

Peer Review

Review of: "Partial Sex-Role Reversal of the Pink Bollworm Moth (*Pectinophora gossypiella*)"

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Comments to the author:

This manuscript by Harari A. investigates the partial sex-role reversal and mate choice in the Pink Bollworm Moth. Through a series of controlled experiments, the author demonstrates that male and female pink bollworm moths exhibit mate selectiveness by altering mating choosiness according to body size and condition. Overall, the data presented in this manuscript are sound and align with previous research on sexual behavior and reproduction in Lepidoptera. Below, I suggest some edits and possible alternative interpretations of the results. I believe that the manuscript requires restructuring and consistent wording. Nonetheless, I think this manuscript presents results that advance our understanding of sexual reproduction and mate choice in Lepidoptera.

Section Comments (I will address by section since line numbers are not provided):

Introduction – First, I appreciate the extensive literature that the author presents, demonstrating the varied examples of species in which size and chemosensory cues impact sexual reproduction. For a non-lepidopteran expert, this background information is invaluable. However, I feel that further information regarding mating systems (polyandry, polygamy) and levels of pre- and post-copulatory sexual selection is necessary for a non-moth expert to contextualize the relevance of mate choice.

Material and Methods – Overall, the experimental design addresses the questions the author aims to answer; however, it lacks some controls and explanations for the chosen treatments. **Experiment 1** – It would be beneficial to include a group with medium-sized females. If female size is a predictor of body condition, it would be useful to know where they stand in terms of time until half of the mating occurs across the three groups (control group). Please explicitly explain why “the time until half of the females

began mating” was chosen as a variable instead of maintaining the variation in time across trials and treatments. Which statistical program was used to run the analyses? **Experiment 2** – Why refer to it as choosiness rather than female assortative mating? Your hypothesis seeks to determine if there is evidence of assortative mating. Please clarify what female calling behavior entails and specify the behaviors that were tracked. Unlike Experiment 1, males and females were allowed to mate multiple times within a trial; please report the average number of matings for each female and male and any statistical differences. Such statistical analyses would provide valuable insights into both male and female mate choice and the potential contribution of post-copulatory sexual selection, particularly sperm competition, in the evolution of this species’ mating system. Regarding the statistical analysis, please report the program used and justify the choice of bootstrapping over non-parametric tests.

Results – Please provide more detail in the figure legends by explicitly explaining what each bar represents. For Figure 1, choose only two colors to differentiate between large and small females and use the same colors across treatments. The same applies to Figure 2; use two colors according to female size, preferably the same colors used in Figure 1.

Discussion – Some clarification is needed. For any of the experiments conducted, the effects are not unidirectional. It is unclear how the author measured the choosy sex; is it the male for some experiments/treatments or the female? Can the author elaborate on this? Was there any metric recorded regarding which sex initiated mating across treatments/experiments? Are there forced copulations, considering the matings were conducted in an enclosure, making it difficult for the female to escape? Are large females in Experiment 1 rejecting males at a higher rate compared to smaller females? Please elaborate on the interpretation of the results or add additional results in the results section. In Experiment 2, what was the level of post-copulatory sexual selection? Is there data regarding the order of mating according to male and female size?

Declarations

Potential competing interests: No potential competing interests to declare.