

Do purely capital layers exist among flying birds? Evidence of exogenous contribution to arctic-nesting common eider eggs

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Abstract

The timing of egg-laying in arctic-nesting common eiders (*Somateria mollisima*) is often considered to be a capital investment, because females do not feed their young after hatching. We used stable isotope analysis to test whether female eiders contribute to their offspring's diet by feeding them exogenously during the first week of life. We collected samples from nestlings at three ages (0, 3 and 6 days post-hatch) and from their mothers. Stable isotope values of nestlings were significantly different from those of their mothers, indicating that nestlings did not receive exogenous food. Our results suggest that nestlings are entirely dependent on their mothers for nutrition during the first week of life.

Electronic supplementary material

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Introduction

Female birds often make substantial investments in their offspring. These investments can be either capital or income. Capital investments are those that are used up during the production of the offspring, whereas income investments are those that are used up during the production of the offspring and can be replaced by the parents (Krebs & Davies 1993). In some cases, the timing of egg-laying in arctic-nesting common eiders (*Somateria mollisima*) is often considered to be a capital investment, because females do not feed their young after hatching (Hobson et al. 2000). This has led to the hypothesis that nestlings are entirely dependent on their mothers for nutrition during the first week of life (Hobson et al. 2000).

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onset of incubation (Fig.). This indicates that endogenous protein mobilization during egg formation was absent or weak (the observed non-statistically significant decrease in breast muscle mass was 5% on average). Within-stage correlations between endogenous reserve estimates and number of follicles (developing or post-ovulatory) were not significant ($P > 0.05$), except for leg mass of laying females ($r = 0.59$, $P = 0.03$), and post-laying females' total body mass ($r = 0.59$, $P = 0.03$).

$$\frac{d^2\theta}{dt^2} = \frac{GM}{r^3} \left(\frac{dr}{dt} \right)^2 + \frac{GM}{r^2} - \frac{v^2}{c^2}$$

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Determining to what extent endogenous reserves are used for reproduction involves the placement of a species (Stephens et al.

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