

Consequences of an amphibian malformity for development and fitness in complex environments

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SUMMARY

1. Environmental stressors have both lethal and sublethal effects, such as altered developmental rates and the induction of malformations. Ecological interactions, including predation and competition, often amplify such effects, for instance by inducing behavioural changes that increase susceptibility to the stress.

2. Using experimental mesocosms, we asked whether the density of conspecific competitors and predation risk from larval water beetles (*Dytiscus* spp.) affect the development of malformations in tadpoles of the wood frog (*Rana sylvatica*). We also examined whether such malformities increase the susceptibility of tadpoles to predation.

3. The risk of predation decreased the frequency of malformities in both low- and high-density treatments, although this effect was greater at low density. Behavioural observations suggested that reductions in activity by amphibian larvae induced by predators mediated these responses by decreasing cumulative exposure to ultraviolet-B radiation, the putative stressor causing the observed malformity. These results suggest that predators can reduce negative impacts of stressors by inducing behavioural changes in prey organisms.

4. Malformed individuals were twice as vulnerable to predators as non-malformed individuals, suggesting that sublethal effects can ultimately cause increased mortality.

Keywords: antipredator behaviour, environmental stressor, scoliosis, swim speed, ultraviolet-B radiation