G. it. Ent., 6: 309-312
30 Aprile 1993

Observations on the biology and host plants of the Australian longicorn beetle, *Thyada barbicornis* (Pascoe) *(Coleoptera: Cerambycidae: Lamiinae)*

by

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Abstract - The biology and host plants of the distinctive longicorn beetle from eastern Australia, *Thyada barbicornis* (Pascoe) *(Cerambycidae: Lamiinae: Zygocerini)* are reviewed from the literature and from previously unpublished data. The beetle appears to be restricted to the subtropical rainforests of south-eastern Queensland and north-eastern New South Wales, where it has been recorded breeding in the wood of native fig trees, *Ficus* spp. [viz. *Ficus macrophylla* Desf. *ex* Pers. and *F. rubiginosa* Desf. *ex* Vent. *(Moraceae)*]. The food of the adults is not known for certain but adults have been recorded frequenting the foliage of fig trees. The colour pattern of the adults and the morphology and size of the antennae are described. It is suggested here for the first time that the combination of colour pattern, the form of the antennae and the habit of holding the two antennae together when disturbed, functions as crypsis and possibly mimicry for the insect. The models are most likely rainforest stink bugs *(Hemiptera)* or pompilid wasps *(Hymenoptera)*.

Riassunto - Sulla base di letteratura e nuovi dati vengono riviste biologia e piante ospiti del cerambicide *(Cerambycidae, Lamiinae, Zygocerini)* australiano (apparentemente esclusivo delle foreste pluviali subtropicali del sud-est Queensland e del New South Wales nord-orientale) *Thyada barbicornis* (Pascoe). Le larve sono state rinvenute in specie di *Ficus* - *F. macrophylla* e *F. rubiginosa (Moraceae)* -, mentre gli adulti non sono stati ancora scorti cibarsi di parti di qualche vegetale, sebbene frequentino il fogliame dei *Ficus*. Negli adulti, disegno e colore, e forma e dimensioni delle antenne, nonché loro posizionamento in allarme sono assieme, a detta degli autori, criptici e probabilmente un mimicry, e modelli emitteri e imenotteri pompilidi della foresta pluviale.

INTRODUCTION

Thyada barbicornis (Pascoe) *(Coleoptera: Cerambycidae: Lamiinae: Zygocerini)* is an attractive, greyish-brown to buff-brown longicorn beetle with dense, dark brown mottling on the body surface, while the elytra have a characteristic dark brown post-median spot near the lateral margin (fig. 1). The antennae are fringed on the medial margin with grey or blackish hairs, a feature which will be commented below. The species was first described by PASCOE (1859: 34) as *Zygocera barbicornis* from Moreton Bay, Queensland. The name *barbicornis* refers to the fringed hairs of the antennae (PASCOE, 1859, 1863). The beetle is known to occur in the rainforests of south-eastern Queensland and north-eastern New South Wales (MCKEOWN, 1947: 139). The biology, behaviour and larval food plants are reviewed here from the published literature and from the recent observations by the first author.

LARVAL HOST PLANTS

FROGGATT (1907: 198) briefly noted that adults were common on the foliage of native figs (*Ficus* spp., *Moraceae*) growing by the Tweed River, north-eastern New South Wales, which suggested that the larvae might also be associated with *Ficus* spp., but unfortunatelly he did not pro-

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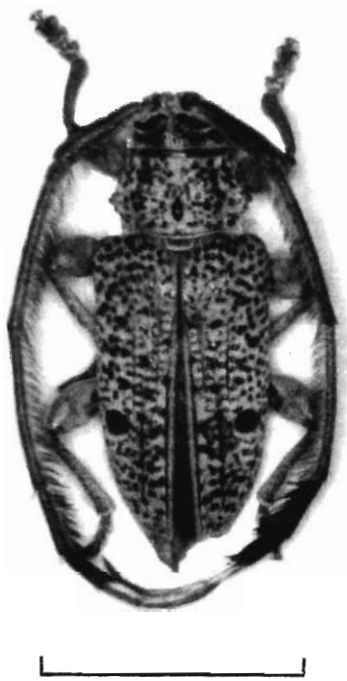

Fig. 1. Dorsal view of *Thyada barbicornis* (Pascoe) bred from a dead branch of *Ficus macrophylla* Desf. *ex* Pers. *(Moraceae)* near Chinderah, north-eastern New South Wales on 10 Jan. 1991. Scale line = 10 mm (Photo: Diethard Dauber).

vide any data on the larvae of this beetle. However, almost 80 years passed before WILLIAMS (1985: 46) published the first larval host record for *T. barbicornis;* WILLIAMS (1985) recorded adults emerging during 27 November to 13 December 1983 from a dying branch of the Moreton Bay Fig, *Ficus macrophylla* Desf. *ex* Pers. *(Moraceae)* which was collected 3 km north of Lansdowne, New South Wales (31°36'S, 152°32'E). The habitat was described by WILLIAMS (1985) as a rainforest / wet sclerophyll forest association. WEBB (1987: 13) listed the species from a museum collection made at Wyong, New South Wales, by K. M. Moore in 1958 from *Ficus rubiginosa* Desf. *ex* Vent. (incorrectly cited by WEBB as *Ficus rubiginosus*).

The following data are from the personal observations of the first author. During November 1990, a fallen branch of *Ficus macrophylla* Desf. *ex* Pers. *(Moraceae)* (measuring about 30-40 mm in diameter), was collected from the ground below the growing tree, near Chinderah, north-eastern New South Wales (28°18'S, 153°32'E). An adult (fig. 1) emerged on 10 Jan. 1991, through an elliptical exit hole which partially bulged outwards and measured 6.0 mm in length and 4.5 mm in width. The exit hole led to a pupal chamber perpendicular to the grain of the wood and measuring 23 mm in length, 8-9 mm in width and 3-4 mm in height. Close examination of the infested parts of the dead wood indicated the following: a) after emerging from the eggs (which are presumably laid in the rather thick bark, 1-2 mm thick), the larvae feed under the bark on the vascular cambium layer, later boring into the underlying sapwood, where they form irregular galleries about 1 mm deep, usually tightly and completely packed with dry, fine to coarse frass behind the larvae: the larvae later move deeper into the sapwood but not too far away from the bark layer; b) after completion of feeding, the larvae apparently remain in the sapwood close to the bark and form a straight pupal chamber perpendicular to the grain of the wood; c) during completion of the pupal chamber, the entrance tunnel is tightly plugged with medium to coarse, powdery frass; d) the emergence of the adult is accomplished by boring through the sapwood and bark layers.

ADULT FOOD PLANTS

The food of the adult beetle is apparently unknown, although FROGGATT (1907: 198) briefly stated that the adults were found amongst the *Ficus* foliage, but did not state whether they fed on the leaves or not.

NOTES ON ANTENNAE AND ADULT BEHAVIOUR

FROGGATT (1907: 198) briefly described the species, noting the presence of fringed hairs on the antennae. TILLYARD (1926: 234) briefly stated that the species had "very beautiful" antennae, but

neither author speculated on the functions of the antennal hairs or their integration with the overall behaviour of the beetle. The specimen that emerged on 10 January remained alive without feeding for 9 days after emergence. For most of the time it remained virtually motionless on the *Ficus* branch from which it emerged, but some observations were able to be made on its behaviour and the antennae, which are outlined below.

The antennae are 11-segmented and the first segment is thick, and relatively short with appressed hairs, segments 3 and 4 are long, approximately equal in length, with series of long, dense, grey hairs on the medial margin; segments 5 and 6 are short with long, black hairs on the medial margin; segment 7 is paler in colour, brownish, with whitish hairs, while the remaining antennal segments are very short, brownish and almost glabrous. The comparison of the length of each antennal segment with the length of segment 1 is provided in table 1.

Table 1. Ratio between each antennal segment length and the length of the first antennal segment in the specimen of *Thyada barbicornis* Pascoe mentioned in this paper.

Antennal segment no.	Ratio
1	1.00
2	0.19
3	1.60
4	1.60
5	0.70
6	0.57
7	0.38
8	0.32
9	0.28
10	0.28
11	0.34

When the beetle is at rest, the antennae are positioned straight outwards from the body or over the elytra in normal fashion for a cerambycid, but if the beetle is slightly disturbed by touching, the antennae are rapidly and rigidly aligned together and are directed forward from the body, with most segments touching or almost touching the corresponding segment of the other antenna, except for the last four segments which are turned outwards in an arch-like fashion. In this position, if the beetle was again touched, e.g. at the apex of the elytra near the dark elytral spots, the beetle stridulated and arched both antennae back over the body simultaneously so that they touched the offending object (i.e. finger or pin) and at the same time, the beetle usually moved forwards in a jerky fashion. When the beetle was no longer threatened, i.e. when the offending pin or finger was removed, it returned its antennae to the former rigid position together at the front of the body.

This antennal - alarm behaviour probably compliments the cryptic coloration of the beetle and this crypsis (especially the dark elytral spots) may also function as mimicry. When the beetle moves to the characteristic position with the antennae extended rigidly forwards, it resembles another insect, possibly a rainforest bug (e.g. some of the large *Miridae* or *Reduviidae*) or possibly large wasps such as *Pompilidae*, which have their antennae with white or pale tips, as does *T. barbicornis*. The black spots on the elytra of *T. barbicornis* become eye-spots in the mimicry. However, it is also possible that the coloration and behaviour of *T. barbicornis* are mainly or solely, procryptic in nature, in order for the beetle to avoid predation. Like many rainforest cerambycids, *T. barbicornis* may be mainly nocturnally active, so that its colour pattern, which closely matches that of the grey-brown bark of many rainforest trees (i.e. procrypsis) may be adaptive in predator avoidance while the beetles forage and mate at night. Whether the antennae are used in mating and courtship as noted in other Australian *Cerambycidae*, i.e. in *Tritocosmia roei* (Hope), as recorded by HAWKESWOOD (1986), remains to be determined. Clearly, *T. barbicornis* is a very interesting cerambycid which deserves closer study when the opportunities arise, but due to the great loss of the rainforest habitat in eastern Australia up to the present time, this species, like many other beetles which breed in *Ficus* and other large rainforest trees, is now rare or locally extinct, so that such observations may not be readily forthcoming.

ACKNOWLEDGEMENTS

Thanks are expressed to Prof. Peter Bernhardt, Dept. of Biology, St. Louis University, St. Louis, Missouri, United States of America, for obtaining the important and often overlooked articles of Pascoe mentioned in this paper.

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