

MEASURING BACKGROUND LEVELS OF INVERTEBRATE HERBIVORY IN THE TUNDRA

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What?

Plant-herbivore Interactions
Invertebrate Herbivory
Common Protocol



Why?

Plant herbivore interactions

- Play an important role in tundra ecosystems

Invertebrates have been under-studied

- Have the capacity to rapidly respond to climate change
- Determine average herbivory levels so that outbreak and background levels can be defined

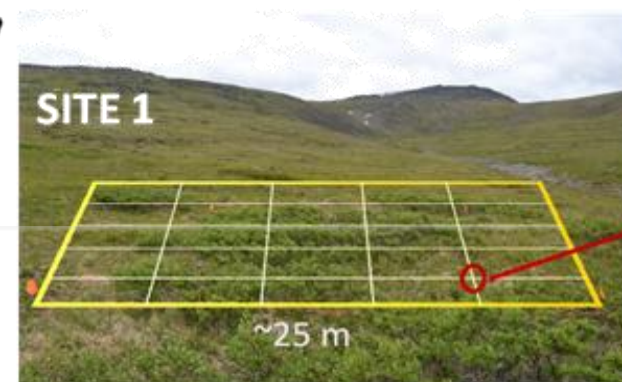
Common Protocol

- Monitor herbivory in tundra ecosystems
- Where does invertebrate herbivory vary?
 - Plant level
 - Site level
- 22 sites across the Arctic
- Collection of leaf herbivory data in a common consistent method

Methods

1. Habitat type typical of your study area?

Choose 5 sites (~25x25 m), at least 100 m apart, within that habitat type



2. Set up sampling grid

4 x 4 sampling points, 5 m apart → 16 sampling points



2a. At each point: point frame (50x50 cm), 10 intercepts (fixed positions)



2b. Harvest live aboveground biomass from 3 frames

ESTIMATION OF FOLIAR BIOMASS
Write down all species hitting the pin. For the focal species, note if woody or leaf parts are hit
x16 datasheets per site

Oven dry and keep in labelled paper bags, FOUR per frame (3 focal species + "others") (study area, site, frame)
x12 bags per site

3. What are the most abundant plant species at your site?

Select the 3 most abundant plant species



Locate 3 "individuals" of each species within the site (could mark them with flags)



COLLECTION OF SAMPLES

Collect 100 leaves from each "individual"
x300 leaves per species



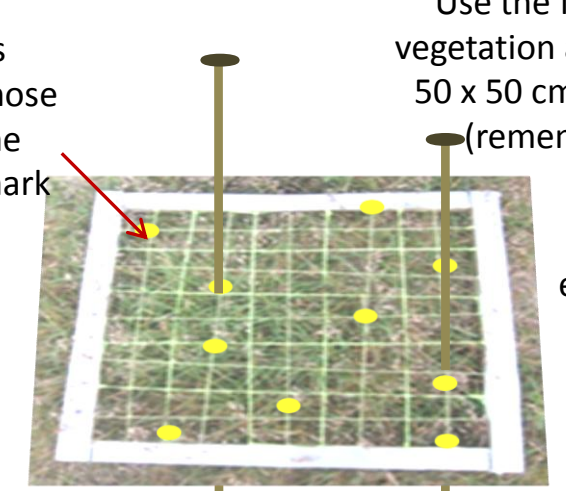
Once pressed and dry, keep leaves in labelled paper envelopes, one per individual (indicate: study area, site, plant species, individual ID)



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POINT INTERCEPT

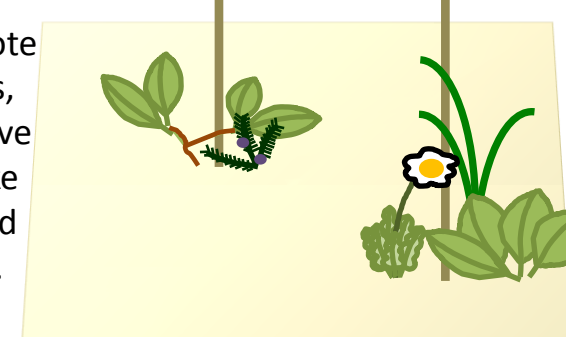
Choose 10 points randomly and use those positions for all the assessments (e.g. mark them with ink)
Only hits by **FOCAL PLANTS** are to be recorded



Use the frame you generally use for vegetation assessments. We recommend 50 x 50 cm, but other sizes will also do (remember to write this down!)

Place the pin through each point perpendicular to the frame

For woody species note if the pin hits leaves, woody or reproductive parts. For needle-like leaved plants, record one hit per branch.



Place the frame parallel to the surface, ~20-50 cm above the surface

At each intercept, for the **focal species** record as many hits as needed; this may involve several hits by the same species or different focal species

What's Next?

- Process samples to estimate biomass lost to invertebrates
 - Community level
 - Plant species level
- Repeat measurements at selected sites (2016)
- Complete manuscript and develop a monitoring protocol by early 2017

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