Surrounding pathogens shape maternal egg care but not egg production in the European earwig

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Abstract

Pathogens are ubiquitous in nature and typically entail major fitness costs in their hosts. These costs can be particularly important when individuals exhibit poor immune defenses, as it is often the case during early developmental stages. Hence, selection should favor parental strategies limiting the risks of pathogen exposure and infection in their offspring. In this study, we investigated 1) whether females of the European earwig Forficula auricularia avoid areas contaminated with spores of the entomopathogenic fungus Metarhizium brunneum prior to and at egg laying, as well as 2) whether spore presence entails an increase in females' investment into both pre-hatching forms of care and clutch quantity and quality. Our results first show that females did not avoid contaminated areas prior to and at egg laying. However, females returned to their eggs faster in presence of living spores compared to UV-killed or no spores. They were also more likely to construct a nest when in presence of both living and UV-killed spores (but only in one studied population). Finally, we found that spore presence did not influence maternal investment into egg grooming, egg gathering and egg defense, as well as into clutch quantity and quality. Overall, our results demonstrate that earwig females do not avoid contaminated environments, but could mitigate the associated costs of pathogen exposure by adjusting their level of egg care. These findings emphasize the importance of pathogens in the evolution of pre-hatching parental care and, more generally, in the emergence and maintenance of family life in nature.

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