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ABSTRACTS

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A new family of orussomorph wasps from Cretaceous Burmese amber

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Orussomorpha is a small group of Hymenoptera sharing the features of two major hymenopteran lineages: sawflies (Symphyta) and wasps (Apocrita). Being formally assigned to Symphyta based on its abdominal structure, Orussomorpha displays numerous apocritan apomorphies, such as a parasitic lifestyle, flexible articulation between 1-st and 2-nd abdominal segments, and reduced wing venation. Being a transitional form between Symphyta and Apocrita, Orussomorpha is essential for understanding the origins of Apocrita – the most diverse and abundant hymenopteran lineage. In the Extant Fauna, Orussomorpha is represented solely by the family Orussidae with few fossil records: only two specimens described from the Cretaceous and two others from the Cenozoic. However, two extinct orussomorph families, namely Karatavidae and Paroryssidae, are rather abundant, known from the Jurassic and Cretaceous.

Examining the Burmese amber collections of Nanjing Institute of Geology and Paleontology, Chinese Academy of Sciences, we revealed two specimens of enigmatic wasps having one of the most striking Orussidae features – an ocellar corona (two rows of backward-pointed teeth around the middle ocellus). However, differences in wing venation, 14-segmented antennae attached high above clypeus, and other characters suggest that these two specimens strongly differ from other orussomorph families and should be assigned to a new family within Orussomorpha.

Our cladistic analysis shows that the new family is the sister group to Orussoidea (Orussidae + Paroryssidae), and that they, forming a

monophyletic group, further become a sister towards Apocrita.

The two specimens, one of which is the best preserved orussomorph fossil, reveal some morphological characters unknown from other fossils of this group: all legs bearing prominent lanceolate lobes on the 3rd tarsomeres. A similar structure serves as a part of the vibration sensor in Orussidae and Stephanidae, but is located only in fore (Orussidae) or hind (Stephanidae) legs. Based on the presence of a vibration analyzer used for host search inside wood, we suspect that the new Burmese wasps were the wood-host parasites, much like extant orussids.

The new findings are also important for confirmation of the “size reduction hypothesis”, proposed by Rasnitsyn (1969, 1980) and discussed by Vilhelmsen (2004). According to this hypothesis, the ancestors of Apocrita underwent a considerable size reduction. The tiny size of the new orussomorph fossils (body length ~2.5 mm) can be regarded as indirect evidence of the size reduction hypothesis.