

THE DISTRIBUTION AND POSSIBLE ORIGINS OF TASMANIAN CAVE CRICKETS

by

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Read by Albert Goede)

Cave crickets have been recorded from 14 of the limestone areas in Tasmania, and are widely distributed throughout the island. They also occur in granite caves, mine adits and on the surface. So far nine species are known belonging to three genera. *Micropathus* Richards extends throughout the western and southern parts of Tasmania, and a single specimen is known from a granite cave near Scottsdale in the north-east. It appears to be the dominant genus on the island. *Parvotettix* Richards occurs in the northern, central and eastern regions. The two genera overlap in caves at Mole Creek in the north and the Florentine Valley in the centre. They converge at Mt Cygnet in the south-east where they occur in different mine adits, and at Hobart where *Micropathus* occurs on Mt Arthur at an altitude of 1040 metres, while *Parvotettix* occurs almost at sea level (Richards, 1970). *Cavernotettix* Richards is a Mainland Australian genus (Richards, 1966), extending from the Southern Highlands of New South Wales to the Furneaux Islands in Bass Strait (Richards, 1967). It is associated with *Parvotettix* in caves on Flinders Island and Cape Barren Island, but has not been recorded from the Tasmanian mainland.

The distribution of the four species of *Micropathus* suggests that in the past they were influenced by Pleistocene glaciation. They may have been forced out of much of the central-west by the extensive glaciation in this area, and, due to geographic isolation caused by unfavourable conditions, speciation eventually occurred. *M. tasmaniensis* Richards became established in the south-east, *M. cavernicola* Richards in the coastal central-west and *M. fuscus* Richards in the north-west (Richards, 1964, 1968). The close relationship between the species suggests that speciation has been comparatively recent. The present day distribution of the species indicates that they have re-colonised the central-west after the retreat of the ice and the return of a milder climate. *Micropathus montanus* (Richards, 1971) is paler than the other species in the genus, and the fact that it has a limited range and occurs at a relatively high altitude in the centre of the glacial region suggests that it may have been established there for a considerable period of time.

While Pleistocene glaciation may have influenced the distribution of *Micropathus*, there is no evidence that it had any effect on the distribution of the four species of *Parvotettix*. Apart from the Florentine Valley/Junee area and Mt Rex, this genus is established in coastal and lowland regions (Richards, 1968, 1970, 1971).

Cave crickets are wingless insects, extremely sensitive to temperature changes and requiring a very high relative humidity, so they are unlikely to be carried passively across Bass Strait by strong winds. *Cavernotettix* probably reached the Furneaux Islands via the land bridge which extended from Wilson's Promontory to Flinders Island during the Pleistocene and until as recently as about 10,000 to 15,000 years ago (Jennings, 1971). *Micropathus* and *Parvotettix* may also have used this land bridge to reach Tasmania. As neither of these genera show close affinities with south-eastern Mainland Australian genera, they probably either migrated to Tasmania before the Pleistocene or they have evolved independently in Tasmania. The Furneaux Islands were also connected to north-eastern Tasmania during the Pleistocene and up till about 8,500 to 10,000 years ago (Jennings, 1971), thus permitting *Parvotettix* to migrate there from Tasmania. As the last land bridge between northern Tasmania and Flinders Island was about 1,500 years later than that between Wilson's Promontory and Flinders Island, this could explain why *Parvotettix* is not known from Victoria or southern New South Wales, and it supports a Tasmanian origin for this genus. It is strange that migration between Tasmania and the Furneaux Islands should have been in one direction only, and that *Cavernotettix* has been unable to cross Banks Strait and establish itself in north-eastern Tasmania.

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DISCUSSION

(answers by Albert Goede)

- Q *Are the different genera readily identifiable by naked eye?*
- A *Micropathus* and *Parvotettix* are very distinct from each other. *Parvotettix* is much smaller, it has very pronounced spines on its legs and with experience you discover it has a different way of sitting on the rock surface. It positions its hind legs so that the upper and lower part actually touch whereas *Micropathus* has its hind legs more extended. Normally *Parvotettix* is overlooked but when you have had some practice in collecting you do in fact very readily distinguish the two genera. *Parvotettix* occurs as individuals sometimes mixed up with a large population of *Micropathus* and unless you are looking for it you are likely to miss it completely.
- Q *May I ask whether there are linkages apparent between Micropathus and the New Zealand fauna?*
- A I have no idea. I think at one stage, this is quite some time ago, Aola said that there were fairly close links between *Micropathus* and some New Zealand genera but just how close this link is I wouldn't be able to say.
- C *I have friends doing some biological collecting in the Kent Islands. They may be able to collect from caves there.*
- A I think the places to look for them in the Kent Islands would be mutton bird burrows as there are no known caves there.
- C *There is a large cave on one of them.*
- A A sea cave or a limestone cave?
- C *It is quite a large dry cave in granite.*
- A It would be a possible habitat.
- Q *What is the association of cave crickets with caves in their multiplication? How much do they rely on caves?*
- A They appear to spend the whole of their life cycle within the cave. During the night at least a portion of the population appears to move out. Elery would be able to tell you more about this, but the whole life cycle is apparently completed in the cave except that the population is dependent on an outside food supply and therefore has to move out during the night.
- C At the tourist end of Newdegate at Hastings, if a party enters during daytime or early evening, and comes out late at night, going in you won't see a cricket anywhere, coming out you see literally hundreds of them, hanging off the gate, the walls and the rocks.
The first collection of a new species of *Micropathus* was made completely by accident. When returning from the top of Mt Ronald Cross late at night, we were walking down the road back to the cars and one of the lads had his headlight on and saw what he thought was a spider on the road. This turned out to be a new species of *Micropathus*. At a lower altitude we collected *M. tasmaniensis* in some fissures at Davis Creek. I suspect that in this area *tasmaniensis* does not rely on caves at all because of the ecological conditions present. A later collection of the same new species was from the twilight zone in Virgo Cave at an altitude of 3100 feet.
- Q *Is it known what these things live on? I was thinking of Micropathus in particular.*
- A Their habits have been described in detail for two Tasmanian species. Dr Richards came over here and made a close study of these. They appear to be omnivorous and apparently can even be cannibals.
- C *They definitely can be cannibals. If you collect half a dozen and put them in the same tube you end up with one or two very fat ones.*
- C *Having seen hordes of them in some of the old mine adits on Mt Jukes and Mt Darwin they must be just about self-perpetuating unless they live on bauera.*

- C *If I can make one other comment on this business of their biological relation to the cave, I sometimes suspect they are a bit like the glow-worm. Everyone sees thousands of glow-worms in caves and about the only ones collected are from caves. If you search carefully you find them all over the place in fern gullies, but you really have to look for them. Now I suspect the same is even more true for cave crickets. They live in places like fern gullies. They are even harder to see than the glow-worm because they not only don't glow but they are negatively phototropic and if you wander around with a light looking for them, if they can, they will get away from you. As far as I know there has been done very little collecting of the kind which would reveal them in the bush. It would need to be very specialized collecting or something like the lucky chance just described. I suspect they may be there.*
- A I think the very fact that they live in mine adits in non-limestone areas gives a certain indication that they must occur on the surface.