



Aalborg Universitet

AALBORG UNIVERSITY
DENMARK

When the stress piles up! A simple mathematical approach to integrate duration and intensity of thermal stress during natural thermal fluctuations

Overgaard, Johannes; Jørgensen, Lisa Bjerregaard; Malte, Hans; Ørsted, Michael; Klahn, Nikolaj Andreasen; Tarapacki, Pénélope

Publication date:
2021

Document Version
Også kaldet Forlagets PDF

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Overgaard, J., Jørgensen, L. B., Malte, H., Ørsted, M., Klahn, N. A., & Tarapacki, P. (2021). *When the stress piles up! A simple mathematical approach to integrate duration and intensity of thermal stress during natural thermal fluctuations*. Abstract fra Society for Experimental Biology Annual Meeting 2021, Antwerpen, Belgien.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

A4.35 WHEN THE STRESS PILES UP! A SIMPLE MATHEMATICAL APPROACH TO INTEGRATE DURATION AND INTENSITY OF THERMAL STRESS DURING NATURAL THERMAL FLUCTUATIONS

📅 Wednesday 30 June 2021 ⌚ 10:40

👤 Johannes Overgaard, Lisa B. Jørgensen, Hans Malte, Michael Ørsted, Nikolaj Andreassen Klahn & Pénélope Tarapacki

Zoophysiology, Aarhus University, Aarhus, Denmark

@ johannes.overgaard@bios.au.dk

Temperature is arguably one of the most important abiotic factors determining the distribution and success of ectothermic animals. Accordingly, interspecific studies often find strong correlations between maximal or minimal thermal tolerance limits and maximal or minimal temperature exposure in the natural environment of the species. To understand in detail the connections between thermal tolerance, exposure to stressful temperature and species distribution it is important to consider not just the extreme temperature exposures, but also the duration and frequency of these exposures. Fortunately, it is easy to describe the interaction of duration and intensity of temperature stress in a semi-logarithmic plot as the duration of survival decreases exponentially as temperature is increased. This simple mathematic way of analyzing temperature tolerance has been termed “thermal tolerance landscapes” (TTL). In this talk, I will use data from a range of drosophila species to show how TTL’s can be used to describe species specific tolerance limits. Using these data I will also show how TTL’s can be used to analyse the stress experienced during fluctuating temperatures and finally I will discuss how TTL’s hold promising perspectives to develop a better models to understand the thermal constraints that limit ectotherm distribution.