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True hoppers and hopperity of the mid-Cretaceous and its importance

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Burmese amber contains the most diverse biota in amber from the Cretaceous. During the last 100 years, Burmese amber has received worldwide scientific interest and more than 480 families of plants, fungi and animals have been reported. Among the immense variety of insects entombed in Burmese amber, the Diptera, Coleoptera, Hymenoptera, and Hemiptera are the most diverse orders. A few striking examples of recent findings of true hoppers – planthoppers (Fulgoromorpha), leafhoppers, treehoppers, froghoppers, cicadas and their relatives (Cicadomorpha) – are given below.

The term “hopperity” was introduced in 2017 by Szwedo, and it can be explained as a play of words – a one-word descriptive term covering taxonomic diversity, morphological disparity, good quality and relatively high quantity of the inclusions of the hoppers among the Burmese amber inclusions.

Fulgoromorpha – families including the extant Cixiidae and Achilidae, as well as the extinct Jubisentidae, Lalacidae, Mimarachnidae, Neazoniidae and Perforissidae – can be found. A preliminary overview of the inclusions deposited in various institutions and available for study revealed maybe ten or more taxa deserving familial status. The most troubling were the inclusions which could be placed in a Cixiidae-like lineage, leading to questions of family monophyly, definition and diagnostic characters, as well as content and classification.

Cicadomorpha representing the Clypeata clade – Tettigarctidae (hairy cicadas), previously known as fossils exclusively from sedimentary

deposits – were recently described for the first time as inclusions in amber. The representatives of singing cicadas, the Cicadidae, were described based on nymphal specimens, but these data must be verified. The groups in question are extremely rare among the inclusions, probably due to taphonomic biases of preservation as inclusions, not their scarcity in paleoenvironments.

Sinoalidae – an extinct family related to froghoppers previously recognized from the Middle Jurassic Daohugou Biota and coeval strata of northeastern China, were reported for the first time as inclusions. Another family – Aphrophoridae was also listed, but presence of this family among inclusions needs to be reinvestigated and confirmed.

Cicadellidae (leafhoppers), recently the most speciose and diverse family, are also present as inclusions in Mid-Cretaceous Burmese amber. Representatives of the subfamilies Ledrinae, Signoretiinae and Coelidiinae were already known, but more await formal descriptions. The whole-bodied fossils entombed in amber will give new insight on the morphological characters, diversification of the family, and process of ‘leafhopperisation’ of these insects.

The extinct bizarre family Minlagerrontidae was recently described, representing the Hylcelloidea, believed to be ancestral to modern superfamilies.

The period documented by Burmese amber biota has been the most crucial for the understanding of the evolution of modern true hoppers, and the hopperity presented by these fossils reflects the rapid diversification and extinction among them.



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