

# Differences in Growth and Parental Mass Arising from

## Uniparental versus Biparental Care

### Introduction

Biparental care is usually advantageous to offspring. Males assist females in the feeding and the protection of the young, resulting in higher quality offspring compared to uniparental care. In burying beetles, however, the end weight of the brood does not differ between biparental and uniparental care even though biparental offspring are fed more often than uniparental offspring.

Burying beetles use carrion as food resource for reproduction. The parents prepare and feed carrion to the offspring. There is strong competition over carrion, especially when there are eggs, or the larvae are still very small, and the carrion has not yet been substantially consumed. Successful take-overs of carrion by intruders result in the death of eggs and larvae. We expect therefore strong selection for fast larval growth with rapid consumption of the carrion.

**Question 1: Does biparental care have a positive effect on the growth pattern of the larvae?**



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Because of the time and energy put into provisioning offspring, parents generally lose mass while providing parental care. In the presence of a mate, parents often provide less care than in the absence of a mate and therefore lose less mass. In burying beetles the parental care effort of females does not depend on the presence of a mate, whereas males provide less care in the presence of a mate than without. We expect that uniparental and biparental females do not differ in change of mass while providing parental care, but biparental males should differ from biparental females in change of mass.

**Question 2: Does the type of parental care affect overall mass change in parents?**

### Results

The growth pattern of the larvae was not affected by the parental care type (Figure 1). Larvae of biparental parents did not grow faster nor did they reach a higher final mass.

As expected biparental and uniparental females did not differ in change of mass. Both gained about 20-30% of mass between mating and hatching of larvae, followed by a continuous loss of mass until larval dispersal. Nevertheless, at the end of parental care, the females were still about 15% heavier than at the beginning (Figure 2). Males gained only about 15% of mass between mating and hatching of the larvae. Their final mass was about 10% of the initial mass (Figure 3).

### Methods

To study whether larval growth and adult mass change differs between uniparental and biparental burying beetles, we provided pairs of virgin female and male *Nicrophorus vespilloides* from our lab colony with previously frozen mice (from 20 to 27g) for carrion. From half of these pairs we removed the male the following day to simulate uniparental female care. The larvae and parents from both uniparental and biparental broods were weighed when the larvae hatched, 0.5, 1, 1.5, 2, 2.5, 3 days after the larvae hatched, or at dispersal from the carrion.

### Discussion

The lack of an effect of biparental care on the growth pattern of larvae suggests that the main advantage of biparental care may lay in improved defense of larvae against intruders and not in the provisioning of larvae.

Females may gain more mass than males between mating and larval hatching because of the larger growth of the ovaries than the "sperm". The larger loss of mass in females during parental care reflects the higher rates of provisioning of females.

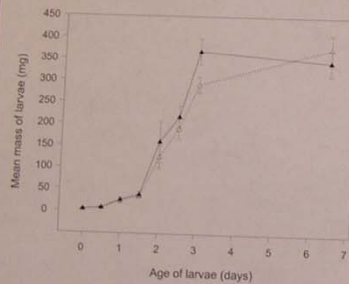


Figure 1: Larval mass in relation to age of larvae. Open triangles: uniparental female care; Closed triangles: biparental care. Means and SE are shown.

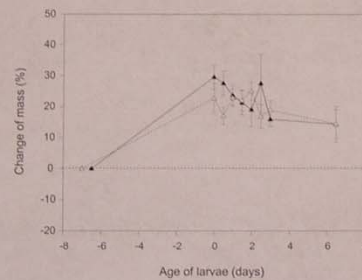


Figure 2: Change of female mass in relation to age of larvae. Open triangles: uniparental female care; Closed triangles: biparental care. Means and SE are shown.

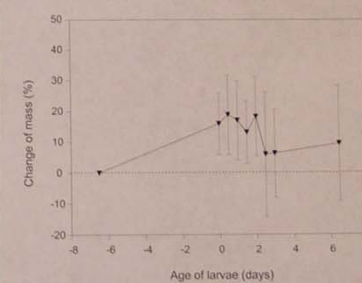


Figure 3: Change of male mass in relation to age of larvae. Means and SE are shown.

# The Effects of Parental Care on Offspring Growth and Adult Mass

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## Acknowledgments

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## Results

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## Discussion

The lack of an effect of biparental care on the growth pattern of larvae suggests that the main advantage of biparental care may lay in the improved defense of larvae against intruders and not in the provisioning of larvae.

The larger gain of mass of females between mating and hatching of larvae compared to males may be due to larger growth of the ovaries than the "sperm". The larger loss of mass in females during parental care reflects the higher rates of provisioning from the females.

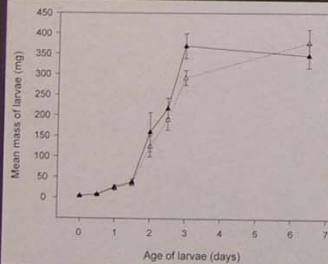


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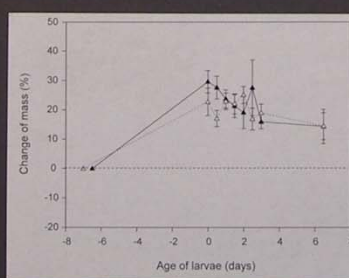


Figure 2: Change of female mass in relation to age of larvae. Open triangles: uniparental female care; Closed triangles: biparental care. Means and SE are shown.

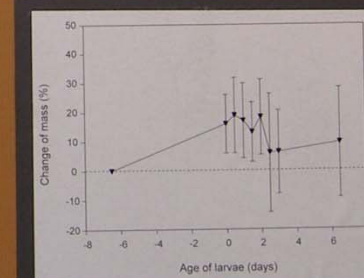


Figure 3: Change of male mass in relation to age of larvae. Means and SE are shown.