

Organisms encounter different kinds of environmental stress over their life span. Stress is defined as an environmental condition which has detrimental effects on the performance of organism, leading to impaired Darwinian fitness (Sibly and Calow 1989, Zhivotovsky 1997) or an “environmental factor causing a change in a biological system, which is potentially injurious” (Hoffmann and Parsons 1991). Environmental stress is a major factor that shapes an organism’s physiology, behavior and life-history. Extreme temperature is one of the most important environmental stresses, especially for ectotherms. Since insects are ectotherms and are generally very small in size, the body temperature of insects depends greatly on the environmental temperature. Temperature can greatly affect the fitness of an organism through its effects on physiology, life-history traits like survivorship, longevity, fecundity and other life-history related traits i.e., immunity (Norry et al. 2006, Lazzaro et al. 2008, Robinson et al. 2000). Temperature can also affect reproduction through its effects on mating behavior, fecundity and fertility (Krebs and Loeschcke 1994, Reeve et al. 2000, David et al. 2005). Therefore, insects typically show preference for an optimal temperature to which their physiological functions are well adapted (Angilletta et al. 2002, Chown and Terblanche, 2006). Therefore, temperature is one of the key factors that determine the distribution of ectotherms, especially insects. In this thesis, my major goal is to explore the evolution of reproductive traits and other life-history traits in insect populations subjected to extreme cold shock.