Flies, flight, and fitness: model organisms under non-model conditions

Emily Price, Dr. Jim Vigoreaux

Drosophila melanogaster is a species of fruit fly that has been studied for decades, mostly under strict laboratory conditions, to facilitate biological, physiological, and medical inquiry. The knowledge gained from studying this genetically-tractable model organism has contributed to our understanding of muscle function from the molecular level through the organismal level. However, the conditions under which the flies are reared, unlike circumstances most organisms encounter in nature, are spatially constrained and provide unlimited access to food. In addition, the flight tests that are used in the laboratory to determine the effects of muscle mutations are unlike the complex environments a "wild" *D. melanogaster* would navigate. How much of the information gathered in this manner about muscle function and flight ability is relevant to the natural conditions under which these properties evolved? To address this question, we are exploring new designs for flight chambers that include some of the challenges flies encounter in the real world. Each chamber will contain either active predators such as dragonflies or passive predators such as carnivorous plants. We are currently in the process of choosing which species of plants and insects to include in order to approximate the conditions under which *D. melanogaster* evolved.