

CORRESPONDENCE

A new species of *Brachypremna* (Diptera: Tipulidae) from Dominican amber, with a key of the genus to all fossil species

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Abstract A new species of *Brachypremna* Osten-Sacken, 1887 from Dominican amber is described and illustrated, namely *B. chenuameii* **sp. nov.**. The new species is most similar to another fossil species documented in Dominican amber, *B. brodzinski* Krzemiński, 1996, by the wing pattern, but is separated from the latter by the absence of final part of Sc, the arcuate origin of Rs, and the length of petiole of cell m₁, which is distinctly longer than the cross vein m-m. A key to all fossil species of the genus *Brachypremna* is provided.

Key words Crane fly, Tipuloidea, taxonomy, paleontology, fossil species.

Dominican amber was formed during the late Lower Miocene through early Middle Miocene (15–20 Ma) in a single sedimentary basin, and contains very rich Miocene biota (Grimaldi, 1995; Iturralde-Vinent & MacPhee, 1996). So far, more than 400 fossil species of Insecta have been reported from Dominican amber, of which the only two species from the family Tipulidae are all from the genus *Brachypremna* Osten-Sacken (Ariño & Ortuño, 2005).

The genus *Brachypremna* was erected by Osten-Sacken in 1887 with type species *Tipula dispellens* Walker, 1861 which was subsequently designated by Coquillett (1910). The genus is characterized by the following characters: antennae shorter than maxillary palpi, commonly 11-segmented, in case with 10 segments, palpus elongated, nasus distinct; eyes with ommatidia small and very numerous; leg slender with tarsus almost as long as the femur and tibia combined, and hind tibia spurred while fore and middle tibia apparently spurless; wing with R₅ curved at base, cross vein r-m short or absent, M₂, M₃ and M₄ at or close to the wing margin narrowly whitened, cell m₁ distinct, anal lobe narrow; hypopygium with outer gonostylus clavate, inserted on lower margin of the larger inner gonostylus, with a small tubercle or spine on outer margin; ovipositor short and straight (Alexander, 1912, 1969).

So far, the genus *Brachypremna* comprises 40 extant species. Among them, 37 species are documented from Neotropical Region, of which one species was also found in Nearctic Region, and another three species are from Australian Region (Oosterbroek, 2020). The earliest fossil species under this genus is *Brachypremna eocenica* Meunier, 1906, which was then transferred to genus *Tipula* Linnaeus, 1758 (Evenhuis, 1994). Subsequently, fossil species of *Brachypremna* are restricted to the study of Krzemiński (1996), in which a new species, *B. brodzinski* Krzemiński, 1996 from Dominican amber was described, and a new combination, *B. gurnetensis* (Cockerell, 1921) was proposed. One single poorly preserved female was also reported by Podenas and Poinar (2001) from Dominican amber. However, this specimen was not erected as a new species although the description was accurate and detailed.

During sorting and identifying the insect inclusions of Dominican amber, a new species of the genus *Brachypremna* was found. Herein, we describe and illustrate it. A key to all fossil species of the genus *Brachypremna* is provided.

The type fossil specimen studied herein was found in the Dominica Republic, Santiago Province, La Toca mine. The type fossil specimen is deposited in the Systematics and Evolution Laboratory, School of Life Sciences, Anqing Normal

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University, Anhui Province, P. R. China. Photographs of the male body were taken using Olympus SZ61 stereomicroscope (Olympus, Japan) with Qimaging QICAM FAST 1394 CCD (Qimaging, Canada). Legs measurement data were not all provided as they were broken. All measurements were made in millimeters (mm). The terminology and methods of description and illustration followed those of Alexander and Byers (1981), Podenas and Poinar (2009) and de Jong (2017).

Order Diptera Linnaeus, 1758

Infraorder Tipulomorpha Rohdendorf, 1961

Family Tipulidae Latreille, 1802

Subfamily Tipulinae Latreille, 1802

Brachypremna Osten-Sacken, 1887

Brachypremna Osten-Sacken, 1887: 161.

Type species: *Tipula dispellens* Walker, 1861, by subsequent designation.

Brachypremna chenuameii sp. nov. (Figs 1–2)

Diagnosis. The new species can be recognized by following combination of characters: final part of Sc absent, R_5 straight except arched base, R_5 and M_1 divergent; gonocoxite elongated, broad basally and narrowed to the apex, outer gonostylus narrowed, inner gonostylus in the shape of broad lobe, longer than outer gonostylus. The new species is most similar to another fossil species from Dominican amber, *B. brodzinskii* Krzeminski, 1996, but differs from the latter by the absence of final part of Sc (present in related species), the origin of R_s obliquely arcuated (the origin of R_s right-angled in shape in related species), the petiole of cell m_1 subequal in length to M_2 (the petiole of cell m_1 distinctly shorter than M_2 in related species), the petiole of cell m_1 distinctly longer than the cross vein m-m (the petiole of cell m_1 subequal in length to

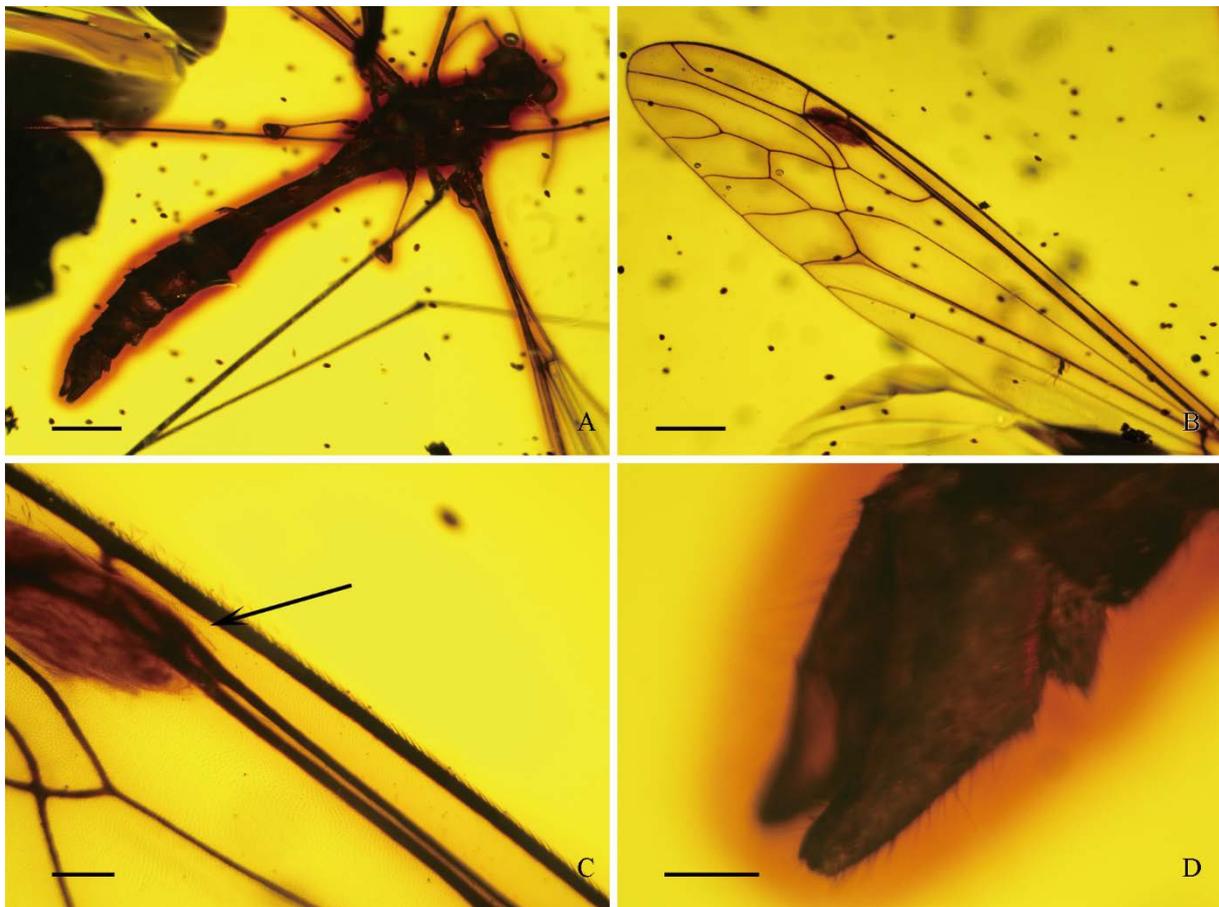


Figure 1. *Brachypremna chenuameii* sp. nov., No. AQNU-DIP-2019004. A. Body, dorsal view. B. Wing. C. Stigma and terminal of Sc. D. Hypopygium, lateral view. Arrow indicates the position of final part of Sc. Scale bars: A–B=1.0 mm; C–D=0.2 mm.

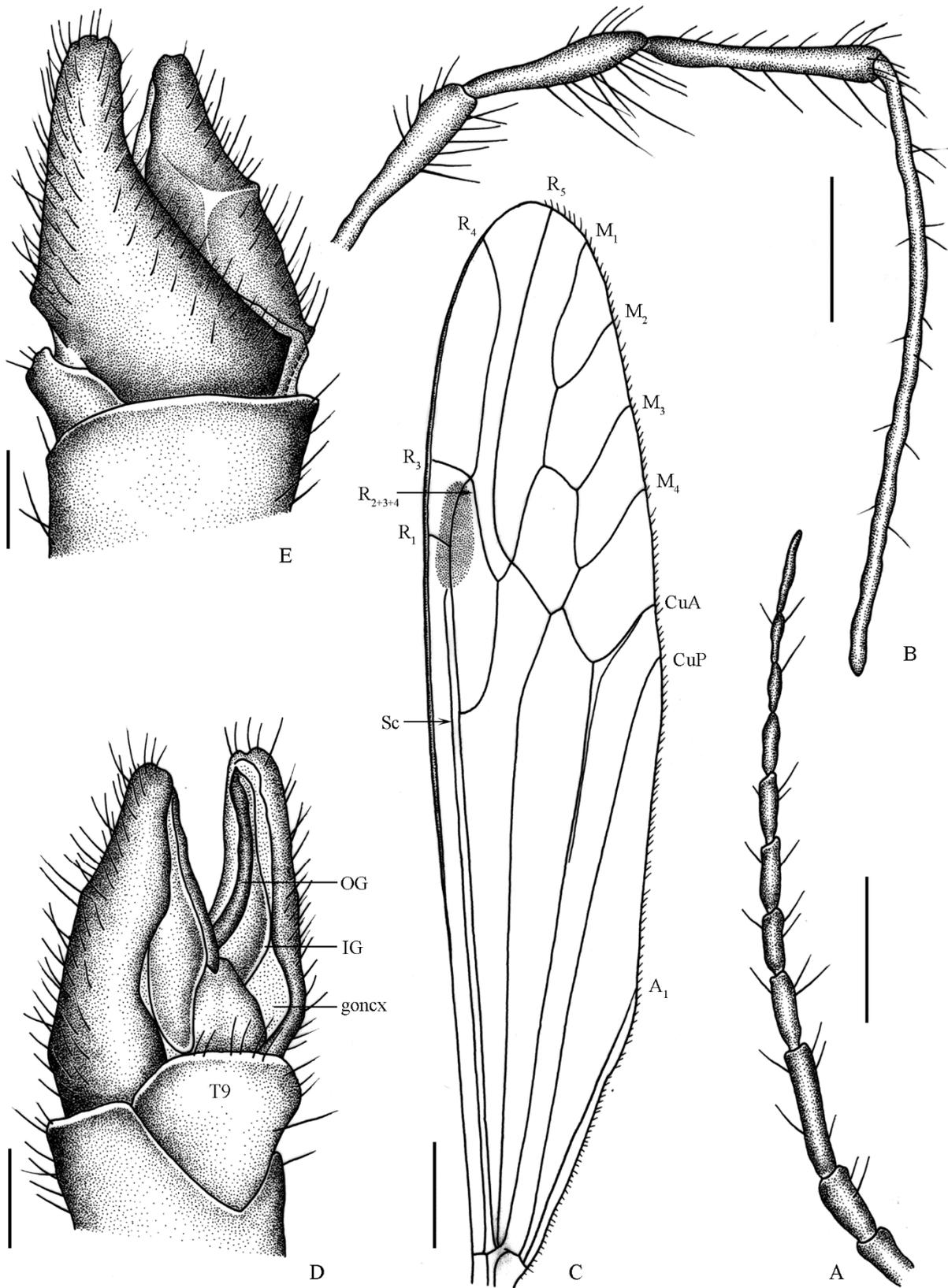


Figure 2. *Brachypremna chenuameii* sp. nov., No. AQNU-DIP-2019004. A. Antenna. B. Palpus. C. Wing. D. Hypopygium, dorsolateral view. E. Hypopygium, ventrolateral view. Abbreviations: goncx—gonocoxite; IG—inner gonostylus; OG—outer gonostylus. Scale bars: A–B, D–E=0.2 mm; C=1.0 mm.

cross vein m-m in related species), and the discal cell 2.2 times as long as the width (the discal cell 1.7 times as long as the width in related species).

Material examined. Holotype, male, No. AQNU-DIP-2019004, Miocene (18–20 Ma), La Toca mine, Santiago Province, the Dominica Republic.

Description. Measurement ($n=1$). Body length 8.36 mm (excluding antenna), wing 10.80 mm, antenna 5.27 mm.

Head. Head brown with black setae (Fig. 1A). Nasus distinct with several black setae on tip. Antenna entirely black, 11-segmented, scape and pedicel cylindrical, slightly expanded apically, first flagellomere subequal in length to scape and pedicel together, remaining flagellomeres progressively shorter and thinner except last segment which is same length to second flagellomere, each flagellomere with numerous black verticils, longest verticil distinctly shorter than its corresponding flagellomere (Fig. 2A). Palpus wholly black, longer than antenna, last segment almost same length to basal three segments together (Fig. 2B).

Thorax. Thorax brown (Fig. 1A). Legs wholly brown (Fig. 1A). Fore leg with femur 8.02 mm, tibia 8.61 mm, tarsi 12.90 mm; middle leg with femur 9.91 mm, tibia 9.20 mm; hind leg with femur 10.50 mm. Wing brown with dark brown venation, narrowed and elongated, transparent, with an elliptic stigma not reaching anterior margin of wing (Fig. 2B). Venation: Sc long, ending distinctly beyond mid-point of wing, sc-r reaching at same level of branch of Rs, final part of Sc absent (Figs 1C, 2C); Rs distinctly arcuate at base, slightly longer than R_{2+3+4} ; R_1 and R_3 short; R_4 elongated, apical one third curved; R_5 elongated, straight except base arched, R_5 and M_1 divergent; cell m_1 present, slightly longer than its petiole; M_2 as long as petiole of cell m_1 ; r-m absent; discal cell elongated, approximately 2.2 times as long as width; m-m distinctly shorter than petiole of cell m_1 ; m-cu reaching discal cell at distal one fourth; CuA and CuP relatively straight with apex slightly bent, A_1 straight. Halter with stem yellow, knob black (Figs 1B, 2C).

Abdomen. Abdomen brown with hypopygium black (Figs 1A, 1D). Tergite nine small, straight at hind margin (Fig. 2D). Gonocoxite elongated, broad basally and narrowed to apex, densely covered with long setae (Figs 2D–E). Outer gonostylus being narrowed rod, inner gonostylus longer than outer, being broad lobe (Figs 2D–E).

Etymology. This specific name is dedicated to Mrs. Chen Huamei for her contribution of this Dominican amber.

Key to fossil species of *Brachypremna*.

1. Cross vein r-m present *B. gurnetensis*
Cross vein r-m absent 2
2. Origin of Rs obliquely arcuated, petiole of cell m_1 distinctly longer than cross vein m-m *B. chenuamei* sp. nov.
Origin of Rs right-angled in shape, petiole of cell m_1 subequal in length to cross vein m-m *B. brodzinskii*

4 Discussion

The new species is well preserved in amber, which gives us the opportunity to reveal the evolutionary correlation between the extant species of the genus *Brachypremna* with their ancestral lineage. In present study, we observed that new species possesses long gonocoxite. Oosterbroek (1980) indicated that elongated gonocoxite is considered as plesiomorphic condition for species in family Tipulidae. Krzemiński (1996) also considered that long gonocoxites of *Brachypremna* and *Megistocera* Wiedemann, 1828 (Diptera: Tipulidae) are plesiomorphic. This provides us direct evidence to consider that *Brachypremna* is a relatively primitive genus in family Tipulidae. Same case was found in *Leptotarsus* Guérin-Méneville, 1831 (Diptera: Tipulidae) (Krzemiński, 1992a, b, 2001). The new species is very similar to some extant species such as *B. dispellens* (Walker, 1861), and *B. candidella* Alexander, 1969 (Walker, 1861; Alexander, 1969). They share certain apomorphic features raised by Krzemiński (1996), that are as follows: R_2 greatly reduced and verticalized, r-m completely reduced, CuP close to CuA, and A_1 close to wing margin.

Fossil species of *Brachypremna* were only documented in amber inclusions from Miocene to Oligocene (Krzemiński, 1996; Podenas & Poinar, 2001). The new species is the third fossil representative in this genus. We anticipate that future intensive investigation and collection would increase the fossil species number and range extension of this genus and provide us more evidence to understand the origin and evolution of this genus.

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