Can diet niche partitioning enhance sexual dimorphism?

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Abstract

Abstract 1. Classic evolutionary theory suggests that sexual dimorphism evolves primarily via sexual and fecundity selection. However, theory and evidence is beginning to accumulate suggesting that resource competition can drive the evolution of sexual dimorphism, via ecological character displacement between sexes. A key prediction of this hypothesis is that the extent of ecological divergence between sexes will be associated with the extent of sexual dimorphism. 2. As the stable isotope ratios of animal tissues provide a quantitative measure of various aspects of ecology, we carried out a meta-analysis examining associations between the extent of isotopic divergence between sexes and the extent of body size dimorphism. Our models demonstrate that large amounts of between-study variation in isotopic (ecological) divergence between sexes is due to systematic heterogeneity, which may be associated with the traits of study subjects. We then completed meta-regressions to examine whether the extent of isotopic divergence between sexes is associated with the extent of sexual size dimorphism. 3. We found a modest but significantly positive association between size dimorphism and sex differences in trophic level. Furthermore, the strength of this positive association varied between ecological contexts, increasing in species whose diets provide the greatest scope for trophic variation and in those for which body size is of greater relevance to feeding. 4. Our results therefore provide further evidence that ecologically mediated selection, unrelated to reproduction, can contribute to the evolution of sexual dimorphism.

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