

Review of literature and the biology of the Australian family Rhinorhipidae (Insecta: Coleoptera)

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Abstract: The literature pertaining to the Australian family Rhinorhipidae (Coleoptera) is reviewed. The information available indicates that very little is known about the one Australian species which occurs in south-eastern Queensland. Corrections and additions are made to the earlier paper on the family by Lawrence (1988). Known biological observations are discussed and embellished.

Introduction

The family Rhinorhipidae was created by Lawrence (1988) for a single species, *Rhinorhipus tamborinensis* Lawrence, 1988, from the Mt. Tamborine area, south-eastern Queensland (see also Calder, 1988; Lawrence & Britton, 1994). The Rhinorhipidae are one of only six newly recognised coleopteran families described in the last 40 years. The position of the family within the Elateroidea is problematical and is unlikely to be resolved in the near future. The first material was actually collected by R.W. Till from Mt. Tamborine but the exact date/time is unknown, but is presumably in the early 20th Century probably between 1935 and 1945, since H.J. Carter apparently appended a handwritten note to the label data on this early collected specimen (Lawrence, 1988). Carter was apparently not able to identify it and apparently had two additional specimens which later could not be found at the Australian Museum, the Museum of Victoria or the Australian National Insect Collection in Canberra (Lawrence, 1988). This paper reviews and discusses the known biology of this beetle and corrects some errors in the paper of Lawrence (1988).

Biology

The biology of *Rhinorhipus tamborinensis* is poorly known. Lawrence (1988) records that adult beetles were collected at the edge of rainforest near small streams; at Mt. Tamborine [not Tamborine Mountain as listed in Lawrence, 1988], adults were collected on the leaves of an introduced noxious weed, crofton weed (*Eupatorium adenophorum* Spreng-sic). [It should be noted that the correct name for this plant is *Ageratina adenophora* (Spreng.) King & Robinson (Asteraceae)]. The exact locality noted by Lawrence (1988) was a cleared housing development at the edge of a small tributary of Cedar Creek. When disturbed, the beetles exhibited a death-feign reaction and dropped to the ground [viz. thanatosis]. Males were found to greatly outnumber females in this habitat. Lawrence (1988) speculated that the clearings are the sites of mating aggregations and that the beetles had flown to them from within the rainforest. Red mud was present on a number of the specimens, which suggests that they had either emerged from the soil after eclosion or had sheltered there. The structure of the metacoxae and legs also suggests fossorial habits (Lawrence, 1988). At the Lamington locality, beetles were found in an open area on low vegetation bordering Moran Creek just above Moran Falls (Lawrence, 1988). At all

localities collected by Lawrence and his team of entomologists, the beetles were always found at the edge of rainforest and near a small stream. Lawrence (1988) further stated that the ovipositor is relatively unspecialized, so that it is unlikely that the eggs are embedded in plant tissue or placed deep in soil.

Species

The Australian fauna currently comprises one species from south-eastern Queensland.

1. *Rhinorhipus tamborinensis* Lawrence, 1988

Adults are medium-sized, elongate, greyish-black, pubescent beetles, ranging in length from 5 to 7.5 mm, with moderately long, filiform antennae and a strongly deflexed head. The vestiture is mainly yellowish to white bristles. The type locality of this species is Joalah National Park, Mt. Tamborine, Queensland (Lawrence, 1988). The following summarizes collecting data for the species (modified, corrected and simplified from Lawrence, 1988) in chronological order: 1, Mt. Tamborine, Queensland, 20 September 1964, J.H. Barrett; 1, Mt. Tamborine, 29 September 1977, B.K. Cantrell; 2, Mt. Tamborine, 29 September 1977, K.J. Houston; 9 & 18, Mt. Tamborine, 12 & 18 October 1978, J.F. Donaldson; 16, Mt. Tamborine, 18 October 1978, K.J. Houston, "edge of rainforest"; 106, Joalah National Park, Mt. Tamborine, 18-21 October 1978, J.F. Lawrence & T.A. Weir, "on low vegetation"; 6, Lamington National Park (near O'Reillys-[Guest House]), Queensland, 22-27 October 1978, J.F. Lawrence & T.A. Weir, "on foliage"; 1, Mt. Glorious, 24 October 1978, J.F. Donaldson; 21, Mt. Tamborine, 27 October 1978, B.K. Cantrell; 6, Mt. Tamborine, 29 October 1978, B.K. Cantrell; 1, Mt. Tamborine, October - November 1978, G. Sankowsky, "malaise trap"; 1, Mt. Tamborine, 15 November 1978, J. Grimshaw; 12, Mt. Tamborine, 10 October 1979, B.K. Cantrell & J. F Donaldson.

Comments

Firstly, it should be noted that the Lawrence paper was actually published in late 1988 and not early 1987 as inferred from the volume and page numbers and stated by date in this CSIRO journal. Secondly, it is interesting to note, that despite the fact that 7 different contemporary biologists/collectors (viz. B.K. Cantrell, J.F. Donaldson, J. Grimshaw, K.J. Houston, G. Sankowsky, J.F. Lawrence and T.A. Weir) have collected this insect in the field (viz. 200 specimens collected on at least 12 occasions!), so little information has been gained on its biology. Perhaps the reason for this is that the first 4 people mentioned above are/were pest entomologists from the Queensland Department of Primary Industries in Brisbane, and as such are/were trained to study and exterminate vermin species and not interesting, harmless, native species such as *Rhinorhipus*. Hence, we know so little about this beetle, which is a pity since more definite biological observations may have allowed Lawrence (and others) to arrive at a more accurate appraisal of its affinities with other beetle groups based on biological attributes.

The Lawrence (1988) paper states that beetles were found in clearings outside the rainforest and that the beetles had flown there from the rainforest. If this is the case, why didn't Lawrence provide data on observations within the rainforest? Is it possible that since no positive observations were/have been provided that the insect was actually found in the adjoining rainforests, that the beetle is not a rainforest species at all? What is the significance of mating on the leaves of *Ageratina* and why would a beetle which was rainforest adapted move into an exposed area for mating, when other suitable habitats exist within the rainforest community? Lawrence (1988) makes the important observation of red mud adhering to some of the beetles bodies but didn't check the soil in the rainforest and the soil along the creeks to determine which soil type matched that adhering to the beetles. It is therefore possible that this species is not a rainforest inhabitant in present times but is a species that once inhabited rainforests and now exploits drier and more exposed margins where the habitat is *Eucalyptus* forests and grasslands with associated creek systems. The beetle has also been found near O'Reillys Guest House in the Lamington National Park and part of this vegetation is *Eucalyptus* forest/woodland. At Mt Glorious, there are also *Eucalyptus* forests adjoining the wet subtropical rainforests.

Lawrence (1988) states that the beetles were always found near a small stream. It is possible that the beetle breeds in soft mud surrounding or beneath rocks in more elevated areas in the streams. Lawrence's entomological team should have checked such habitats for larvae and pupae, given the fact that mud was discovered on adults and that the legs are somewhat adapted for fossorial habits.

From my discussion, it is clearly evident that Lawrence's (1988) observations are not extensive enough to make safe conclusions on the ecology and behavior of this obscure but interesting insect. It is possible that this beetle is an enigma, once a rainforest species but now a species adapted to a more exposed habitat outside the rainforest, breeding in moist soil within or near streams and exhibiting relatively large mating aggregations in early summer. The eggs may be dropped to the ground or deposited directly on the soil surface. It is clear that further observations are badly needed on this beetle and it is hoped that one day soon these may be forthcoming.

References

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