



## **Response of high southern latitude herbivorous arthropod guilds to the collapse of glossopterid forests during the end-Permian biotic crisis**

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The upper Permian to Middle Triassic continental succession of the Sydney Basin, Australia, is rich in plant fossils, well constrained by radiometric dating of tuffs and palynostratigraphy, and has been subjected to detailed sedimentological and geochemical studies. This succession represents an ideal testing ground for assessing plant-arthropod interactions through the Permian–Triassic extinction and recovery phases. Broad-leafed glossopterid gymnosperms overwhelmingly dominated the high-palaeolatitude wetland communities of the Sydney Basin during the Permian. The abrupt collapse of glossopterid ecosystems and cessation of peat accumulation characterizes the end-Permian extinction in the Sydney Basin. Succeeding plant assemblages from a <5 m package of dark shales immediately overlying the uppermost coal seam are characterized by peltaspermalean seed-ferns and voltzialean conifers with small sclerophyllous leaves together with herbaceous pleuromeian lycophytes, ferns and sphenophytes. Plant assemblages progressively diversify through the Lower Triassic succession, with corystosperm taxa becoming dominant during the Olenekian. A general increase in leaf size among the dominant plants and the re-appearance of coaly laminae suggests a return to more humid conditions near the end of the Early Triassic. Arthropod damage is common and diverse on Late Permian glossopterid plants across Gondwana. Damage features on immediate post-EPE plant remains are sparse and dominated by simple margin-feeding injuries. A stepwise increase in insect damage abundance and complexity is evident through the Early Triassic, attesting to the tandem recovery of plant and terrestrial arthropod communities.