

Conference abstract

Sixth International Symposium on the Environmental
Physiology of Ectotherms and Plants, August 3rd to 7th, 2015
Aarhus, Denmark



Investigating fitness consequences of single and multiple stresses experienced during development in *Drosophila melanogaster* and *Drosophila hydei*

Michael Ørsted and Torsten N. Kristensen

Environmental conditions play a major role in the ecological and evolutionary dynamics of natural populations. During the last century, many plant and animal population have experienced rapid deterioration of their natural habitat e.g. due to climate change and anthropogenic impacts, which have led to an increased level of environmental stress perceived by individuals. By definition exposure to abiotic and biotic stresses decrease fitness of populations relative to benign conditions. However, in nature environmental stresses seldom occur alone, but populations will experience a multitude of different stresses simultaneously, e.g. stressful temperatures, malnutrition and exposure to toxicants. An important question is whether decreases in fitness are additive when stresses are combined, or if fitness is decreased more (or less) than expected under the assumption that each stress act independently. When the simultaneous effects of the stressful environmental conditions are not additive there is an environment (E) by E interaction. The fitness consequences of interactions between environmental stresses (E x E, and possibly E x E x E interactions) are not yet fully understood. In this study we aim at investigating the effects of thermal, chemical and competition stress experienced during development of *Drosophila melanogaster* and *D. hydei* on fitness components, including viability, thermal resistance and behavioural traits. Specifically, we examine the effects of developing at cold, benign and hot temperatures and two levels of chemical stress (i.e. as different concentrations of the insecticide, dimethoate) on both *Drosophila* species separately and in competition. We investigate each stressor individually and in every possible combination to elucidate the complex nature of effects of multiple stresses. Preliminary results suggest an interaction between the effects of dimethoate and thermal stress and that the fitness consequence of stresses are highly trait and species specific.