Interaction between the effects of maternal and larval levels of nutrition on pre-adult survival in *Drosophila melanogaster*

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**ABSTRACT**

*Drosophila melanogaster* is used extensively for studies of life-history trade-offs involving acquisition and allocation of nutritional resources. Yet we know very little about the effects of level of parental nutrition on offspring fitness traits, and whether parental and offspring nutrition interact in their effect on offspring phenotype, although such interactions are known in other organisms. We looked for such parental effects and interactions by assaying pre-adult survivorship and dry weight at eclosion on individuals from a long-standing laboratory population of *D. melanogaster* subjected to four combinations of maternal (rich or poor food) and offspring (rich or poor food) nutritional environments. We saw no effect of maternal food level on offspring dry weight at eclosion. On average, females were heavier than males, and flies given rich food as larvae were heavier than those raised on poor food as larvae. Levels of maternal and offspring food interacted significantly in their effect on pre-adult survivorship, with the highest survivorship being seen in individuals from the combination of poor maternal and rich offspring food; survivorship did not differ significantly among the other three treatments. We suspect that some aspect of egg provisioning by mothers reared on poor food may be involved in this interaction, as we found that females reared on poor food laid eggs that were 28% heavier than those from females reared on rich food. This difference, however, was not significant. Although the underlying basis for the interaction between levels of maternal and offspring food in their effect on pre-adult survivorship is not clear at this time, we believe that the observation of such an interaction suggests caution in interpreting results from dietary manipulation experiments in *Drosophila*, in which maternal nutrition is typically not treated as a factor in the experimental design.

**Keywords:** *Drosophila*, dry weight, fitness, larval survivorship, life history, maternal effect, nutrition.

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