



Cave cricket capers: An extraordinary diversity and evolutionary history revealed by molecular phylogenetics (Orthoptera: Rhaphidophoridae).

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Cave crickets (Orthoptera: Rhaphidophoridae) are an understudied group of insects that act as keystone species in subterranean habitats. In the remnants of Gondwana—South America, South Africa, Australia, and New Zealand—the fauna is exclusively comprised of members of the ancient subfamily Macropathinae. While the New Zealand fauna have undergone something of a taxonomic renaissance in recent years, Australian cave crickets remain poorly known. Yet, several Australian species are at formal risk of decline, and local extinctions have been observed nationwide. Unfortunately, no taxonomic work has been undertaken on the Australian fauna for almost fifty years. There is clearly a need to revitalise research into this understudied, and often underappreciated, group of insects. Here, we detail how we are using molecular phylogenetics to illuminate new taxa, as well as an enigmatic evolutionary history, of this ancient orthopteran lineage. The entire Southern Hemisphere fauna have a Tasmanian origin, with at least three subsequent evolutionary origins for the remainder of the Australian Rhaphidophoridae. Phylogenetic evidence also suggests the existence of new species (and at least one genus) in Queensland, New South Wales, Victoria, and Tasmania, both in subterranean and above-ground habitats.

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