

STEP Early Undergraduate Research – Report 2009

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

Participating Students

<i>Student Name</i>	<i>Major</i>	<i>Classification at end of Fall 08</i>
Scott Cline	BS Biology	Sophomore
Jennifer Creps	undecided, Biology	Sophomore
Valerie Creps	undecided, Biology	Sophomore
Lisa Grobeck	BS Environmental Studies	Sophomore
Lisa Sinclair	undecided, Pre-medicine	Sophomore
Jowanda Ashley Wright	BS Biology	Sophomore
Lindsey Augustin	BS Biology, Pre-Physical Therapy	Junior*

* (not supported by STEP EUR)

Scope of Project

The overall goal of the project was to offer undergraduate students hands-on research experience in behavioral ecology. The main goal of the research project 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*.

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.

Results and Discussion

We found that density affected only feeding behavior ($F_{3,71} = 8.41$, $P < 0.0001$). Beetles kept at high densities spent more time feeding than beetles maintained at low densities. This suggests that when competition over food becomes stronger, focusing on feeding may be advantageous. Body size influenced only body mass with large beetles, as expected, being heavier than small beetles ($F_{1,92} = 162.64$, $P < 0.0001$). Overall, sex exerted no main effects. As the beetles matured, they spent more time feeding and thus gained mass (Feeding $F_{1,71} = 16.17$, $P = 0.0001$; Mass: $F_{1,92} = 16.14$, $P = 0.0001$). Especially females gained mass and improved their body condition with maturation, while at the same time male body mass increased less and their body condition even decreased (Mass: $F_{1,92} = 10.03$, $P = 0.002$; Condition: $F_{1,92} = 9.18$, $P = 0.003$).

These findings support earlier results that egg production and parental care are energetically costly for females thus requiring large body reserves.

Student Involvement and Assessment of Success

All students worked together in data collection and data entry as well as maintenance of the beetle colony that provided the beetles for the experiment. After completion of the experiment, the students summarized their results in form of a poster (see attached poster).

All students were highly dedicated and worked enthusiastically on the project. Overall, all students performed very well.