



AARHUS UNIVERSITY




Beauty and the beast: butterfly and spider species responses to climate change in Greenland

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Arachknowledgements

- TT Høye
- RR Hansen
- A Eskildsen
- OLP Hansen
- BioBasis, NM Schmidt 
- ClimateBasis, Jakob Abermann
- Natural History Museum, Aarhus, K Olsen

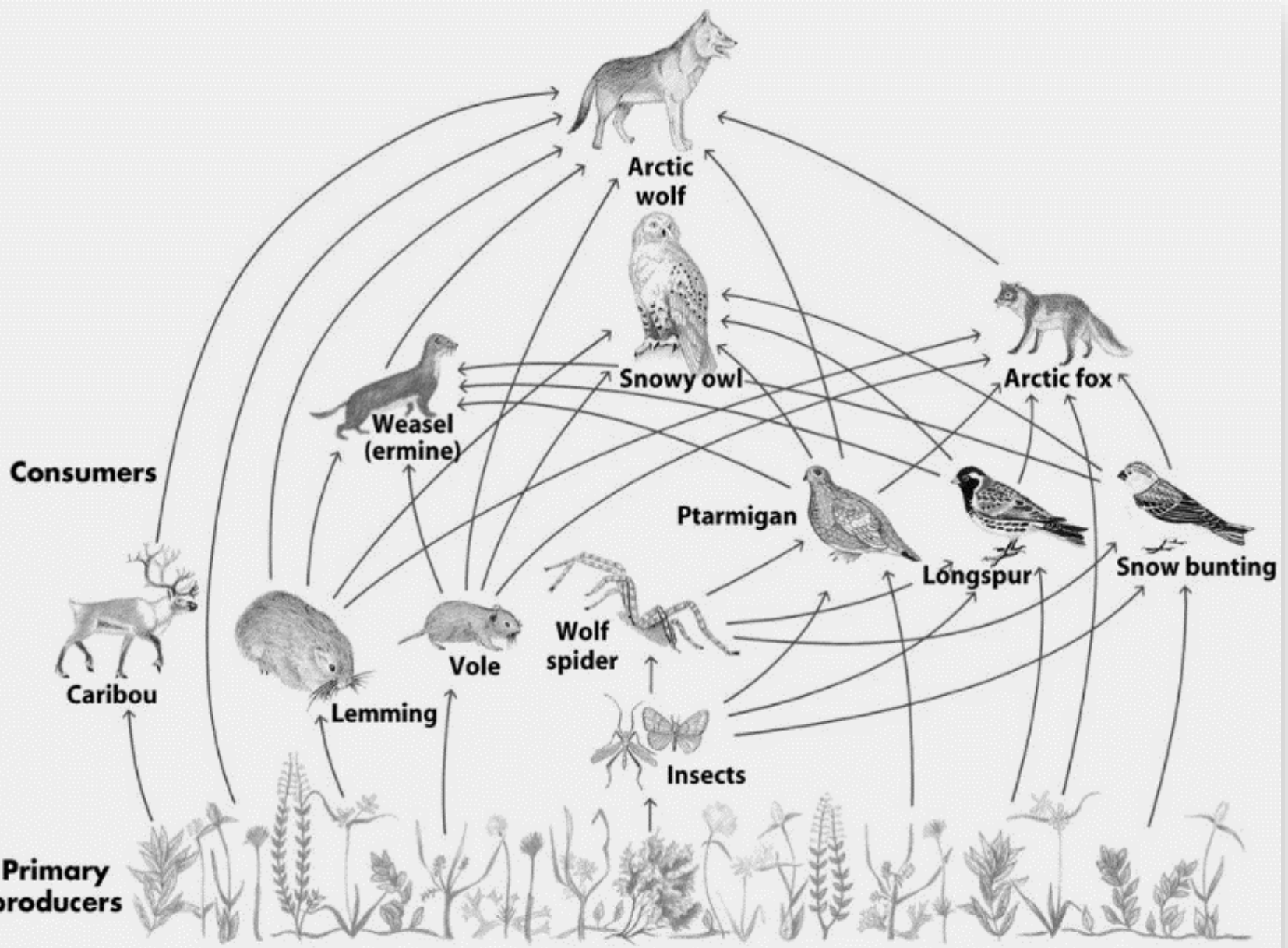
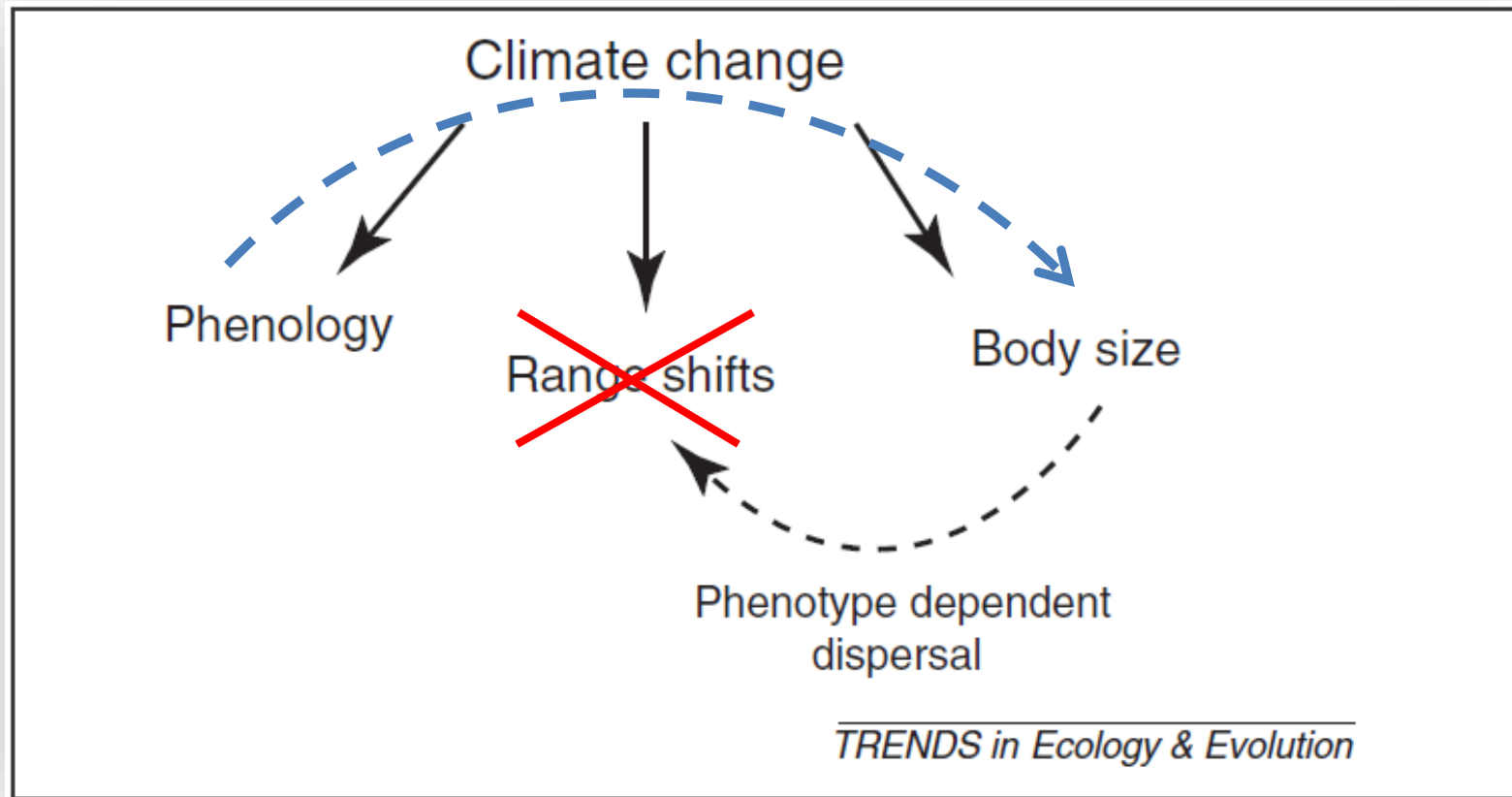


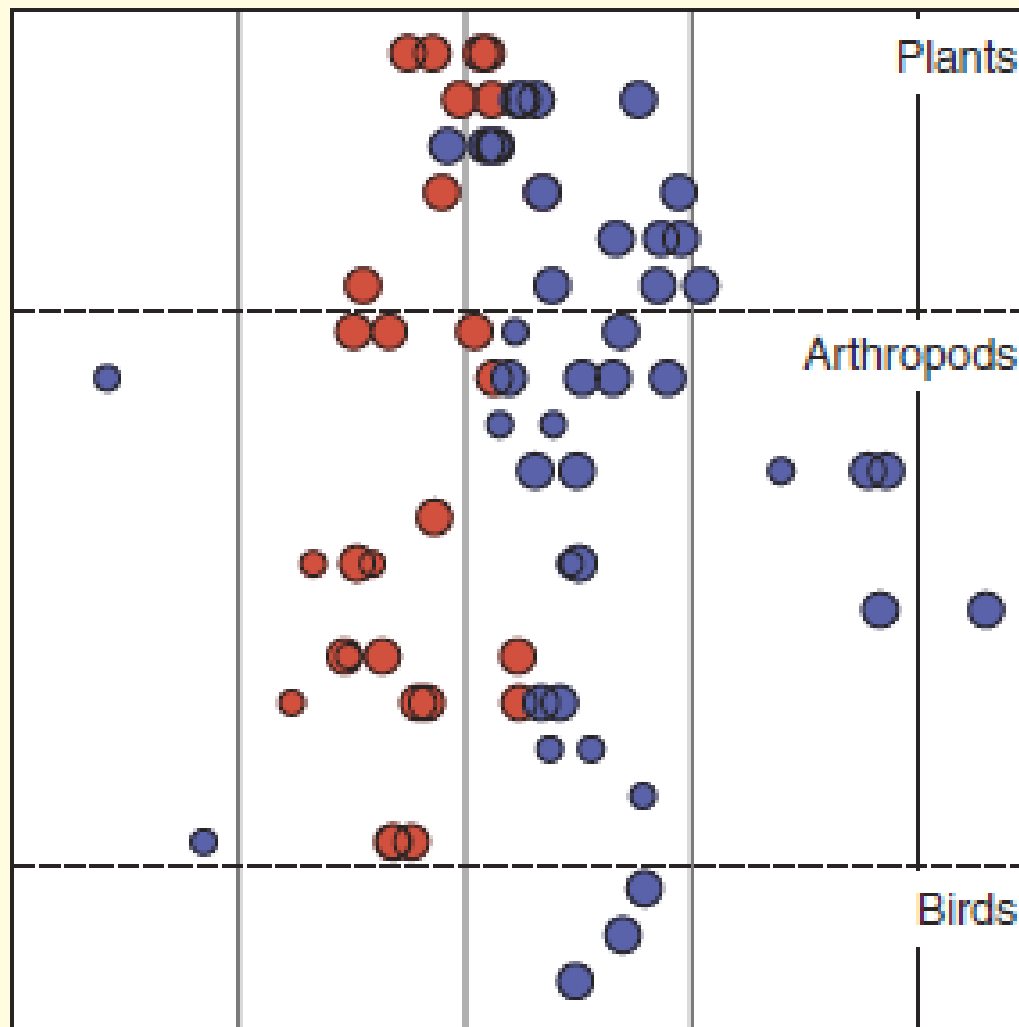
Figure 31-1
Biology of Plants, Seventh Edition
 © 2005 W. H. Freeman and Company

Three universal species responses to CC



(b)

-40 -20 0 20



- Cassiope tetragona*
- Dryas* sp.
- Papaver radicum*
- Salix arctica*
- Saxifraga oppositifolia*
- Silene acaulis*
- Acari*
- Chironomidae
- Coccoidea
- Collembola*
- Culicidae
- Ichneumonidae
- Linyphiidae*
- Lycosidae
- Muscidae
- Nymphalidae
- Phoridae
- Sciaridae
- Dunlin
- Sanderling
- Ruddy turnstone

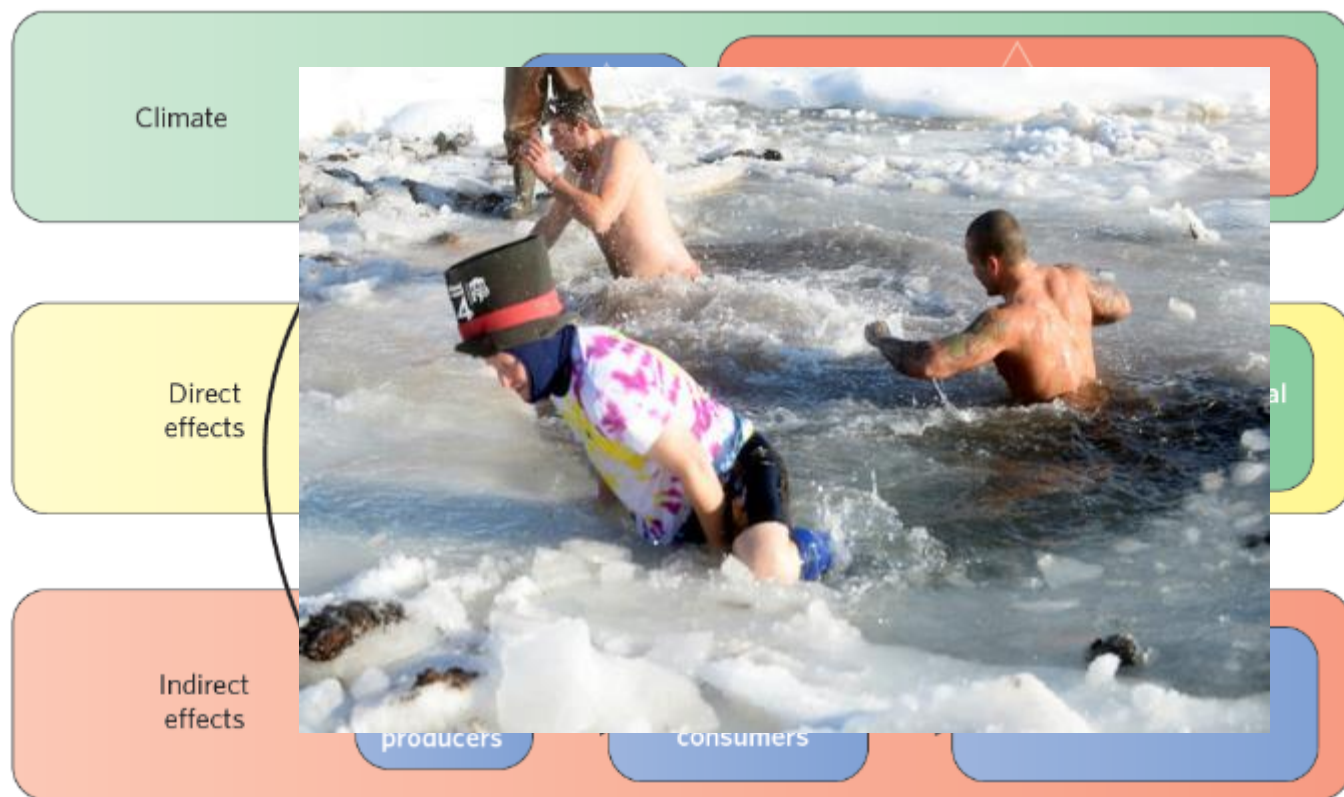
Mean phenological change (days/decade)

Current Biology

Høye et al. 2007

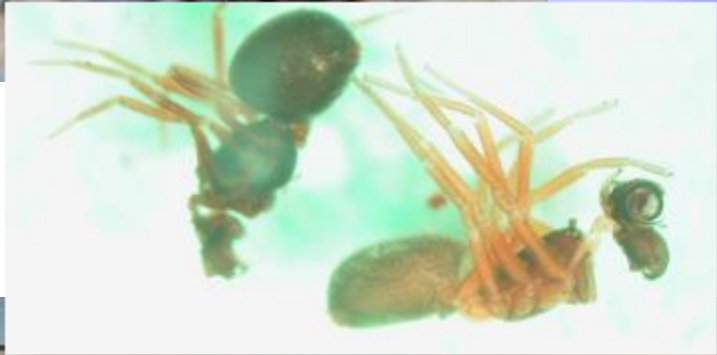
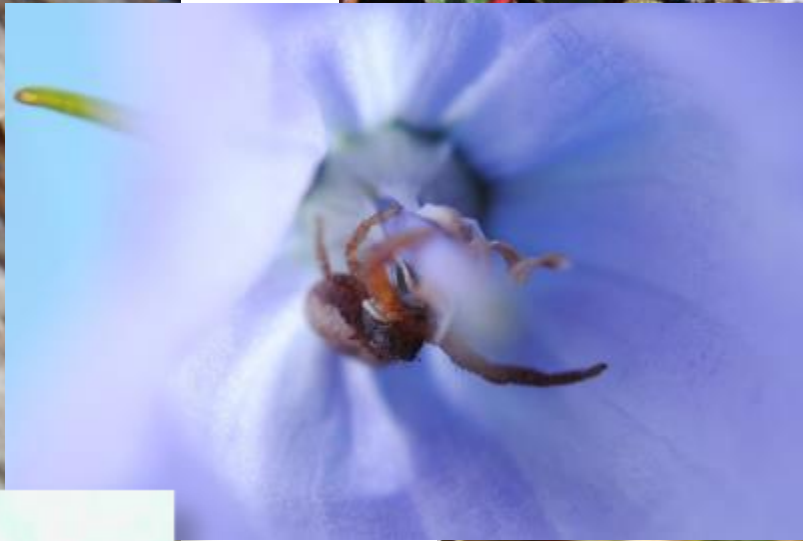
Shrinking body size as an ecological response to climate change

Jennifer A. Sheridan* and David Bickford*

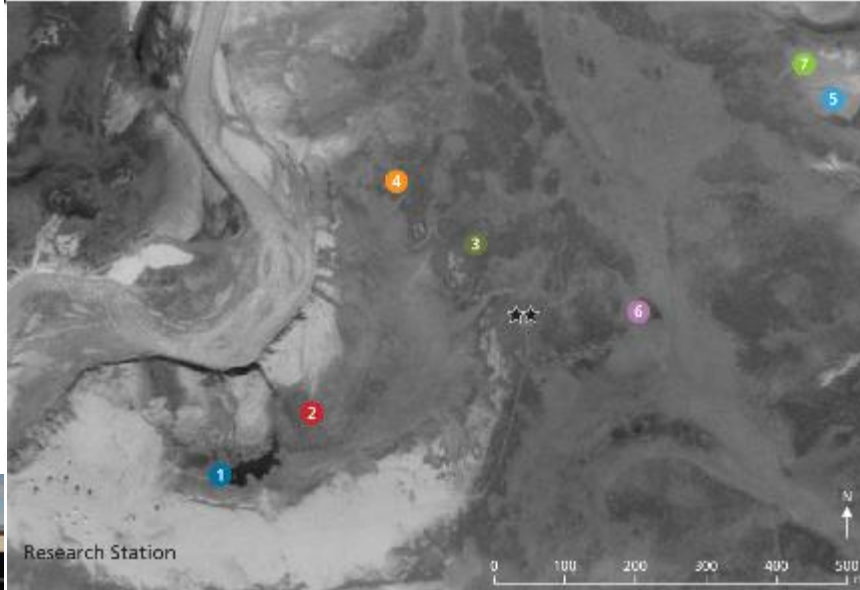
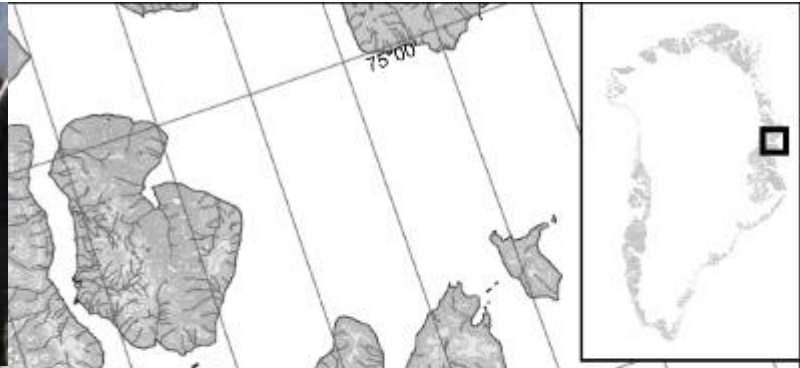
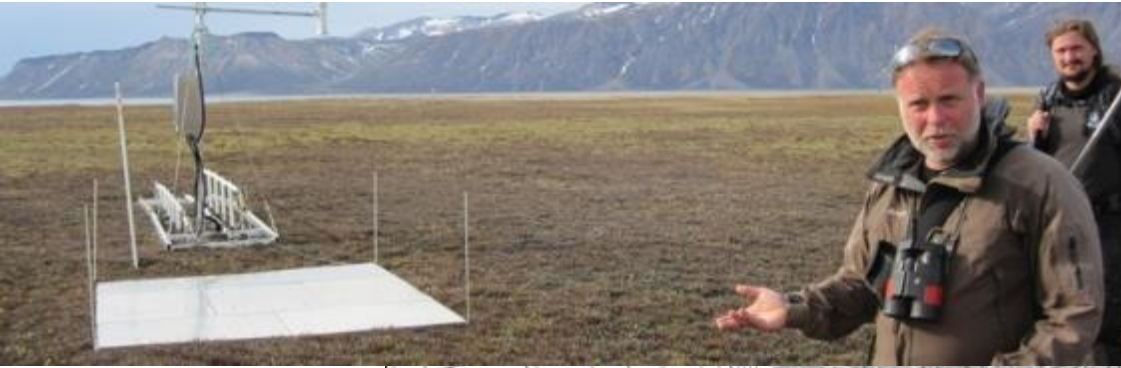


So how do we get at species responses (Δ body size/phenology) to CC in the Arctic?

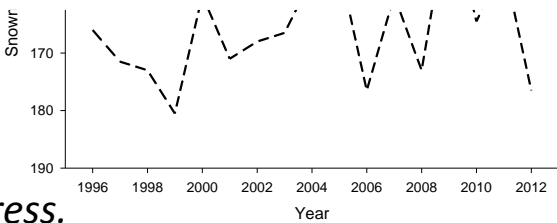
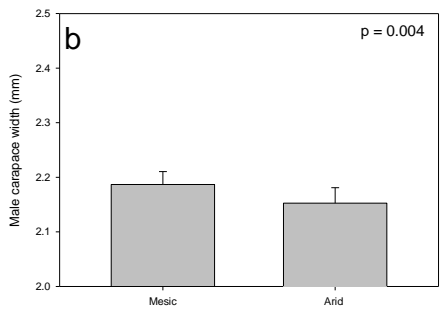
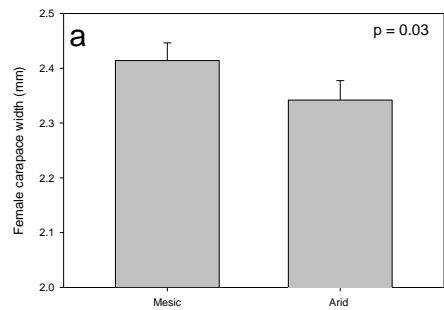
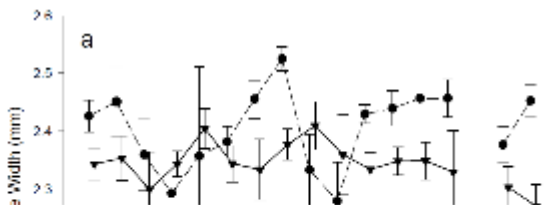
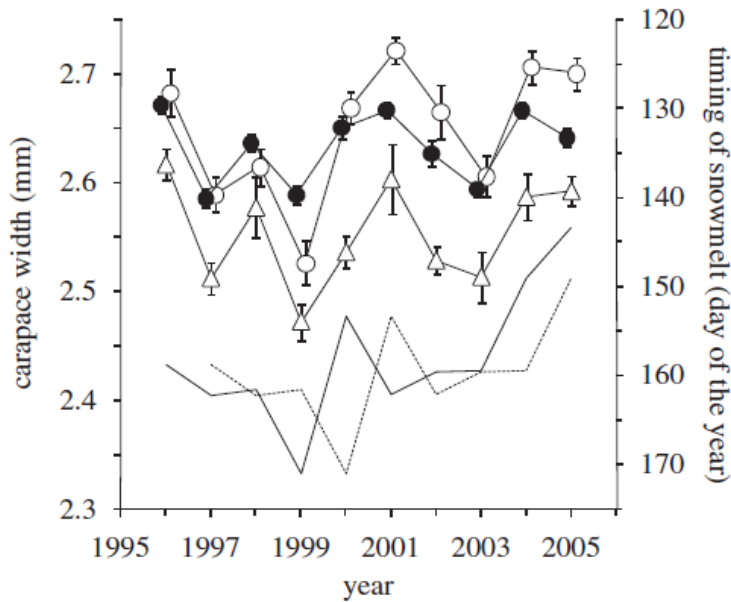




Zackenberg Valley



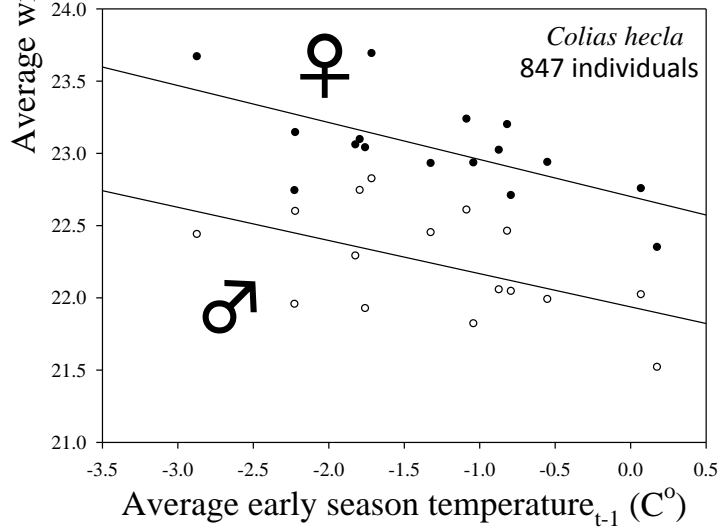
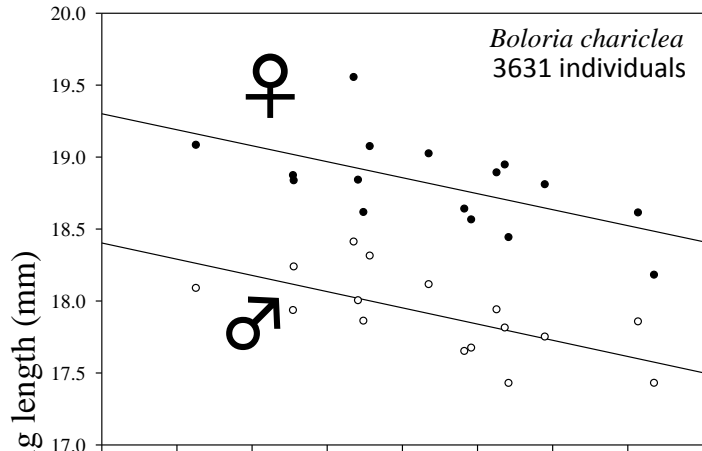
Spiders



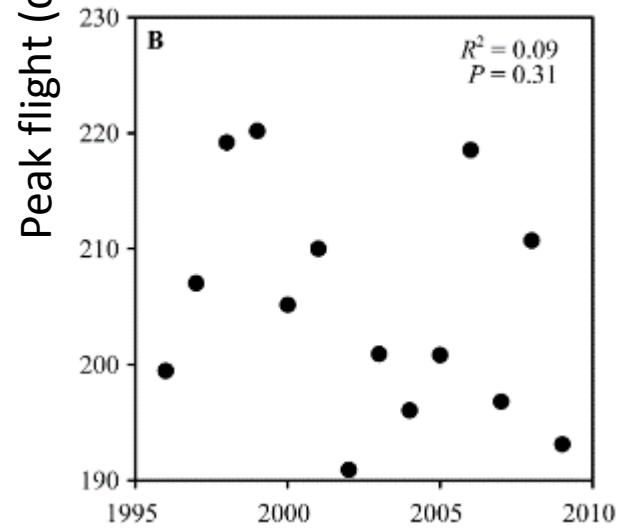
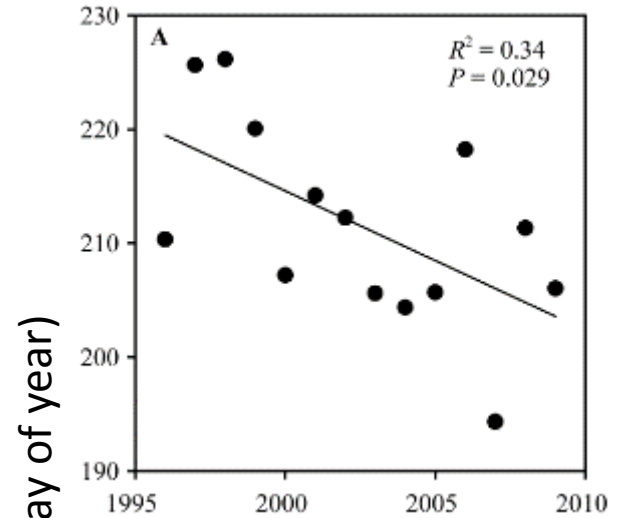
Høye et al. 2009

Bowden et al. *In press.*

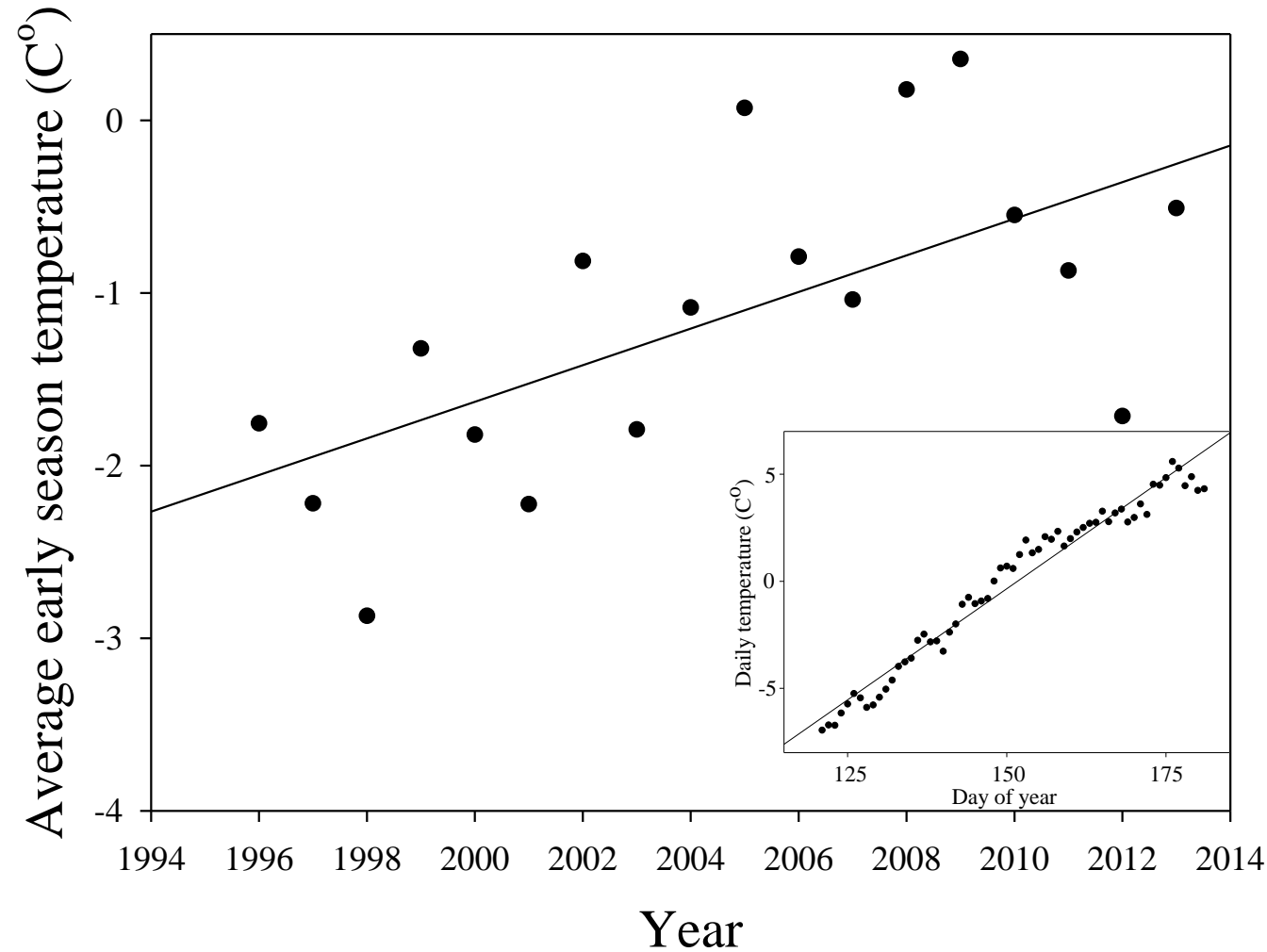
Butterflies



Between 1996-2013



It's getting warmer and early season temperatures increase dramatically within season



Summary

- Need long term field data to visualize patterns and see what is occurring in nature
 - E.g., Size of stages growth
- Need experimental approaches (lab rearing) to understand the mechanisms



