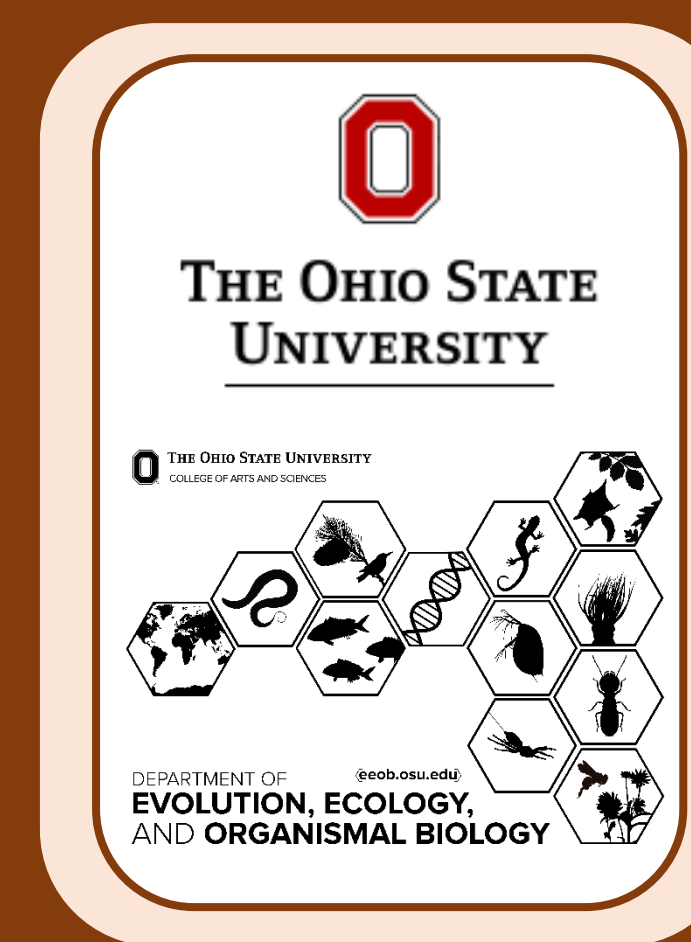


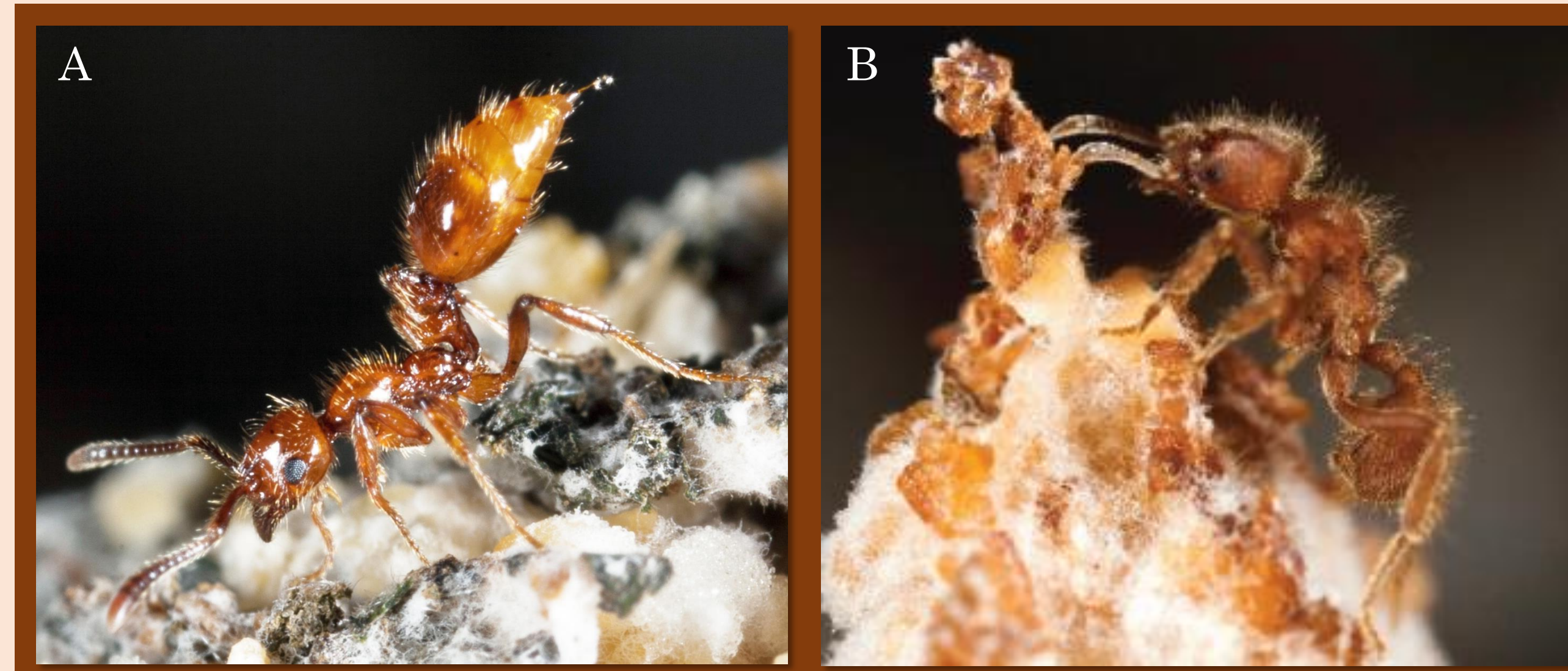
To Sting or Not to Sting: When Social Parasites use their Venomous Weaponry

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Introduction

Socially parasitic *Megalomyrmex symmetochus* ants (Figure A) exploit their fungus-gardening host ants, *Sericomyrmex amabilis* (Figure B), for critical resources using their venom alkaloids. This venomous weapon is often utilized during aggressive interactions between the two species. A third raiding ant species attempts to usurp nests of *S. amabilis* ants which can result in the annihilation of the colony. Non-host colonies are more vulnerable to these attacks, while parasitized *S. amabilis* colonies can benefit from their guest ant defenders, suggesting a conditional mutualism between the two species.



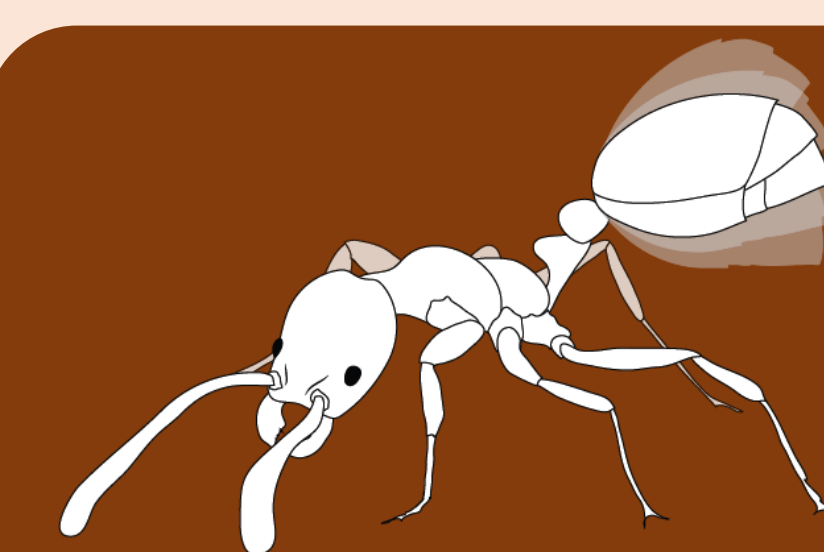
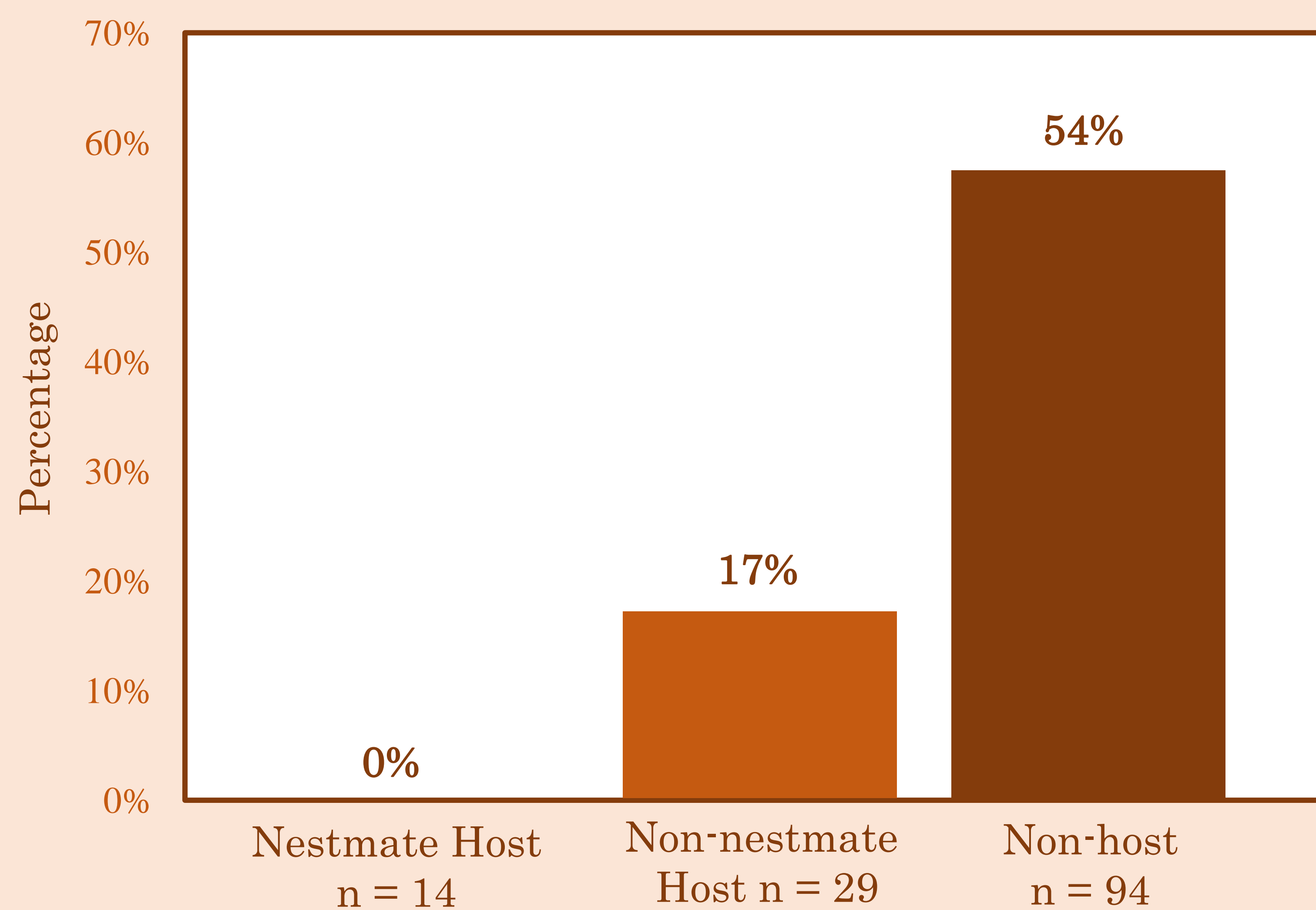
Methods

In this study, we observed the stinging behavior of *M. symmetochus* towards host and non-host *S. amabilis* workers. The three types of alkaloid dispensing behaviors observed were **gaster flagging**, **side-swipe sting**, and **gaster-tuck sting**.

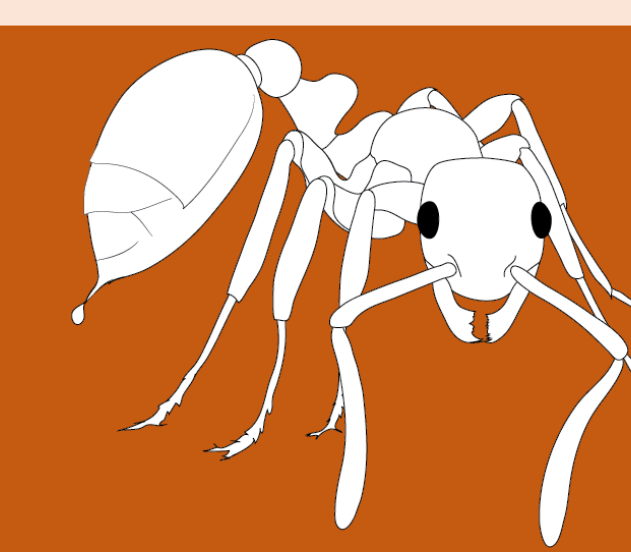
Results

No alkaloid dispensing behaviors were observed between parasites and their nestmate hosts in 14 trials. Stinging was observed in five of 29 trials and 51 of 94 trials in non-nestmate host and non-host trials respectively.

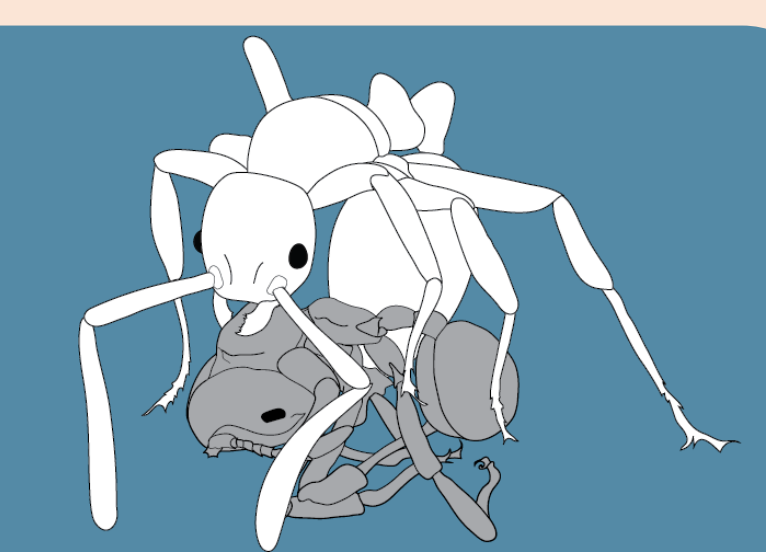
Alkaloid Dispensing Behavior



Gaster Flagging:
Vibrating gaster held at approximately 45 degree angle



Side-swipe Sting:
Gaster waves from the side in the direction of the host ant

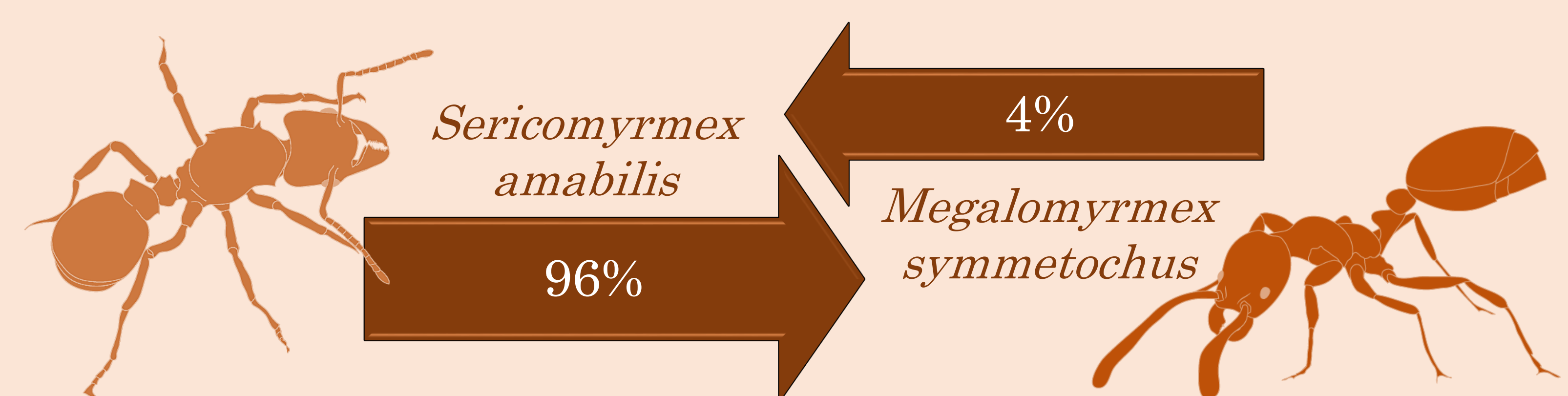


Gaster-tuck Sting:
Gaster tucked under the body and between legs and directed at the host ant

Parasite behaviors were observed in a Petri dish containing a small portion of fungus and five *S. amabilis* worker ants. The parasite ant was introduced to either its own host colony, a non-nestmate host colony, or non-host colony of *S. amabilis* ants. Five minute videos were scored until an alkaloid dispensing behavior was observed. All observations were performed blind.

Results

Individual Interaction Initiation

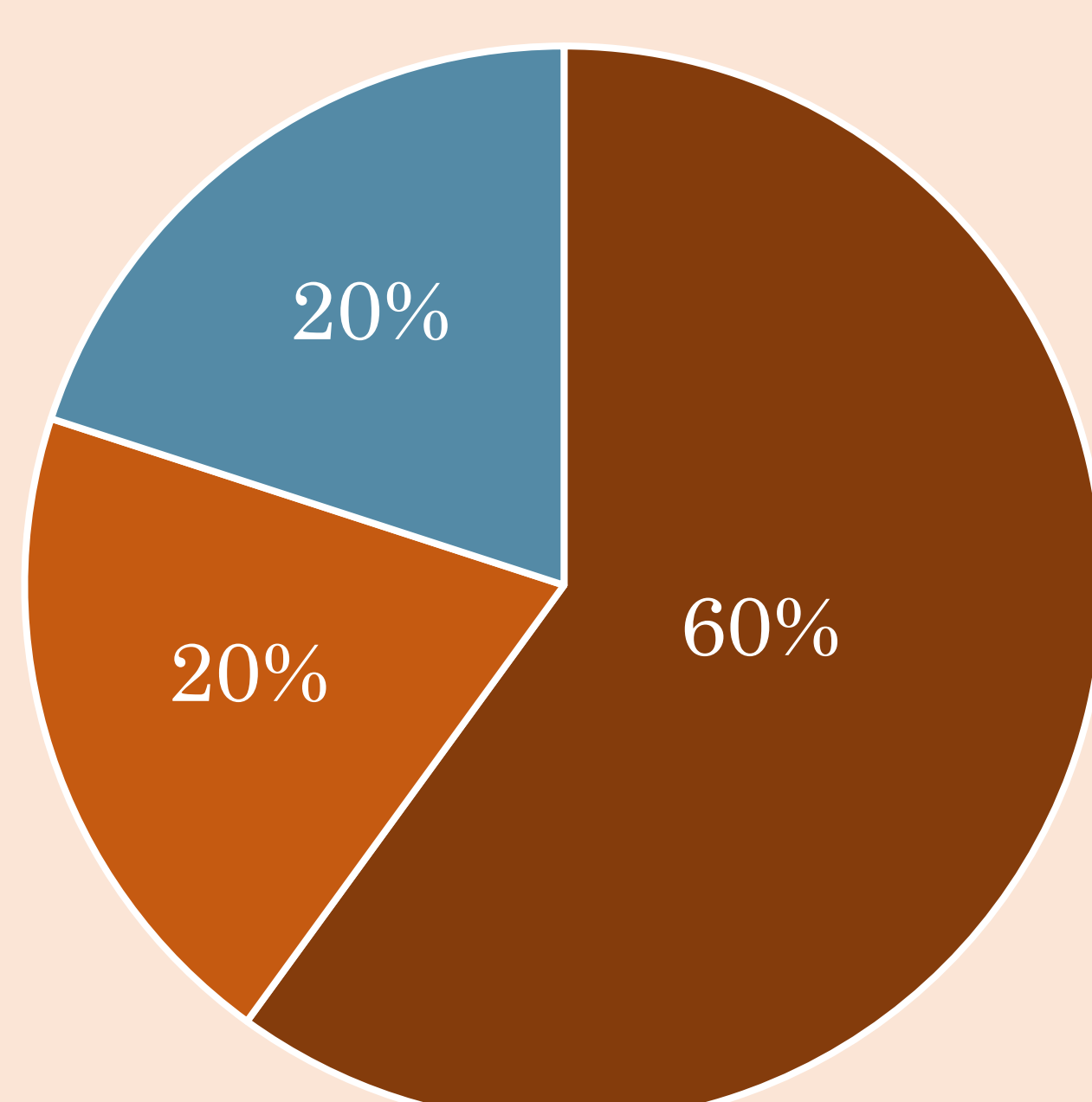


In the 137 interactions between *S. amabilis* and *M. symmetochus* workers, only two parasites initiated interactions, whereas 54 *S. amabilis* workers approached a *M. symmetochus* parasite.

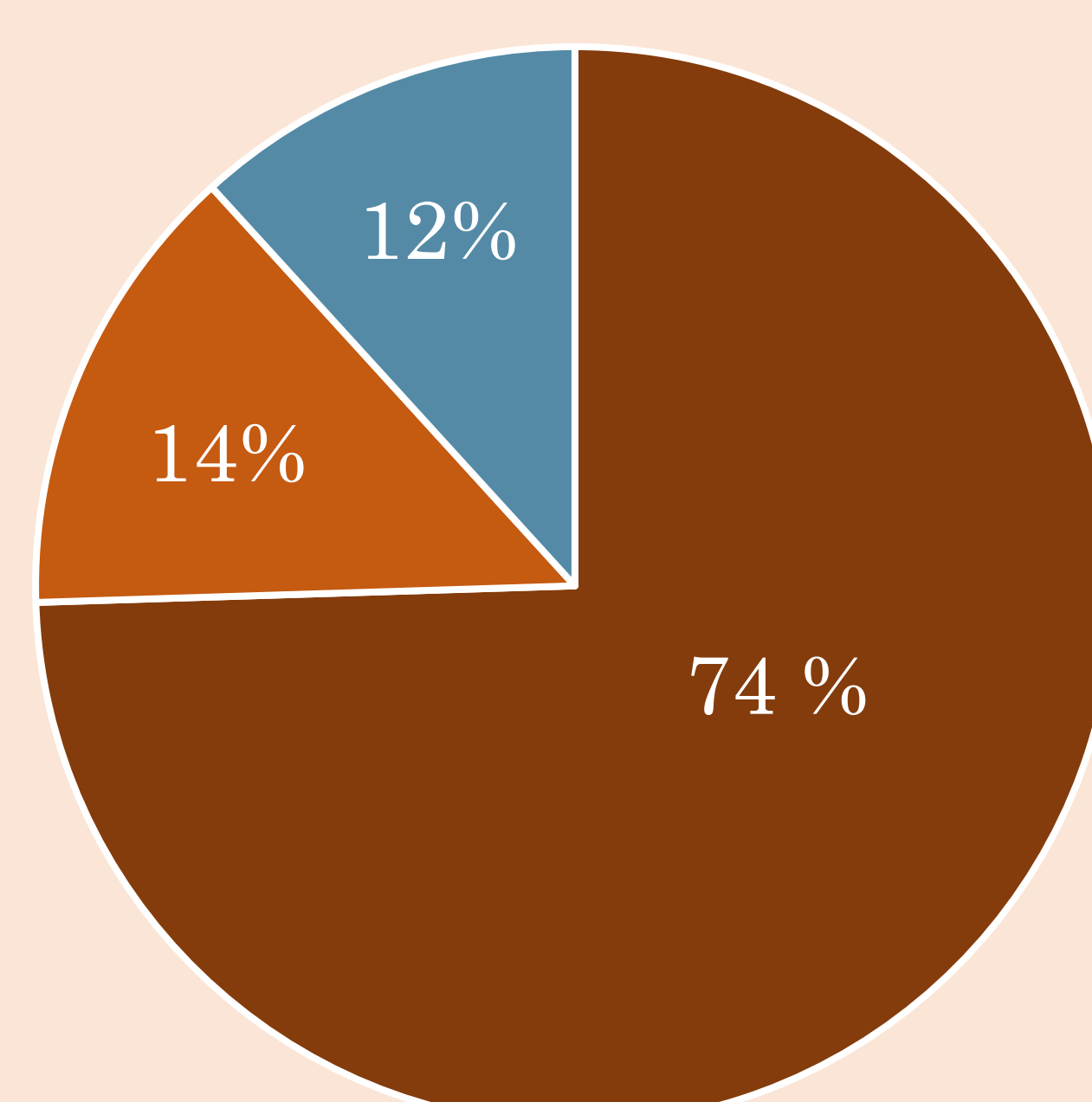
Results

Individual Alkaloid Dispensing Behaviors

■ Gaster flagging ■ Side-swipe sting ■ Gaster-tuck sting



Non-nestmate Host
n = 5



Non-host
n = 51

Of the five trials where stinging was observed in non-nestmate hosts, gaster flagging was recorded three times, whereas side-swipe and gaster-tuck sting only occurred once. In the 51 trials of non-host colonies, gaster flagging was observed 38 times, side-swipe seven, and gaster tucking six times.

Conclusions

In this study we observed fewer alkaloid dispensing behaviors in the host colonies compared to the non-host colonies. It is likely there were no observed stinging behaviors toward nestmate host colonies because host ants should avoid conflict with their parasitic nestmate. The small percentage of stinging behaviors seen toward the non-nestmate host colonies may be explained by detection of a non-nestmate parasite. The highest percentage of stinging behaviors were observed toward non-host colonies, who readily attack *M. symmetochus* parasites.

Acknowledgements

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