Title:	Evolution of Pre- and Post-Copulatory Traits in Male Drosophila melanogaster as a Correlated Response to Selection for Resistance to Cold Stress
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Abstract:	Background: In Drosophila melanogaster the fitness of males depends on a broad array of reproductive traits classified as pre- and post-copulatory traits. Exposure to cold stress, can reduce sperm number, male mating ability and courtship behavior. Therefore, it is expected that the adaptation to cold stress will involve changes in pre- and post-copulatory traits. Such evolution of reproductive traits in response to cold stress is not well studied. Methods: We selected replicate populations of D. melanogaster for resistance to cold shock. Over 37-46 generations of selection, we investigated pre- and post-copulatory traits such as mating latency, copulation duration, mating frequency, male fertility, fitness (progeny production) and sperm competitive ability in male flies subjected to cold shock and those not subjected to cold shock. Results: We found that post cold shock, the males from the selected populations had a significantly lower mating latency along with, higher mating frequency, fertility, sperm competitive ability and number of progeny relative to the control populations. Conclusion: While most studies of experimental evolution of cold stress resistance have documented the evolution of survivorship in response to selection, our study clearly shows that adaptation to cold stress involves rapid changes in the pre- and post-copulatory traits. Additionally, improved performances under stressful conditions need not necessarily trade-off with performance under benign conditions.
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