

## An orussid wood wasp in amber from the Dominican Republic (Hymenoptera: Orussidae)

MICHAEL S. ENGEL

*Division of Entomology (Paleoentomology), Natural History Museum, and Department of Ecology & Evolutionary Biology, 1501 Crestline Drive – Suite 140, University of Kansas, Lawrence, Kansas 66049-2811 msengel@ku.edu*

The first Dominican amber fossil of the parasitoid family Orussidae (Euhymenoptera: Orussomorpha) is described and figured from a single individual preserved in Early Miocene (Burdigalian) amber from the Dominican Republic. *Ophrynopus peritus* Engel, new species, is the first orussid fossil described from Tertiary amber and the first species documented from the West Indies.

*Keywords: Orussomorpha, Euhymenoptera, Tertiary, paleontology, Symphyta, taxonomy.*

### INTRODUCTION

Wood wasps of the family Orussidae sit at the evolutionary crossroads between the primitive, phytophagous Hymenoptera of the symphytan grade and the extensive parasitoid radiation of the Apocrita. Like other symphytan wasps, orussids lack the characteristic constriction between the metasoma and mesosoma (the so-called “wasp waist”) among other apocritan synapomorphies (Vilhelmsen, 2001, 2003a, 2007). Nonetheless, orussids share with their more diverse sister group a parasitoid mode of life and together the Orussidae and Apocrita form the Euhymenoptera (Vilhelmsen, 2001, 2003a, 2003b; Grimaldi and Engel, 2005). Orussids are ectoparasitoids of woodboring insects and, where known (few host records are documented), principally Buprestidae (Coleoptera) or Siricoidea (Hymenoptera). Despite the considerable age of the lineage based on its phylogenetic position as sister to Apocrita, fossils of Orussidae are scant and accordingly provide minimal insight into the overall evolution of the family (*e.g.*, Vilhelmsen, 2004, 2007). The only fossil orussids described to date are two species in Late Cretaceous amber – *Mesorussus taimyrensis* Rasnitsyn in Santonian amber from Siberia (Rasnitsyn, 1977) and

*Minyorussus luzzii* Basibuyuk *et al.* in Turonian amber from New Jersey (Basibuyuk *et al.*, 2000). Although originally proposed as an orussid, *Sinicorussus luzhongensis* Lin from the Miocene of China (Lin, 1982) has proven to be an ichneumonid (Zhang *et al.*, 1994). Similarly, *Lithoryssus parvus* Brues (1906) from the Eocene-Oligocene boundary of Colorado lacks features of the family and cannot be considered a definitive orussid (Rohwer, 1912). At least nine additional fossils have been assigned to the extinct family Paroryssidae, a group sister to Orussidae proper, although it may prove to be a paraphyletic stem group to Orussidae (*e.g.*, Vilhelmsen, 2004). Rasnitsyn *et al.* (2006) classify the extinct apocritan families Ephialtitidae and Karatavitidae (both known only as compressions from the Jurassic-Cretaceous of various deposits but largely from Eurasia) in a paraphyletic infraorder Orussomorpha along with orussids. However, such associations are dubious at best and not based on any cladistic overview of these Mesozoic fossils. Moreover, Ephialtitidae and Karatavitidae are more likely stem groups to either Stephanoidea, a cluster of basal apocritan superfamilies, or Apocrita as a whole and accordingly provide more insight into early apocritan evolution rather than diversification along the orussid line.

Herein I describe the first fossil orussid in Tertiary amber. The new species is representative of the Neotropical genus *Ophrynopus* Konow, with nine modern species distributed from the southern United States to northern Argentina (Vilhelmsen and Smith, 2002). While the fossil is clearly far too young to provide new insights into orussid phylogeny or the origins of the family, the species does have some interesting biogeographic implications. Orussids are not presently known from the West Indies and the fossil, therefore, represents yet another interesting localized extinction from the Hispaniolan fauna similar to Hymenoptera of the genera *Proplebeia* Michener, *Euglossa* Latreille, *Neocorynura* Schrottky, *Chilicola* Spinola, *Lindenius* Lepeletier de Saint Fargeau and Brullé, *Ceratochrysis* Cooper, *Pristapenesia* Brues, and many other lineages (e.g., Engel, 1995, 1999a, 1999b, 2005, 2006; Bennett and Engel, 2006; Camargo *et al.*, 2000). Owing to the curvature of the amber surfaces which could not be polished the specimen was submersed in glycerine for photography and measurement. Nonetheless, the optimal angle for metrics was not always achievable and so the values should be considered approximate. The age of Dominican amber has been reviewed by Grimaldi and Engel (2005).

#### SYSTEMATIC PALEONTOLOGY

Family Orussidae Newman

Genus *Ophrynopus* Konow

*Ophrynopus peritus* Engel, new species (Figs. 1–2)

Orussidae sp.; Wu, 1997: 202, fig. F-524.

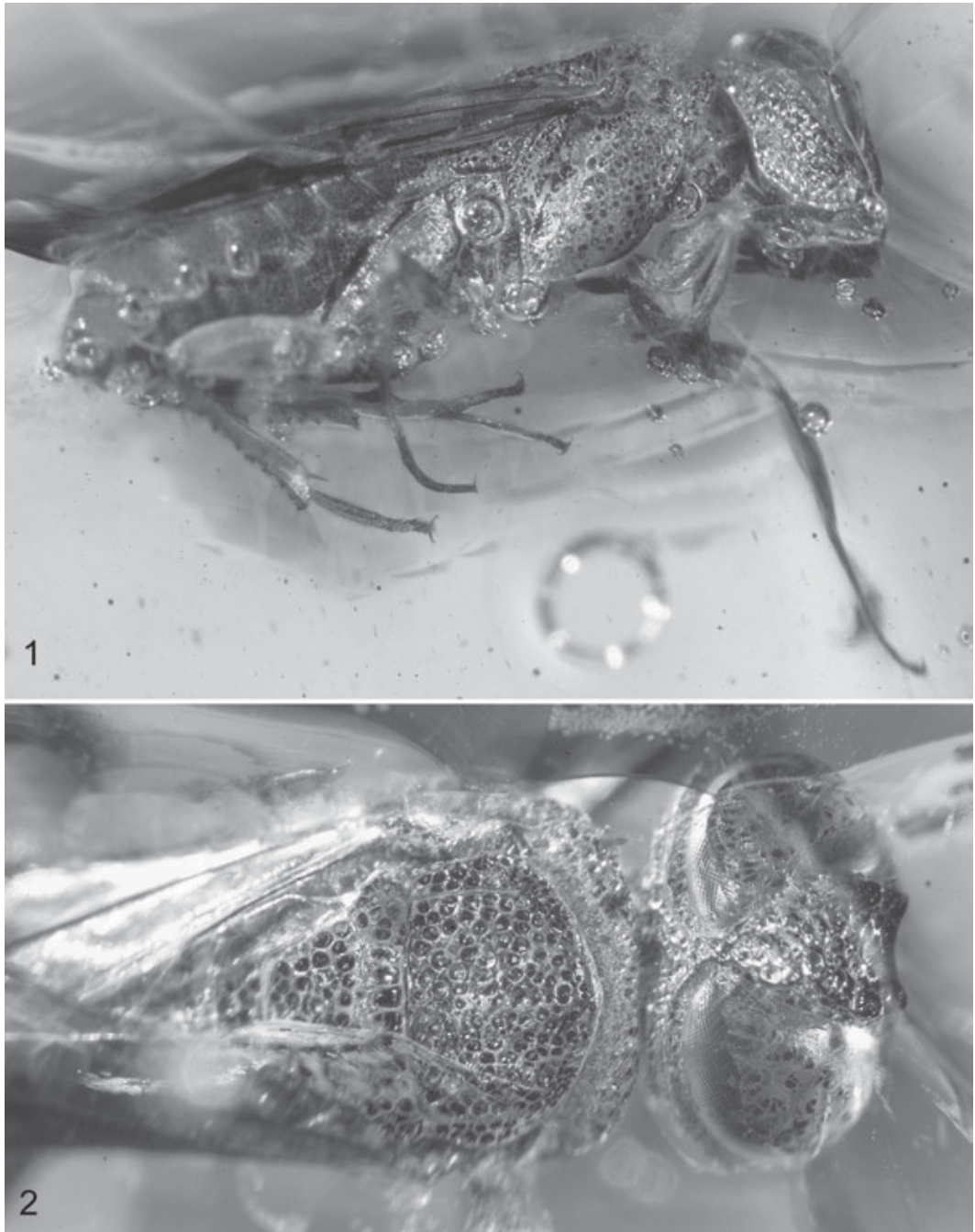
#### Diagnosis

The new species can be distinguished from modern *Ophrynopus* by the very faint vertical, anterior mesepisternal carina (present above, becoming much more faint ventrally), the exceedingly weak denticles of the metafemoral ventral surface, setose pronotal

dorsal surface, and most notably by the relatively complete development of the lateral longitudinal frontal carinae (*i.e.*, weaker but still present ventrally), in addition to other details of head and thoracic sculpturing.

#### Description

**Male.** Total body length 6.20 mm; forewing length 4.22 mm. Integument generally dark brown, shining and nearly black on head, thorax, abdomen, and some basal leg podites (*vide infra*), antennae and mouthparts dark brown. Head without green metallic highlights, integument foveate except frons strongly rugose, setae short and sparse (without broadly expanded setae anywhere on surface); ventral coronal tooth no larger than remaining teeth, without depression below ocellar corona; posterior coronal teeth not separated by narrow longitudinal furrow; dorsal, transverse frontal carina present; ventral transverse frontal carina present; lateral longitudinal frontal carina present, weaker ventrally but distinctly present; medial longitudinal frontal carina absent; postocular carina distinct, strong, complete, extending dorsally to upper part of compound eye; occipital carina strong and complete; subantennal groove strongly depressed; maxillary palpi elongate, pentamerous. Pronotum slightly shorter medially than laterally as viewed in dorsal aspect, without short, longitudinal carina or line medially, setae on anterior-facing surface sparse, dorsal-facing surface with numerous short, simple, fine, appressed setae, anterior margin of dorsal-facing surface foveate, such foveae apparently weak and surface somewhat imbricate beneath setose area; mesoscutum foveate, with sparse, minute, simple setae, anterior margin broadly rounded, notauli and parapsidal lines present, the former relatively weak; mesoscutellar sulcus deeply impressed; mesoscutellum foveate except anterior border with a series of relatively regular areolae, with lateral margins not distinctly raised, posterior border broadly meeting metanotum for much



Figs. 1–2. *Ophrynopus peritus* Engel, new species (MACT-2524) in Early Miocene Dominican amber. 1. Lateral habitus of holotype (length 6.20 mm). 2. Dorsal aspect of holotype showing thorax and head.

of its width; visible portion of metanotum foveate as on posterior of mesoscutellum. Mesopleuron largely foveate as on mesoscutum except posteriorly imbricate with scattered punctures; subalar carina strong, distinct; vertical mesepisternal carina weak, present above, becoming faint and nearly obsolescent ventrally. Legs dark brown, nearly black, generally sparsely setose (except as noted below); protibia with short, apical spine on posterior surface near spur, without peg-like projections; metacoxa foveate except posterolaterally faintly imbricate with scattered punctures; metafemur dark brown, with exceedingly faint denticles ventrally, laterodistal corner broadly triangular, laterally with numerous, fine, appressed, simple, silvery setae, such setae not present on coxae or thorax, nor broadened; tarsi uniformly dark brown. Forewing infusate except apex and medially in band running from anterior to posterior around area pterostigma to posterior margin, with anal and first cubital (= subbasal cell) cells hyaline [*i.e.*, costal and radial cells (= basal cell) infusate]; cu-a meets Cu<sub>1</sub> just past separation from basal vein (M), separated from Cu<sub>1</sub>-M juncture by less than vein width; 2r-rs meets pterostigma at two-thirds length of pterostigma from base; veins nearly black except in hyaline regions light brown. Hind wing not obscured, apparently hyaline. Abdominal terga rugosopunctate, with scattered, simple, short setae; posterior margin of first tergum posterior without fringe of setae; sterna rugosopunctate albeit more weakly than on terga, posterior sterna becoming gradually more punctate with imbricate integument between punctures; posterior surface of ninth sternum glabrous with scattered punctures, posterolaterally with distinct, pointed tubercles and longer posteriorly-directed, simple setae, posterior margin with short truncated projection, apical margin of projection weakly concave.

### Holotype

MACT-2524; Early Miocene (Burdigalian) amber, Dominican Republic; Morone Amber Collection, Turin, Italy.

### Etymology

The specific epithet is taken from the Latin term *peritus*, meaning “perished”.

### DISCUSSION

This new fossil species from the West Indies possesses a distinctly peculiar feature for *Ophrynopus*, specifically the relatively complete development of the lateral longitudinal frontal carinae. While this might initially suggest placement in a separate subgenus or closely allied genus, this trait is likely plesiomorphic owing to its occurrence in the genera *Stirocorsia* Konow, *Kulcania* Benson, *Guiglia* Benson, and *Ophrynon* Middlekauff. Segregation of *O. peritus* into a new genus-group taxon seems unwarranted as it may render modern *Ophrynopus* paraphyletic. Indeed, the apparent absence of distinct green coloration suggests that this species is more derived relative to *O. carinatus* Vilhelmsen and Smith, while the completely black pterostigma implies that it is perhaps basal to all other *Ophrynopus*. Admittedly, while coloration is typically well preserved in Dominican amber fossils (*e.g.*, the brilliant metallic green bees of the tribe Augochlorini are similarly colored in Dominican amber species: *vide* Engel, 1995, 1996, 1997, 2000) it is possible that had a faint metallic green highlight been present in life, such a faint coloration might have been lost during preservation, even though the presence of preserved metallic coloration in other taxa suggests otherwise. Based on the observable features *O. peritus* appears to occupy an intermediate position in the phylogeny. A possible intermediary position

vitiates the recognition of a separate genus or subgenus until such time as a more thorough cladistic analysis of relationships within *Ophrynopus* and related genera is completed.

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