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## *Cretevania bechlyi* sp. nov., from Cretaceous Burmese amber (Hymenoptera: Evaniidae)

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### Abstract

The fossil evaniid wasp *Cretevania bechlyi* sp. nov., is described based on a well preserved female specimen from Cretaceous Burmese amber. The new species is placed in the genus *Cretevania* Rasnitsyn, 1975 based on the elongation of the mid and hind trochantellus, the fore wing venation (e.g. first marginal cell triangular and broad, 2m-cu absent, second submarginal cell separated from first discal cell), the shape of the petiole (subcylindrical with distal extension) and other distinct morphological features. *Cretevania bechlyi* sp. nov. differs from all previously described species in having just 10 flagellomeres (11 in other members of the genus) and in the presence of notauli (absent in other species). The new species represents the first species of *Cretevania* from Burmese amber and significantly expands the known morphological diversity of Mesozoic Evaniidae.

**Key words:** fossil, Myanmar, systematic palaeontology, Evanioidea

### Introduction

Ensign or hatchet wasps (family Evaniidae) are distinctive solitary predators on cockroach eggs in oothecae (e.g., Deans 2005). They have a uniquely shaped metasoma with a tubular petiole and a shortened, laterally compressed gaster (*sensu* abdominal segments posterior to abdominal segment 2—URI: [http://purl.obolibrary.org/obo/HAO\\_0000369](http://purl.obolibrary.org/obo/HAO_0000369)). The world fauna comprises about 650 species in 22 extant and 12 fossil genera (Deans 2005; Deans *et al.* 2012; Jennings *et al.* 2012). Several fossil species have been described from Mesozoic ambers ranging from the Early to Late Cretaceous (e.g., Rasnitsyn 1975; Basibuyuk *et al.* 2000a, 2000b, 2002; Deans *et al.* 2004; Engel 2006; Pérez-de la Fuente *et al.* 2012), in addition to relatively derived species in Tertiary ambers (e.g., Brues 1933; Nel *et al.* 2002a, 2002b; Sawoniewicz & Kupryjanowicz 2003; Jennings *et al.* 2012 and summary therein). Several other evaniids have been described from non-amber deposits, mostly Early to Late Cretaceous as summarized in Jennings *et al.* (2012).

The dating of Burmese amber has been reviewed most recently by Shi *et al.* (2012), who concluded a late Albian—early Cenomanian age. Two evaniid species have been described from Burmese amber: *Sorellevania deansi* Engel 2006, and *Mesevania swinhoei* Basibuyuk & Rasnitsyn 2000 (in Basibuyuk *et al.* 2000b).

The most species-diverse fossil evaniid genus is *Cretevania* Rasnitsyn, 1975, which is mainly characterized by its fore wing venation and the shape of the hind legs and petiole (Pérez-de la Fuente *et al.* 2012). To date, 14 species of this genus have been recorded from different Cretaceous deposits of amber and compression rocks from Eurasia and the Middle East, the highest diversity being known from Spain (Peñalver *et al.* 2010, Pérez-de la Fuente *et al.* 2012).

Herein we provide the description of a new species of *Cretevania* from Lower Cretaceous (late Albian—early Cenomanian) Burmese amber, thus significantly expanding the known paleogeographic range of this extinct fossil evaniid genus.

## Material and methods

The amber specimen, which had been previously polished, was immersed in 50% glycerol in distilled water and photographs were taken using a Visionary Digital BK plus imaging system with a Canon EOS 5D Mark II 21.1 megapixel camera. Images were produced using Zerene Stacker, Zerene Systems LLC, software and cropped and resized in Photoshop CS5.

Anatomical terminology follows the Hymenoptera Anatomy Consortium (<http://glossary.hymao.org>); wing venation terminology follows Deans & Huben (2003). The methods outlined in Peñalver *et al.* (2010) were used to calculate the pterostigmal and wing cell ratios.

## Systematic Palaeontology

### Superfamily Evanioidea Latreille, 1802

#### Family Evaniidae Latreille, 1802 (as Evaniales)

[See Deans 2005 for full taxonomic history of the family]

#### Genus *Cretevania* Rasnitsyn, 1975

**Type species.** *Cretevania minor* Rasnitsyn, 1975 from Late Santonian Yantardakh amber (Taimyr, Russia; see Zherikhin & Eskov 1999).

[See Peñalver *et al.* (2010) for the generic diagnosis, and Pérez-de la Fuente *et al.* (2012) for a list of included species.]

#### *Cretevania bechlyi* Jennings, Krogmann & Mew, sp. nov.

Figures 1–3.

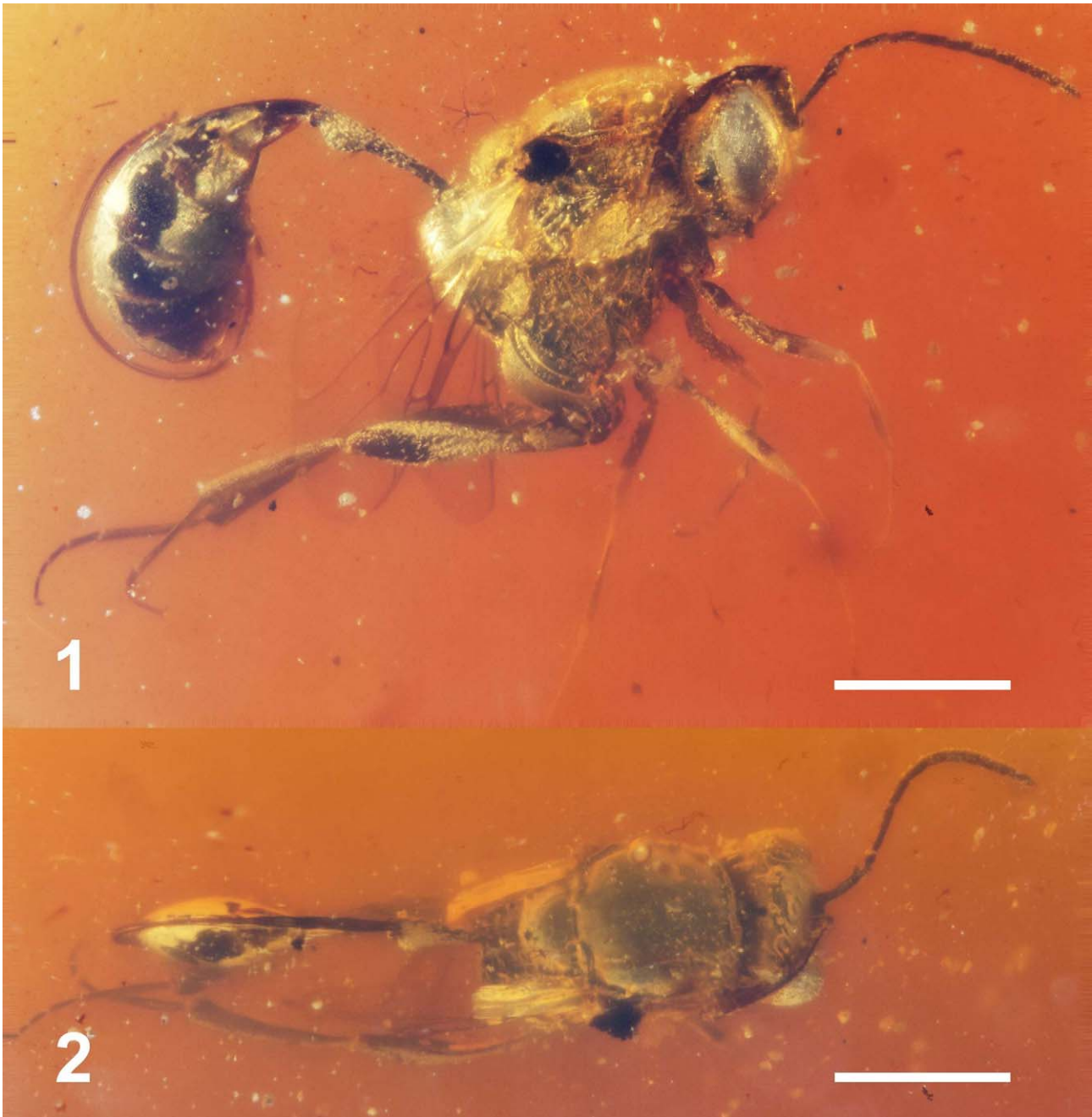
**Holotype:** Specimen SMNS BU-2, in Cretaceous amber from Myanmar (Burma). Deposited in the State Museum of Natural History Stuttgart.

Small wasp distinguished from other *Cretevania* by absence of notauli; antennae with 10 flagellomeres, not broader distally; petiole very long and thin, 11.8× longer than wide, and the following combination of fore wing characters: (1) pterostigma 4.5× longer than wide, (2) first submarginal cell 2.85× longer than wide, (3) vein 2RS nearly straight, (4) first marginal cell 4.4× longer than wide at base, (5) 1CU 1.9× length 1m-cu, (6) 1r-rs straight (i.e., not concave), arising near the pterostigma apex, (7) vein 2M nearly concave subbasally, (8) vein 2CU+3CU slightly changing its slope distally, and (9) wing apex rounded.

**Etymology.** The species epithet is named for Günter Bechly (State Museum of Natural History Stuttgart).

**Description.** Female fully winged and of small body size (total length 4.0 mm); body and gaster dark brown. Head 0.70 mm in height, mesosoma 1.35 mm in length, metasoma 2.2 mm in length; head 2.0× as wide as long; vertex 0.40× head width; compound eye 0.75 mm in height, distance between eyes 0.52 mm; distance of lateral ocellus to compound eye 0.08 mm; occipital carina narrow, complete; malar space 0.27× height of compound eye; antennae inserted slightly above mid-line of eye, toruli almost touching; distance from torulus to eye 0.12 mm; antennae uniformly thickened, with 10 flagellomeres; scape 0.45 mm in length; pedicel 2.5× longer than wide, 0.09 mm in length, first flagellomere 0.21 mm in length; flagellomeres longer than wide. Mesoscutum and mesoscutellum apparently smooth; notauli approximately parallel, percurrent, each notaulus indicated by shallow groove; propodeum areolate. Petiole subcylindrical, long and thin, length 11.8× max. width, 0.73× length of the remaining metasoma (i.e. gaster), distal third of petiole ventrolaterally expanded; gaster smooth, elliptical. Fore wing venation relatively complete: first marginal cell 4.4× longer than wide at base; first submarginal cell triangular and broad (length 2.85× max. width); 2m-cu absent; second submarginal cell separated from first discal cell; 3M and 2CU+3CU extending to wing margin; 1r-rs straight and near the pterostigma apex; pterostigma narrow, about 4.5× as long as wide; 3RS+4RS straight; 1m-cu nearly aligned with 2RS; 2cu-a angled towards wing base; 2m-cu absent; 1CU straight; 1CU 1.9× length 1m-cu. Legs elongate; hind leg robust; hind tibia slightly wider

apically; distance between fore and mid coxae about equal to distance between mid and hind coxae, pretarsal claws short, slender, simple, arolium present. Mid and hind trochantellus conspicuously enlarged. Ovipositor exerted, dorsally bent over metasoma, 2.65 mm in length.



**FIGURES 1–2.** *Cretevania bechlyi* Jennings, Krogmann & Mew, **sp. nov.** (1) lateral habitus (right side); (2) dorsal habitus. Scale bars = 1 mm.

## Discussion

The fore wing vein pattern in Evaniidae is an important taxonomic character. Most fossil evaniids have a relatively complete fore wing venation (see, for example, Basibuyuk *et al.* 2002; Deans *et al.* 2004; Rasnitsyn & Brothers 2007; Peñalver *et al.* 2010). *Cretevania bechlyi* **sp. nov.** has a fore wing venation (see Fig. 3) that corresponds well with the generic diagnosis of *Cretevania* (see Peñalver *et al.* 2010) and is most similar to that of *C. alonsoi* Peñalver, Ortega-Blanco, Nel & Delclòs 2010 from Albian Peñacerrada I amber (Burgos Province, Spain) and *C.*

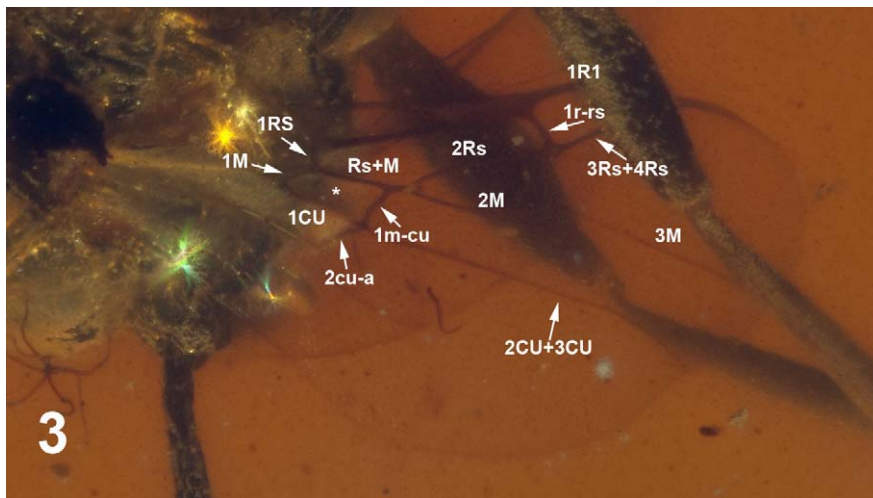
*montoyai* Peñalver, Ortega-Blanco, Nel & Delclòs 2010 from Albian San Just amber (Teruel Province, Spain) (Peñalver *et al.* 2010).

The robust hind legs, the hind tibial shape, and other hind leg characteristics are similar to other species of the genus *Cretevania* (see Peñalver *et al.* 2010).

*Cretevania bechlyi* has a very long and thin petiole (see Figs 1, 2); other members of the genus have a petiole length : max. width between 3.6 and 7.2× (Peñalver *et al.* 2012). The ventrolateral extension of the distal portion of the petiole (Figs 1, 2) is most similar to that found in *C. alonsoi* and *C. alcalai* (see Peñalver *et al.* 2010, Figs 5, 6d).

As is the case with other *Cretevania* where the ovipositor is present, *C. bechlyi* has a long, curved and up-turned ovipositor (Figs 1, 2; see also, for example, Peñalver *et al.* 2010).

We place the new species in *Cretevania* mainly based on the elongation of the mid and hind trochantellus, the fore wing venation (e.g. first marginal cell triangular and broad, 2m-cu absent, second submarginal cell separated from first discal cell) and the shape of the petiole (subcylindrical with distal extension). However, the fact that *C. bechlyi* has just 10 flagellomeres (see Figs 1, 2) compared with 11 in other members of the genus and notauli (absent in other *Cretevania* species) suggests that the generic diagnosis in Peñalver *et al.* (2010) should be expanded to encompass this new species. The alternative would be to erect a new genus, a step we are reluctant to take at present. Such a step should only be considered after further material becomes available from Burmese amber and other Cretaceous deposits which would allow a better understanding of the distribution and polarities of morphological characters in evaniid genera.



**FIGURE 3.** *Cretevania bechlyi* Jennings, Krogmann & Mew, **sp. nov.**, right fore wing. \* = first discal cell.

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