Beyond Simple vs Complex: Exploring the Nuanced and Unexpected Effects of Spatial Environmental Complexity on Mating Patterns and Female Fecundity

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The features of the physical environment define the space in which individuals interact, potentially influencing sexual selection. Several experimental studies have explored this idea using fruit flies *Drosophila melanogaster* and found that changing environmental spatial complexity influences the expression of male behaviour and is associated with changes in mating rates and female fecundity. However, these studies did not measure mating patterns, which can alter the genetic composition of the next generation, and furthermore only tested differences between a single simple and complex environment, thereby limiting our understanding of this phenomenon is. In our study we compared patterns of mating and offspring production between groups of large- and small-bodied males and females housed in a variety of different spatial environments. We found dramatically different mating patterns both between simple and complex environment, as well as between different complex environments, and that females in complex environments produced more offspring. We discuss these results in the context of sexual selection and sexual conflict, and the consequences for evolution in subsequent generations.

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