Similar or dissimilar? That is the question

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Genetic variation is the fuel of adaptation and underlies all the striking biodiversity observed in nature. However, how genetic variation fitness is maintained in natural populations is still under major debate in evolutionary biology. How can there still be “bad genes” if individuals carrying “good genes” have better chances to survive and reproduce, suggesting that these “good genes” should be the only ones maintained by natural selection? One mechanism that has been suggested capable of maintaining genetic variation for fitness is sexually antagonistic (SA) selection. SA selection favours alternative genes in males and females. For example, the males of many species benefit from mating often, however, since repeated mating can be a harmful for females they try to minimize the number of mating occurrences. However the conditions under which alternative SA genes are maintained are still thought to be somewhat restrictive.

Several mathematical models have explored potential mechanisms that may allow the maintenance of SA genetic variation. One such mechanism is assortative mating. Assortative mating occurs when individuals with similar characteristics mate more frequently than expected by random chance. For instance, in humans some mate choice is based on socio-economic status, where individuals choose partners that are on a similar social standing as themselves. Assortative mating for fitness would thus be the pairing of “good” males and females and of “bad” males and females, which, in the context of genes with SA effects, would cause the pairing of opposite genes. This scenario would tend to maintain both of those alternative genes in a population.

This study explores if there is assortative mating for fitness in a population of *Callosobruchus maculatus* seed beetles. To do this, I competed high- and low-fitness male and female genotypes in a replicated fashion that enabled me to quantify the offspring produced from each of the combinations, and hence, quantify assortative reproduction for fitness. Contrary to expectation, the results show evidence of *dis*assortative reproduction, which would tend to destabilize the maintenance of SA genetic variation, leaving the question of what maintains genetic variation for fitness still unanswered.

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