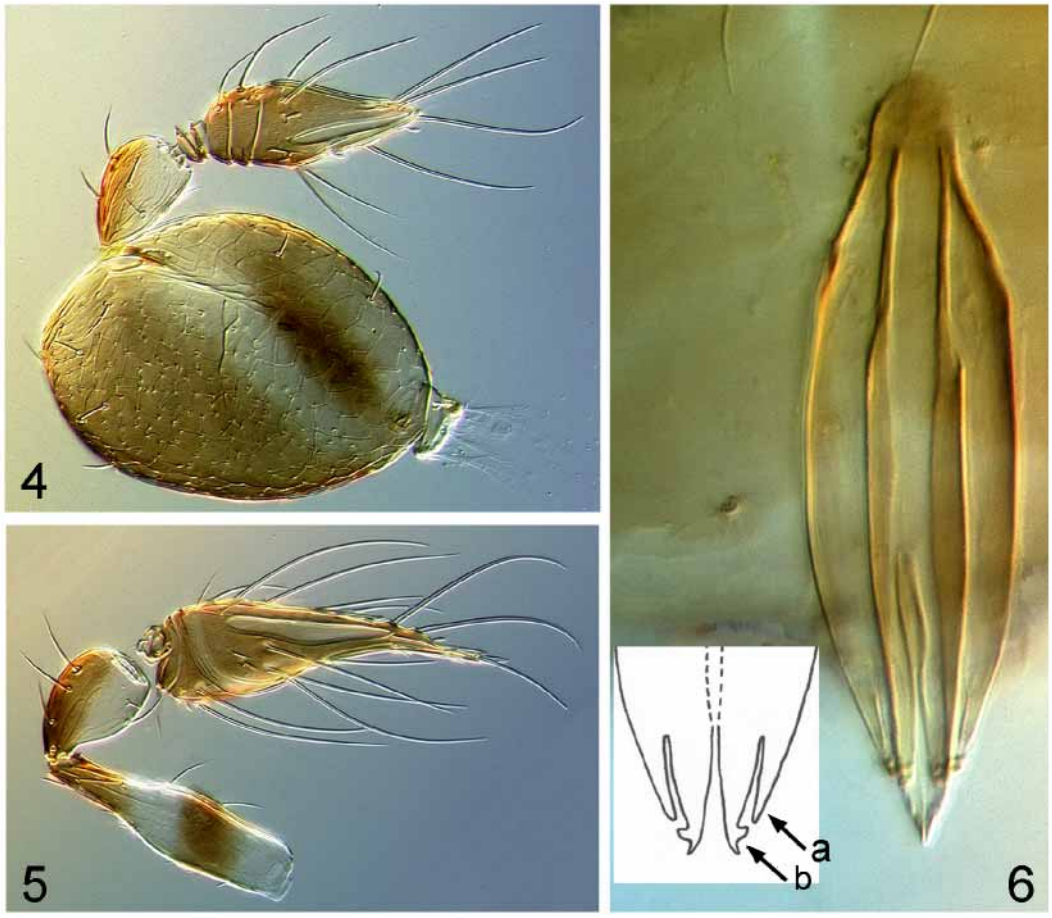
white and varying shades of brown; club uniformly brown; forewing fumate except apical tenth. Antenna with BPS elongate (Fig. 7), ca. 5 x as long as wide, slightly bulbous apically. Maxillary palp (Fig. 9) with a well-developed apical seta and a smaller medial seta; apical peg-like sensillum absent. Forewing ca. 1.8 x as long as wide; setation sparse, restricted to apical .35 of wing; only R, RS2 and r-m setal tracks discernible; setation posterior to r-m not clearly arranged in tracks; fringe elongate, with longest setae on anteroapical margin of wing, ca. 0.3 greatest wing width; venation elongate, extending ca. 0.7 x wing length; MV with 2-3 elongate setae arising from anterodorsal margin; costal cell lacking setae. Hind wing ca. 5 x as long as wide; disk with two complete setal tracks closely spaced in the anterior 1/3 and a 3rd complete setal track in the posterior ¼, setae between 2nd and 3rd tracks scattered, not linearly arranged; fringe stout and elongate, with maximum length along posterior edge, and extending 0.9 hind wing width.



FIGURES 2–3. *Pachamama speciosa*, wings. 2, Forewing (arrow to preretinacular lobe). 3, hind wing.

Male (N = 3, except for antennal characteristics N=2)

Antenna with scape extremely enlarged, suboval, ca. 1.5 x as long as wide, subequal to length of remainder of antenna; club conical and symmetrical; relative length of scape: pedicel: club = 3:1:2; C3 2–3 x as long as C1 and C2 combined. C1 with 1 APB and 0–1 BPS; C2 with 1 APB, 0–2 APA, and 2 BPS; C3 with 3 APB in basal half, 1–2 APA, 3 BPS, 4–5 FS, and 3 PLS parallel to longitudinal axis of segment. Forewing with relative length of PM: MV: SV = 4:5:1. Genital capsule widest at middle, sides tapering gradually to apex, and more abruptly and unevenly to base; genital capsule and aedeagus including apodemes subequal, together ca. 0.6–0.7 x hind tibial length; apodemes ca. 0.2 x genitalia length and restricted to basal 1/3 of capsule.

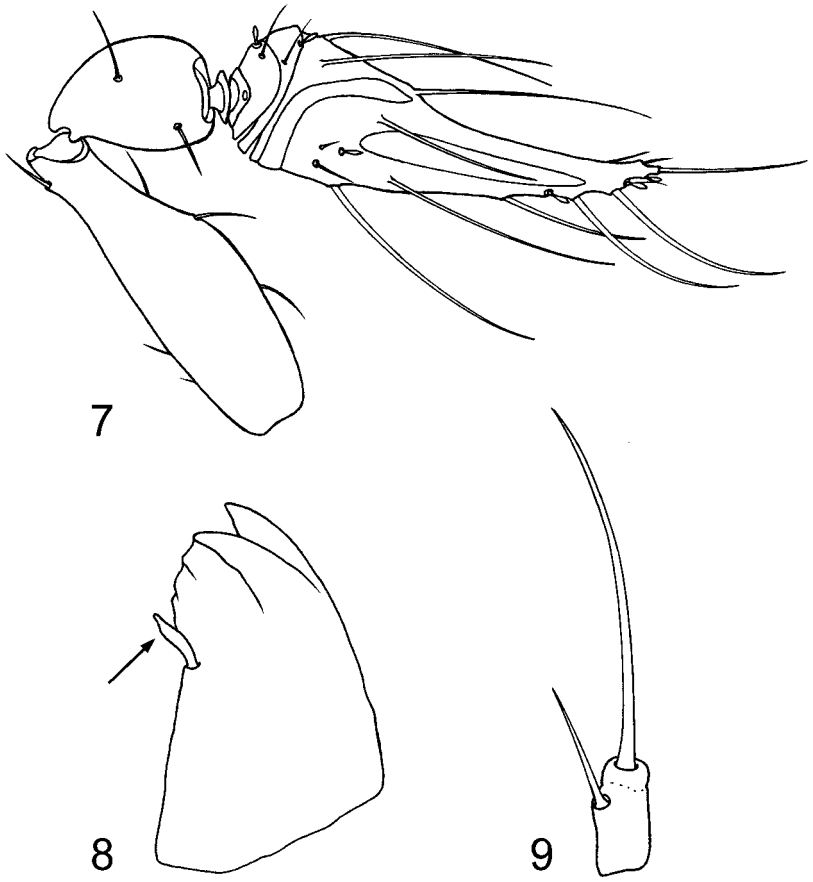


FIGURES 4–6. *Pachamama speciosa*. 4, ♂ antenna. 5, ♀ antenna. 6, male genitalia [detail of apex of genital capsule at left; arrows to paramere (a) and volsellar spines (b)].

Female (N= 3)

Antennal scape unmodified, elongate, ca. 3 x as long as wide; club apically attenuate and slightly asymmetrical, tapering evenly on dorsal surface and more abruptly so on ven-

tral surface; with more sensilla than male; relative length of scape: pedicel: club = 2:1:3; C3 7-8 x as long as C1 + C2 combined. C1 with 1 APB and 0-1 BPS; C2 with 1 APB, 0-2 APA, and 2 BPS; C3 with 2-3 APB near base and 2-4 short APB near apex, 0-1 APA, 3-4 BPS, 10-13 FS, 1 elongate and setiform UPP at apex, 5 PLS including 1 PLS transverse at base of segment, but curving longitudinally in apical half, and 1 PLS on dorsal surface extending beyond apex. Forewing with relative length of PM: MV: SV = 2:2:1. Ovipositor ca. 0.6 x length of hind tibia.



FIGURES 7–9. *Pachamama speciosa*. 7, ♀ antenna (medial). 8, mandible showing two strong posterior teeth, and socketed anterior tooth (at arrow). 9, maxillary palp.

Geographic distribution. Costa Rica, Ecuador, and Honduras.

Material examined. 4♀ (1 on card), 3♂. COSTA RICA. *Puntarenas*: R. F. Golfo Dulce; 24km. west of Piedras Blancas; 200m; ii.1992; 1♀; P. Hanson [UCRC]. ECUADOR. *Napo*: Reserva Etnica Waorani; 1km S. Onkone Gare Camp; 220m; 00°39’10”S, 76°26’00”W; 3.vii.1995; fogging terre firme forest; Lot # 1091; 1♀; T. Erwin et al.

[NMNH]; As previous except collected 21.vi.1994 and Lot# 697; 1♀ (card mounted) [UCRC]. *Napo*: Tiputini Biodiversity Sta. 1♂ (See type) [NMNH]; 1♂, same data as holotype (missing antennae) [NMNH]; 1♂, same data as holotype except collected 5.vii.1998 and Lot # 1889 [UCRC]. HONDURAS. *Olancho*: La Muralla National Park; ~1480m; 15°05'49"N, 86°44'17"W; 4–7.vii.2002; 1 ♀; D. Yanega [UCRC].

Remarks. Specimens are deposited as indicated above in brackets. The specimen from La Muralla National Park, Honduras, is a primary molecular voucher (D# 776; GenBank accession number AY623495 for 28S D2 & D3; Owen et al. in prep.). It is represented on a slide by an individual forewing, hind wing, and antenna.

Discussion

Pachamama is one of the most conspicuous, yet uncommon, trichogrammatids found in the Neotropics. Its paucity in collections could be attributable either to true rarity or association with an inadequately sampled habitat or season. It is not likely due to a general lack of sampling since numerous collections are now available from the Neotropics and many trichogrammatid taxa are well represented.

Pachamama is clearly differentiated from other trichogrammatid genera. However, considering the strong sexual dimorphism and the few specimens available, conspecificity of the material studied cannot be tacitly assumed. For this reason we have restricted the type material to a single male.

Pachamama is tentatively placed in the subfamily Trichogrammatinae and the tribe Trichogrammatini as defined by Viggiani (1971, 1984), based on male genitalia. The few other genera in the Trichogrammatini that share the compact and robust habitus of *Pachamama* include *Ceratogramma*, *Poropoea*, and *Haeckeliania*. Antennal structure immediately distinguishes these three genera from *Pachamama*, as *Ceratogramma* and *Poropoea* have a funicle, whereas *Haeckeliania* lacks a funicle, but has a 5-segmented club. Additionally, *Ceratogramma* and *Haeckeliania* lack the strongly sigmoid forewing venation found in *Pachamama*. Although the forewing venation of *Pachamama* and *Poropoea* can both be called sigmoid, the structure is quite different. The greatest curvature of the venation in *Pachamama* is in the base of the wing (Fig. 2) and is attributable to the SC, PM, and MV; the SV is relatively short and straight and deviates little from the wing margin. In contrast, in *Poropoea* the greatest curvature of the venation is apical due to the strong deviation of the SV from the wing margin (see Doutt and Viggiani 1968, Fig. 23). *Pachamama* can also be distinguished from the aforementioned genera by the presence of a preretinacular lobe in the forewing and the subtriangular hind wing (Fig. 3). This genus is even less likely to be confused with other genera if males are present, due to its dramatically enlarged antennal scape (Fig. 4).

Although the forewing venation and overall structure found in *Pachamama* is unique among described Trichogrammatidae, we are aware of two undescribed species from

Madagascar which are comparable. One is known only from two females and its overall habitus and forewing are superficially similar to *P. speciosa*. However, its antenna has a two-segmented funicle and a three-segmented club and the forewing lacks a preretinacular lobe. The second species, known from a small series of males and females, also resembles *Pachamama* in habitus and forewings but has several important differences of its own. Unlike *Pachamama*, in this species the PM and MV are disjunct, the scape is somewhat expanded but equally so in both sexes, the maxillary palp is two segmented, the forewing disk is highly setose, and although the antenna lacks a funicle, the club is five segmented. The male genitalia of this species also place it in the Trichogrammatini, but apically bifid parameres and an elongate intervolsellar process distinguish it from *Pachamama*. It is likely that both species represent distinct genera, but we refrain from further description until more material can be collected and examined.

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