Impacts of Experimental Warming on Phenology and Growth of Carex aquatilis-stans in Northern Alaska

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Outline

- Background
- Design
- Results
- Implications
Project Background

- Barrow sites established in 1994, Atqasuk in 1996
- Part of the International Tundra Experiment (ITEX)
- Examine tundra vegetation response to temperature
- Aid in modeling and predicting future vegetation change
Study Sites

Atqasuk
70°29’N
157°25’W

Barrow 71°18’N
156°40’W
Carex aquatilis-stans

- Dominant sedge
- Found in most wet meadows
- Variable forms (inflorescences)

Source: Hulten 1968
Research Design

- 2 Wet Meadows
- 1 x 1 m plots
  - 24 Control
  - 24 Passively Warmed
- Open Top Chambers
  - Warmed 1 - 3°C
Measurements

- Phenology (timing of flowering)
- Seasonal Growth (leaf length and inflorescence height)
Results
Statistics

• Used R version 2.15.0

• Software for statistical computing and graphics

• 2 way ANOVAS
  • Treatment x Year
  • P < 0.05
Phenology Data - First Flower

Atqasuk Experimental
Atqasuk Control
Barrow Experimental
Barrow Control
P = 0.075

Day of the Year (June 1 = 152)

Year
Average Inflorescence Height

Atqasuk Experimental
Atqasuk Control
Barrow Experimental
Barrow Control

P=0.029
Average Leaf Length

Year | Atqasuk Experimental | Atqasuk Control | Barrow Experimental | Barrow Control
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1998 | | | |
1999 | | | |
2000 | | | |
2007 | | | |
2008 | | | |
2010 | | | |
2011 | | | |

Average Leaf Length (cm)

P = 0.07
Discussion

- Altered phenology in Barrow, no change in Atqasuk
- Taller inflorescences and longer leaves at both sites
- Implications
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Questions?