The effects of temperature stress and ivermectin on the development time of yellow dung flies (Scathophaga stercoraria)

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In the face of global environmental change, wild animal populations are frequently subjected to multiple environmental stressors. While a population may remain healthy under the pressure of one stressor, it could be devastated under the negative influence of combined or synergistic effects of multiple stressors with different modes of action. The knowledge and techniques required to investigate the effects of stressors likely to be found together in nature, cross academic disciplines and are thus seldom brought together in the necessary interdisciplinary approach. Using yellow dung flies (Scathophaga stercoraria; YDF) as a model system I tested the synergistic effects of two anthropogenic stressors on the larval development time in a common garden experiment. I used the common veterinary vermicide, ivermectin (IV), known to have a detrimental effect on many species in the dung fauna as a toxicological stressor. Since YDFs are known to be cold-tolerant and generally avoid high temperatures, I also subjected them to a high temperature stress to simulate a climate change stressor. A linear model fitted to the data reveals that larval development time, as expected for ectotherms, increase with decreasing temperature while the IV contamination prolonged the development period. In combination, the two stressors hasten development but not to the same extent as temperature alone. The sexes reacted similarly to temperature stress and IV presence when they were applied independently as solo stressors. However, when there was both a high temperature stress and IV present there was a difference in response between the sexes.

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