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A new species of *Hemipenthes* LOEW (Diptera: Bombyliidae: Anthracinae) from Miocene Dominican amber

NEAL L. EVENHUIS

J. Linsley Gressitt Center for Research in Entomology, Bishop Museum,
1525 Bernice Street, Honolulu, Hawaii 96817-2704, USA,
email: NealE@bishopmuseum.org

ABSTRACT. A new species of the genus *Hemipenthes* LOEW, *H. dominicana* sp. n. is described and illustrated from the Miocene Dominican amber. This marks the first record of this genus and the subfamily Anthracinae from Dominican amber.

KEY WORDS: Diptera, Bombyliidae, Miocene, amber, fossil, Dominican, Miocene.

INTRODUCTION

The genus *Hemipenthes* LOEW is a worldwide genus (except Australia), with most species found in temperate regions, but a few species are known to extend into the more tropical regions of the globe. Immatures are hyperparasitic on Hymenoptera, and there are a few records on Diptera (HULL 1973). Individuals are commonly found in forested or semi-wooded areas, where they sit resting on the ground or rocks in dappled sunshine. With the new species described here, 82 extant and fossil species are known (EVENHUIS 1994, EVENHUIS & GREATHEAD 1999, AVÁLOS-HERNANDEZ 2009). Previous to this study, the genus was known from only three described compression fossil species from the Miocene and Oligocene of European deposits (EVENHUIS 1994). The discovery here marks the first confirmed record of the genus in the amber fossil record and also is the first record of the subfamily Anthracinae from Dominican amber.

Acknowledgments

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and Ryszard Szadziewski for their extensive and seminal contributions to Diptera palaeontology over the last four decades.

MATERIAL AND METHODS

The specimen of Dominican amber examined in this study derives from the Poinar Collection at Oregon State University, Corvallis, Oregon. The photographs were made at the Bishop Museum's Imaging Center using an Automontage system and a Leica M165C stereo dissecting scope with a Planapo 1.0 x objective lens. Photographs of each specimen were stacked and focused using Zyrene Stacker (ZYRENE SYSTEMS, 2013) and Adobe Photoshop was employed when necessary to correct exposure and colour.

Family classification and morphological terminology follow GREATHEAD & EVENHUIS (2001). Dating of Dominican amber to the Miocene follows PENNEY (2010).

RESULTS

Hemipenthes dominicana sp. n.

(Figs 1-4)

Type

Holotype female (D-7-229) from the Miocene amber of the Dominican Republic. The type is in the Poinar Collection of amber fossils maintained at Oregon State University, Corvallis, Oregon. The type is in a thick rounded clear golden amber-coloured piece measuring 20 × 17 × 31 mm in circumference × 9-11 mm thick. There are five syninclusions in this amber piece in addition to the bombyliid type: a small undetermined acalyptrate dipteran lies nestled underneath the base of the left wing; a small undetermined sciarid fly is located away from but near the head of the type; the husk of a phorid fly is located below the edge of the right wing ; a small parasitic hymenopteran is located away from the caudal end of the bee fly; and an undetermined worker ant is at one edge of the amber piece.

Diagnosis

Using the key to species in the revision of North American *Hemipenthes* by AVÁLOS-HERNANDEZ (2009), this species keys to the extant *Hemipenthes bigradata* (LOEW) recorded in EVENHUIS & GREATHEAD (1999) from Cuba, Bahamas, Jamaica and Puerto Rico, as well as from California and New Mexico. It is similar to *H. bigradata* based on the same wing infuscation pattern and the presence of white pile on the fourth abdominal tergite (the only two species in the New World with this combination of characters). It can be separated from *H. bigradata* by the predominant orange-yellow pile of the anterior

and lateral portions of the thorax and abdomen in *H. dominicana*, sp. n. (these hairs mixed white and black or all white in *H. bigradata*), the lack of conspicuous white tomentum on the first abdominal tergite (this white tomentum present in *H. bigradata*), and the two large spines on the mid tibia (these large spines absent in *H. bigradata*).

Description

Female. Body length: 7.8 mm; wing length: 8.2 mm.

Head. Occiput and mentum black; occipital fringe with short black and yellow hairs on upper portion, orange-yellow hairs on lower portion; vertex, front and face brown. Eyes separated by 1.5 times width of small, narrow ocellar triangle. Front black pilose. Face rounded, with black hairs. Antennae with scape subcylindrical, brown, swollen on inner apical margin, twice as long as pedicel, with dense, thick black hairs; pedicel brown, subtrapezoidal, twice as wide as long, with dense thick black hairs; flagellomere (Fig. 2) brown, longer than scape and pedicel combined; base subconical, tapering to styliform apical three-fourths, style minute, terminal. Proboscis short, brown, not projecting beyond oral margin. Palpi tan, with sparse, minute black hairs.

Thorax. Mesonotum matt greyish black, with anterior and lateral margins dense orange-yellow pilose; disc without tomentum, hairs black, short, minute, not dense, longest in prescutellar area. Scutellum black basally, dark reddish brown posteriorly, hairs and tomentum black. Pleura dark reddish brown, black pilose, orange-yellow hairs on all of humeral callus and katatergite, and on upper portions of proepisternum and anepisternum. Postalar callus with dense patch of orange hairs and long macrochaetae.

Legs brown, coxae with black hairs and white tomentum, remainder with black hairs and tomentum; mid tibia with two thick long black spines on posteroventral surface (Fig. 4). Halter stem pale yellow, knob white with brown laterally.

Wing (Fig. 3). Black setulae on basicosta. Cells c, br, and bm entirely infuscated, cell sc hyaline only at extreme apex; cells r1, cup and a with two basal thirds infuscated; cell dm with basal half or less infuscated; cells r2+3, r5, cua1 and m2 infuscated just at base; colour in anal cell not reaching hind margin of wing; cell dm infuscated behind r-m crossvein; r-m crossvein slightly before middle of cell dm; no crossvein between veins R_4 and R_{2+3}; first section of vein CuA_1 two times length of r-m crossvein, second section half length of r-m crossvein, third section twice length of first two sections combined; anal cell slightly wider than cell cup.

Abdomen black, tergites black pilose dorsally, dense orange-yellow pilose laterally on tergites I-IV, dense black pilose laterally on tergites V-VII; black tomentum overall except broad crossband of white tomentum fourth tergite (see Fig. 1). Venter reddish brown, sparse short black pilose, whitish tomentose medially. Acanthophorites with 6 pairs of short, stout black spines.

Male unknown.

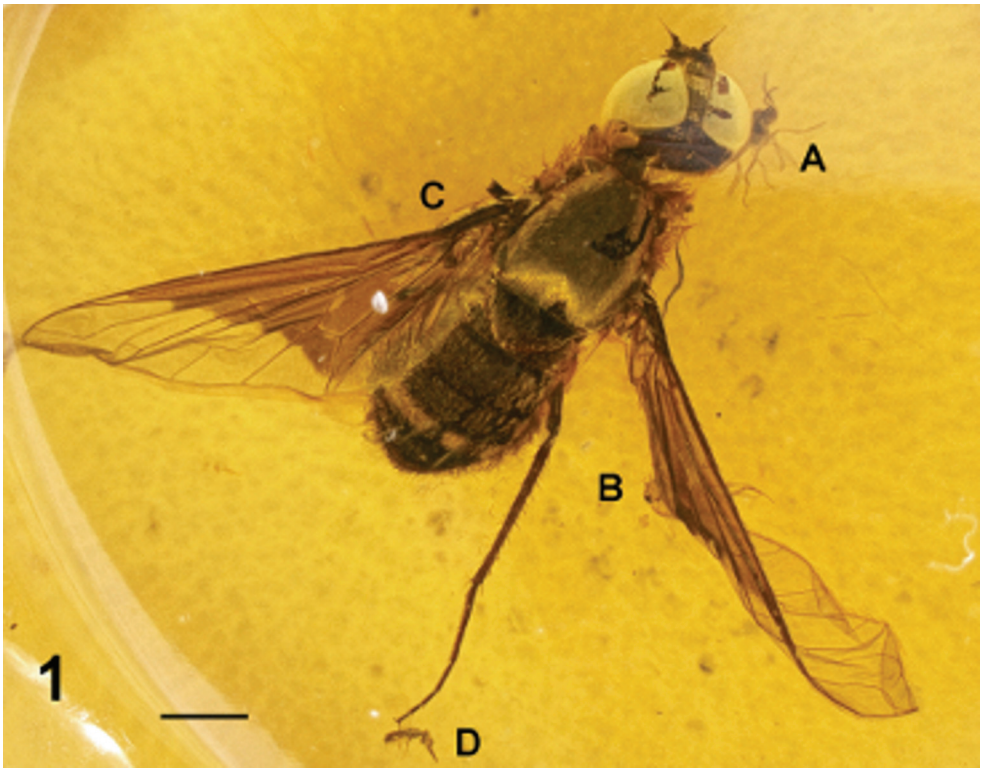


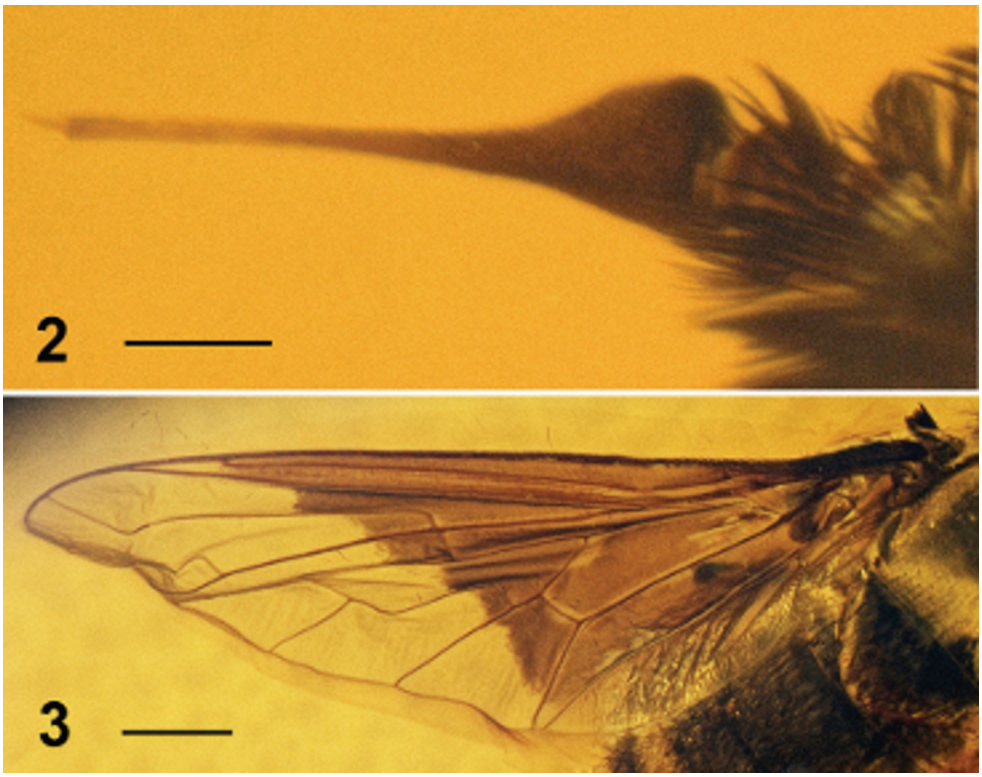
Fig. 1. Habitus of holotype of *Hemipenthes dominicana* sp. n. and location of 4 of 5 syninclusions: A – undetermined sciarid, B – husk of phorid, C – acalyptrate fly (under left wing), D – parasitic hymenopteran. Scale bar = 1.0 mm.

DISCUSSION

The discovery of *Hemipenthes* in amber is a rare find and rather surprising as adults rarely rest on tree trunks, instead preferring the ground or rocks on the ground. That it is embedded in this piece of amber may mean that the amber flow may have been dripping to the ground where this fly got trapped. There does not seem to be any indication of a struggle while in the amber (bombyliid hairs are easily broken off but there are virtually no hairs broken off on this specimen; a few hairs are broken off at the tip of the abdomen and a few leg scales are found broken off and floating near the legs). Additionally, the position of the legs is one found in dead or moribund individuals (legs curled up

underneath the body), so it could also have been that the fly had died and fell into the amber or that the amber, when the fly became trapped, was extremely thin and not viscous, allowing the legs to curl after the fly died in the amber. If the fly had died before becoming embedded, the finding of a syninclusion of an acalyptrate nestled underneath the left wing (see Fig. 4) is curious. This situation is akin to that found with many large bristly specimens caught in Malaise traps that have smaller specimens entangled in legs or wings and bodies.

Given the presence of a fossil species of *Hemipenthes* from the island of Hispaniola, one would expect the potential of extant species to be there as well. There is in fact only one extant species of *Hemipenthes* known from Hispaniola (*H. bigradata*), first recorded by PEREZ-GELABERT (2008). As noted in the Diagnosis above, the two species share a similar wing infuscation pattern and the presence of white pile on the fourth abdominal tergite, which suggest a close, possible sister-species, relationship between *H. dominicana* and *H. bigradata*.



Figs 2-3. *Hemipenthes dominicana* sp. n.: 2 – antenna, 3 – left wing, dorsal. Scale bar = 1.0 mm.

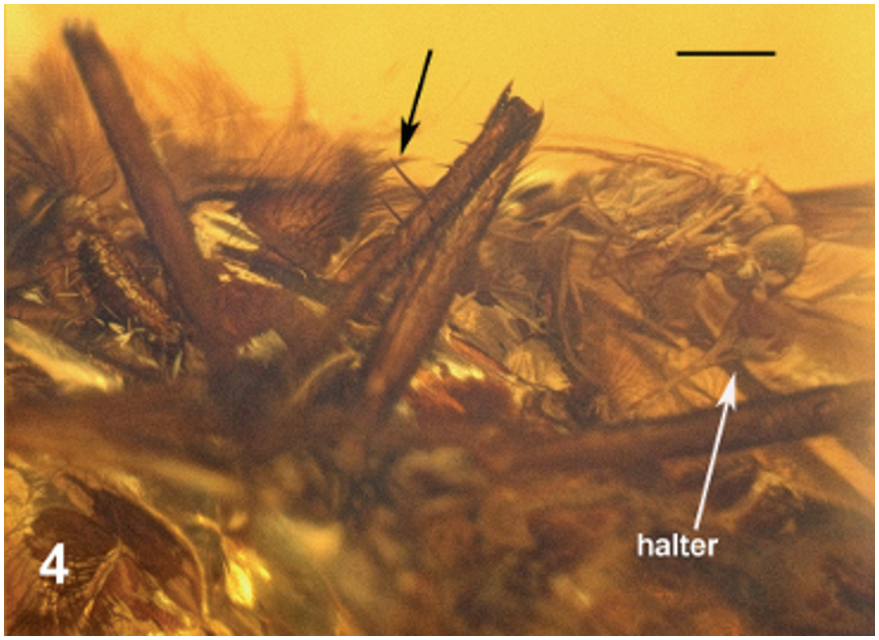


Fig. 4. *Hemipenthes dominicana* sp. n. showing pair of large spines on mid tibia (black arrow) and location of undetermined acalyptrate syninclusion under left wing near halter. Scale bar = 0.5 mm.

REFERENCES

AVÁLOS HERNANDEZ O. 2009. A review of the North American species of *Hemipenthes* LOEW, 1869 (Diptera: Bombyliidae). Zootaxa **2074**: 1-49.

EVENHUIS N.L. 1994. Catalogue of the fossil flies of the world (Insecta: Diptera). Backhuys Publishers, Leiden, 600 pp.

EVENHUIS N.L., GREATHEAD D.J. 1999. World catalog of bee flies (Diptera: Bombyliidae). Backhuys Publishers, Leiden, 756 pp.

GREATHEAD D.J., EVENHUIS N.L. 2001. Annotated keys to the genera of African Bombylioidea (Diptera: Bombyliidae; Mythicomyiidae). African Invertebrates **42**: 105-224.

HULL F.M. 1973. Bee flies of the world. the genera of the family Bombyliidae. Bulletin of the United States National Museum **286**: 1-687.

PENNEY D. 2010. Dominican amber. [In:] PENNEY D. (ed.). Biodiversity of fossils in amber from the major world deposits. Siri Scientific Press, Manchester, UK, pp.: 22-41.

PEREZ-GELABERT D.E. 2008. Arthropods of Hispaniola (Dominican Republic and Haiti): a checklist and bibliography. Zootaxa **1831**: 1-530.

ZYRENE SYSTEMS. 2013. Zyrene Stacker – the basics. Available at: http://zyerensystems.com/cms/stacker [Version: 13 June 2013. Last accessed 2 October 2013].

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