REPRODUCTIVE BEHAVIOUR AND PHEROMONE TRAPPING OF THE COMMON ARMYWORM, *MYTHIMNA CONVECTA* (WALKER) (LEPIDOPTERA: NOCTUIDAE)

Volume 1. Nocturnal Behaviour of *Mythimna convecta*

by

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ABSTRACT

The common armyworm, *Mythimna convecta* (Walker) (Lepidoptera: Noctuidae) is an important pest of cereal crops and pasture grasses. It is an endemic species widely distributed throughout Australia. Outbreaks are sporadic and largely unpredictable. Pheromone traps might be useful as early warning devices, thus giving better prediction of outbreaks. An understanding of the reproductive biology of the species and field testing of synthetic equivalents of the female sex pheromone are relevant towards developing a pheromone lure for this species.

The general patterns of the nocturnal behaviour of virgin females were studied in the laboratory at 20°C and 16:8 light:dark (LD) regime. Female behaviours were categorised as non-reproductive or reproductive. Non-reproductive behaviours such as activity, resting and feeding were observed throughout the night, whereas reproductive behaviours such as calling, extrusion and oviposition were recorded mostly in the 2nd half of the scotophase. *M. convecta* females exhibited similar calling behaviour to that found in many Lepidoptera, characterised by the full protrusion of the ovipositor. The age at first calling ranged between the 2nd and 11th scotophases with the peak on the 4th scotophase. Calling duration varied with age and time of the scotophase. Younger moths tended to call more frequently with shorter duration while older ones called less frequently but with longer duration. The peak of calling was during the 7th hour of the scotophase. The pattern of calling in younger females was not significantly different from that in older females, suggesting that conspecific pheromone from the latter did not influence the calling behaviour of the former.

The effects of temperature and photoperiod on calling were studied in the laboratory. Calling behaviour at 10, 15, 20, 25 and 30°C and at 16:8, 14:10 and 12:12 LD regimes was investigated. First calling was delayed at lower temperatures and longer scotophases. Females held at 10°C never called even after 31 scotophases. However, females that were at 10°C and were then transferred to 20°C after 10 scotophases exhibited calling behaviour between 4 and 6 scotophases following transfer to 20°C. Mean onset time of calling was earlier at 15 and 20°C than at 25 and 30°C, and at 16:8 than at 14:10 or 12:12 LD regimes. At all the temperatures and photoperiods tested, calling occurred mostly in the 2nd half of the scotophase. Peak calling at 16:8 LD was in the 7th hour, at all temperatures from 15-30°C. At 14:10 LD, peak calling was in the 9th hour and at 12:12 LD in the 10th hour of the scotophase. The presence of an endogenous circadian rhythm of calling was observed during the first 72 hours following transfer to darkness after entrainment of females at 16:8 LD for 3 and 8 days. However, as the moths aged, this rhythm was disrupted and a calling pattern similar to what would have been expected during the larval scotophase was observed.

Interactions between sexes, particularly copulatory behaviour, were investigated in laboratory and field cages. Male behaviour was first studied in a wind tunnel in the presence of caged females. Males exhibited a sequence of behavioural responses to calling females. This sequence included take off from the cage, upwind flight, approach and landing on the female cage followed by extension of claspers and copulatory attempt. Similar precopulatory and copulatory behaviours were observed in the laboratory and in the field.

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