



The unknown highly diverse and endemic invertebrate communities of forest floors in south-eastern Australia threatened by the new fire regime.

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Terrestrial decomposer communities play a crucial role in forest biodiversity. However, many invertebrate groups within these communities, such as millipedes, arachnids, and crustaceans, remain poorly described. To better understand the impact of the 2019/2020 megafires on this vulnerable community, we conducted a survey of litter-dwelling invertebrates in fire-affected rainforest and wet forest sites in South Eastern Australia. We employed a pooled-DNA barcoding approach from a subset of the invertebrates collected and discovered significant evolutionary diversity among crustaceans, arachnids, and myriapods, along with substantial evidence of short-range endemism. We also found very high levels of regional evolutionary diversity and substantial community turnover between regions. It's noteworthy that none of the groups we studied were listed as priorities to determine the impact of the Black Summer fires, however our studies indicate that more than 60 billion litter invertebrates were consumed by the fires. Given that short-range endemics are clearly at risk from landscape-level fires, our results underscore the urgent need for comprehensive systematic studies of these vulnerable invertebrate fauna. Whilst this is clearly a substantial task, our research suggests that conducting landscape-level studies on endemism at the community level may offer a solution to the taxonomic challenges associated with these groups.

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