

Fossil trove sheds light on ancient antipodean ecology

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Flake of clear yellow amber from Anglesea, Victoria containing a new, beautifully preserved biting midge ca. 41 million years old. Credit: Enrique Peñalver.

The oldest known animals and plants preserved in amber from Southern Gondwana are reported in *Scientific Reports* this week. Gondwana, the supercontinent made up of South America, Africa, Madagascar, India, Antarctica and Australia, broke away from the Pangea supercontinent around 200 million years ago. The findings further our understanding of

ecology in Australia and New Zealand during the Late Triassic to mid-Paleogene periods (230-40 million years ago).

Jeffrey Stilwell and colleagues studied more than 5,800 amber pieces from the Macquarie Harbour Formation in Western Tasmania, dating back to the early Eocene Epoch (~54-52 million years ago) and Anglesea Coal Measures in Victoria, Australia, from the late middle Eocene (42-40 million years ago). The authors report a rare "frozen behaviour" of two mating long-legged flies (Dolichopodidae). The specimens also include the oldest known fossil ants from Southern Gondwana and the first Australian fossils of 'slender springtails', a tiny, wingless hexapod. Other organisms preserved in the amber include a cluster of juvenile spiders, biting midges (Ceratopogonidae), two liverwort and two moss species.

The authors also studied deposits found at locations in southeastern Australia, Tasmania and New Zealand. These include the oldest reported amber from Southern Pangea dating back to 230 million years ago, 96-92 million year old deposits from forests near the South Pole and an intact fossil of an insect called a felt scale (Eriococcidae) from 54-52 million years ago.



A rare example of ‘frozen behavior’ in the fossil record of two mating, long-legged flies in clear, honey-colored amber from Anglesea, Victoria ca. 41 million years old. Credit: Jeffrey Stilwell.

The findings provide new insights into the ecology and evolution of Southern Gondwana and indicate that there may be a vast potential for future, similar finds in Australia and New Zealand.



A large piece of amber with an association of two flies (long-legged on left and biting midge on right) with the first ever Australian fossil of a large mite of the extant genus, *Leptus*, Anglesea, Victoria, ca. 41 million years old. Credit: Enrique Peñalver.

More information: Amber from the Triassic to Paleogene of Australia and New Zealand as exceptional preservation of poorly known terrestrial ecosystems, *Scientific Reports* (2020). [DOI: 10.1038/s41598-020-62252-z](https://doi.org/10.1038/s41598-020-62252-z) , www.nature.com/articles/s41598-020-62252-z

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