

Parental Diet Effects on Offspring Body Size and Pathogen Resistance in *Bactrocera tryoni*

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Abstract : Better understanding of how parental diet affects offspring traits is an important ecological and evolutionary question. In this study, we explored how maternal diet influences offspring physiology and resistance to infection using *Bactrocera tryoni* (Q-fly) as a system model. Female Q-flies were fed one of six single diets varying in their yeast-to-sugar ratio yielding six protein-to-carbohydrate ratios. As controls, we used females that were given a choice between yeast and sugar. Males were reared on a choice diet and allowed to mate with females 14 days post-emergence. Results showed that while maternal diet does not influence offspring developmental time, it has a strong effect on larval body weight. Mother fed either high-protein or high-sugar diet produced larger progeny. By challenging offspring with the bacterium *Serratia marcescens*, we found that female offspring from mothers fed high-sugar diet survived better the infection compared to those from mothers fed low-sugar diet. In contrast, male offspring produced by mother fed high-protein diet showed better resistance to the infection compared to those produced by mother fed low-protein diet. These results suggested sex-dependent transgenerational effects of maternal nutrition on offspring physiology and immunity.

Keywords : bacterial infection, *Bactrocera tryoni*, maternal diet, offspring, *Serratia marcescens*

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