

## Australia's subantarctic Tropics – a contradiction?

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The tropical rain forests of northeastern Australia harbour a multitude of carabid beetles that divide into a group of old, indigenous faunal elements with close relationships to the cool-adapted southern, circumantarctic ("Bassian") fauna, and a second group of warm-adapted species of oriental ("Torresian") origin which immigrated into Australia since about 10 Mio years ago (late Miocene). Recent surveys reveal that the majority of "oriental" carabids occur in the warm lowland rain forests, whereas the indigenous species almost exclusively range in the cooler montane rain forests above c. 700 m. Although the number of genera is almost the same, the number of species in the "Bassian" group is about three times as great. This disproportion probably is caused by plate tectonics and subsequently also by the ef-

fects of Ice Age, because the immigrating Torresian faunal elements were not able to colonize the uplands, where – during repeated periods of expansion and retreat of the cool montane rain forests during Ice Age – the Bassian faunal elements not only had survived, but also experienced a period of rapid evolution and speciation.

Hence, at least as the faunal boundary between the Bassian and Torresian subregions is concerned, the classical concept of well confined faunal subregions in Australia cannot be maintained, because the Australian tropical rain forest carabid fauna to a large extent is subantarctic. It is this old, indigenous element that mainly was responsible for the northern Australian rain forests to become a "Hot Spot" of evolution.

## Phylogenetic significance of skeleton-muscular anatomy of the genitalia in Geometridae

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Examination of the male genital musculature in Geometridae could provide important information for clarification of phylogenetic relationships at the tribe and genus group level. Genera *Petrophora*, *Scionomia* and *Ocoelophora* from Lithinini have strongly different structure of the genital skeleton, but their arrangement of phallic muscles is quite similar and shows clearly a synapomorphic state. A similar situation is between the genera *Angerona* and *Diapre-*

*pesilla*, which have rather different appearance and male genitalia but their genital musculature is similar. Combining characters of the genital musculature and skeleton supports the synonymy of Angeronini and Diaprepesillini well. On the other hand, the clustering of Angeronini with the *Ennomos*-like series of tribes is not supported by the characters of genitalic musculature. The shape of the genital segment, and the dorsal attachment of the adductor of

the valva to the tegminal area, provide possible synapomorphies of Angeronini with the *Hypomecisl*-like series of tribes. Genus *Devenilia*, which is superficially similar to Baptini members, has an arrangement of male genitalia musculature that is quite different from typical Baptini and unique for the examined Ennominae. A combination of apomorphic skeletal and muscle characters supports the

erection of *Devenilia*, together with possibly related genera, to a separate tribe. Thus, involving the genitalic musculature in taxonomic and phylogenetic research results in an increase of analysed characters, and enables the discovery of apomorphies for relationships between morphologically diverse genera as well as for distinction in superficially homogeneous groups.

## The species of the neotropical genus “*Trocherateina*” (Larentiinae)

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The present studies were aimed to examine morphological and genitalic characters of all species of *Trocherateina* to estimate their relation with the genus *Erateina* Doubleday.

According to recently published Geometrid Moths of the World catalogue edited by Malcolm J. Scoble (1999), the Neotropical genus “*Trocherateina*” (Larentiinae) consists of eight species. However, there is no published reference available, as well as no species was designated as a type species of “*Trocherateina*”. In the research collection of the Natural History Museum, London, the name of the genus was marked as a manuscript name proposed by Prout to separate eight distinct species from the genus *Erateina* Doubleday where they have been originally described. Of these eight species, four were described by Druce (*buckleyi*, *cyris*, *hermaea* and *uecysia*), two by Schaus (*cachara* and *delecta*), one by Walker (*specularia*) and one by Felder & Rogenhofer (*pohliata*).

In their geographical distribution species of “*Trocherateina*” occur at lower elevations in mountains ranging from Mexico to Bolivia. One species (*delecta*) is probably endemic to Costa Rica. The only two known specimens (females) of this species were collected at the elevation of 2300 m on Mt Poas. The other three (*cachara*, *cyris* and *specularia*) are distributed from Mexico to Guatemala at the elevation of about 1000 m and the remaining four species occur from Venezuela to Bolivia with only *T. hermaea* reaching the elevation of 2300 m.

One of the most striking morphological struc-

ture discovered in males of all species, except of *T. buckleyi* Druce, is a peculiar scent organ situated in a concave fold made by the wing membrane near the basal part of CuA vein on the dorsal side of forewings. Only very narrow slit visible between the edge of the fold and the wing membrane marks the way inside the organ. When the walls of the fold are pushed open, very small finger like scales projecting inwards are revealed. They probably serve as a containers for storage of a male pheromone. In addition a bunch of a very long, heavily sclerotized hair like scales originating from the basal part of the vein R are hidden under the fold. They may serve as a surface for the evaporation of a male pheromone when released from beneath the fold in the presence of a female.

The wings are triangular in shape, slightly narrower in males than in females with black or dark brown background and large iridescent white, semi-transparent spots covering central parts of both wings. By the contrast to black scales that are of typical shape and make ground colour of the wing, scales that cover white areas are strongly bent upwards. No areole is present on forewings.

In male genitalia valvae are elongated, trapezoidal or rounded with a pronounced, hardly sclerotized thorn-like processes located at their ventral part. In *T. pohliata* and *T. cachara* those processes are asymmetrical in both, the shape and length and occur on the ventral margin of the valvae. The asymmetry between the left and right valvae is also marked by differently sculptured surfaces. Uncus is beak like,

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