

Behaviour of brood thieves in an Indian ant

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Introduction

Thievery is not limited to human societies and has been documented throughout the animal kingdom, starting from small invertebrates to large mammals.

Theft of objects like food, nest and nesting materials, brood etc. have been recorded.

Brood theft has been documented in **ants** in three contexts:

- 1. Consumption.
- 2. Quickly increasing workforce at initial stages of colony formation.
- 3. Rearing slave workers.

Brood theft mostly has been observed in 2 subfamilies: Myrmicinae and Formicinae, belonging to the temperate regions.

Brood theft in Diacamma indicum

D. indicum is a ponerine ant distributed in the tropical Indian subcontinent.

In our previous studies we have observed intraspecific brood theft in this species, where:

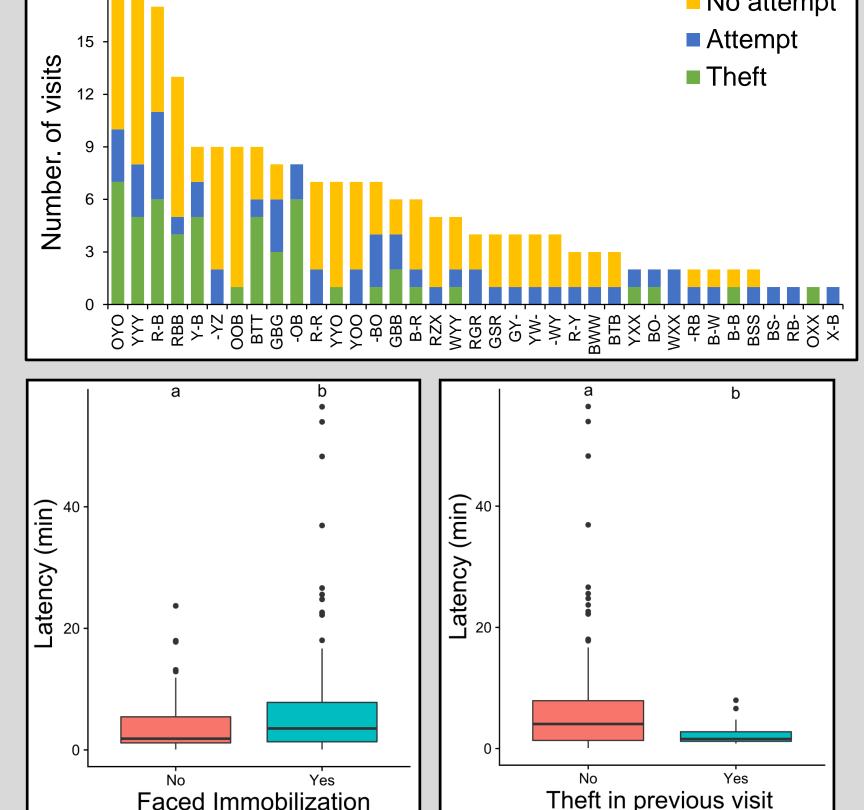
- Theft was opportunistic and **pupae** were preferentially stolen.
- Victim colonies defended themselves using aggressive interactions.
- Thieves ensured success by acting quickly, staying furtive and stealing unguarded brood.



(Source: AntWiki)

Behaviour of thieves

We analysed the behaviour of thieves (n = 37) from laboratory based experiments. The experiments (n = 20) were done by pairing two non-neighbouring colonies in an sand arena (1.45 m x 1.75 m). The colonies were physically disturbed so to emulate conditions created during disturbances in the natural habitat.



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- Thieves made multiple visits to the victim nest and had varying degrees of success.
- A positive correlation was observed between number of visits and aggression received. (Spearman rank correlation: r_s = 0.596, df = 33, p < 0.001)
- Latency of thieves to return to the victim nest was significantly higher when immobilized by the victim ants in the previous visit. (GLMM: p = 0.038)
- Latency of thieves were higher when they were unsuccessful in stealing brood in the previous visit. (GLMM: p < 0.003)

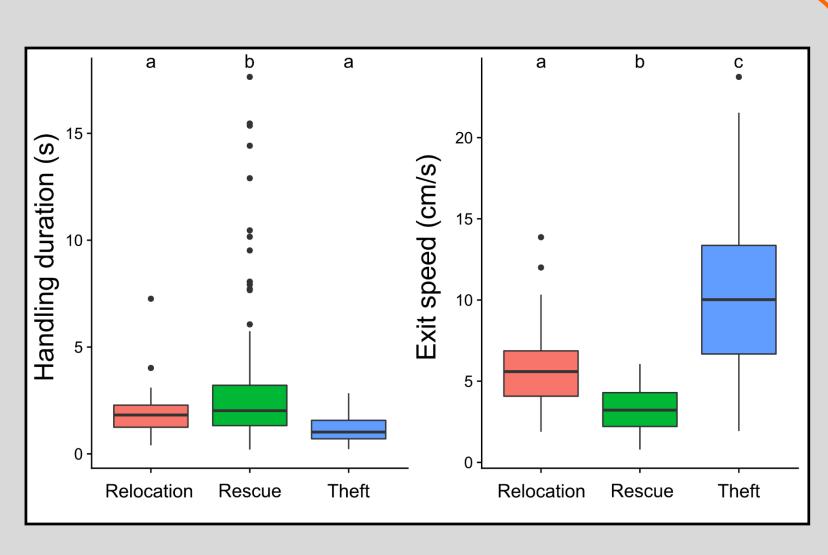
Modification in behaviour

Modification in behaviour during theft was assessed by comparing behaviour in three contexts:

- 1. Transport of brood by individuals while the colony is relocation from an old nest site to a new one (**Relocation**).
- 2. Procurement of unguarded brood by individuals from an exposed nest (**Rescue**).
- 3. Theft of guarded brood from a foreign colony residing in an exposed nest (**Theft**).

Two aspects were compared across the categories:

- 1. Time taken to pick up and hold the brood (Handling duration).
- 2. Speed during exit from the nest with the brood (**Exit speed**).
- Handling duration of Relocation and Theft were similar (GLMM: p = 0.15), but they were significantly lower than Rescue (GLMM: p < 0.002 for both).
- Exit speed was highest during Theft, 2 folds higher than Relocation and 3 folds higher than Rescue. (p < 0.001 for all).



Causal factors

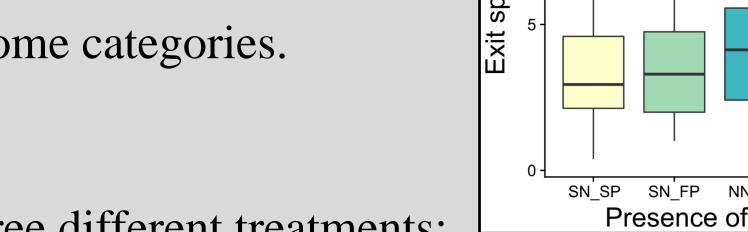
Experiments were done in a similar fashion to Rescue. The thieves procured brood from an exposed nest containing foreign brood. We incorporated the different factors given below in the experimental design to assess their impact on the modification of behaviour.

• Presence of foreign odour:

Thieves were allowed to procure brood at four different treatments:

- 1. Odour of self nest and self pupae (SN_SP).
- 2. Odour of self nest and foreign pupae (SN_FP).
- 3. Odourless (new) nest and odour of foreign pupae (NN_FP).
- 4. Odour of foreign nest and foreign pupae (FN_FP).

Exit speed was marginally different across some categories. (GLMM: p ~ 0.05)



Thieves were allowed to procure brood at three different treatments:

1. Absence of adults (Control)

- 1. Absence of adults (Control).
- Adults were present inside a mesh to stop
- Presence of nestmates (Self).
 Presence of foreign adults (Foreign).

Presence of foreign adults:

aggressive interaction with the thieves

Exit speed was highest in Foreign (GLMM: p < 0.01 compared to both Control and Self), but Control and Self had similar exit speed (GLMM: p = 0.78).

• Aggressive interaction from non-nestmates:

Exit speed during Theft was significantly higher (2.5 folds) compared to that of Relocation (GLMM: p < 0.001).

Conclusions

- Thieves continued to visit victim nest to attempt to steal brood despite facing aggressive interactions.
- Return of thieves to the victim nest was delayed after facing immobilization in the previous visit.
- Thieves returned quicker to the victim nest if successful in previous visit.
- Thieves modified their behaviour during attempt of brood theft: they were faster in both picking up brood and exiting the victim nest.
- The modification in behaviour was not caused by the mere presence of odour of foreign colonies.
- Presence of foreign adults caused a intermediate shift in behaviour, but modification of the highest degree was a response to the potential of aggressive encounter with the non-nestmates..

References

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