

# Life stage

## characterisation of *Thaumatotibia batrachopa* on an artificial diet

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*Thaumatotibia batrachopa*, commonly referred to as the macadamia nut borer (MNB), is an important lepidopteran pest of macadamia. Significant larval infestations within nuts have been detected in the main growing regions, namely KwaZulu-Natal, Mpumalanga and Limpopo (de Villiers, 2001). The species has a limited geographic distribution, reported only from Southern Africa, and reported to feed exclusively on macadamia nuts.

Effective management requires knowledge of its life cycle, behaviour and biochemistry. However, these are often difficult or nearly impossible to study in natural environments (Nunes et al. 2017). Lab reared populations therefore provide an attractive alternative.

### Population reared in laboratory for study

To develop a lab reared population, we used a maize-meal based artificial diet described by Moore et al. (2014) with some modifications to reduce desiccation and fungal contamination. Incubation was at ambient laboratory conditions (25-30°C, 50-80% relative humidity and a photoperiod of 12 hours light, 12 hours darkness (L12: D12)). Adults were placed outside in breeding cages for the duration of the dusk period. Adults consistently became more active during the dusk period, but unfortunately neither

mating nor oviposition were observed. A second generation of *T. batrachopa* was therefore not achieved. However, the lab reared colony did allow us to study various aspects of the biology.

Data from the lab reared moths revealed that the total life cycle duration of *T. batrachopa* is between 40-50 days at 23°C, with the egg stage estimated to take approximately 4 days, larval stage 16-20 days, pupal

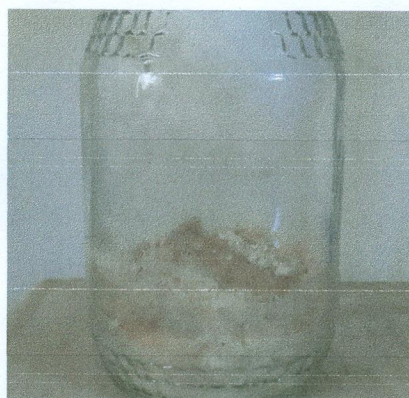


Figure 11. The rearing process in the laboratory.



stage 10-12 days, and an adult lifespan of 10-14 days. Larval mortality of *T. batrachopa* was 40-45% and pupal mortality approximately 15% in the lab reared colony. Future studies will focus on variation in lifecycles between species and at different temperatures. Such information can subsequently be used to model species presence

in orchards during different times and growing seasons. In addition, modifications to the rearing colony will be made to facilitate successful mating and thus allow multiple generations to be reared.

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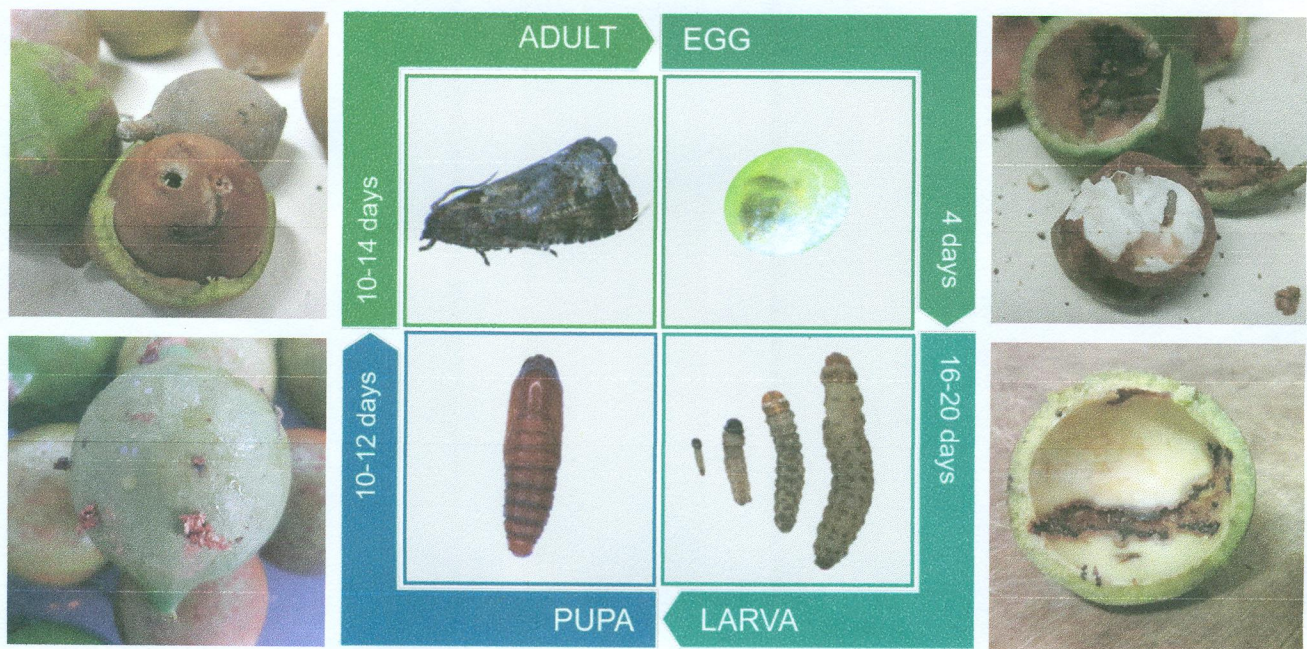


Figure 12. The life cycle of the macadamia nut borer.

### References

- de Villiers, 2001. *Cryptophlebia batrachopa* (Meyrick) Macadamia nut borer. In: Pests and Beneficial Arthropods of Tropical and Non-citrus Subtropical Crops in South Africa.
- Nunes, et al. 2017. Biology of *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae) rearing on artificial or natural diet in laboratory. Journal of Entomology, 14, 168-175.
- Moore et al. 2014. An improved larval diet for commercial mass rearing of the false codling moth, *Thaumatotibia leucotreta* (Meyrick) (Lepidoptera: Tortricidae). African Entomology 22, 216-219.

