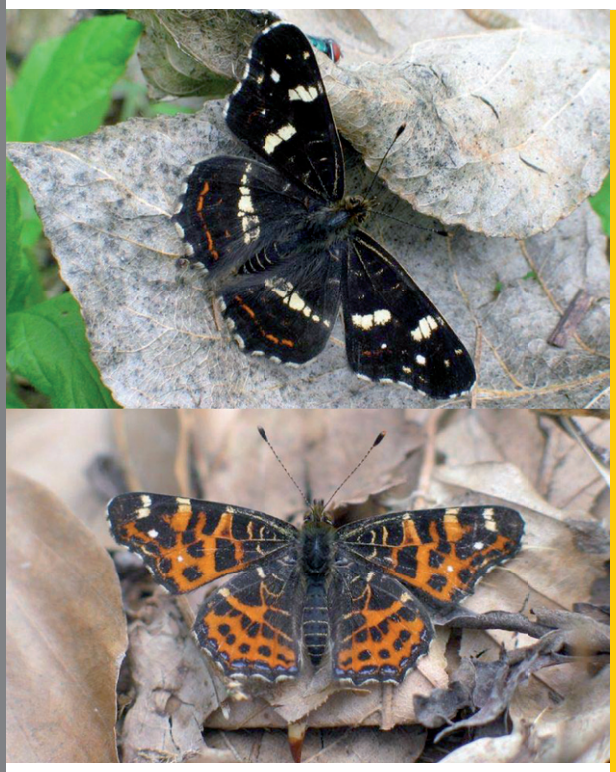
EUROPEAN SCIENCE FOUNDATION
SETTING SCIENCE AGENDAS FOR EUROPE

RESEARCH NETWORKING PROGRAMME

ThermAdapt

Standing Committee for Life, Earth and Environmental Sciences (LESC)



The same butterfly species (Map butterfly: *Araschnia levana*) looks different depending on the thermal and photoperiodic environment (so-called polyphenism). © Holger Gröschl

Climate crucially affects all organisms. Cold-blooded (ecto- or poikilothermic) organisms particularly respond readily to changes in their thermal environment. In the simplest case, animals can leave unsuitable (hot or cold) habitats. They can also acclimate (a short-term physiological and behavioural response) to the conditions, for example by adjusting their metabolic rate. In the long term, metabolism, thermal tolerance and heat or cold resistance can evolve, resulting in differences between species or geographic populations of a single species. However, organisms may be constrained in adapting to a changing environment, in which case they can die out. Adaptation at the physiological level, or lack thereof, affects the dispersal, migration, diapause and, ultimately, the distribution of species. As a result, prominent within-species temperature-size effects (larger at cooler temperatures), Bergmann (larger at higher latitudes), and converse Bergmann clines (larger at lower latitudes) occur in all major animal groups but remain largely unexplained. The genetic, physiological, life history and behavioural mechanisms by which thermal acclimation and adaptation is achieved are not well understood and are therefore of central interest to ecologists and evolutionary biologists, particularly in the face of recent rapid human-made environmental and climate changes. How will species, and ultimately the human environment, cope with rapid global warming?

Programme Activities

We give out competitive grants for four types of activities broadly relating to thermal adaptation:

- Short Visit (Travel) Grants for initiation of research collaborations (max. 15 days)
- Exchange Grants for conducting research collaborations (up to 3 months)
- Science Meeting Grants covering any topic within the scope of the programme
- Training Course Grants teaching methods relating to the scope of the programme

Priority will be given to researchers and institutions from European countries that financially support the programme, but others are not explicitly excluded.

Proposals can be submitted any time but should be received at least 1 month before the start of the activity.
Visit our website for more **information on all activities and application procedures: www.esf.org/thermadapt**

Scope

We have launched a cross-disciplinary, cross-taxonomic European effort to promote interactions between researchers working on thermal adaptation at different levels of biological organisation and with various organisms to integrate approaches, from molecular biology to systems ecology, to link micro-evolutionary processes to macro-evolutionary patterns. This includes cooperation with extra-European researchers and institutions to maintain a global perspective. We promote interactions between life historians, physiologists, geneticists, behavioural and comparative biologists, which typically work at different levels of biological organisation. Specifically, we want to involve scientists working in molecular and cell biology to promote the use of new protein-level, genetic and genomic techniques associated with thermal adaptation and exposure to temperature extremes.

www.esf.org/thermadapt

Keywords:

Acclimation; adaptation; animal distribution; behaviour; Bergmann's rule; body size; diapause; dispersal; ecology; genetics; ecophysiology; ectotherms; genomics; global warming; heat shock protein; life history; metabolomics; microarray; proteomics; QTL; range shifts; thermal adaptation; temperature; tolerance; stress.

ThermAdapt (Thermal Adaptation in Ectotherms: linking life history, physiology, behaviour and genetics) is an ESF Research Networking Programme (RNP).
The European Science Foundation (ESF) provides a platform for its Member Organisations to advance European research and explore new directions for research at the European level. Established in 1974 as an independent non-governmental organisation, the ESF currently serves 80 Member Organisations across 30 countries.

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For the latest information on this RNP consult the following website:
www.esf.org/thermadapt

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