

## ACCLIMATION COST OF COMMON ENVIRONMENTAL STRESS TO COPEPOD *TIGRIOPUS JAPONICUS*

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Anthropogenic stress and climate change pose major challenges to survivorship of organisms. Acclimation to these changes often incurred energy costs to organisms and led to decrease in fitness. This presentation will make use of two studies, using copepod *Tigriopus japonicus*, to examine whether development of resistance to two common stressors (copper and thermal stress) can be acquired and whether fitness cost is involved. *T. japonicus* inhabits shallow supratidal tidepools that subject to extreme environmental conditions and has good tolerances to a wide range of stresses. For copper, *T. japonicus* (F0) were acclimated to three concentrations (0, 10, and 100 µg Cu l<sup>-1</sup>) and offspring (F1 and F2) of each treatment were subsequently acclimated at these three concentrations, respectively. Cu resistance of the copepod was increased even after one generation of acclimation to 100 µg Cu l<sup>-1</sup>. Acquired Cu resistance had a fitness cost, as intrinsic population growth rate of this Cu resistant lineage was significantly lower than the control in clean seawater. For thermal stress, thermal tolerance of a temperate South Korea population (SK) and a sub-tropical Hong Kong population (HK) were compared. Copepods (F0; 27 pairs each) were raised in 3 temperatures: 15, 20 and 25°C for 30 days and offspring (F1 and F2) of each treatment were subsequently acclimated at these three temperatures, respectively. As suspected, F0 SK copepods have lower thermal tolerance than F0 HK copepods as reflected by their mean lethal temperatures (LT; SK: 42.9°C, HK: 45.3°C). After acclimation to the 3 test temperatures, LT of both F0 populations shifted accordingly but similar difference remained. Interestingly, F1 individuals of both populations raised in the same temperature have less difference LTs than the F0 parents. Despite this, the reproductive output of F1 SK copepods under 25°C were less than the HK group and the difference in output was larger than that observed their F0 parents. The overall results suggested that stress tolerance in *T. japonicus* is plastic but may involve some initial cost on the Darwinian fitness of the population.