

A new species of *Grotea* Cresson, the first record of Labeninae (Hymenoptera, Ichneumonidae) in the Greater Antilles

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Abstract

Grotea ambarosa **sp. nov.** is described, illustrated and compared to currently described species of the genus. The new species is characterized mainly by having the mesosoma 2.9× as long as high; genal projection distinct and apically subquadrate; pleural carina distinct only anteriorly to anterior transverse carina; mesosoma almost entirely amber-orange and legs with complex dark brown and white marks. This is the first record of any labenine species for the Greater Antilles; the few distribution records elsewhere in the Caribbean Islands are reviewed and discussed in the context of the biogeography of Labeninae.

Keywords

Caribbean Islands, biogeography, Darwin wasp, ichneumonid

Introduction

Labeninae are a relatively small subfamily of ichneumonid wasps, currently with 12 genera and 163 extant species (Yu et al. 2016 and additions in Herrera-Florez 2018 and Herrera-Florez and Penteado-Dias 2019). Genera within Labeninae exhibit a diverse range of morphologies but share the following putative synapomorphies: an

apically truncated vein Sc in the hind wing; a uniformly weakly sclerotized proctodeal membrane; the ventral valve of the ovipositor enclosing the dorsal valve; and a basally lobate ovipositor sheath (Gauld 2000). In addition, species of Labeninae have a distinct areolet on the front wing, cylindrical flagellum, simple tarsal claws, slender hind coxa, and first tergite and sternite usually fused (Townes 1969; Gauld 1991). The subfamily historically has been known to have a mainly “Gondwanan” distribution: almost all species occur in the Australasian and Neotropical regions, with a few species of *Labena* and *Grotea* found in the Nearctic region (Gauld and Wahl 2000).

Grotea Cresson is a moderately diverse genus of labenines characterized by the rather elongate and slender body; clypeus with apical margin distinctly concave; lower part of gena usually strongly raised into a lamella or process; hind wing with about 6–8 basal hamuli on vein C; and sternite 1 extending far past the level of spiracle of tergite 1 (Gauld 2000). Species of *Grotea* are cleptoparasitoids of bees that build nests in hollow twigs, including species of *Ceratina* Latreille, *Megachile* Latreille, *Chilicola* Spinola, and *Manuelia* Vachal (Daly et al. 1967; Packer 2004; Gonzalez and Giraldo 2009). The adult female oviposits through the wall of the twig into the cell, and after eclosing the wasp larva consumes both the bee larva and its pollen reserves, sometimes going through the contents of multiple cells.

The genus currently includes 26 species broadly distributed in the New World, from Canada to southern Chile (Slobodchikoff 1970; Gauld 2000; Herrera-Florez 2014; Herrera-Florez and Pentead-Dias 2019). However, there are no records for the genus, and in fact for any species of Labeninae, from the Greater Antilles. Herein we describe a new species of *Grotea* from the Dominican Republic, providing the first record of the subfamily for this region.

Material and methods

The type series is deposited in the Utah State University Insect Collection (USUC); comparative material for other species of *Grotea* was obtained from USUC as well as the American Museum of Natural History (AMNH); *Instituto Nacional de Pesquisas da Amazônia* (INPA) and the National Museum of Natural History (USNM).

Morphological terminology follows Broad et al. (2018). Proportions of the mesosoma (length vs. height) were calculated by measuring length from the point at which the pronotum meets the cervical shield to the posterior basal angle of the metapleuron (i.e. “Weber’s length”, Weber 1938) against the distance from the midcoxal attachment to the dorsal apex of the scutellum (Fig. 1). Leg surfaces were interpreted as in Aguiar and Gibson (2010). When potentially ambiguous, color names are followed by their respective RGB formula, as determined from digital pictures of the studied specimens, according to procedures described by Aguiar (2005).

Specimens were examined using a Leica Wild Stereo/Dissecting M10 microscope. Images were prepared using a modified version of the EntoVision suite (GTVision, Hagerstown, Maryland), including a Leica Z16 zoom lens attached

to a digital video camera that feeds image data to a desktop computer, with a custom fabricated illumination dome (RK Science Factory, Vitória, Brazil). Stacks of photos were combined in a single image using Zerene Stacker (Zerene Systems, Richland, WA, USA).

Results

Grotea Cresson, 1864

Figs 1–6

Grotea Cresson, 1864:397. Type-species: *Grotea anguina* Cresson (ANSP), by monotypy. *Macrogrotea* Brèthes, 1916:84. Type-species: *Pimpla gayi* Spinola *sensu* Brèthes [= *Grotea superba* Schmiedeknecht], by original designation.

Echthropsis Brèthes, 1916:86. Type-species: *Echthropsis porter* Brèthes [= *Pimpla gayi* Spinola], by original designation.

Labenidea Rohwer, 1920:413. Type species: *Grotea superba* Schmiedeknecht, by original designation.

Diagnosis. Body slender and elongate, mesosoma in lateral view 2.1–2.9× as long as high. Clypeus with apical margin distinctly concave, exposing labrum; gena close to junction of occipital and hypostomal carinae usually raised into a lobe; hind wing with 6–8 basal hamuli on vein C; metasomal insertion above but close to coxal insertions; sternite 1 extending far past the level of spiracle of tergite 1.

Grotea ambarosa sp. nov.

<http://zoobank.org/93FBADC2-EC6D-47F1-B1EF-8ACCD548DD92>

Material Examined. Holotype: DOMINICAN REPUBLIC • ♀; Duarte, 20 km NE San Francisco de Macoris, Loma Quita Espuela; 300 m; VII.1991; L. Masner (USUC). Pinned; left apical tip of antenna missing, otherwise in good condition.

Paratypes: DOMINICAN REPUBLIC • 1 ♀ 1 ♂, same data as holotype (USUC).

Diagnosis. Mesosoma 2.9× as long as high, polished and almost entirely impunctate; genal projection distinct and apically subquadrate; pleural carina distinct only in front of transverse carina; mesosoma almost entirely amber-orange, legs with complex dark brown and white marks.

Description. Forewing 7.7 mm long. **Head.** Head in dorsal view with gena rounded behind eye, occiput lightly pubescent. Posterior ocellus separated from eye by 1.2× its diameter. Supra-clypeal area shiny and shallowly punctate. Groove between clypeus and face strong (Fig. 3). Clypeus 2.8× as wide as long. Occipital carina dorsally slightly raised, sublaterally slightly expanded forming a subtle flange. Gena at junction with hypostomal carina abruptly projected as a lamella with subquadrate apex.



Figures 1–6. *Grotea ambarosa* sp. nov., holotype female **1** lateral habitus; detail showing measurement of length vs. height of mesosoma overlaid onto image from Townes (1970) **2** head and mesosoma, lateral view **3** head, frontal view **4** ovipositor, lateral view **5** first metasomal tergite, lateral view **6** posterior tergites and ovipositor sheath.

Antenna with 40 flagellomeres. First flagellum segment as long as the second and third flagellum segments combined.

Mesosoma. Mesosoma 2.9× as long as high, polished and almost entirely impunctate (Fig. 2). Pronotum centrally uniformly and evenly concave. Epomia absent. Scuto-scutellar groove deeply impressed and smooth; scutellum distinctly convex. Area basalis of propodeum triangular in shape, about 1.5× as long as wide. Spiracles kidney-shaped. Pleural carina distinct only anteriorly to anterior transverse carina. Anterior transverse carina forming a smooth arc. Lateral longitudinal carina distinct from propodeal apex to anterior transverse carina, sinuous and irregular. Area spiracularis and



Figure 7. Diagram showing type locality for *Grotea ambarosa* sp. nov.

area lateralis not fully enclosed. Posterior transverse carina absent. Forewing crossvein 1cu-a arising distinctly distad of M&Rs. Aerolet large and pentagonal, about 1.6× as wide as long.

Metasoma. Tergite 1 very long, 0.85× as long as mesosoma, curved upwards on posterior 0.25 (Fig. 5). Postpetiole only slightly wider than petiole. Exposed portion of ovipositor 4.4 mm, about 2.05× as long as hind tibia.

Color. Mostly amber-orange with black and whitish marks. Head whitish (247,214,160) (Fig. 3); mandible apex, supra-antennal area and occiput except orbital band and posterior 0.3 of dorsal 0.75 of gena glossy black; supra-antennal area just anteriorly to ocelli with brownish spot. Dark grey regions of eyes bordered by light grey pigment. Supraclypeal area white. Antenna entirely dark brown (084,076,060). Mesosoma mostly amber-orange (172,091,046) (Fig. 2). Anterior portion of pronotal collar, narrow bands on dorsal margin of pronotum and anterior margin of mesopleuron, tegula, small spot on postscutellum and dorsal apex of mesepimeron whitish. Posterior 0.2 of scutellum lighter in color than the rest. Fore and mid coxae, all trochanters and femora and fore tibia dark brown (093,070,068) on dorsal and posterior faces, whitish on ventral and anterior faces; fore tarsus whitish with brownish apical marks; hind coxa amber-orange on basal 0.6, dark brown on apical 0.4, with a white apical spot on dorsal face; hind trochanter and trochantellus mostly dark brown, whitish in the articulation; hind femur medially amber-orange, basal and apical fourths dark brown; mid and hind tibiae and tarsi dark brown. Wings hyaline, forewing with a faint brown spot at apex. Tergites mostly blackish; T1 with sublateral white bands on anterior 0.75 and posterior whitish band; T2–3 with triangular whitish mark on posterior apex; T4–6 with posterior whitish bands, medially narrower on T6. Ovipositor sheaths black with subapical pale yellow band (Fig. 6).

Remarks. *Grotea ambarosa* does not run well to any of the species in the keys of Slobodchikoff (1970) or Gauld (2000) and does not correspond either to the species described later on by Herrera-Florez (2014, 2018) and Herrera-Florez and Pentead-Dias (2019). Among described species, it is most similar to *G. paulista* Herrera-Florez and *G. perplexa* Slobodchikoff. The new species can be differentiated from *G. paulista* by the pleural carina posteriorly absent (vs. distinct in *G. paulista*); area basalis 1.5× as long as wide (vs. 3.4×) and ovipositor 2.0× as long as hind tibia (vs 1.5×). The color pattern on the legs is also different, with *G. paulista* having the apex of all femora and of the hind tibia entirely white and hind femur basally amber-brown (vs. dark brown in *G. ambarosa*). Color pattern is also quite different between *G. ambarosa* and *G. perplexa*, which has a distinct whitish mark on antero-dorsal corner of mesopleuron (absent in *G. ambarosa*); fore- and mid legs almost entirely white (vs. extensively marked with dark brown); and hind femur and tibia apically entirely white (vs. dark brown). In addition, *G. perplexa* has a distinct pleural carina (absent in *G. ambarosa*) and the forewing crossvein 1cu-a arising opposite to M&Rs (vs. distinctly distad).

Etymology. The name refers to the striking resemblance of the color of the mesosoma to the rich amber deposits found in the Dominican Republic.

Discussion

This is the first record of *Grotea*, or in fact any labenine genus, in the Greater Antilles (Fig. 7). A few labenine species are recorded from islands in the Atlantic Ocean: *Labena nigra* Rohwer in Bermuda (Rohwer 1920), *L. trilineata* Ashmead in Grenada (Ashmead 1900) and the predominantly South American *G. delicator* Thunberg with records from Trinidad and Tobago (Slobodchikoff 1970) and a nonspecific record to the Leeward Islands (i.e. northern islands of the Lesser Antilles chain, from the Virgin Islands to Guadeloupe; Slobodchikoff 1970).

It has been repeatedly suggested that the Labeninae have originated in Gondwana after its separation from Laurasia, but before the landmasses of South America and Australia split from each other (e.g. Gauld 1983; Wahl 1993; Gauld 2000; Gauld and Wahl 2000; but see Spasojevic et al. 2018). If that is the case, the occurrence of Labeninae in the Greater Antilles would likely be due to overwater dispersal. The occurrence of some species in rather remote landmasses (e.g. Bermuda, or *Certonotus fractinervis* (Vollenhoven) in New Zealand) seems to indicate that labenines can be relatively good dispersers, making their absence from the Greater Antilles until now rather surprising. This study reveals that labenines do indeed occur in this region, suggesting that the lack of labenine species was due to a deficit in collecting and taxonomic studies rather than to a real faunal depletion. We predict that yet other species of Labeninae remain undiscovered in the Greater Antilles.

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