Effects of global climate change of the Brazilian fauna: a conservation physiology approach

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Team:
- 4 Foreign collaborators
- 5 National collaborators
- 2 Postdoctoral fellows
- 18 Graduate students
- 4 Undergraduate students
- 3 Technicians

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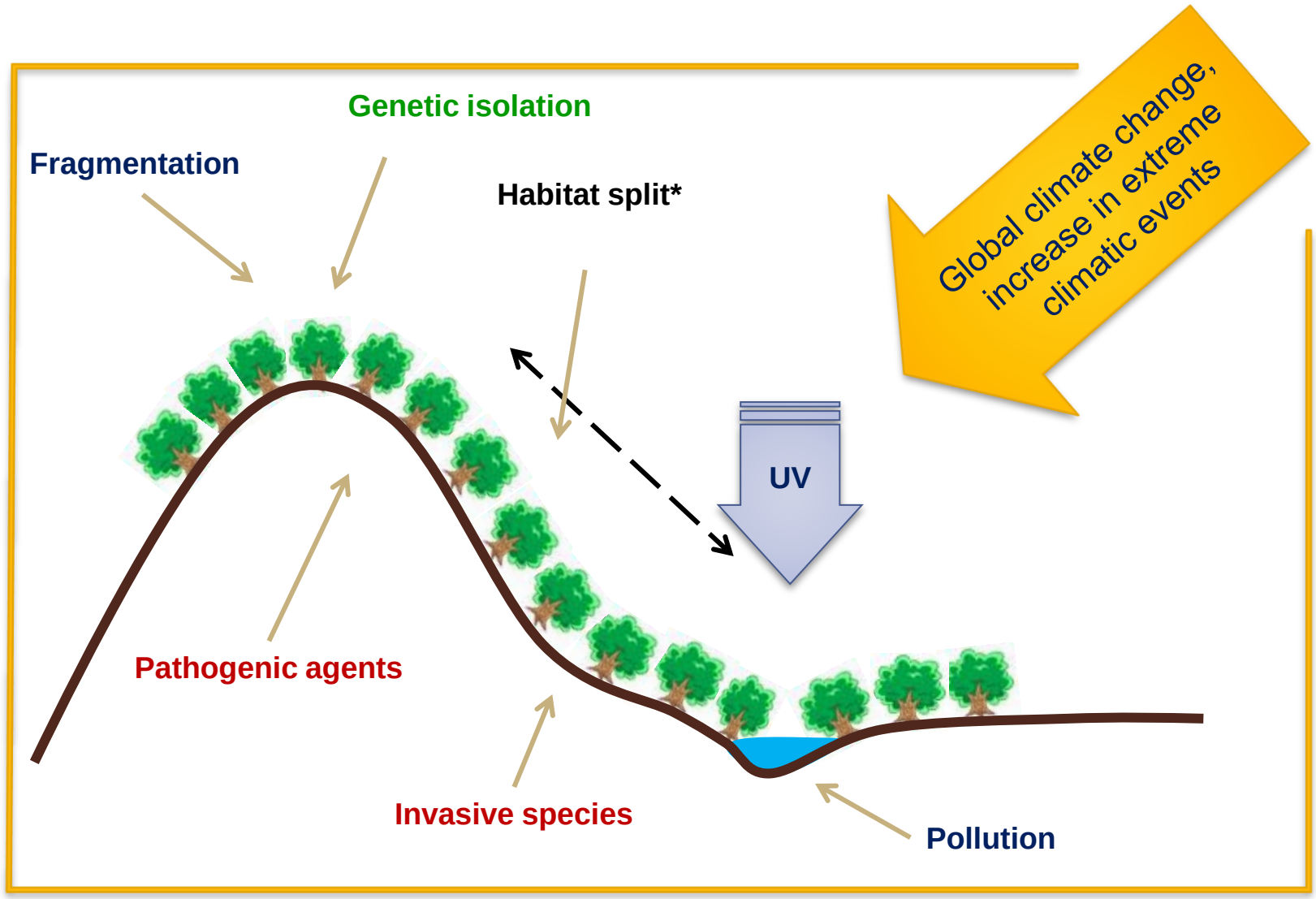


* e.g., Becker et. al., 2007, 2009

SPECIFIC GOALS

To investigate (for key elements of the Brazilian fauna):

- effects of climate on ecological performance
- effects of the interaction [climate – environmental change] on ecological performance,
- the physiological mechanisms of effects, and the scope for physiological adjustment

To raise hypotheses regarding:

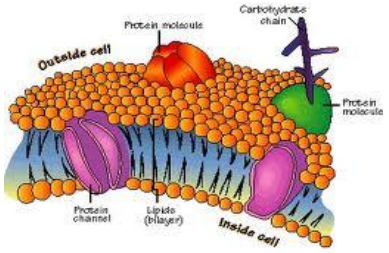
- elements of highest impact in the climate-environmental change interaction
- Impact of climate change on the distribution of species

To produce knowledge helpful to:

- raise in captivity some endemic species that appear to be threatened by climate change

SOME SPECIFIC RESEARCH CONTEXTS

Temperature and development

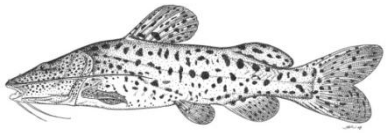


• Thermal effects on metabolism, cell membrane organization and development in fish

• Thermal tolerances of anuran larvae from Caatingas and Atlantic Forest

Interaction climate-habitat fragmentation

• Climate, habitat fragmentation and physiology in rodents and bats from different Brazilian biomes.



• Endocrine control and reproductive blocking in migrating fish exposed to dams: The *surubim do Paraíba*

• Microclimate, habitat fragmentation and cutaneous microbiota in anuran amphibians.

SOME SPECIFIC RESEARCH CONTEXTS

Temperature and physiological tolerance

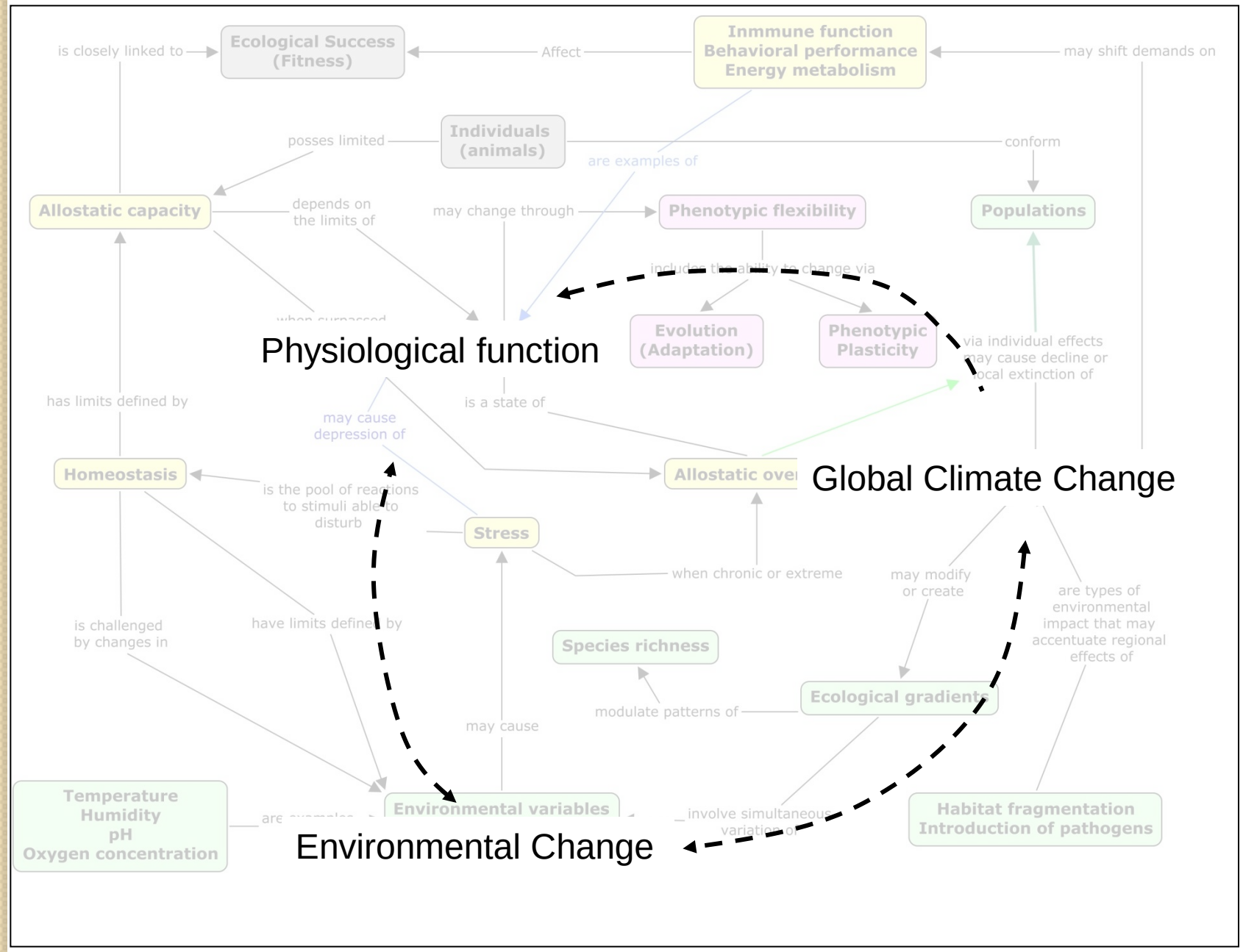
• Climate, stress and physiological tolerance in the endemic bird *Cinclodes pabsti* from the Brazilian *Campos Sulinos*

• Critical temperatura in anurans and arthropods in terrestrial brazilian biomes

• Tolerance to freezing in anurans

Aridization and physiological tolerance

• Aestivation physiology in Caatinga anurans: consequences in a aridization scenario


Ecological Success (Fitness)
is closely linked to
Affect
Inmmune function
Behavioral performance
Energy metabolism
may shift demands on
Individuals (animals)
posses limited
conform
are examples of
Allostatic capacity
depends on the limits of
may change through
Phenotypic flexibility
Populations
Evolution (Adaptation)
Phenotypic Plasticity
Physiological function
via individual effects
has limits defined by
is a state of
may cause depression of
Homeostasis
is the pool of reactions to stimuli able to disturb
Stress
Allostatic over
Global Climate Change
when chronic or extreme
may modify or create
are types of environmental impact that may accentuate regional effects of
is challenged by changes in
have limits defined by
Species richness
Ecological gradients
modulate patterns of
may cause
Temperature
Humidity
pH
Oxygen concentration
Environmental variables
involve simultaneous
Habitat fragmentation
Introduction of pathogens
Environmental Change

Programa FAPESP de Pesquisa em Mudanças Climáticas

Projeto Temático
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Universidad Nacional de Colombia

USP

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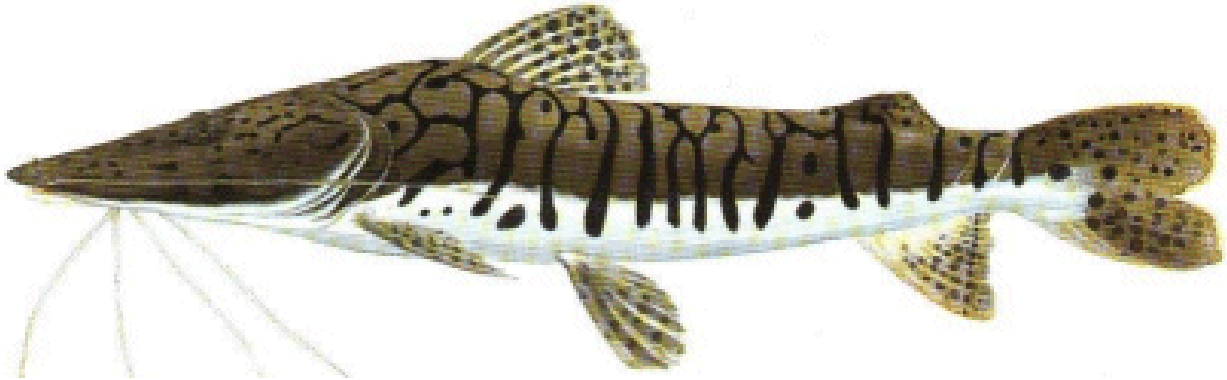
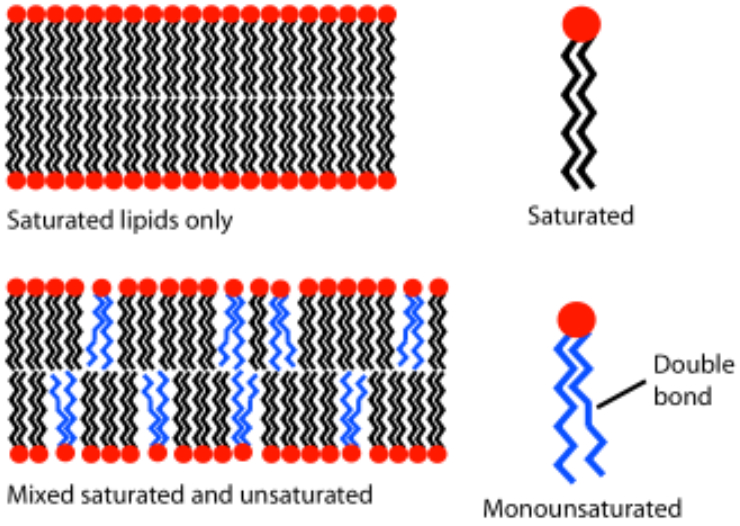


• The surubim tolerates an increase in water temperature. Higher temperatures promote growing, but at metabolic spend.

• Observed adjustments involve re-organization of cell membranes, and an increase in saturated fatty acids.



Environ Biol Fish (2009) 85:207–208
DOI 10.1007/s10641-009-9480-9

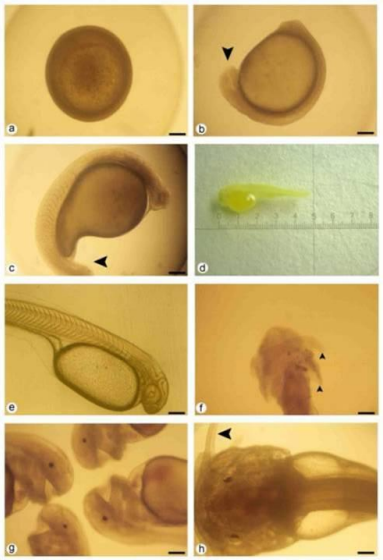
Threatened fishes of the world: *Steindachneridion parahybae* (Steindachner, 1877) (Siluriformes: Pimelodidae)

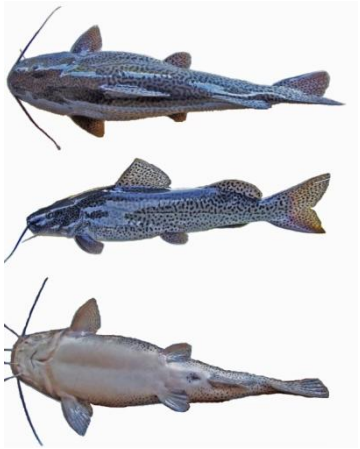
Renato M. Honji · Danilo Caneppele ·
Alexandre W. S. Hilsdorf · Renata G. Moreira

- Climate-reproduction interactions explained via physiology of the brain-pituitary-gonads axis and reproductive hormones;

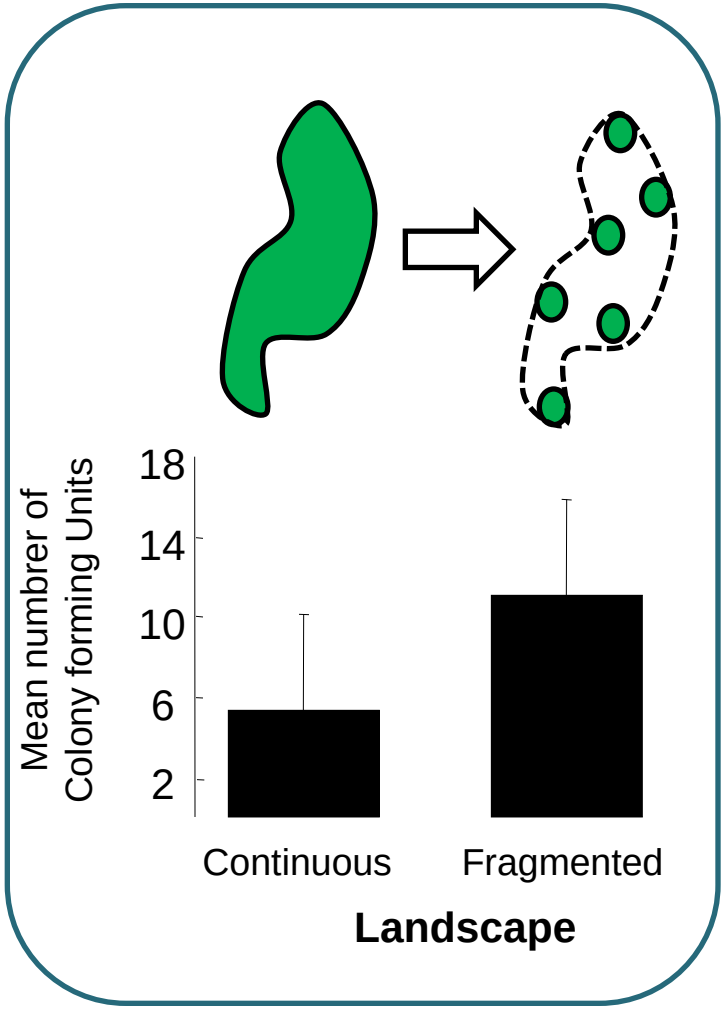
- Artificial reproduction in captivity is now viable in this threatened fish species;

- Survival improved through studies of embryonic and larval stages.





Micro climate?



Specific diversity; ~ 7% forms found exhibit pathogens inhibition

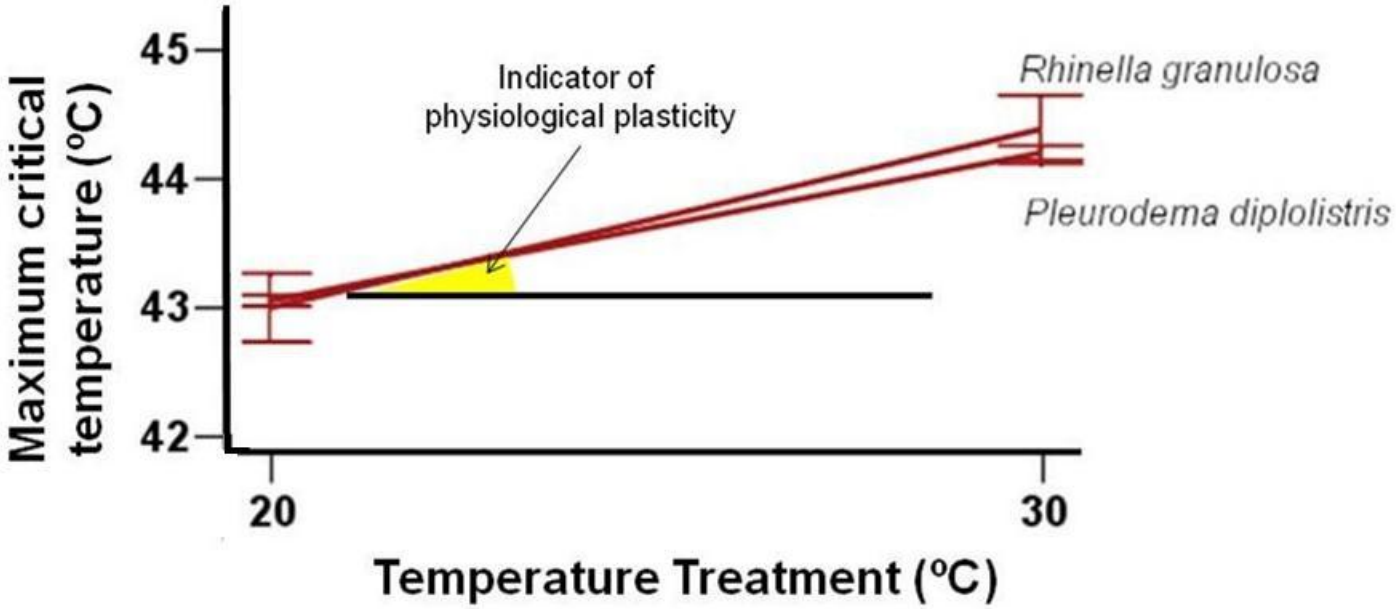
Dendropsophus minutus

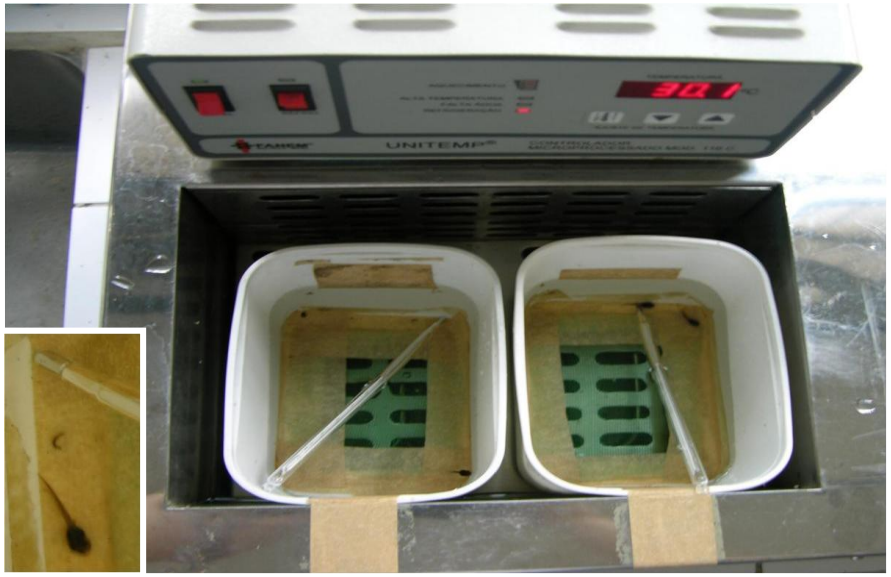
Phyllomedusa distincta

Aplastodiscus leucopygius

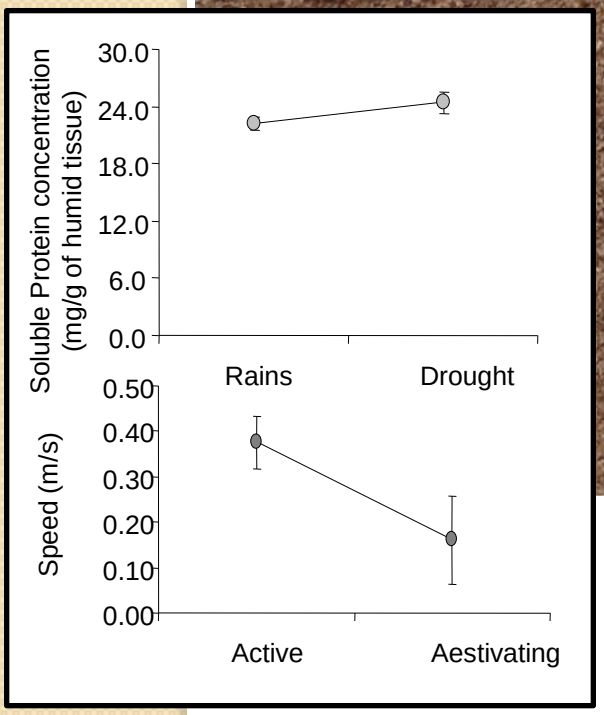
Proceratophrys boiei

Brito & Navas, 2010





Simon, Ribeiro & Navas, 2010



Pleurodema diplolistris

Pereira et al., não publicado