

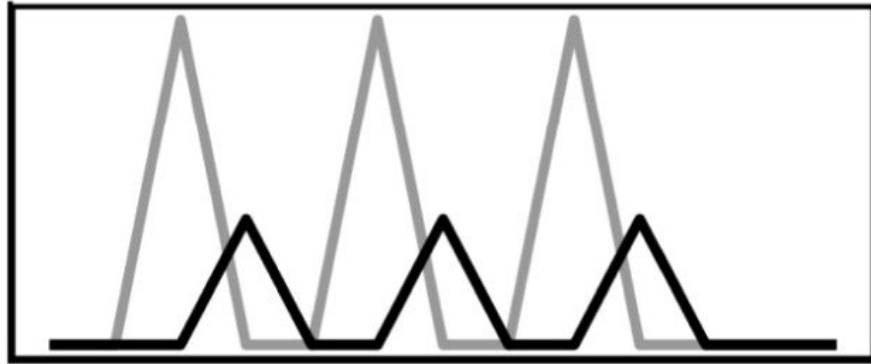


Temperature or Light?

The seasonal changes that trigger leaf senescence
in *Eriophorum vaginatum*

Is leaf senescence a feedback or feedforward mechanism?

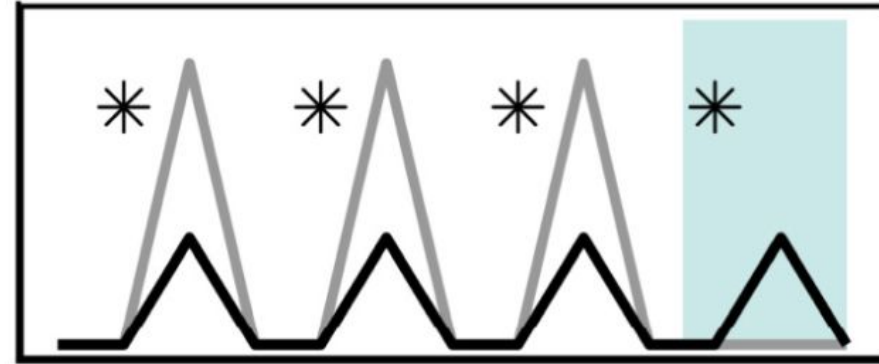
feedback with some delay



time

— environmental variable

feedforward from cue (*)
(e.g. photoperiod)

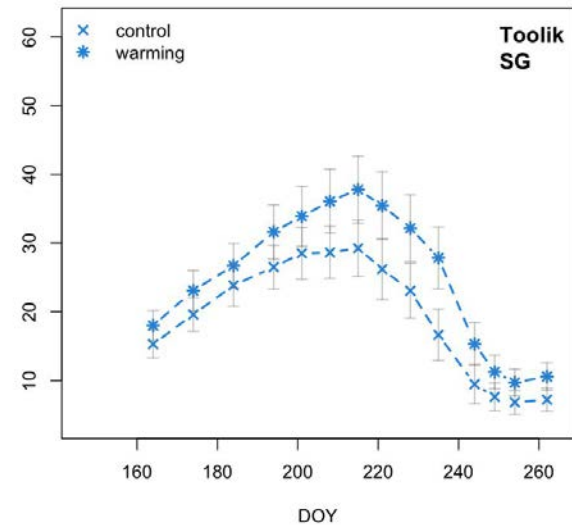
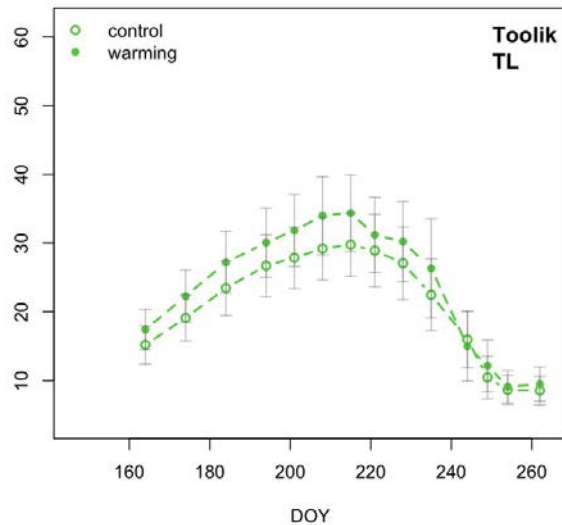
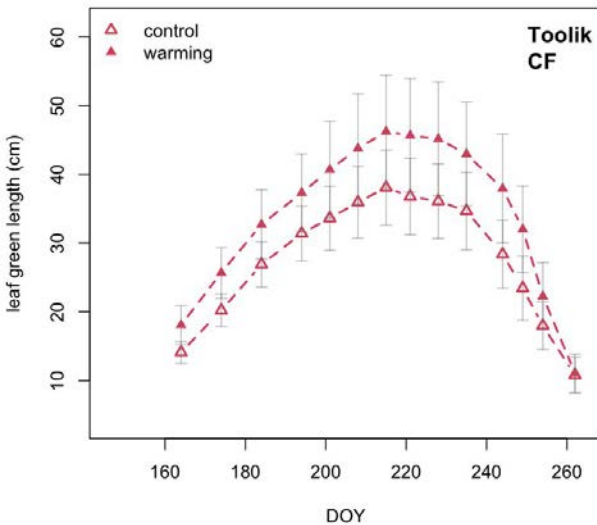
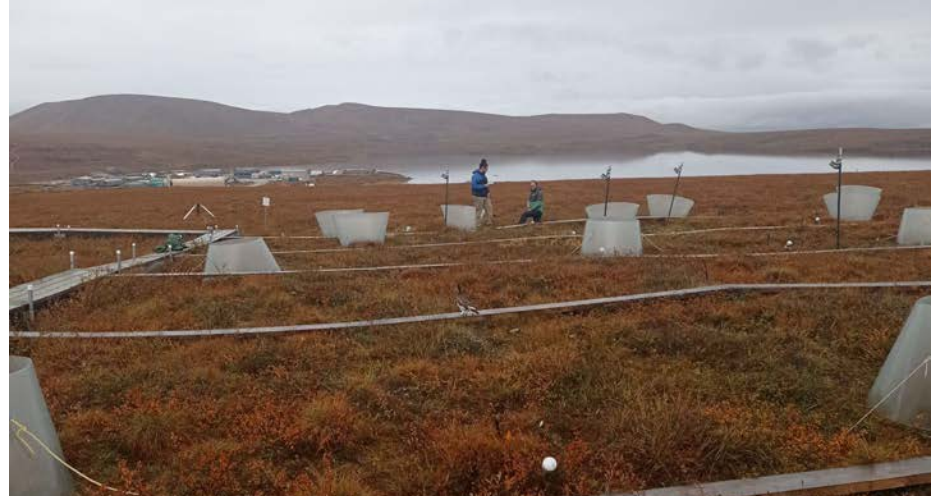


time

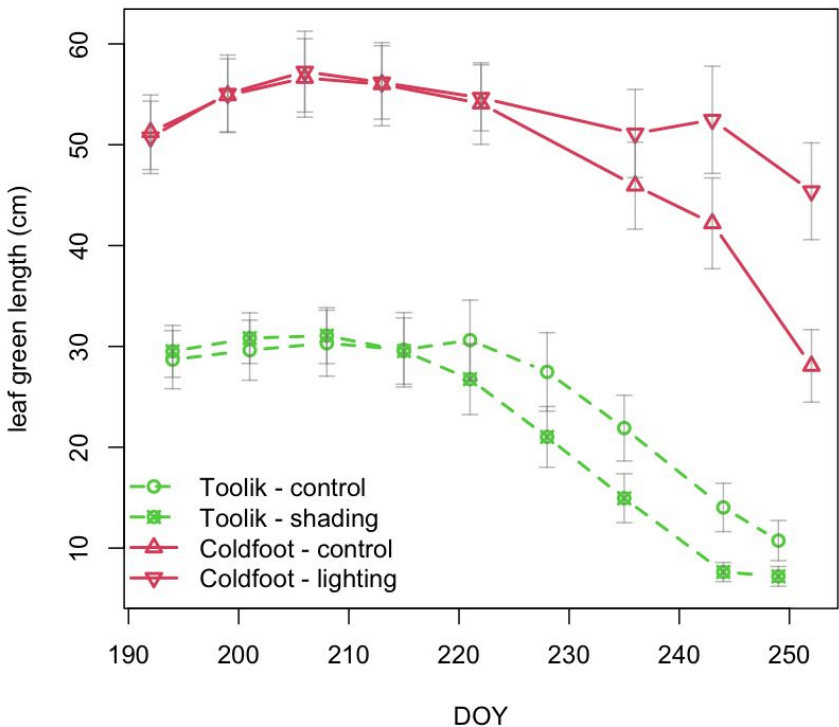
— biological response

Bernhardt *et al.* (2020)

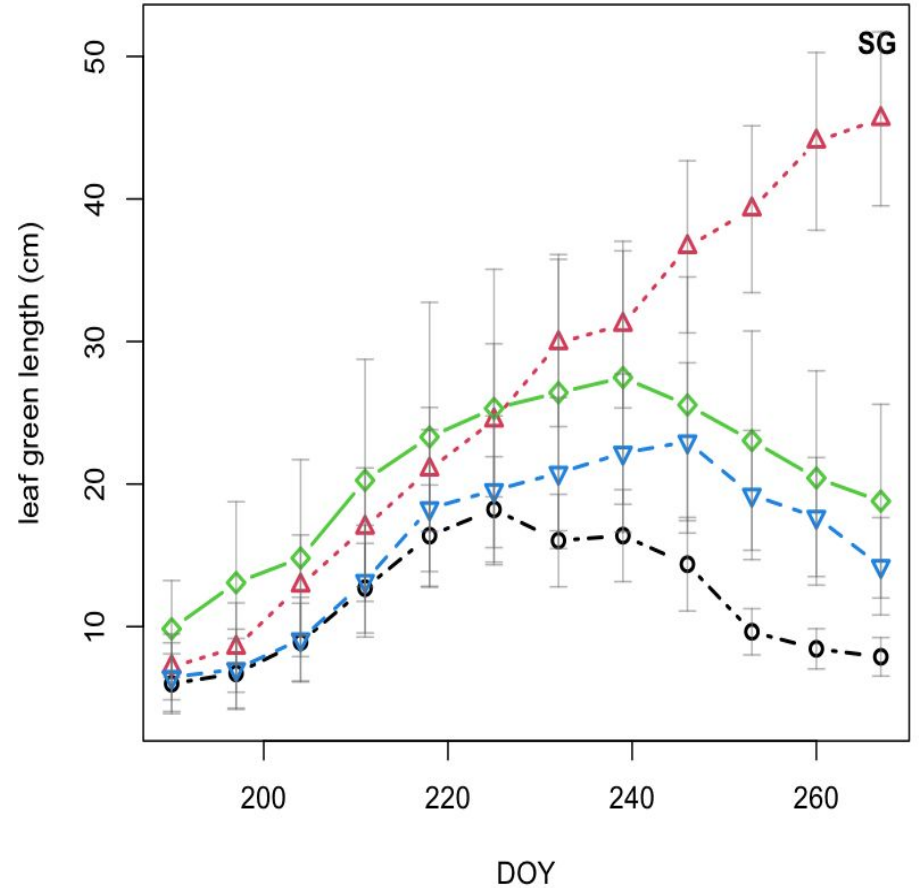
Warming promotes growth but not timing of senescence



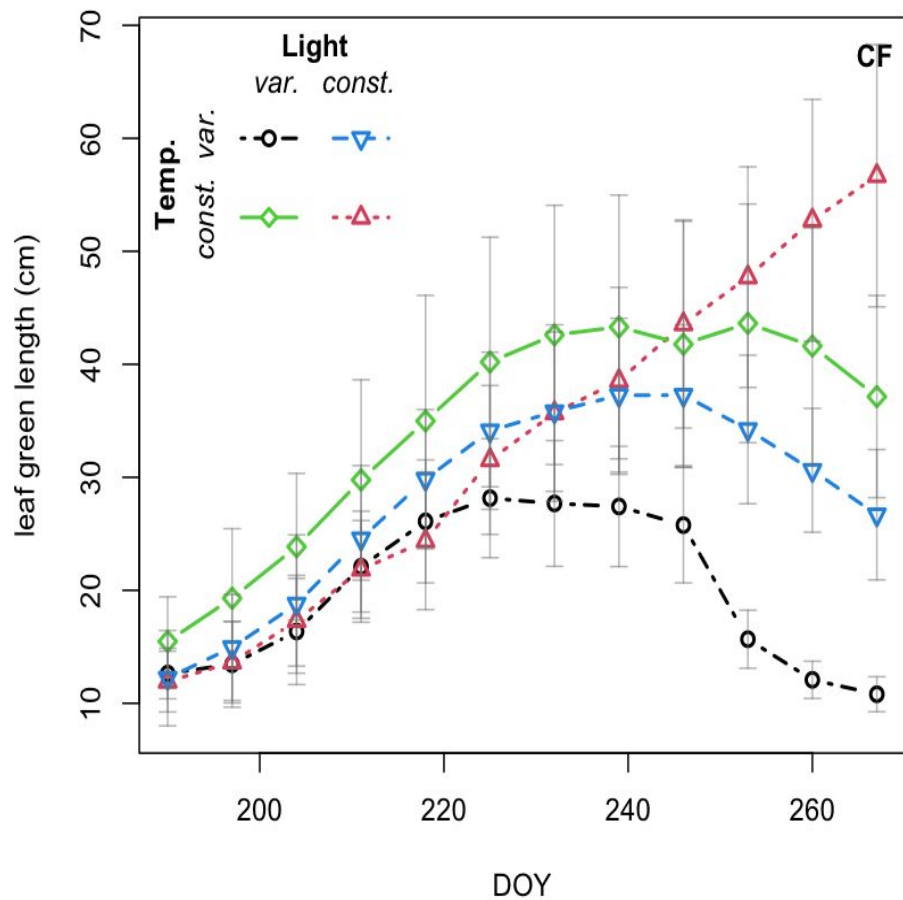
Manipulating **light** regime does affect senescence



Both **light** and **temp.**
affects senescence
independently



Southern ecotype was clueless



This senescence mechanism is not currently **adaptive**

Temperatures rising, but light regime has remained the same, thus crippling the **cue-based feedforward mechanism**

This mechanism is only adaptive when:

1. No climate change
2. Climate changes, but:
 - a. Ecotypes migrate Northwards under climate warming (current)
 - b. Ecotypes migrate Southwards under climate cooling (glaciation)



Thank you!



I am grateful for having access to the lands of the Nunamiut, Gwich'in, Koyukuk, and Iñupiaq peoples, among many others

Thank you Bjorn Larson, Allie Faunce, Luis Pallares, Jenny Grischuk, Ruby An, and Helen Brush for your invaluable help in the field.

Big thanks to the whole staff at the Toolik Field Station and Logistic Office for keeping us alive and well and for the Wilkes University staff

Shout out to Gaius Shaver, Donnie Bret-Harte, Tom Parker, Kevin Griffin, Steve Oberbauer, among many others for fruitful conversations and introduction to the tundra

This research was only possible thanks to Ned Fetcher, Michael Moody, and Jim Tang, who came up with the project funded by NSF (grant #2109946)

