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Title: Exploring the nature of pleiotropy in fitness components in male *Drosophila melanogaster*

Authors: Sen, Sharmi (/jspui/browse?type=author&value=Sen%2C+Sharmi)

Keywords: Biology
Drosophila
sexual conflict

Issue Date: 2-Jul-2015

Publisher: IISER M


Abstract: The theory of antagonistic pleiotropy predicts that a trait which provides a fitness advantage in early life but has a deleterious effect at a later life will be selected as strength of selection decreases over age. So far, this theory has been validated with experimental evidences from studies of life history traits such as reproduction and longevity. Little emphasis has been given on the nature of age dependent pleiotropy in traits evolving as a result of sexual conflict. Here, in this study we hypothesize that a sexually selected trait which confers an early life fitness advantage will show rapid decline with age in populations selected for high levels of sexual conflict than in populations with low or intermediate levels of sexual conflict. The trait that we were interested in was male mate harm - a trait that is already known to influence the fitness of a male. Our aim was to investigate whether this trait which has evolved under varying levels sexual conflict shows antagonistic pleiotropy. We have carried out this study using experimental evolution on replicate populations of *Drosophila melanogaster* that have been selected for altered levels of sexual conflict for more than a hundred and forty generation. Previous studies on the very same populations have shown that young males subjected to increased levels of sexual conflict evolve to become more harming to females than young males subjected to intermediate or lower levels of sexual conflict. However, what happens to this trait in selected males at a later age still remains unknown. We conducted two separate studies in order to understand how flies from selected populations differ in the resources that they acquire early in life and to investigate the effect of age on mate harming ability in males from selected populations and to answer the question whether mate harming ability shows a negative pleiotropy with age. Our results indicate that selected populations do not differ significantly in the resources that they acquire in their early life and male mate harming ability does show a negative pleiotropy with age in populations with higher levels of sexual conflict. This is to the best of our knowledge the first indication of antagonistic pleiotropy seen in a trait evolving under sexual conflict.

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