

Extra-pair paternity in birds: review of the genetic benefits

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ABSTRACT

Question: How well are genetic benefits hypotheses for extra-pair paternity supported by empirical evidence?

Data incorporated: Almost all published studies testing for genetic benefits from 1980 onwards (121 papers, 55 species).

Analysis methods: Collected key features and findings of each study in a database. Determined overall level of support for both good genes and compatible genes hypotheses. Conducted a formal meta-analysis on a subset of studies asking the following questions: (1) Do extra-pair mates of females have different phenotypes than their within-pair mates? (2) Do extra-pair offspring differ in viability from within-pair offspring? (3) Is there a correlation between the genetic similarity of a social pair and the incidence of extra-pair paternity?

Results: Both the good genes and compatible genes hypotheses failed to be supported in more than half of the species studied. The meta-analysis shows that extra-pair males are on average larger and older than within-pair males, but not different in terms of secondary sexual traits, condition or relatedness to the female. No difference was found between extra-pair and within-pair young in survival to the next breeding season. We found no significant correlation between pair genetic similarity and extra-pair paternity.

Conclusions: Genetic benefits are not strongly supported by available empirical data. New hypotheses are needed.

Keywords: compatible genes, direct benefits, extra-pair paternity, good genes, meta-analysis.

BACKGROUND

Most birds are socially monogamous, yet most are not completely so genetically (Griffith *et al.*, 2002). This realization, brought about by molecular methods utilized in the last two decades, has spurred great interest in elucidating the evolution and maintenance of extra-pair reproductive activity in birds. Initially, interest was focused on whether and why males do not or cannot guard their mates to prevent extra-pair copulations, generating a variety of predictions on the relation of breeding demographics with extra-pair paternity (Griffith *et al.*,

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