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Research Advances

First Eggs of Fossil Bristletails (Meinertellidae: Microcoryphia) from Burmese Amber

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Objective

Fossil microcoryphids are scarce. Silverstri (1912) described two genera and eight species of Machilidae or Machiloidae incertae sedis from Baltic amber (35–40 Myr). In Cretaceous Myanmar amber (burmite: ~99 Myr) one preserved Machilidae plus five undetermined specimens were reported but with no details by Grimaldi et al. (2002). In Dominican amber (20–25 Myr) only *Neomachilellus (Praeneomachilellus) dominicanus* (Sturm & Poinar 1997: Meinertellidae) has been found. Mendes (2013) considered that one undetermined Microcoryphia specimen preserved in burmite belonged to the genus *Macropsontus*, but did not provide enough argumentation.

Results

Systematic paleontology

Family: Meinertellidae Verhoeff, 1910

Genus: *Cretaceobrevibusantennis* gen. nov.

Derivation of name. The first part of the name alludes to the Cretaceous period and to the Latin “creta” (chalk); “brevibusantennis” is Latin meaning ‘short antennae’ in English.

Type species. Cretaceobrevibusantennis hookensis, sp.nov.

Diagnosis. The main reasons for placing the fossil into the family are the absence of scales on scapus, pedicellus and flagellum (a major feature of extant meinertellidae) and the presence of a characteristic hook near the distal end of article 2 of the male maxillary palp. Compare this genera with cretaceous Meinertellidae *Cretaceomachilis* Sturm & Poinar, 1998, whose holotype (*Cretaceomachilis libanensis* Sturm & Poinar, 1998) was preserve in the Lebanese amber (Lower Cretaceous, 120–135 Myr), the short antennae with sloping setae have not been found in the latter genera.

Cretaceobrevibusantennis hookensis, sp.nov.

Derivation of name. The species-name refers to the presence of a characteristic hook near the distal end of article 2 of the male and female maxillary palp.

Material. Holotype CSCLRCAB100001, ♀ (Fig. 1a, a, d); paratype CSCLRCAB100002-001, ♂ (Fig.1a, b, e); housed in (CSCLR), Sanhe, China. Late Albian, Burmese amber, Myanmar.

Diagnosis. As for the genus.

Description. Both the holotype and the paratype are complete.

Head: Compound eyes large, touching at the median plane. Length of antennae 1.0 mm, without scales; each article with several declining setae, its length about 2x longer than article. Maxillary palp with 4 proximal articles preserved; article 1 with triangulaer process; hook on article 2 clearly protruding; article 3 of labial palps not distinctly broaden, with sensory rods.

Thorax: Not humped; all legs deviod of coxal stylets with some very long setae, spiniform setae on the lateral margins of the tergites visible; taris simple, clealy with only two articles.

Abdomen: The abdominal vesicles not visible. I-II each with pair of abdominal stylets. VIII-IX each with pair of abdominal stylets of paratype, terminal spines of stylets short.

Penis: Distinctly shorter than 0.5 length of coxites IX; aperture large, subapical to ventral, without setae.

Caudal: Length of coxite 3.25 mm; length of the cerci/ length of body=0.81, length of the cerci/length of coxites IX=2.0.

Cretaceobrevibusantennis thornis, sp.nov.

Derivation of name. The species is so named because of present the I abdominal stylets.

Material. Holotype CSCLRCAB100003, ♀ (Fig.1a, c, f) housed in (CSCLR), Sanhe, China. Late Albian, Burmese amber, Myanmar.

Diagnosis. The main reasons for placing the fossil into the genus are the following characters: I abdominal sternites with 1 pair of stylets which are not ringed; terminal spines of styles short, gonapophysis IX short than urosternote IX.

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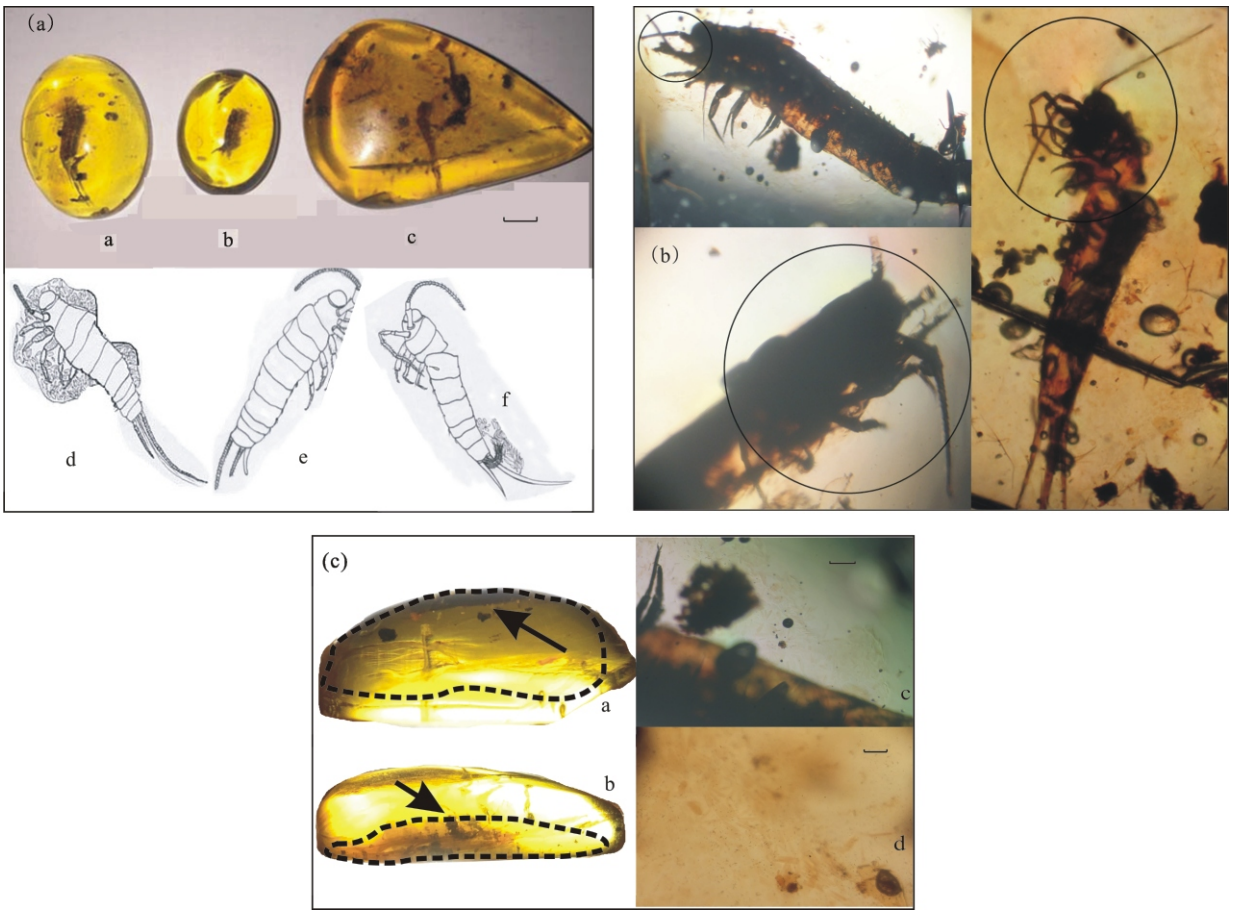


Fig. 1. (a), studied samples. Left a: CSCLRCAB100001, including female of the specimen *Cretaceobrevibusantennis hookensis* sp. nov., holotype; middle b: CSCLRCAB100002-001, showing male of the specimen *C. hookensis* sp. nov., paratype; right c: CSCLRCAB100003, showing female of the species *C. thornis* sp. nov., holotype. Scale bar = 1mm; (b), set of photographs showing the short antennae of all the three samples; (c), dark-flowing textured areas and eggs. Upper left a: dark-flowing textured areas of CSCLRCAB100001 (inside the dotted line) and the fossil bristletail (simple arrow); below left b: dark-flowing textured areas of CSCLRCAB100003 (inside the dotted line) and the fossil bristletail (simple arrow); upper right c: eggs of CSCLRCAB100001; lower right d: eggs of CSCLRCAB100003.

Description. The holotype is complete.

Head: Most of the features are the same as *C. hookensis*, sp.nov.. Antennae slightly shorter than the body without scales. Article 1 without triangulaer process; without hook on article 2 clearly protruding.

Thorax: Most of the features are the same as *C. hookensis*, sp.nov..

Abdomen: The abdominal vesicles not visible; I with 1 pair of stylets which are not ringed; terminal spines of styles short, length of the stylets/length of the spines=0.25.

Caudal: Most of the features are the same as *C. hookensis*, sp.nov.. Length of gonapophysis IX/length of urosternote IX=0.5; length of the cerci/length of body =0.5, length of the cerci/length of coxites IX=0.5.

Conclusions

The characteristics of the mature fossil bristletails with short antennaes may be determined. The increase in the length of the antenna maybe provide the exact fossil evidence for the evolution of bristletails (Fig. 1b). The purpose of the behavior of irritable ovulation of insect is to improve the survival rate, when insects are in danger, and this behavior even affects extant vertebrates and mammals (Fig. 1c).

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