

**Evolutionary compromises in ecological adaptation: urea and ammonia tolerance in  
*Drosophila suzukii* and *Drosophila melanogaster***

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*Drosophila suzukii* is an invasive species, and a serious agricultural threat. Unlike other *Drosophila*, females of *D. suzukii* lay eggs under the skin of fresh fruits, through morphological and behavioral adaptations. Therefore, larvae development and exposure to pathogens result in damage of a wide range of small fruits. The more innocuous *Drosophila melanogaster* lay eggs in fermented fruits and larvae develop in a crowded environment characterized by accumulation of nitrogenous waste such as ammonia and, at lower extent, urea. Behavioral avoidance cannot prevent larvae exposure to environmental toxins, so physiological mechanisms evolved to cope with these compounds. While it is known how *D. melanogaster* respond to high concentrations of urea and ammonia, little is known on the potential effects on *D. suzukii*. We investigated the impact of different concentrations of these compounds on fecundity and larval development in both species. Females and larvae of *D. suzukii* showed a greater sensitivity to high concentration of nitrogenous waste, with a drastic decrease in fecundity and egg viability. To better understand the pathways underlying these differences, we evaluated the effect on enzymes involved in nitrogen metabolism and stress response that are expressed during larval development. Under ammonia and urea exposure, the expression of these enzymes was significantly reduced in *D. suzukii*. Adaptation to a different ecological niche has allowed larvae to develop in a safer and healthier environment. However, metabolic adaptations to different food and environment have probably resulted in less efficient detoxifying and excretory mechanisms. To shed light on those mechanisms in *D. suzukii* is a necessary step to plan effective strategies of sustainable pest control.