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Publication

Bateman gradients in hermaphrodites : an extendes approach to quantify sexual selection

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Sexual selection is often quantified using Bateman gradients, which represent sex?specific regression slopes of reproductive success on mating success and thus describe the expected fitness returns from mating more often. Although the analytical framework for Bateman gradients aimed at covering all sexual systems, empirical studies are biased toward separate?sex organisms, probably because important characteristics of other systems remain incompletely treated. Our synthesis complements the existing Bateman gradient approach with three essential reproductive features of simultaneous hermaphrodites. First, mating in one sex may affect fitness via the opposite sex, for example, through energetic trade?offs. We integrate cross?sex selection effects and show how they help characterizing sexually mutualistic versus antagonistic selection. Second, male and female mating successes may be correlated, complicating the interpretation of Bateman gradients. We show how to quantify the impact of this correlation on sexual selection and propose a principal component analysis on male and female mating success to facilitate interpretation. Third, self?fertilization is accounted for by adding selfed progeny as a separate category of reproductive success to analyses of Bateman gradients. Finally, using a worked example from the snail Biomphalaria glabrata, we illustrate how the extended analytical framework can enhance our understanding of sexual selection in hermaphroditic animals and plants.