World Academy of Science, Engineering and Technology
International Journal of Biological and Ecological Engineering
Vol:12, No:06, 2018

Energy Metabolites Show Cross-Protective Plastic Responses for Stress Resistance in a Circumtropical Drosophila Species

Authors : Ankita Pathak, Ashok Munjal, Ravi Parkash

Abstract : Plastic responses to multiple environmental stressors in wet or dry seasonal populations of tropical Drosophila species have received less attention. We tested plastic effects of heat hardening, acclimation to drought or starvation; and changes in trehalose, proline and body lipids in D. ananassae flies reared under wet or dry season specific conditions. Wet season flies revealed significant increase in heat knockdown, starvation resistance and body lipids after heat hardening. However, accumulation of proline was observed only after desiccation acclimation of dry season flies while wet season flies elicited no proline but trehalose only. Therefore, drought-induced proline can be a marker metabolite for dry season flies. Further, partial utilization of proline and trehalose under heat hardening reflects their possible thermoprotective effects. Heat hardening elicited cross-protection to starvation stress. Stressor-specific accumulation or utilization, as well as rates of metabolic change for each energy metabolite, were significantly higher in wet season flies than dry season flies. Energy metabolite changes due to inter-related stressors (heat vs. desiccation or starvation) resulted in possible maintenance of energetic homeostasis in wet or dry season flies. Thus, low or high humidity induced plastic changes in energy metabolites can provide cross-protection to seasonally varying climatic stressors.

Keywords : wet-dry seasons, plastic changes, stress related traits, energy metabolites, cross protection
Conference Title : ICEEG 2018 : International Conference on Ecological and Evolutionary Genetics
Conference Location : Vienna, Austria
Conference Dates : June 14-15, 2018