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The somatic cost of reproduction: what determines reproductive effort in prime-aged fallow bucks?

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ABSTRACT

The somatic costs of reproduction are important for understanding the relationship between sexual selection and life-history evolution, and there are two main hypotheses used to explain the pattern of reproductive effort in ungulates. The terminal investment hypothesis predicts that reproductive effort should increase with age, because the value of each offspring increases as the number of future potential offspring decreases over the lifetime of an individual. In contrast, the mating strategy-effort hypothesis predicts that reproductive effort should be highest in prime-aged males, and lower in both younger and older males, since prime-aged males are most active in trying to gain matings. We examined reproductive effort among prime-aged (5–8 years old) fallow bucks (*Dama dama*) by comparing mass loss during the breeding season with mating success and activities associated with mating. Males lost about 26% of their body mass during the breeding season and mating success was strongly positively related to the time spent moving and in vocal display. However, mass loss was not related to either mating success or the behaviours associated with mating success. This indicates that males of higher quality were more efficient at converting energy into reproductive success, and is consistent with our earlier results showing phenotypic quality differences between males in our study population. Mass loss was positively correlated with initial mass. Therefore, body condition at the start of the breeding season was the most important determinant of reproductive effort. Mass loss was not related to age, in that it neither increased with age nor peaked in males that are usually the most reproductively active (ages 6 and 7). Thus, for reproductive effort in prime-aged males, our results do not support either the terminal investment hypothesis or the mating strategy-effort hypothesis.

Keywords: *Dama dama*, life history, mass loss, mating strategy-effort hypothesis, mating success, terminal investment.

INTRODUCTION

Reproduction is energetically expensive and mass loss during reproduction is common in both sexes of many species (Halliday, 1987). Variation in the ability to cope with energetic

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