

## Keynote address

### Cape Range caves changed understanding of Australian biogeography – rainforest and tethyan troglobionts

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In 1987 I was invited by Brian Vine to participate in a caving trip to Cape Range, an invitation that profoundly changed both my research and ultimately our understanding of the biogeography of Australia. This is that story. Brian had been making observations on a micro-whipscorpion in C18 and C106 following a visit there by Jackie Lowry in 1984. At the time no micro-whipscorpion had been described in Australia and their presence in arid Cape Range was incongruous as they typically inhabit rainforests. This short trip led to a series of expeditions (1988–1990) and the recognition of a diverse relictual rainforest fauna in Range caves. The work was extended to the coastal plain (1993) and opened up a completely different horizon. There, seawater intrudes below the fresh groundwater forming an anchialine ecosystem that contains aquatic species, mostly crustaceans, being members of higher taxa (Class, Order, etc.) comprising the tethyan assemblage, many being found for the first time outside the Atlantic Ocean. The techniques developed on Cape Range were extended to other karst regions (Barrow Island, Kimberley Devonian reefs, Christmas Island) identifying regionally distinct subterranean faunas on each and anchialine faunas on two.

However, the biggest surprise came when the techniques were extended to long emergent western Australian plateau. These non-karst areas mostly lack caves and the subterranean realm was accessed by boreholes yielding a great diversity of both terrestrial and aquatic troglobites. Mostly, each species occurs in only a small area, including 100 or so species of blind diving beetles, more species than occur on the surface. Despite this there is a total change in the subterranean fauna between the Pilbara and the Yilgarn, the cause of which is not apparent. A common theme arising from this more intensive research is the wet forest origin of many of the lineages now living as troglobionts in this now arid area, isolated underground by increasing in the Mid- to Late Tertiary.

The invitation to join Brian has led to 1000s of new species being discovered, numerous higher order taxa new to Australia and even the Southern Hemisphere. Australia, rather than being a troglobite poor continent, is vying for top rank in the global troglobiont stakes, a far cry from the poverty of the subterranean fauna so recently argued *to be the result of aridity*. The caver community has made a pivotal contribution to the development of these studies which themselves have been instrumental in raising awareness for the protection for subterranean fauna and karst landscapes.



A Micro-whipscorpion (Schizomid) from Papillion Cave (Photo Tim Moulds)

