Examination of the Differences in Physiological Responses of Daphnia to Different Chemical Pollutants

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Fertilizer runoff is a biohazard that impacts many freshwater ecosystems and has become increasingly detrimental in recent years. Lakes have experienced high rates of eutrophication resulting from the runoff, which has contributed to high ammonia levels in those ecosystems (Aquatic Life Criteria - Ammonia, 2015). Model organisms are used to observe environmental impacts on water quality, and one of the most common is Daphnia magna, a subspecies of zooplankton. These organisms also function as keystone species for their integral role in aquatic food webs. The risk to zooplankton's lives proves dangers for the future of these ecosystems. The research question that guided the study was: to what extent do the physiological responses of Daphnia magna differ from different chemical pollutants in increasing concentrations? A study with four separate tanks was run: one control tank, one tank with phosphate, one ammonia, and one salt. Each tank was given one culture of Daphnia and the physiological responses of the Daphnia were measured following the increased chemical concentrations. Over time, there was no difference in heart rate changes or changes in population between the control and pollutant type. However, the movement speeds of all the tanks decreased with statistically significant differences between the control and variable tanks of Daphnia. The recommendation of the study is that in a water source of unknown pollution level, the movement speed of Daphnia in the water may be used to determine if there is any possible significant pollution.

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