



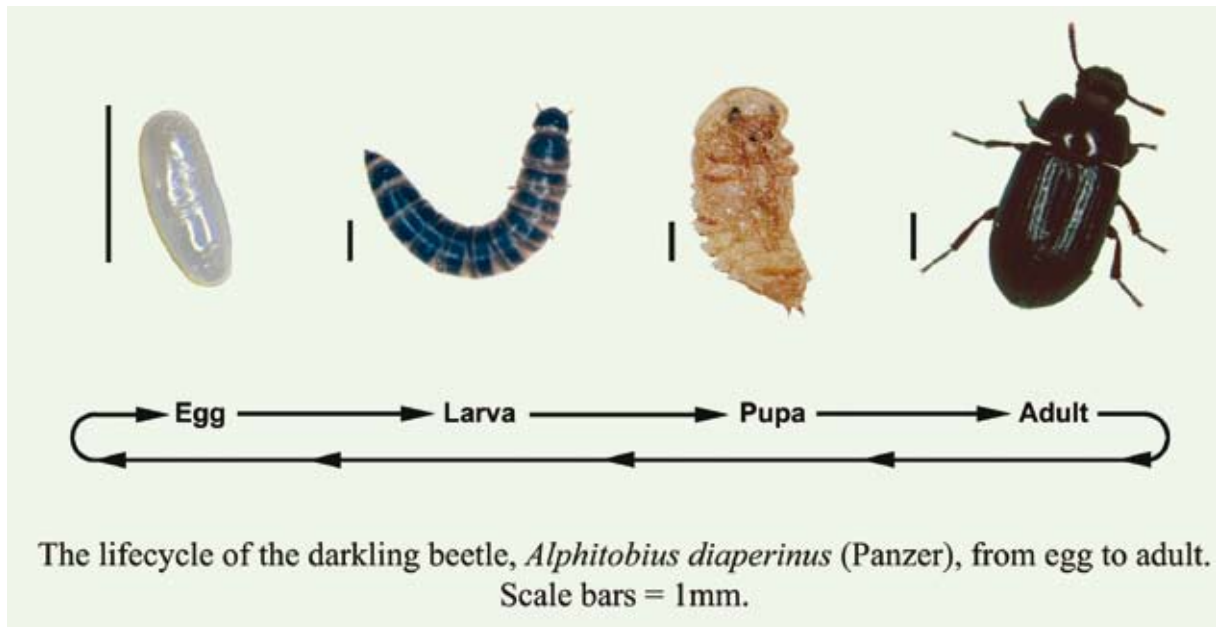
# Darkling Beetles

Mr Trevor Lambkin

## What are darkling beetles?

Darkling beetles or lesser mealworms (*Alphitobius diaperinus*) are common cosmopolitan insect pests of broiler houses where they often occur in large numbers in the bedding litter material that is used on the floors. In Australia, the floors of these houses most often consist of compacted earth and the litter bedding material is usually wood shavings. Because of the beetle's natural association with animals, in particular birds, this tropical species is well suited to the conditions that occur in broiler houses.

Typically, darkling beetles lay eggs in the bedding litter producing larvae (lesser mealworms) that live in the litter, predominately under feed pans. These larvae then burrow into the earth floor of the broiler house to pupate, and from these pupae the adult darkling beetle emerges. Earth floors of broiler houses are an important medium for pupation but darkling beetles still occur, albeit in smaller numbers, in broiler houses with higher density flooring materials such as concrete or bitumen.



Despite darkling beetles occurring in most broiler houses throughout the world, the effects that these infestations have on poultry production are difficult to quantify. In Australia, infestations contribute to:

### Disease transmission

Darkling beetles are known vectors and reservoirs for a number of serious poultry disease agents (leucosis, Marek's disease, infectious bursal disease, reovirus, enterovirus, fowl pox and Newcastle disease) and can act as intermediate hosts for caecal nematodes, tapeworms and protozoa. In addition, they can transmit a number of food-borne diseases such as *Escherichia coli* and *Salmonella typhimurium*, and have been recently implicated in the transmission of *Campylobacter*. Thus, the large populations of the pest that are prevalent in most broiler houses are a bio-security threat to the welfare of the flock and the production of safe food.

### Structural damage to broiler houses

In Australia, lesser mealworms tunnel readily into compacted earth floors of broiler houses, and into broiler house insulation, thereby markedly reducing its insulating value. In warmer climates, predominately in broiler houses without insulation, larvae almost exclusively tunnel into compacted earth floors resulting in the surface of the floor becoming perforated and hollowed, particularly under feed pans. These hollows retain bedding litter at litter clean out time thus reducing the effectiveness of clean outs.

## Other effects

The loss of chicken feed in broiler houses by the pest readily consuming spilt feed increases production costs, while feeding on lesser mealworms in preference to feed lowers bird nutrition. In addition, feeding on beetle larvae directly increases the likelihood of ingesting disease organisms or parasites.

## Control

No acceptable field control strategies have been developed for darkling beetle control and therefore there has been little long term success in controlling the pest. In Australia, the meat chicken industry has been concerned in recent years over the inadequacies of current control practices, i.e., regular applications of insecticides to the floors and lower walls of broiler houses, and for this reason commissioned research to develop acceptable control strategies for darkling beetle. The results of this research have shown that the current standard industry insecticide is not effective when applied to broiler house floors, a situation exacerbated by strong and widespread insecticide resistance occurring in broiler house beetle populations.

Following extensive field ecological and insecticide baseline studies, an integrated approach is now being researched and will soon be trialled in Australia. This ongoing research is a joint collaborative venture currently funded by the Queensland Department of Primary Industries and Fisheries, the Rural Industries Research and Development Corporation (RIRDC) and a number of key chemical companies.

## Further Information

For more information, refer to the reading list below or contact **Trevor Lambkin**, Senior Entomologist at the Animal Research Institute (Queensland Department of Primary Industries & Fisheries) on **07 3362 9606**.

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