

## **Out of Africa repeated? On the tribal composition of southern Ennominae and the origin of Geometridae**

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The tribal composition of the ennomine faunas of the former Gondwanan provinces of southern Africa, Australia and the Neotropical Region, as well as of the geologically much younger island of Borneo as a surrogate for the Oriental Region, was compared. The total fauna is represented by 20 tribes and a total of 4725 species. Fifteen tribes each have been recorded from southern Africa and Borneo, 14 from Australia, and 8 from the Neotropical Region. Most tribes have a surprisingly wide distribution: the species-rich tribes Boarmiini, Baptini/Caberini, Macariini, and Cassymini occur in all four areas; six tribes (Hypochrosini, Eutoeini, Scardamiini, Abraxini, Plutodini, and Lithinini) are common to the three Old World areas, with Abraxini also being present in the Nearctic and Palaearctic Regions, and Lithinini in the Nearctic. Indeed, with the exception of Diptychini in the Afrotropical Region and Nephodiini (which may fall within the concept of Ourapterygini), surprisingly no endemic tribes have evolved in any of the regions, despite their sometimes longstanding geographical isolation, as in the case of Australia.

The fossil record for the Geometroidea dates back to the early Cenozoic only, making vicariance an unlikely explanation for the wide distribution of many tribes in the southern hemisphere, given that the Gondwanan landmasses were well separated by the late Cretaceous. Conversely, with some notable exceptions, Geometridae have limited powers of dispersal. Dispersal alone therefore remains equally unsatisfactory at present to account for the distributions described.

Southern Africa is tentatively identified as the centre of origin of Geometridae as a whole based on the presence of the endemic, relictual cycad-feeding tribe Diptychini, which is likely to be of Mesozoic origin. Diptychines are the putative sister-group to Nacophorini, which have speciated extensively in Australia, probably prior to the arrival of more modern groups, but are represented in the Nearctic and Neotropical Regions as well. Larvae of Diptychini possess a full complement of prolegs and walk in the normal lepidopteran fashion. In the temperate Archiearinae, usually considered the most primitive subfamily, prolegs are also normally developed, but the larvae progress in a looping manner.

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