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ABSTRACT BOOK

Editors

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NOTE: the abstracts are listed alphabetically based on the family name of the first author of each abstract.

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The hoppers' case – are fossils Cheshire cats?

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The groups of hemipterans known as ‘auchenorrhynchous hoppers’, which includes planthoppers, cicadas, froghoppers, leafhoppers, treehoppers, and their relatives, comprises approximately 47,000 described species in 70 families. Their evolutionary history dates back to the Carboniferous. Since then, they have undergone numerous moments of origin, extinction, ecological and co-evolutionary challenges, and shifts. Due to the complexity of their evolutionary history, their classification is still a subject of long-standing debate, leading to many uncertainties and subjective opinions. While the process of grouping organisms, both living and extinct, based on similar characteristics is known as classification, phylogeny refers to the evolutionary history of a species or group, particularly in relation to lines of descent and relationships among broad groups of organisms. Most modern and robust phylogenies are based on molecular data that use terminal taxa to represent the crown groups, compiled then with the fossils for divergence time calibration. The results in patterns of branching can be used to test existing classifications, which are often based solely on morphology, and to propose new and stable ones. The use of fossils in classifications can raise new questions and challenges as they are frequently used to represent branching nodes of crown groups, supporting diversification events. Such treatment, however, may not always be accurate and should be approached with great caution. Fossils treated as representatives of crown lineages can be both justified and unjustified. They can be seen as ancient representatives of a particular lineage due to their morphological similarity to the crown group under scrutiny. However, it is important to note that the fossil record of a lineage is never complete, and the first or last organism of a lineage may not be preserved. Molecular phylogenies deal with crown taxa that represent lineages. However, extinct species may not always fit morphologically into these lineages. Fossils offer valuable insights into morphological differences and can represent lineages leading to crown groups or their sister counterparts, but they are often treated as high units in classifications due to their unique morphology, despite the possibility of their extinction resulting from specialized adaptations, biotic and abiotic changes, and other factors. The question is: should they be excluded from evolutionary hypotheses? Various ‘auchenorrhynchous’ hopper lineages have appeared and disappeared in the fossil record. Some of them can be linked to current lineages, while others cannot. The traceability of some lineages is greater than others, and some are only partially visible on evolutionary trees, such as the famous Cheshire Cat. These fossil insects have witnessed a wide variety of abiotic and biotic events that have created both opportunities and bottlenecks, promoting some lineages while limiting others.