

Tiger moths and pheromones

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Introduction

Amongst New Zealand's small fauna in the worldwide family Arctiidae are three spectacular moths in the genus *Metacrias* (Gibbs 1962, Dugdale 1988). Within the Arctiidae they are placed in the sub-family Arctiinae. Brightly coloured, diurnal males contrast with the buff coloured, extremely short-winged females which remain within their cocoon for mating and egg-laying (Gibbs 1962). It is the hairy, brown polyphagous larva that is the most commonly seen stage of the life-cycle, and it is their high mobility that accounts for dispersal and expansion of the geographic range within each species.

All three species are found in the bottom half of the South Island, with *Metacrias strategica* (Hudson) confined to this region. It is found from coastal and forest-edge sites to the montane zone. A second species, *M. huttoni* (Butler), ranges over the eastern areas of the South Island in montane to low-alpine habitats. The third species, *M. erichrysa* (Meyrick), is found in the wetter western alpine areas of the South Island and mountains of the lower half of the North Island. All three are probably congeneric with three eastern Australian species currently placed in the genus *Phaos* (Nobutoyo Koda, *personal communication*, 2002). Indeed *M. huttoni* was originally placed in that genus when first described in 1879. Our observations of the external appearance, life-cycle and behaviour of the six species confirm the suggested synonymy.

Pheromones

As is normal, female tiger moths attract flying males by the use of pheromones. Therefore, unmated females can be used to attract males in any given locality. Furthermore, Gibbs (1962) documented that the males of one species are attracted to the scent of females of different species. We too have recorded instances of this phenomenon. The following list documents successful instances of male pheromonal attraction to captive females, both within species and between species:

1. Early to mid-afternoon 9 December 1981, Otatara, Invercargill SL. Five male *M. strategica* attracted to female *M. erichrysa* bred from Homer Tunnel FD, 945 m a.s.l., 5 December 1981. Three eggs laid, but failed to hatch.
2. 14 December 1981, another male *M. strategica* attracted, as above. Windy

and warm day.

3. 17 December 1981, another male *M. strategica* attracted, as above, at 5 pm.
4. 18 December 1981, four further male *M. strategica* attracted, as above, in late morning (one eaten by a bird!).
5. 19 December 1981, 10 additional male *M. strategica* attracted, as above: one at 9.45 am, five more by 1 pm, one more by 3.20 pm and the remainder by 5 pm.
6. 15 December 1982, Flagstaff Hill, Dunedin DN, 400 m a.s.l. Two male *M. strategica* attracted to female *M. huttoni* bred from the Rock & Pillar Range CO, 1200 m a.s.l., on 11 December 1982.
7. 31 December 1982, Homer Tunnel FD, 945 m a.s.l. Two male *M. erichrysa* attracted to female *M. huttoni* bred from the Rock & Pillar Range CO, 1300 m a.s.l., on 27 December 1982.
8. 1 January 1982, Homer Tunnel, as above, two males at 11 am flying around the spot where above female had been placed on the previous day.
9. 1-2 January 1984, Homer Tunnel, as above, 20 males of *M. erichrysa* attracted to three females of *M. erichrysa* bred from Murchison Mountains FD, 1200 m a.s.l., on 26-30 December 1983.
10. 8 December 2002, Transmitter Station above Long Gully, Upper Clutha Valley CO, 952 m a.s.l. Eight male *M. huttoni* attracted to female *M. huttoni* bred from Lower Nevis Valley CO, 700 m a.s.l., on 5 December 2002. Resulting eggs fertile.

Using unmated females to attract males is a useful technique that enables the capture of the otherwise undetectable males in new localities. In our experience females can live for up to three weeks and thus remain useful as a lure in this way for a considerable period of time. Another trait of *Metacrias* species is that adults emerge at a similar time of year (from late November to early January) at all altitudes. Because of the obligatory larval diapause, adults reared in captivity also emerge at this time.

In January 1983, we placed *M. huttoni* females bred from the Rock & Pillar Range CO, 1300 m a.s.l., with both *M. huttoni* males bred from Nevis CO, 700 m a.s.l., and *M. erichrysa* males bred from Homer Tunnel FD, 945 m a.s.l. On both occasions eggs resulted from these closely observed matings. The eggs from both females turned dark, indicating that larval development was proceeding normally, but the eggs failed to hatch. This might indicate that interspecific matings do not result in complete larval development, which may be one barrier to the production of hybrids in areas where two or three species live sympatrically (Gibbs 1962).

Continued presence in the Invercargill area

Gibbs (1962) could find no trace of *M. strategica* in the Invercargill area, despite it being reported as common up to the early part of the twentieth century (Howes 1901, Philpott 1901). One of us (BHP) grew up in Invercargill very close to Thomsons Bush, one of the reported localities. At this site *M. strategica* was abundant in areas of long grass up to 1975, after which time suburban development spread over this favoured site. The species probably still occurs on the forest margins of Thomsons Bush Scenic Reserve in damp pasture areas that are still present. It would be interesting to survey the area in question. BHP also found the species at Otatara, another reported locality, and at Waituna, occupying coastal silver tussock patches at the back of the shingle beach (Patrick 1994). Other sites in Southland where *M. strategica* is known to occur are Brydone, Cannibal Bay, Waipapa Point and Sandy Point.

Other observations

On the 8 December 2002, as detailed above, we noted another unusual phenomenon associated with the pheromonal attraction of male *M. huttoni*. We noted that blue (*Zizina oxleyi*) and boulder (*Antipodalycaena* new species) butterflies (Lycaenidae) and the diurnal moths *Arctesthes catapyrrha* and *Paranotoreas brephosata* (Geometridae) were also attracted to the female *M. huttoni*. In addition, we noted that large tachinid flies (*Protohystricia* sp., Diptera: Tachinidae) became more common in the vicinity, where they positioned themselves on sunny rocks and attacked the incoming *M. huttoni* males!

Summary

We suggest that there is a lot of potential for more formal research on the distribution of these three endemic moths. As all three species are found in the Lake Wakatipu district (Gibbs 1962) it would be interesting to know what barriers there are to cross-fertilisation. Additionally, more research is required to explain the attraction of other diurnal moths and butterflies to female tiger moths.

References

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