The greater wax moth, *Galleria mellonella* L.: Evidence for a larval aggregation pheromone

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INTRODUCTION

Most chemoecological studies on arthropods have been biased towards the adult life stage, ignoring similar interactions in their immatures. Over a decade ago, Jumean *et al.* (2005) identified the first larval aggregation pheromone in cocoon spinning larvae of the codling moth, *Cydia pomonella* (L.), and utilised it as an integral component of an IPM programme to suppress the pest in apple orchards. Nielsen and Brister (1979) observed aggregation behaviour in larvae of the greater wax moth *G. mellonella*. However, there have been no efforts to substantiate this and identify the chemical basis for this behaviour to-date. Because of current advances in this field and the renewed interest in the health of honey bees following their global decline, we initiated studies to fill this knowledge gap.

OBJECTIVE

To demonstrate the existence of larval aggregation behaviour in the greater wax moth *Galleria mellonella.*

METHODS

Greater wax moth larvae were collected from infested colonies in apiaries maintained by *icipe* in Karura forest, within Nairobi city environs and used to raise a laboratory colony using an artificial diet. Aggregation behaviour of the larvae was investigated using a suite of behavioural assays conducted in Petri-dish and glass Y-tube olfactometer arenas. In the first behavioural assay, 10 and 20 mature larvae were placed in a Petri dish and allowed to spin cocoon within 24 and 48 h. In a second similar experiment, 1, 2 and 4 newly spun cocoons were stuck using a piece of tape on one side of the Petri dish against an empty piece of tape on the opposite end of the dish and the number of larvae spinning cocoons around each odour source. In dual choice olfactometer assays, the responses of mature (8th instar) and immature (3rd–5th instar) larvae to various pairs of test odour (1 – cocooning larvae vs clean air odours; 2 – Mature larvae vs clean air odours; 3 – Newly spun cocoon case vs clean air odours; 4 - Frass + Faeces vs clean air odours; 5 - Artificial diet vs clean air odours; 6 - Honey bee comb vs clean air odours; 7 - Honey bee comb vs artificial diet odours; 8 - Honey bee comb vs frass + faeces) were recorded.

RESULTS

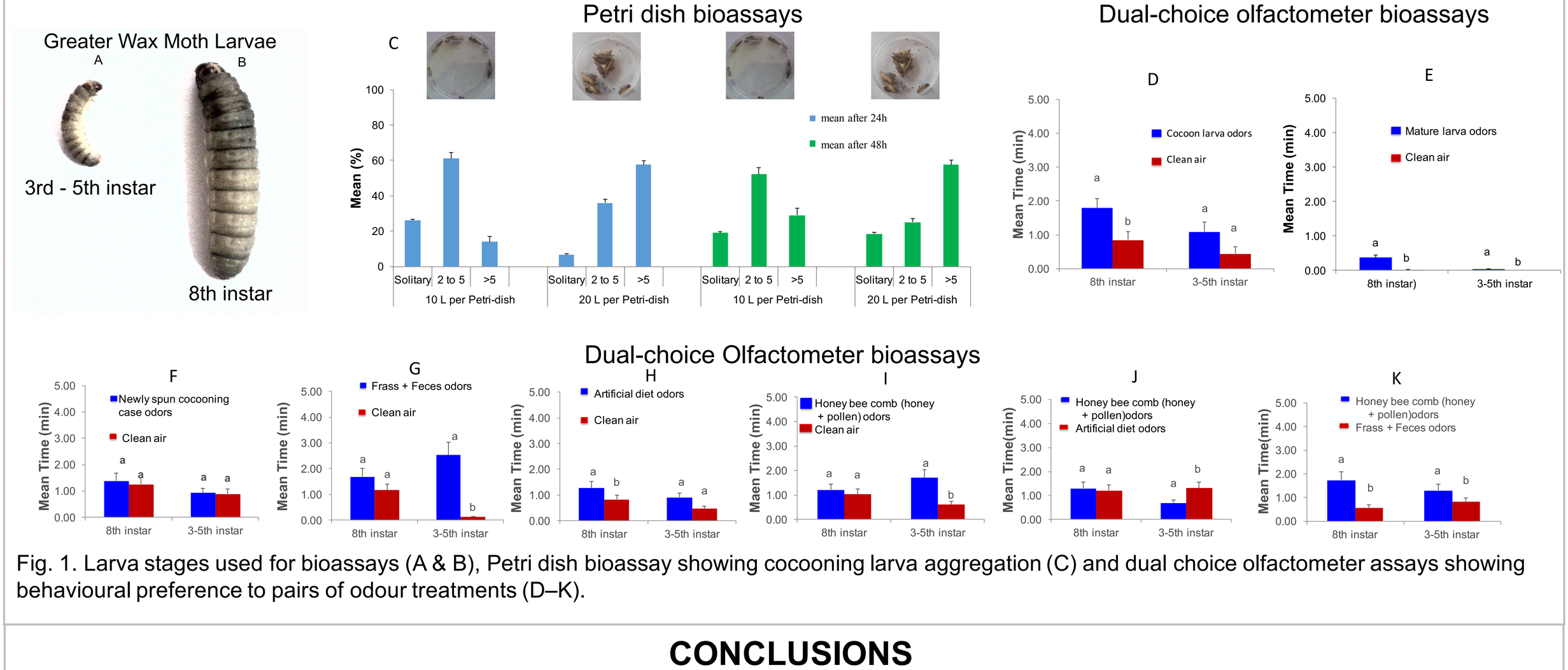

Fig. 1. Larva stages used for bioassays (A & B), Petri dish bioassay showing cocooning larva aggregation (C) and dual choice olfactometer assays showing behavioural preference to pairs of odour treatments (D–K).

CONCLUSIONS

- Larvae of *G. mellonella* appear to display aggregation behaviour which is likely mediated by larva-produced aggregation pheromone
- Food odours (from honey combs and artificial rearing diet) appear most attractive to both mature and immature larval stages.

IMPACT

The current finding suggests the potential to develop an in-hive wax moth larva trap to eradicate them from infested colonies.

REFERENCES

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