

# Site-fidelity, body size, and mating success in *Bolitotherus cornutus*

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## Introduction

- Male forked fungus beetles travel between varying numbers of fungus brackets
- *We hypothesized that larger males would spend time on fewer brackets because they are able to defend their space from smaller males*
- Unsure about connection between site-fidelity and mating success; more brackets might mean more chances to find mates, but might also prevent stable social connections from forming

## Methods

### Data Collection

- Visited population of *B. cornutus* on *Ganoderma applanatum* fungus twice a day for over a month
- Recorded ID, bracket location, and mating behaviors

### Measurements

- Elytra length measured using ImageJ

### Statistical Analysis

- Regression of sex, elytra length, number of observations, and elytra\*sex against number of brackets visited
- Regression of number of brackets visited, number of observations, and elytra length against number of guards and courtships, respectively

## Results

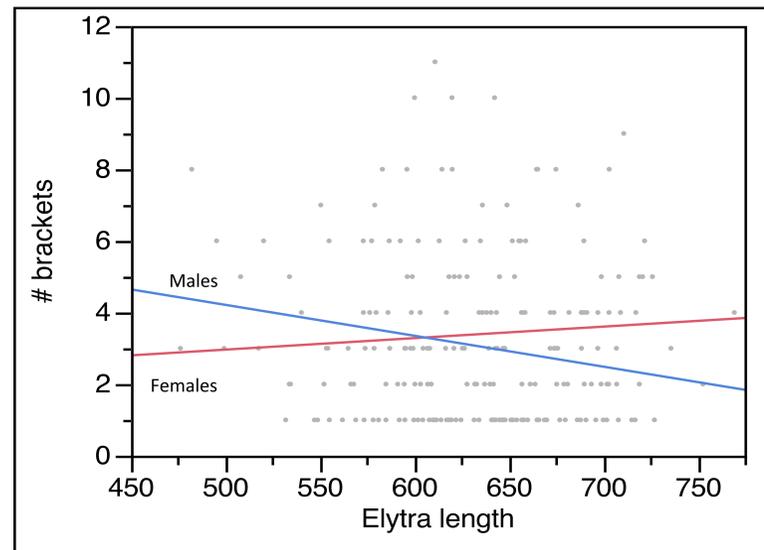


Figure 1. Bivariate fit of number of brackets visited by elytra length; the effect of elytra length on number of brackets is significantly stronger for males than it is for females ( $p=0.044$ ). Elytra length has a significant effect on number of brackets visited for males ( $p=0.0255$ ; generalized linear model)

a.

Factors	df	$\chi^2$	P
# of brackets	1	3.2396	0.0719
# of observations	1	31.053	<0.0001
Elytra length	1	1.7023	0.1920

b.

Factors	df	$\chi^2$	P
# of brackets	1	0.2569	0.6123
# of observations	1	10.1996	0.0014
Elytra length	1	0.9154	0.3387

Table 1. Number of brackets and elytra length did not significantly predict the number of (a) courtships or (b) guards a male obtained (generalized linear model).

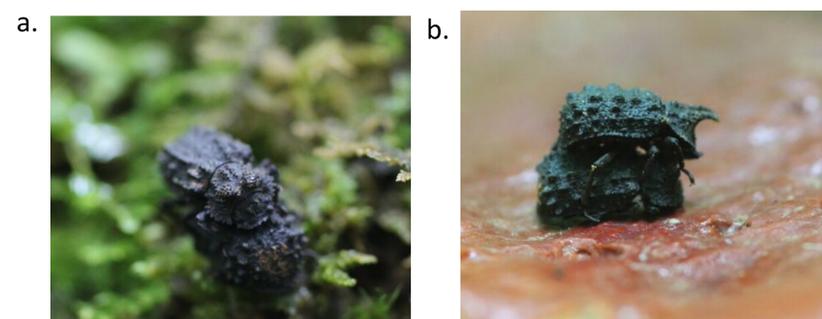


Figure 2. Forked fungus beetles engaging in (a) courtship and (b) guarding behavior. A courtship indicates an attempt at mating, whereas a guard indicates a successful copulation.



Figure 3. The study population, showing *G. applanatum* fungus brackets. Beetles form social networks on the surfaces of these brackets and travel between them. Individual brackets constitute mating arenas, where males will often compete with each other for access to females.

## Conclusions

- Elytra length has a significant effect on number of brackets visited; this effect is different between males and females
- *Smaller males visit more brackets than larger males*
- Number of brackets visited has no significant effect on courtships or guards

### Future directions

- Possible link between aggression and body size; investigating the relationship between this and site-fidelity could lead to better understanding of how social networks form

## Literature Cited

- Brown, Luther. "Aggression and mating success in males of the forked fungus beetle, *Bolitotherus cornutus*." *Proc. Ent. Soc. of Wash.* 82, no. 3 (1980): 430-434.
- Lacey, EA, and JR Wiczorek. "Territoriality and male reproductive success in arctic ground squirrels ." *Behavioral Ecology* 12, no. 5 (2001): 626-632.

## Acknowledgements

I would like to thank Professor Vince Formica, Hannah Donald-Cannon, and Mountain Lake Biological Station for their guidance and support of this project. I would also like to thank HHMI for funding this research.