

# New insect fossils clarify systematic position of Umenocoleidae

February 1 2021, by Li Yuan

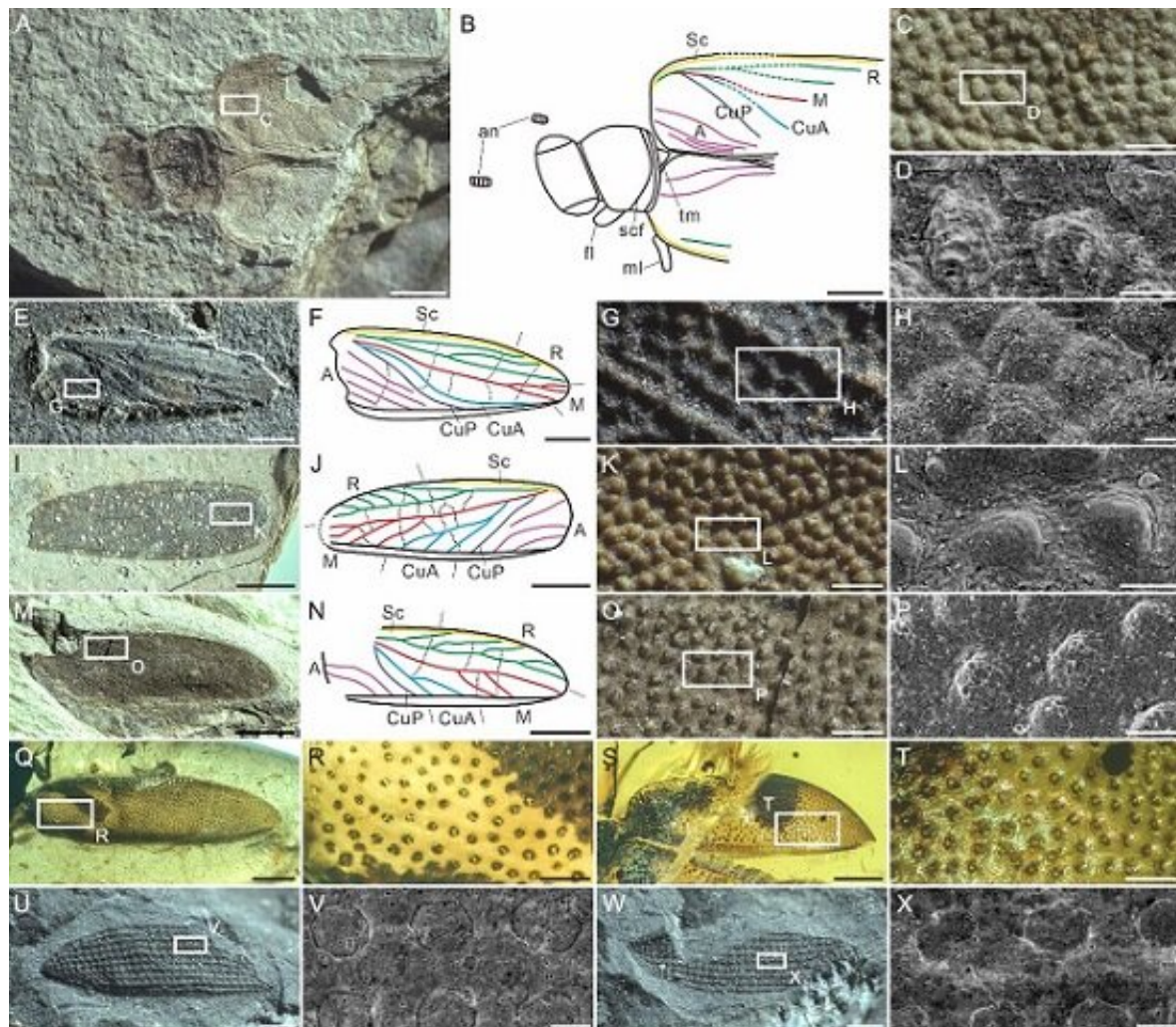


Fig. 1 Photographs and line drawings of Umenocoleidae. Credit: NIGPAS

Umenocoleidae was first discovered from the Lower Cretaceous of Yumen City, Gansu Province, northwestern China. It is one of the most perplexing fossil insect groups.

The systematic position of Umenocoleidae has long been disputed. Some scholars restrict it to its type genus Umenocoleus and retransferred it to Coleoptera, proposing the placement of Umenocoleus as sister group to all other beetles; while there are still scholars who insist on classifying it in Dictyoptera.

Recently, Luo Cihang, a postgraduate student, supervised by Prof. Wang Bo and Prof. ZHANG Haichun from the Nanjing Institute of Geology and Palaeontology of the Chinese Academy of Sciences (NIGPAS) proposed that the Umenocoleidae is likely a specialized taxon of Dictyoptera, sister to Alienoptera. The beetle-like appearance is a result of convergent evolution.

This study was published in *Palaeoworld* on Jan. 23.

The researchers described three new specimens from the Lower Cretaceous Zhonggou Formation of Yumen City, one of the type species, and two forewings of Ponopterix, a genus potentially closely related to Umenocoleus.

They re-examined the forewings of *U. nervosus* from the Lower Cretaceous Dalazi Formation, and two additional species preserved in mid-Cretaceous Kachin amber.

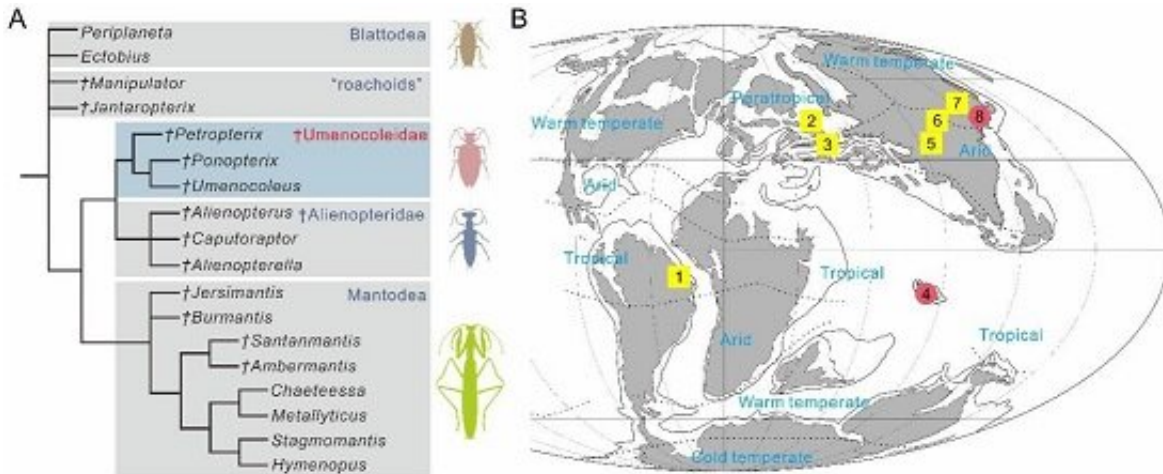


Fig. 2 Systematic position and distribution of the Umenocoleidae. Credit: NIGPAS

The results revealed that though cup-shaped punctures on the forewings of Umenocoleidae were superficially similar to the window punctures of stem-group Coleoptera and extant Archostemata, their micro-structures were different.

The researchers also carried out a [phylogenetic analysis](#) based on a matrix with 72 characters and 36 terminals, which provided robust evidence that the Umenocoleidae is a specialized taxon of Dictyoptera, sister to Alienoptera.



Fig. 3 Ecological reconstruction of Umenocoleidae. Credit: LI Jiahao

Umenocoleidae was a successful globally distributed family during the Early Cretaceous but had never been discovered from the Late Cretaceous, which probably accompanied by the decline of gymnosperms and in competition with wood-associated polyphagan beetles. Umenocoleidae (and also Alienopteridae) were apparently a failed attempt of roachoids to occupy a new microhabitat.

**More information:** Ci-Hang Luo et al. Beetle or roach: systematic position of the enigmatic Umenocoleidae based on new material from Zhonggou Formation in Jiuquan, Northwest China, and a morphocladistic analysis, *Palaeoworld* (2021). [DOI: 10.1016/j.palwor.2021.01.003](https://doi.org/10.1016/j.palwor.2021.01.003)

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