

The influence of shrub-moss interactions on shrub growth responses to climate change



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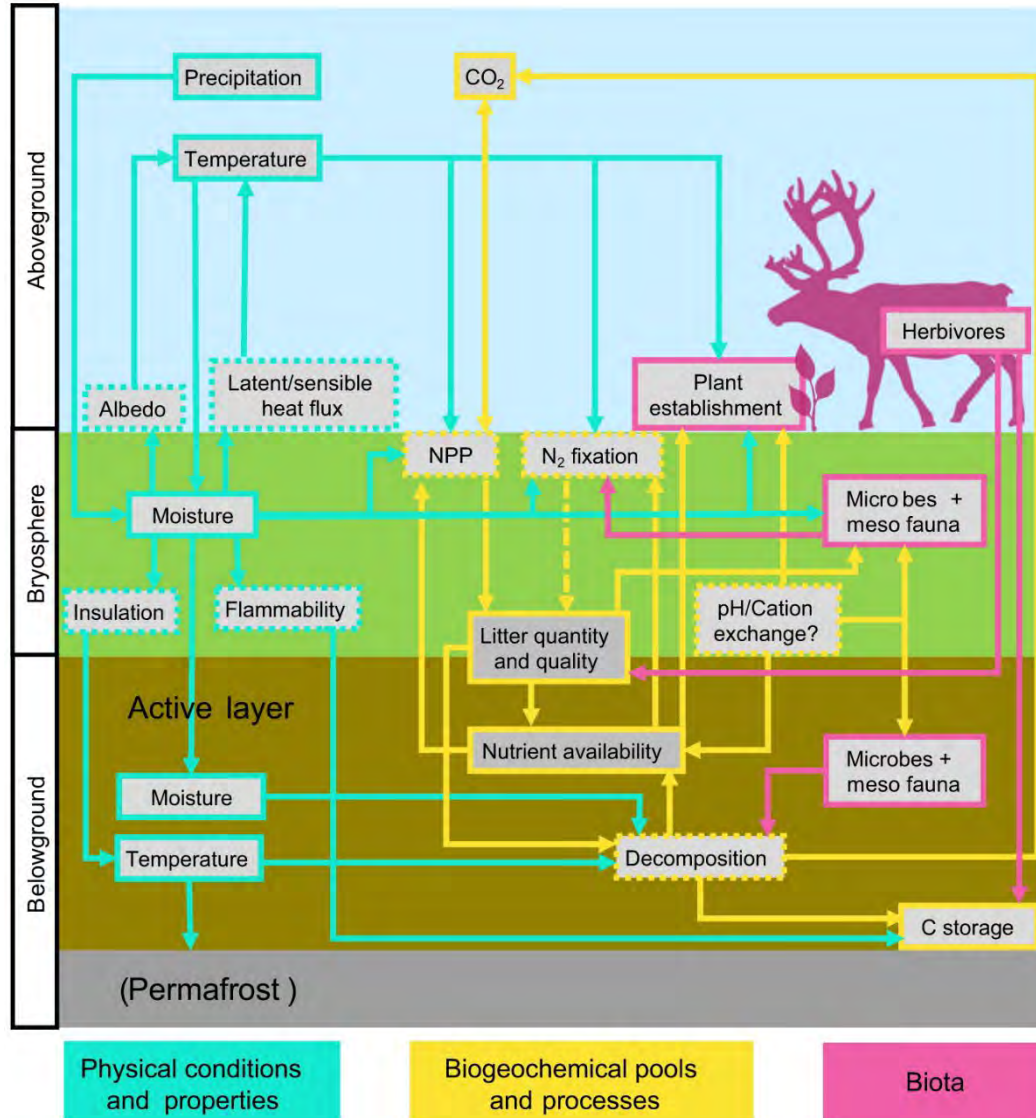
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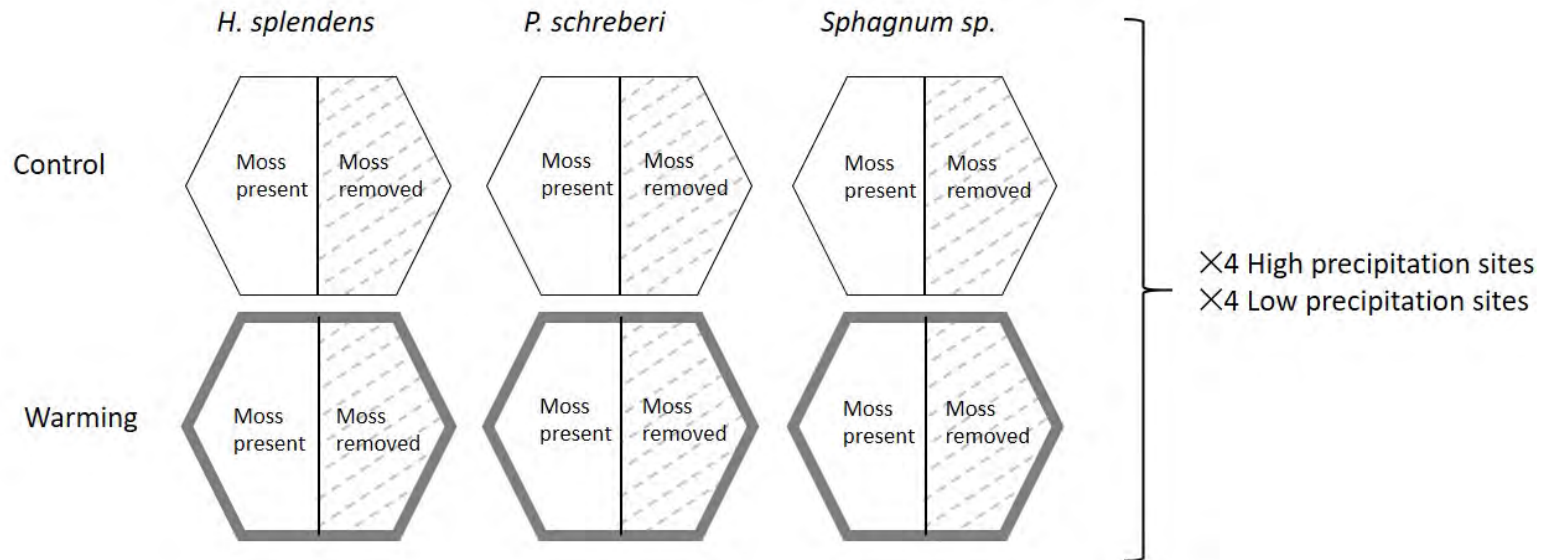
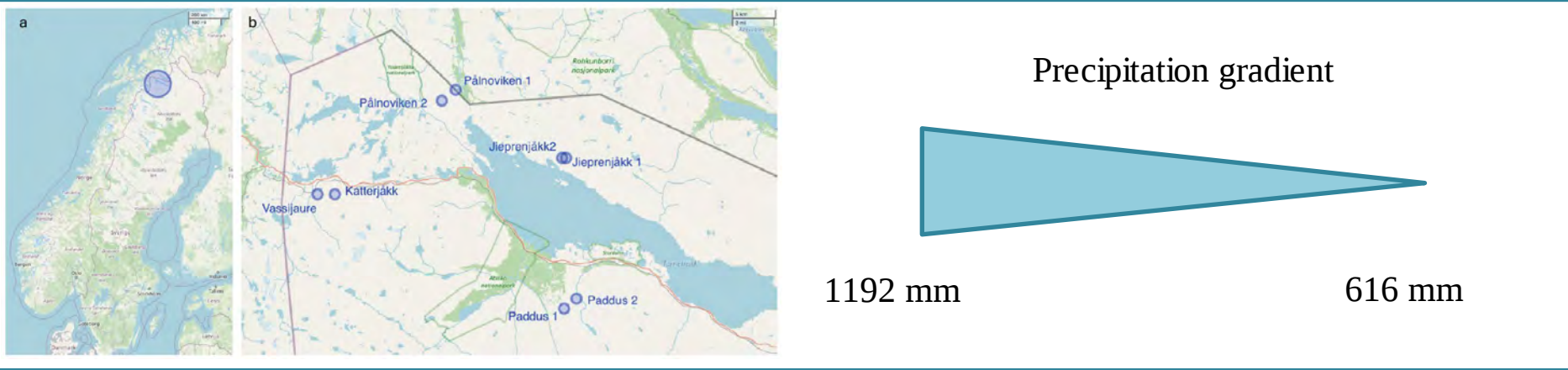
Bryophytes in the tundra







Experimental design



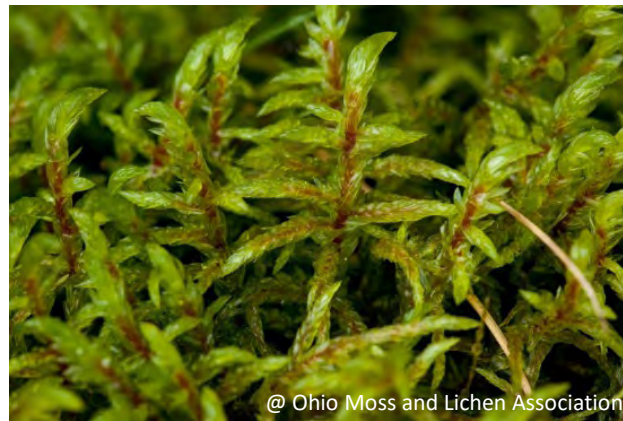
Experimental design



Hylocomium splendens



Pleurozium schreberii



Sphagnum spp.



Experimental design



Study species

Betula nana



Empetrum hermaphroditum



Vaccinium myrtillus



Vaccinium vitis-idaea



Vaccinium uliginosum

Study species

Betula nana



Empetrum hermaphroditum



New shoot elongation



2018, 2022

+ Plot vegetation data 2014, 2018
+ Moss growth data

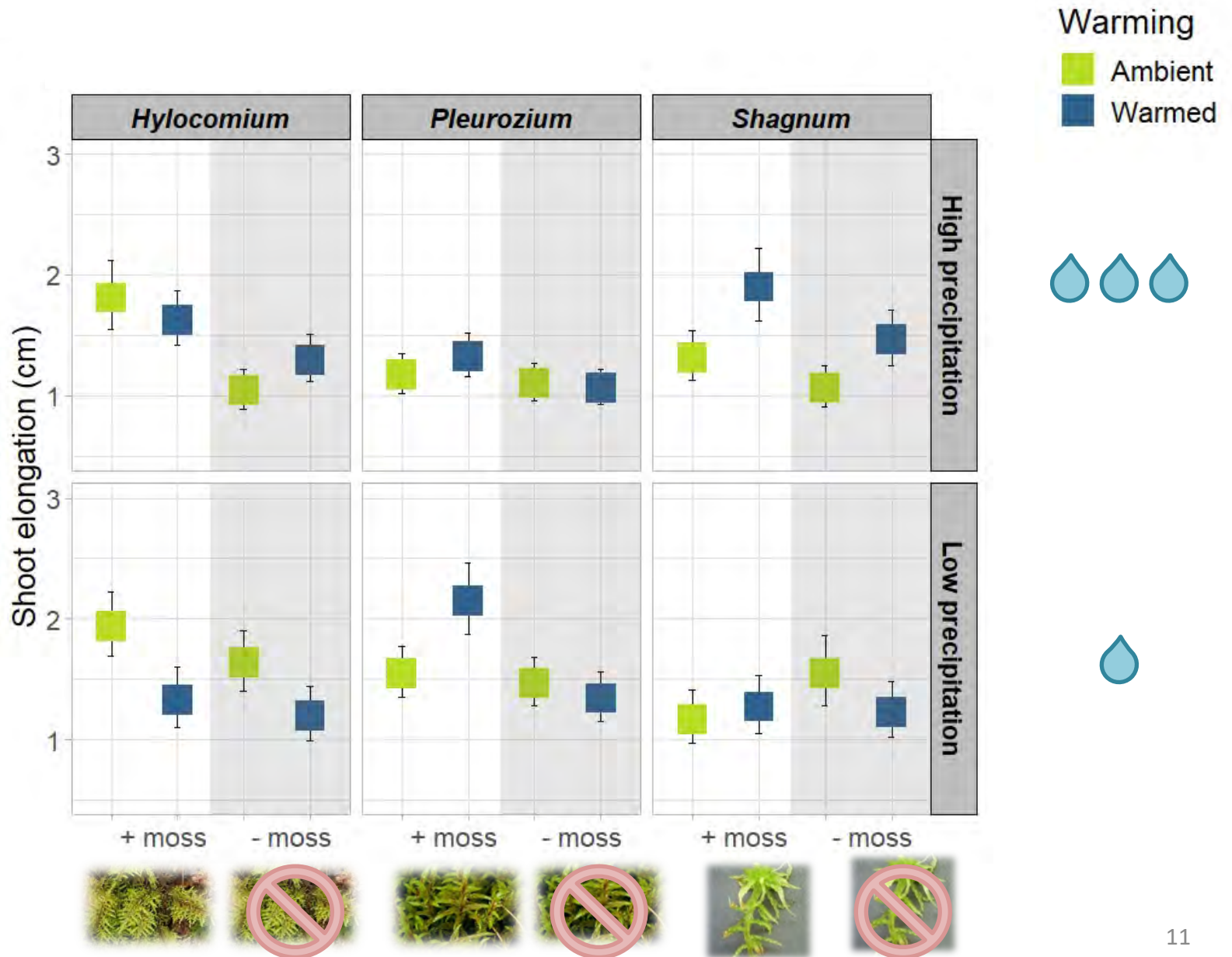


Vaccinium myrtillus

Vaccinium vitis-idaea

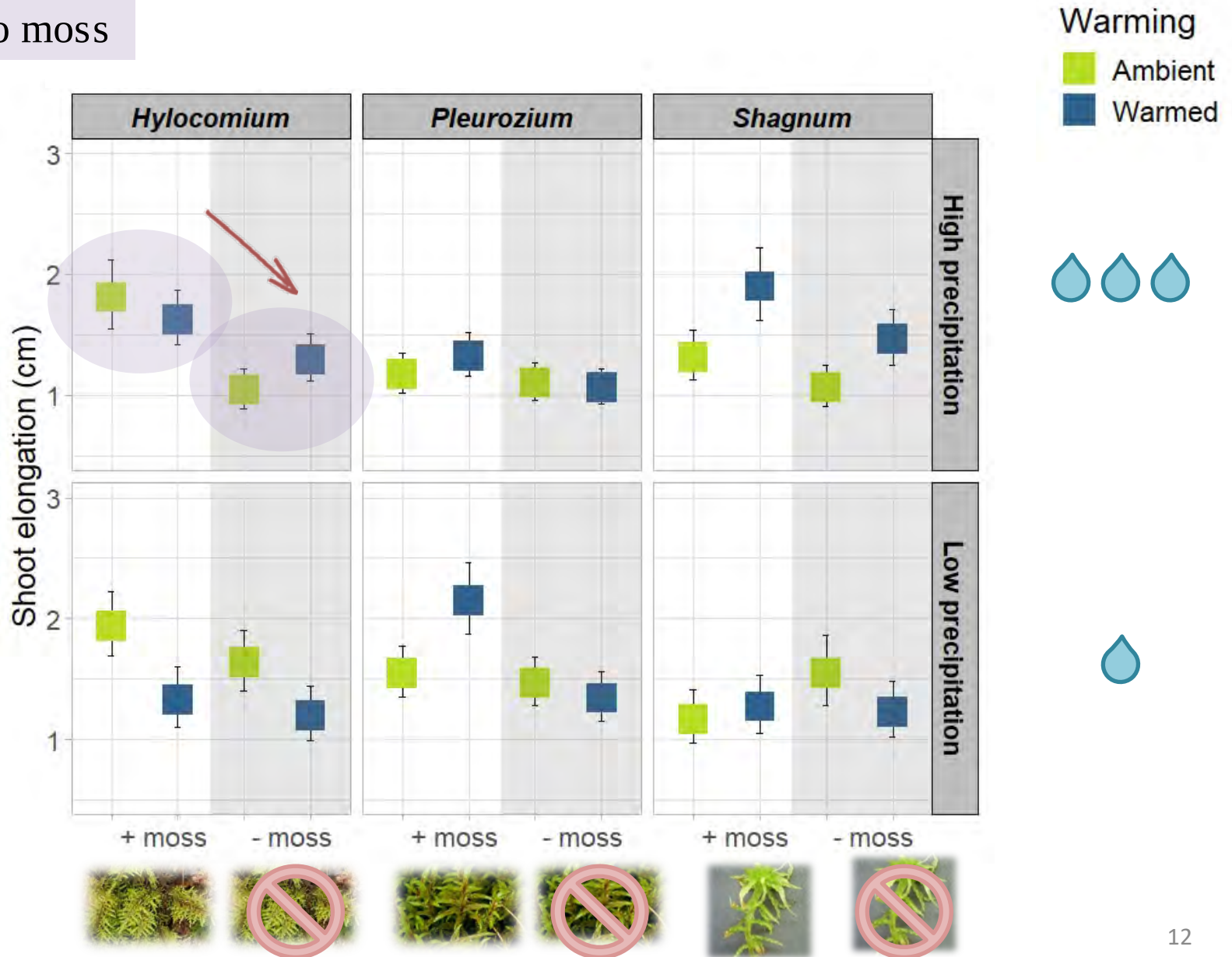
Vaccinium uliginosum

Empetrum hermaphroditum - 2018

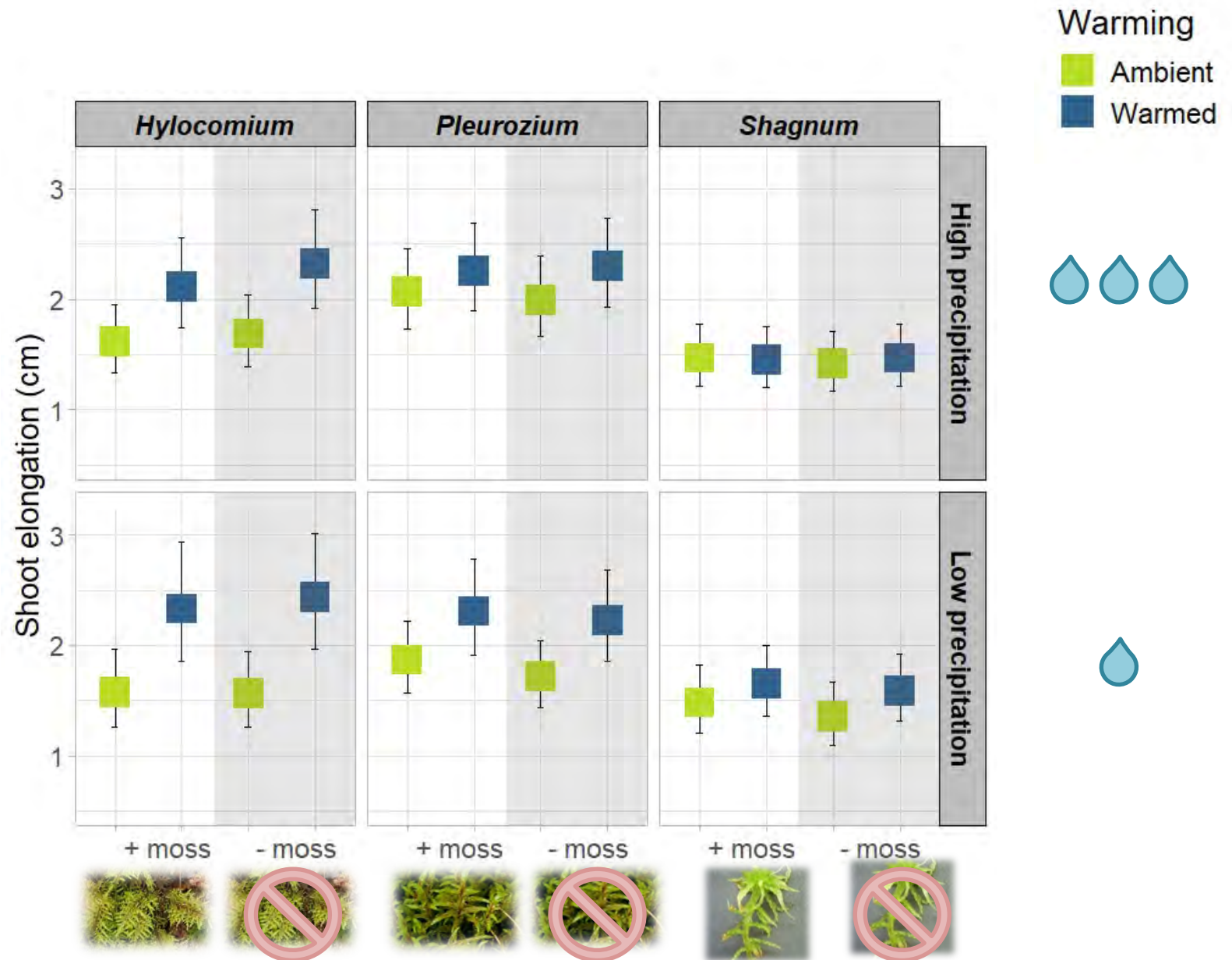


Empetrum hermaphroditum - 2018

Moss > no moss

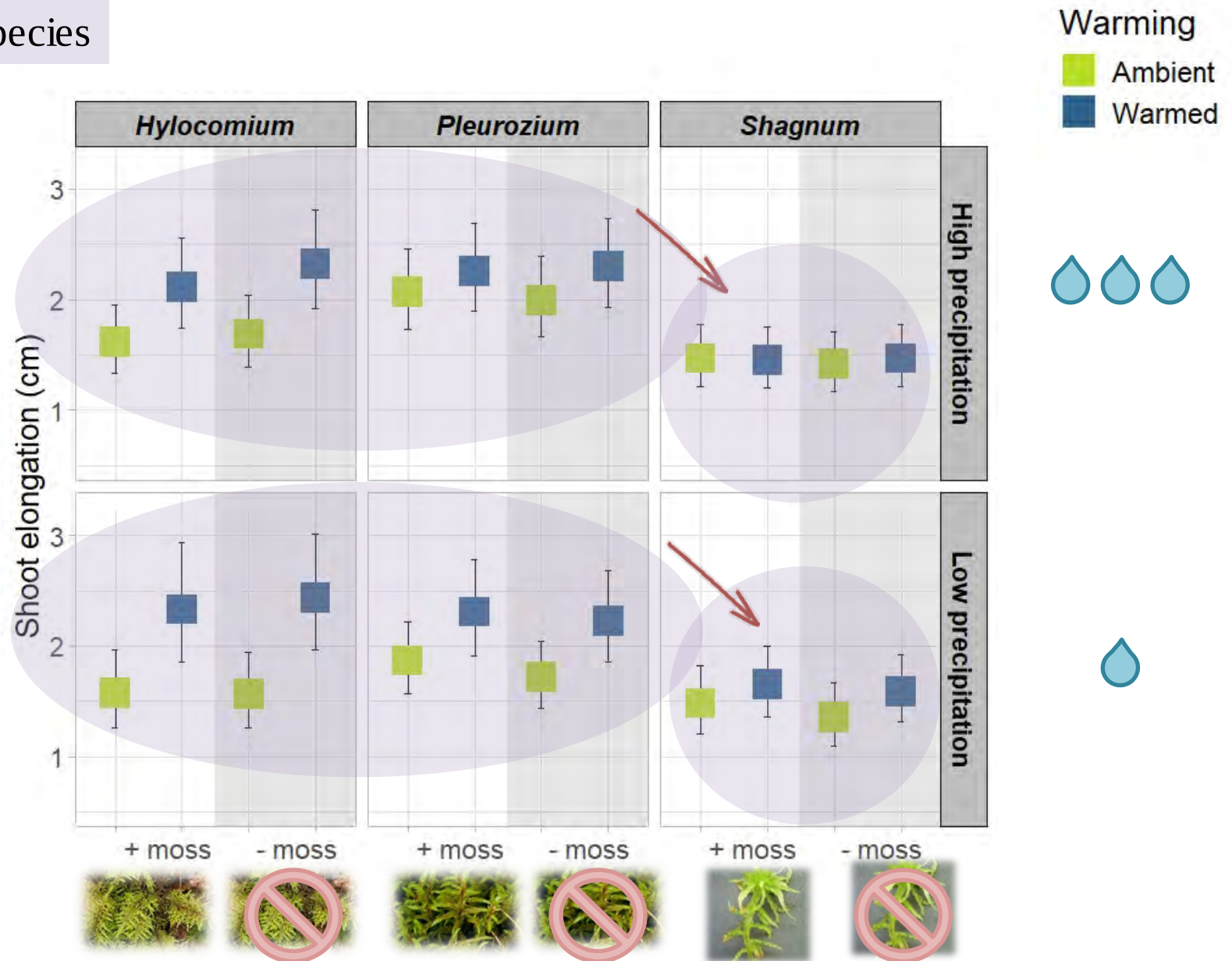


Betula nana - 2018

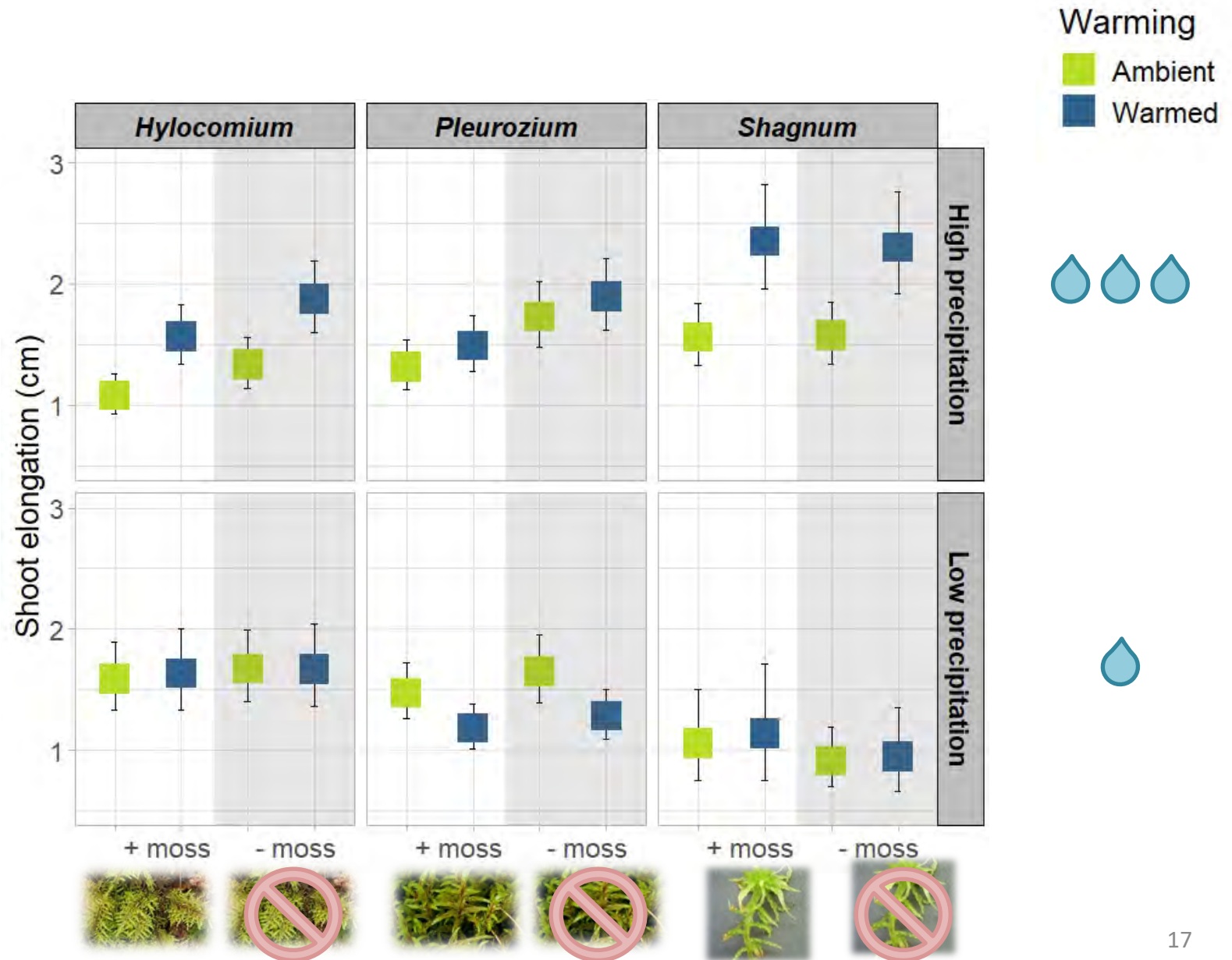


Betula nana - 2018

Moss species



Vaccinium myrtillus - 2018

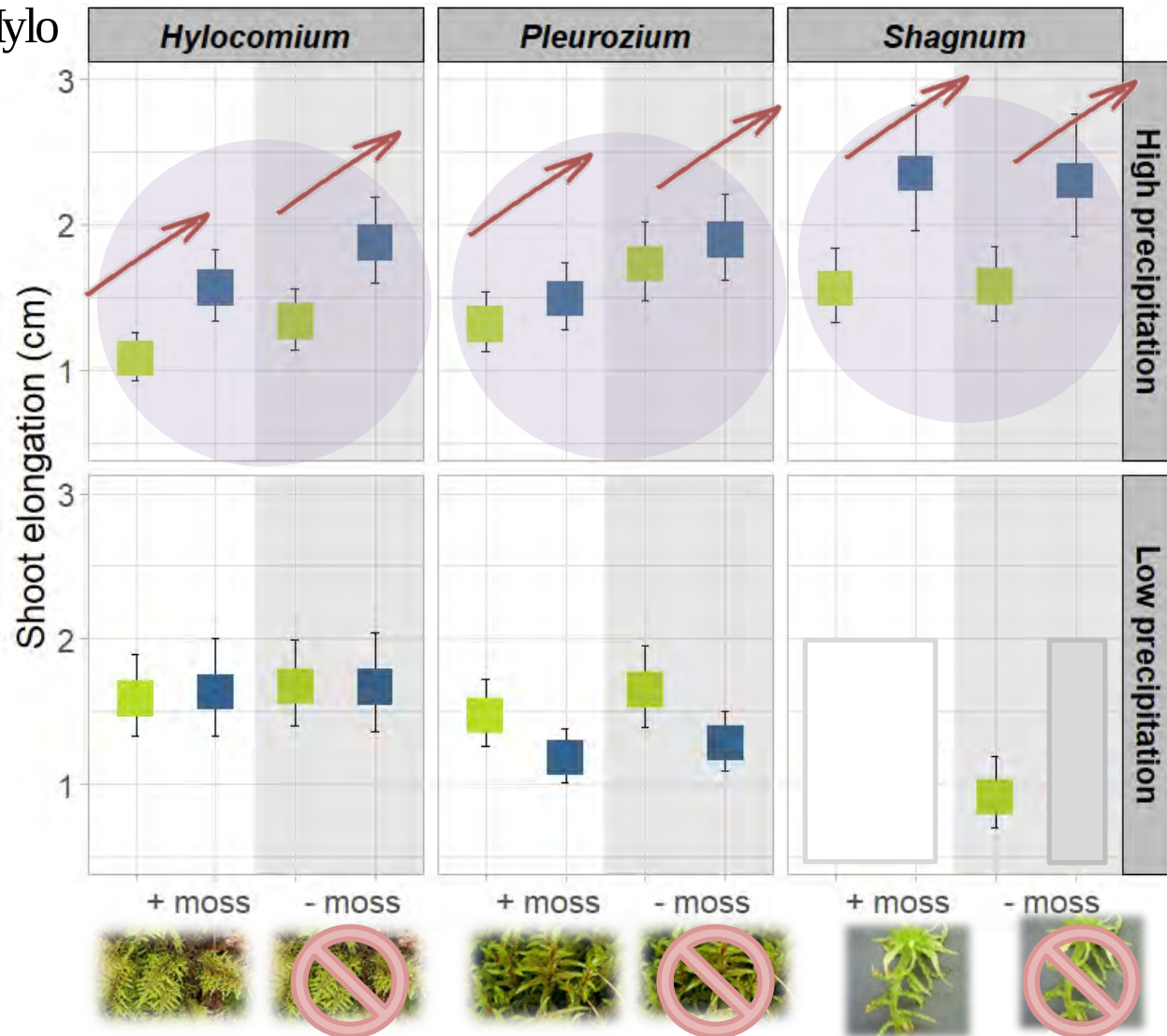


Vaccinium myrtillus - 2018

High precipitation

W > A

Spha > Hylo



Warming

Ambient

Warmed

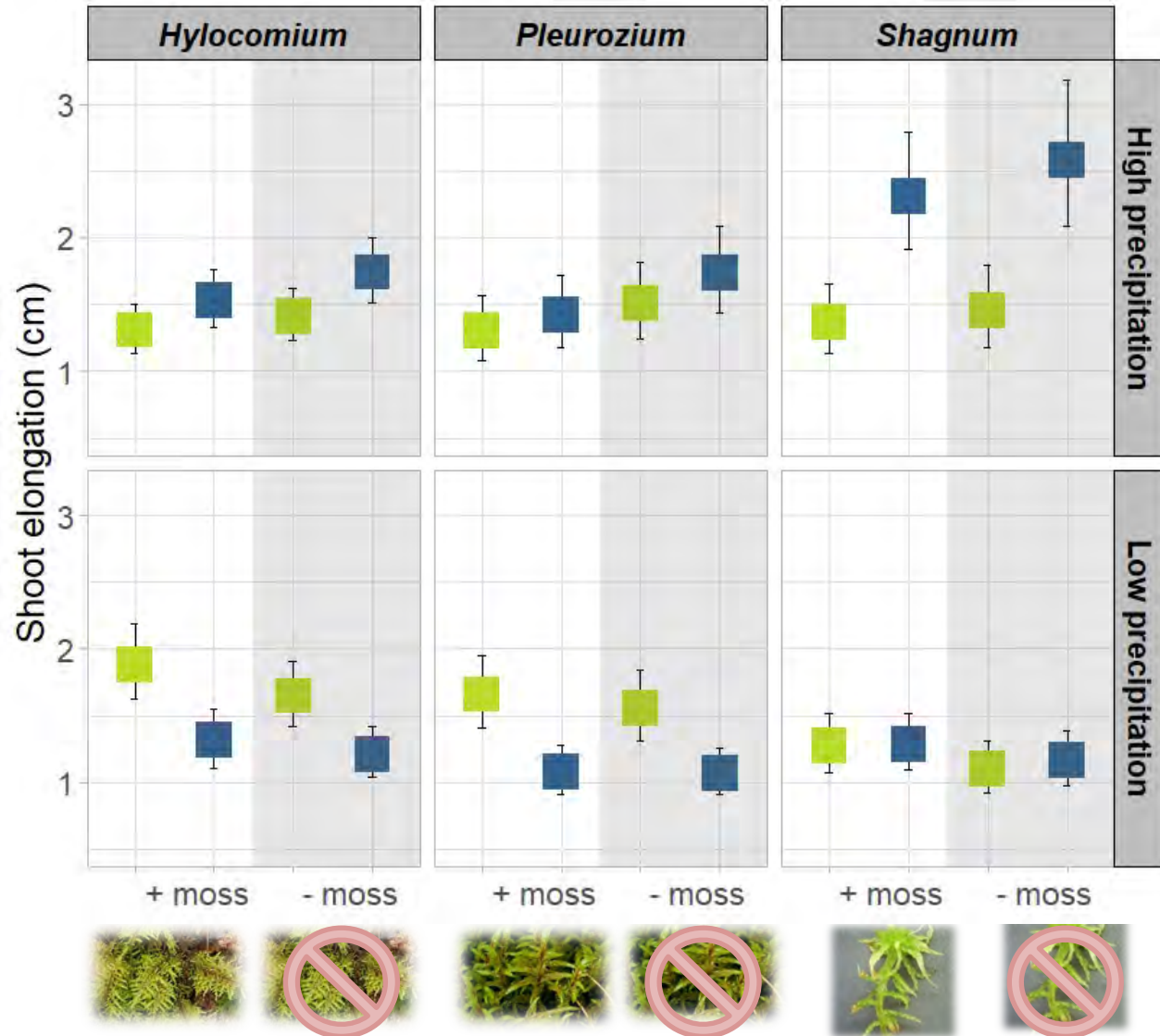


Vaccinium uliginosum - 2018

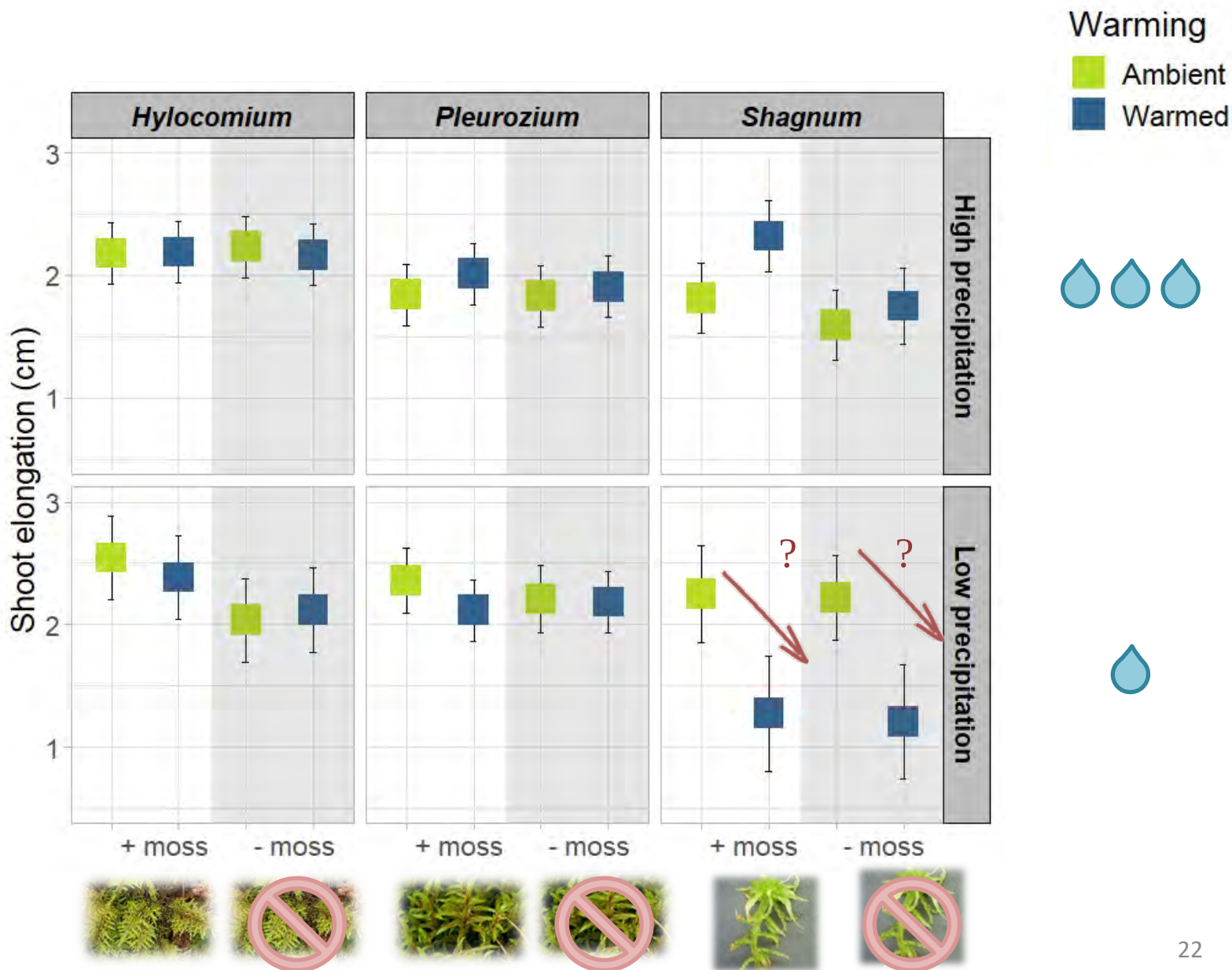
Under warming
High > Low precipitation

Without moss
High > Low precipitation

Warming
■ Ambient
■ Warmed



Vaccinium vitis-idaea - 2018



Main findings

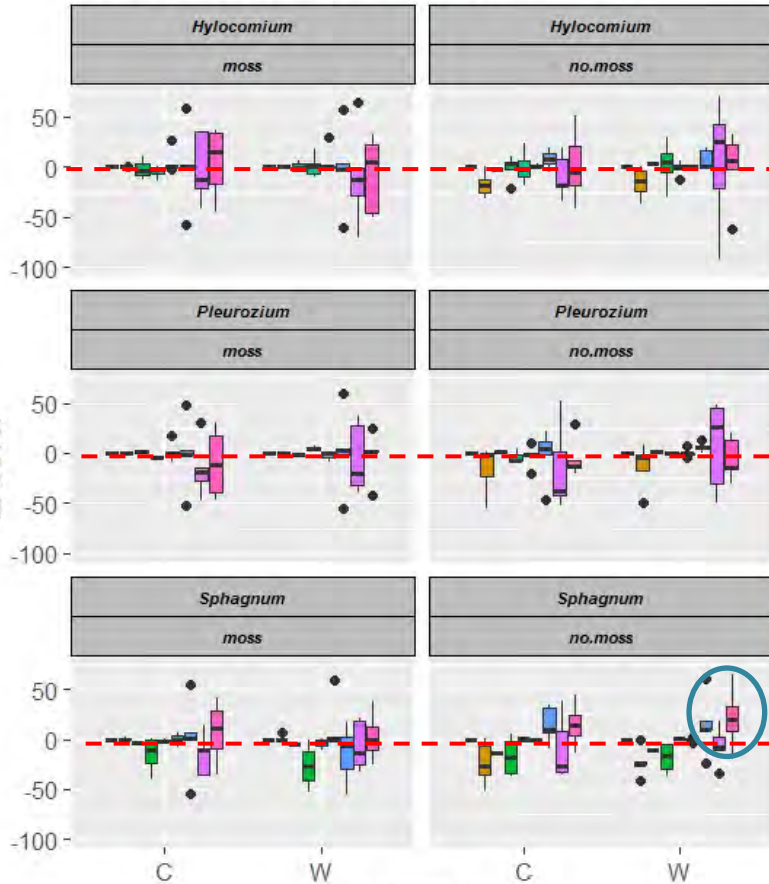


- 💧 No consistent response across shrub species
- 💧 No consistent responses between years
- 💧 *Empetrum hermaphroditum*: moss removal detrimental (soil T° fluctuations?)
- 💧 *Betula nana*: greater growth in *Hylocomium* and *Pleurozium* plots (too wet with *Sphagnum*? Competition - Community composition?)
- 💧 *Vaccinium myrtillus*:
 - Warming beneficial at high precipitation sites
 - Growth was stimulated at *Sphagnum* plots (warm summer)
- 💧 *V. uliginosum*:
 - Diverging warming effects (high vs. low precipitation)
 - Diverging moss removal effects (high vs. low precipitation → soil T° fluctuations?)
- 💧 *V. vitis-idaea*: unresponsive to treatments (some trends in response to warming under high precipitation)

Vegetation cover change



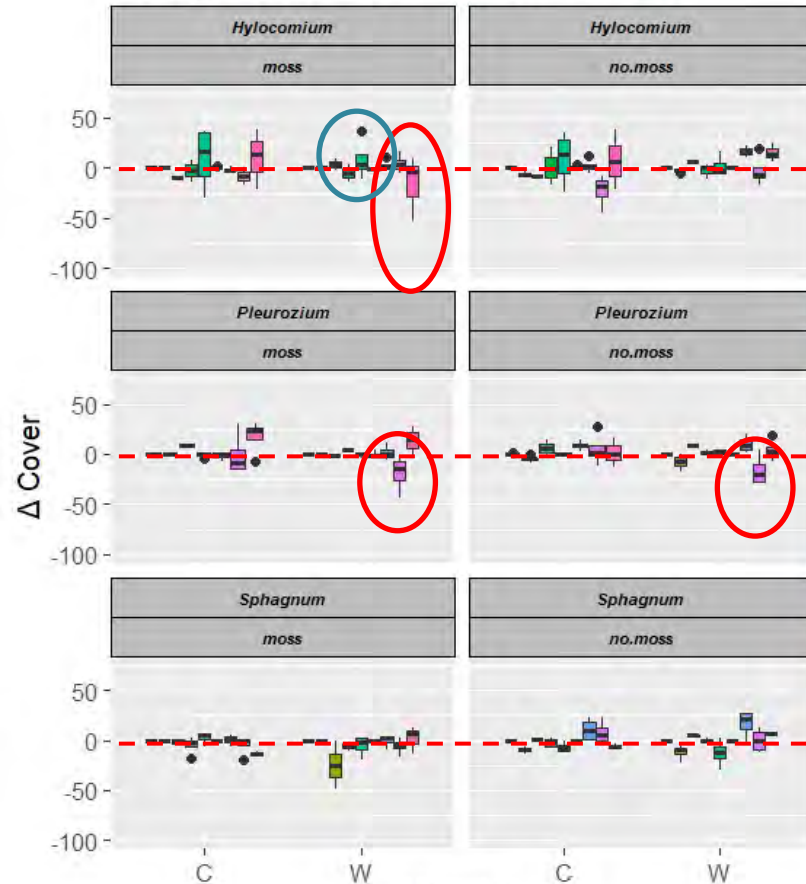
Change in PFG cover (2018 – 2014)



Warming



Change in PFG cover (2018 – 2014)



Warming



PFG

- Bare_min_soil
- Bare_org_soil
- Fern
- Forb
- Graminoid
- Lichen
- Moss
- Shrub_d
- Shrub_e

Thanks!



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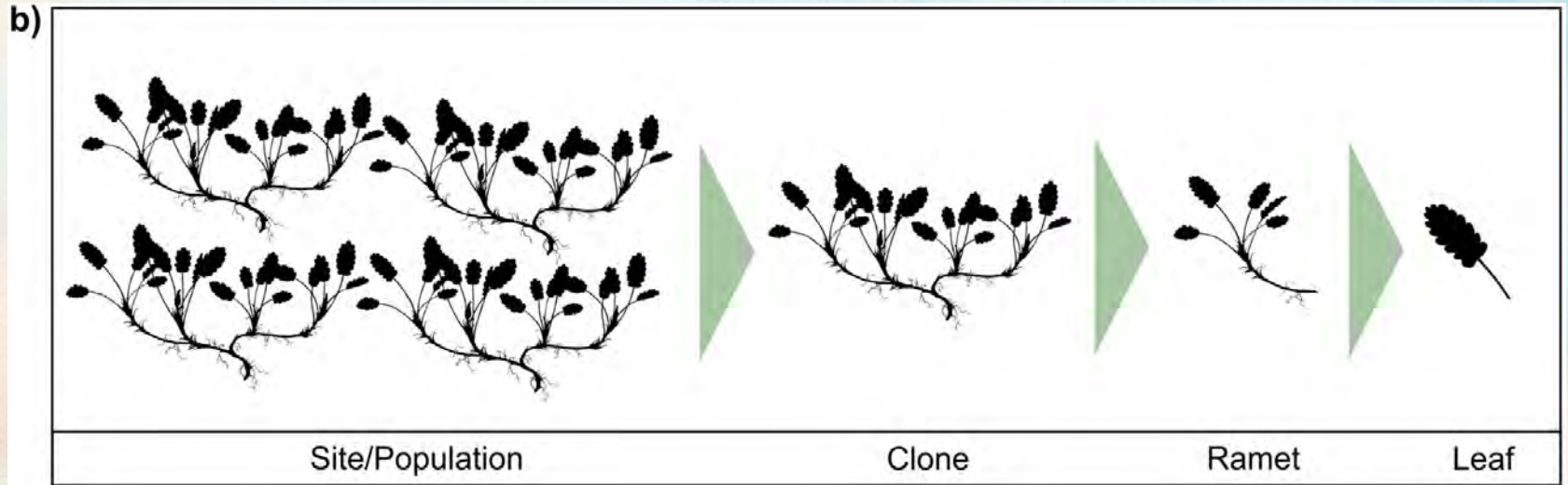


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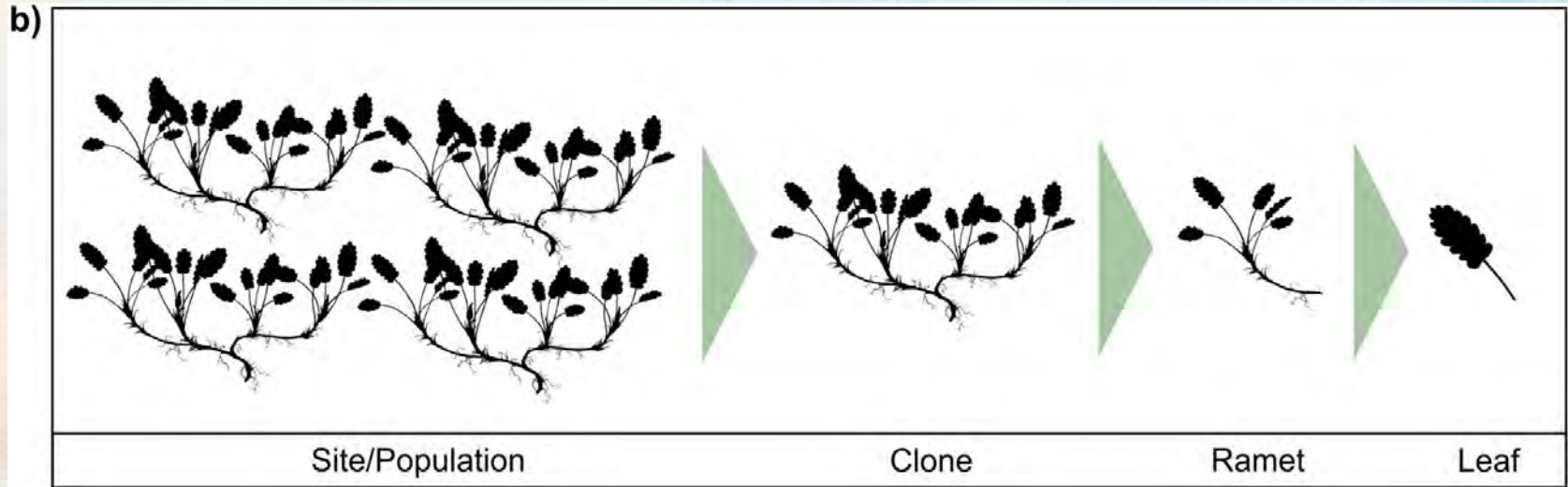


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About intraindividual variability...



About intraindividual variability...



Global Ecology and Biogeography

WILEY

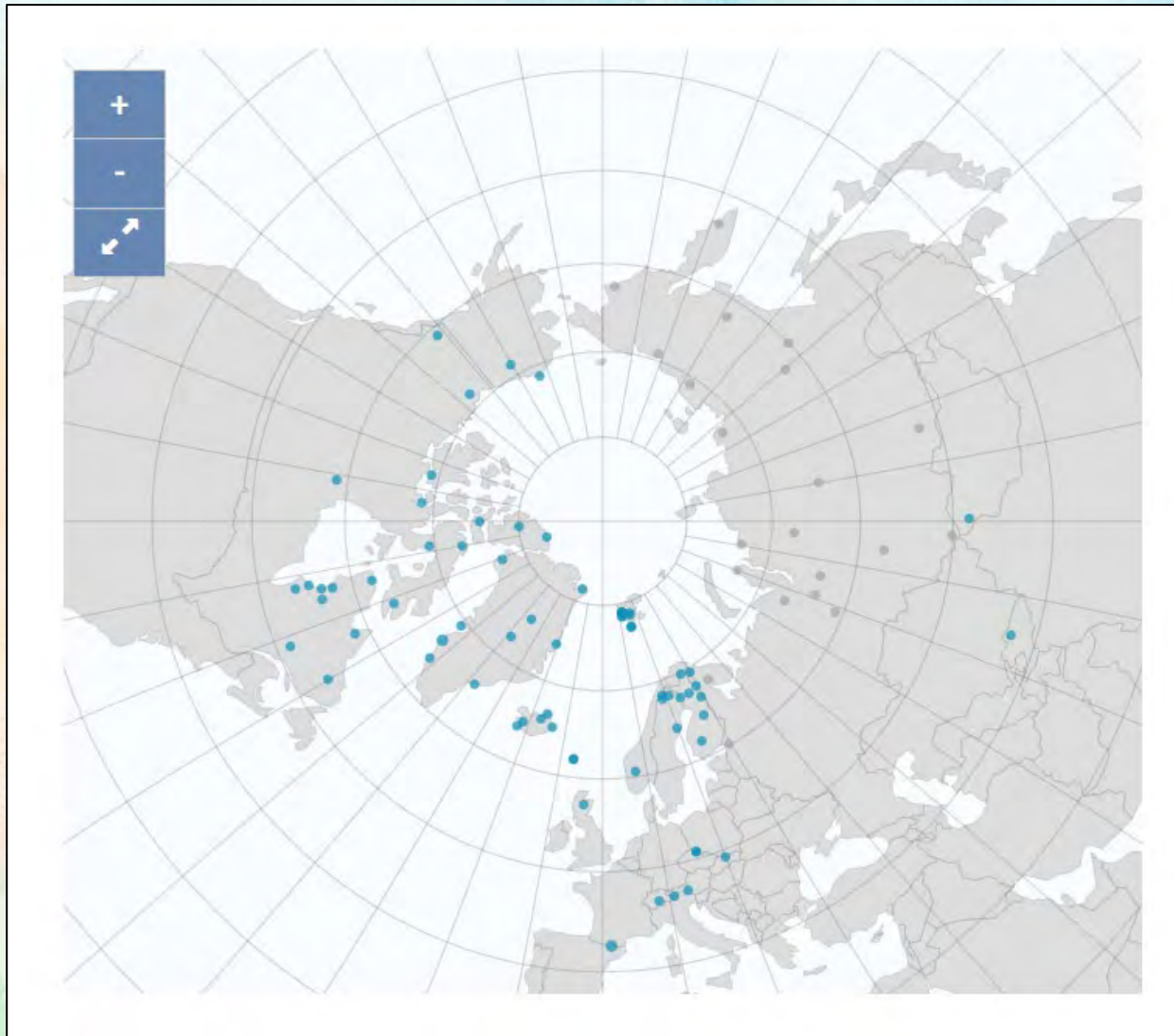
Global Ecology
and Biogeography

A journal of
Ecology

RESEARCH ARTICLE **OPEN ACCESS**

Intraindividual Variability as a Large Source of Trait Variation in Clonal Tundra Dwarf Shrubs Along Elevation and Latitude Gradients

Alba Anadon-Rosell^{1,2,3} | Amanda Casanovas¹ | Manuela Bog³ | Estela Illa^{1,4} | Jürgen Kreyling³ |
Jordi Martínez-Vilalta^{2,5} | Josep M. Ninot^{1,4} | Aaron Pérez-Haase^{1,4} | Martin Wilmking³







Oriol Grau Alt Pirineu Natural Park



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CHANGE



MANAGING RISKS



USING DRONES



TRACKING
BIODIVERSITY



TOURISM



POLLUTION



ARTIFICIAL
INTELLIGENCE



TRANSPORT AND
COMMUNICATION



EXTREME
WEATHER



INTERACCESS



INTERACT GIS



DATA PORTAL

WELCOME ALT PIRINEU NATURAL PARK, NEW OBSERVER STATION IN INTERACT

March 23, 2023



Alt Pirineu Natural Park is INTERACT's newest observer station. Situated in the high Pyrenees, this alpine station was established in 2003. Like other Alpine mountains in Europe, the Pyrenees include small islands of cold biomes. In this mountain range the contrast with massive Mediterranean conditions towards the South gives a particular relevance and uniqueness to these ecosystems and species, which persist at high elevations, and share many species of **flora** and **fauna** that are found in northern latitudes.

Find out more about the station [here](#) or in the [INTERACT GIS System](#).

Prev: New INTERACT online lessons available

Next: APECS International Polar Week

Thanks!



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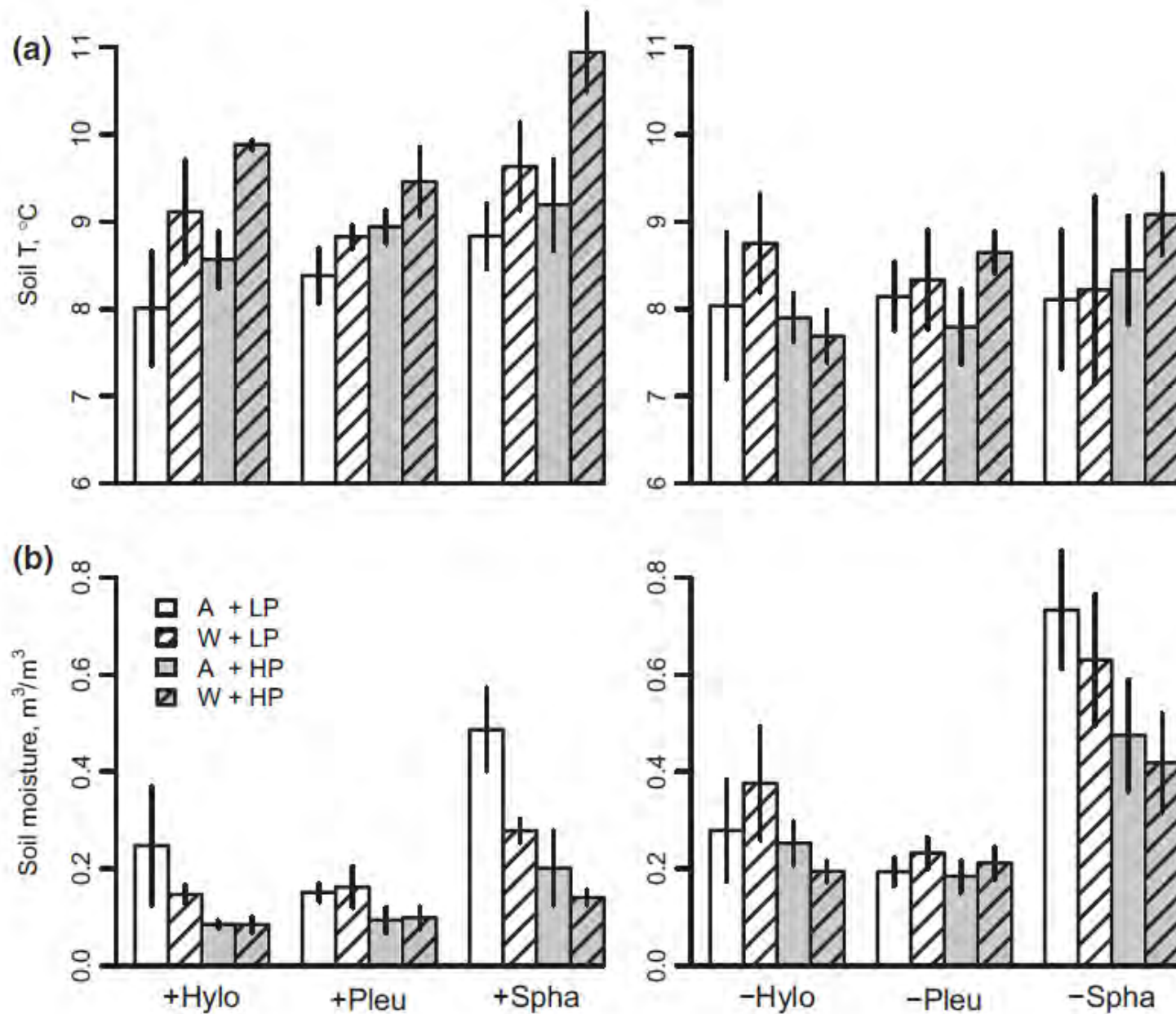
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Microclimate data

