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Unity, diversity and conformity of bugs (Hemiptera)

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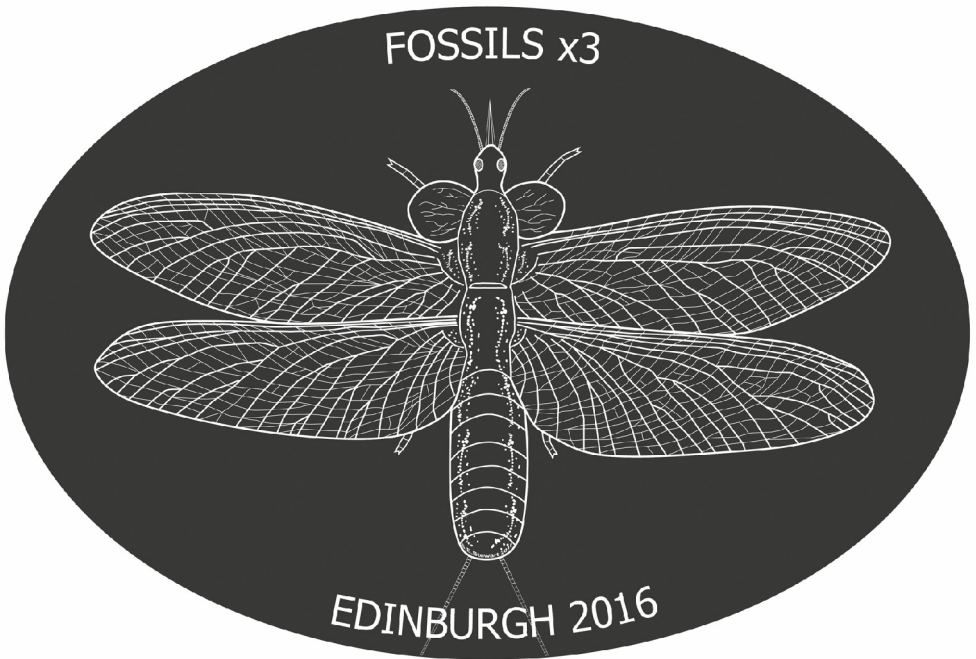
ABSTRACTS

Edited by
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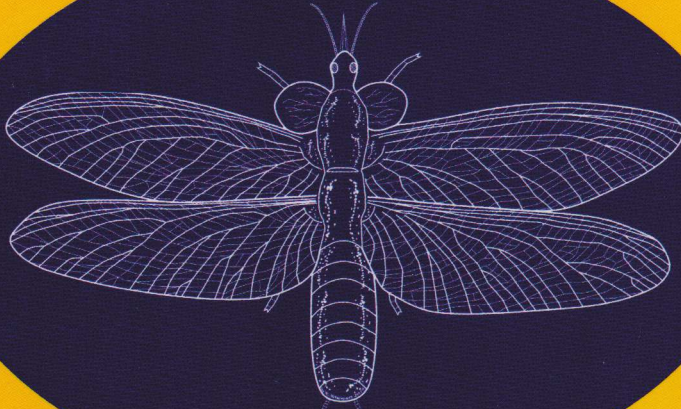
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True bugs, order Hemiptera, are an incredibly diverse and successful group, with nearly 300 extant and extinct families known (they represent one of the Big Five insect orders), inhabiting all terrestrial and some marine habitats. The order has a long and complicated evolutionary and taxonomic history. Since the Carboniferous their evolutionary history has incorporated many originations and extinctions, ecological shifts and revolutionary changes. Since the time of Linnaeus, the views on their scope and classification have varied. The recent opinion of Hemiptera comprising six suborders seems to be corroborated. However, the monophyly and relationships between the subunits are still the subject of debate. The first division of ancient Hemiptera took place in the Carboniferous – sternorrhynchan lineage vs. euhemipteran lineage. Euhemiptera are believed to be monophyletic, the monophyly of sternorrhynchans is disputable. This is not only based on the fossil record and its interpretation, but also the different evolutionary strategies, range of adaptations and heterogeneity presented by the Hemiptera. Firstly, global events (climatic, abiotic) influenced the history of the hemipterans in different ways. Secondly, biotic changes, such as host availabilities, host shifts and adaptations have shaped the evolutionary scenarios of the bugs. Thirdly, long-term interaction with various internal symbionts and external partners, have carved their marks on the evolutionary traits of the group.

Viewed from one angle, the Hemiptera can be treated as a uniform, monophyletic group, presenting number of autapomorphies, recognisable in both extinct and recent forms. However, the other side of the coin is rather blurred. The very early stages of Hemiptera evolution remain virtually unknown. A number of questions concerning the formation and specialisation of the rostrum remain unanswered. The head capsule structure needs to be reinterpreted. The wing structure, venation pattern (including a homologous nomenclature) still need to be elaborated. The genital structures and the homology of these elements are still disputable. The behaviour and other biological features, such as sound production, chemical communication, wax production and use, need attention. The endosymbiotic interactions and their influence on food-adaptations and evolutionary processes are still far from understood. The mutualistic interactions with other organisms is another challenging field of research. Some of these questions and problems can be at least partly answered with fossils. The uniformity of the Hemiptera in some features, juxtaposed by the enormous diversity in others, high adaptability to various conditions, and developmental plasticity are all phenomena that are recorded in fossils. The evolvability of the Hemiptera and their potential for great diversification, make the study on this group frustrating on one hand, but fascinating on the other.

FOSSILS x3



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