Effect of Reproductive Maturity, Density, Body Size, and Sex on Feeding Behavior, Body Mass, and Body Condition in Adult Burying Beetles *Nicrophorus pustulatus*

L. Augustine, S. Cline, J. Creps, V. Creps, L. Grobeck, L. Sinclair, A. Wright, and C. Rauter

Department of Biology, University of Nebraska at Omaha

Introduction

Animals using carrion as food resource face special challenges. Although carrion is a food resource of very high quality, it is not only rare but its occurrence is also unpredictable in time and space. During sexual maturation, interactions among individuals on carrion are often non-aggressive and they feed side-by-side from carrion. At sexual maturity this may change, especially when carrion is monopolized for reproduction. With increasing population density, competition over carrion usually increases leading to more aggressive interactions among individuals. Larger individuals are more likely to win aggressive interactions and gain and maintain access to carrion. Large individuals have therefore better body condition than small individuals.

The purpose of this study was to investigate the effects of reproductive maturity, density, body size, and sex on feeding behavior, body mass, and body condition in the burying beetle *Nicrophorus pustulatus*.

Feeding Behavior (Figure 1)

- All beetles spent more time feeding as they matured ($F_{1,71} = 16.17, P = 0.0001$).
- With increasing density, all beetles spent more time feeding ($F_{3, 71} = 8.41, P < 0.0001$).
- Body size and sex had no effect on time spent feeding ($F_{1, 71} = 0.00, P = 0.96$; $F_{1, 71} = 1.06, P = 0.31$).

Body mass

- All beetles gained more body mass than mature males ($F_{1, 92} = 10.03, P = 0.002$).
- As expected large beetles were heavier than small beetles ($F_{1, 92} = 162.64, P < 0.0001$).
- Density and sex had no effect on body mass ($F_{3, 92} = 2.80, P = 0.05$; $F_{3, 92} = 2.66, P = 0.11$).

Body size was determined by the width of the pronotum ($\text{mean} \pm \text{SEM} = 6.82 \pm 0.03$ mm; $N = 248$). Beetles with a pronotum larger than the average width of 6.82 mm were classified as large beetles, while beetles with a pronotum smaller than 6.82 mm were classified as small beetles.

Body mass and body condition

Body condition was calculated, separately for sexually immature and mature beetles, as the residuals of the regression of body mass on pronotum width (sexually immature: $r = 0.83, P < 0.0001$; sexually mature: $r = 0.95, P < 0.0001$; $N = 248$).

Conclusions

- The increase of time spent feeding as density increased suggests that when competition over food becomes stronger, focusing on feeding may be advantageous.
- The increase in time spent feeding as beetles mature and the corresponding improvement in body condition of females supports earlier findings that egg production and parental care are energetically costly for females thus requiring large body reserves.

Acknowledgements

This research was funded by NSF STEP grant NSF-0336462.