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Title: Virility does not imply immensity: Testis size, accessory gland size and ejaculate depletion pattern do not evolve in response to experimental manipulation of sex ratio in *Drosophila melanogaster*

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Abstract: Sperm competition theory predicts that with increase in sperm competition, males either invest more in reproductive organ(s) and/or improve ejaculate investment. We test this idea using experimental evolution in *Drosophila melanogaster*. We maintained replicate populations of *Drosophila melanogaster* under male (M) and female (F) biased sex ratio regimes for more than a hundred generations with the result that males from the M regime evolved higher sperm competitive abilities relative to males from the F regime. In the present study, we measured the testes and the accessory gland size of virgin and singly mated males from the M and F regimes. The M and F males do not differ in either testis or accessory gland size. Additionally, ejaculate investment is not different in the M and F males, as measured by reduction in testis and accessory gland sizes. Thus, contrary to theoretical prediction and evidence from other species, we found that evolved differences in sperm competitive ability are not necessarily due to evolution of testis/accessory gland size or strategic ejaculate investment in these populations.

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