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# Camera trapping of small mammals – pilot study

## Motivation

Small rodents are key herbivores in tundra food webs. Climate change impact is expected to be especially pronounced on lemmings, as they are the most arctic species of the rodent community present at COAT Varanger study region. Specialist predators are expected to modify small rodent population dynamics.

This camera trapping protocol describes data collection during a pilot study from 2014 to 2015, for the dataset "V_rodents_cameratraps_short_term_2014». During summer 2015, the spatial design was changed, and long-term monitoring dataset "V_rodents_cameratraps_lemming_blocks" commenced with the associated protocol "Camera trapping of small mammals".

***Reference(s) to method:*** Soininen et al. 2015 give the first description of the camera trap.

## Spatial study design

The camera trapping of small mammals is conducted within the intensive design of Varanger, at the locality Komagdalen. Cameras are placed in four "lemming block" sections with 11 sites per section. Two blocks have primarily snow bed sites, while the two other blocks have heath, mesic hummock tundra and mire sites. Within each block, the traps are placed in two transects with 5-6 traps each. The minimum distance between traps is 300 m to avoid that the same rodent individual included more than one camera trap within its home range and thus independent data on rodent presence.

Each site has one camera trap box, similar to those described by Soininen et al. 2015 (see Figure 1). The camera used is a Reconyx ReconyxTM SM750 HyperFireTM License Plate Capture Camera (Reconyx Inc., Holmen, WI, USA), modified to accommodate a faster movement sensor and a wide-angle lense with a focal distance of 15 cm. The box is protected with stones.

The complete list of siteIDs included in the pilot study is in the coordinate file of the associated dataset "V_rodents_cameratraps_short_term_2014».

## Temporal study design

The camera traps are deployed in September 2014, visited in July and collected in late August 2015.

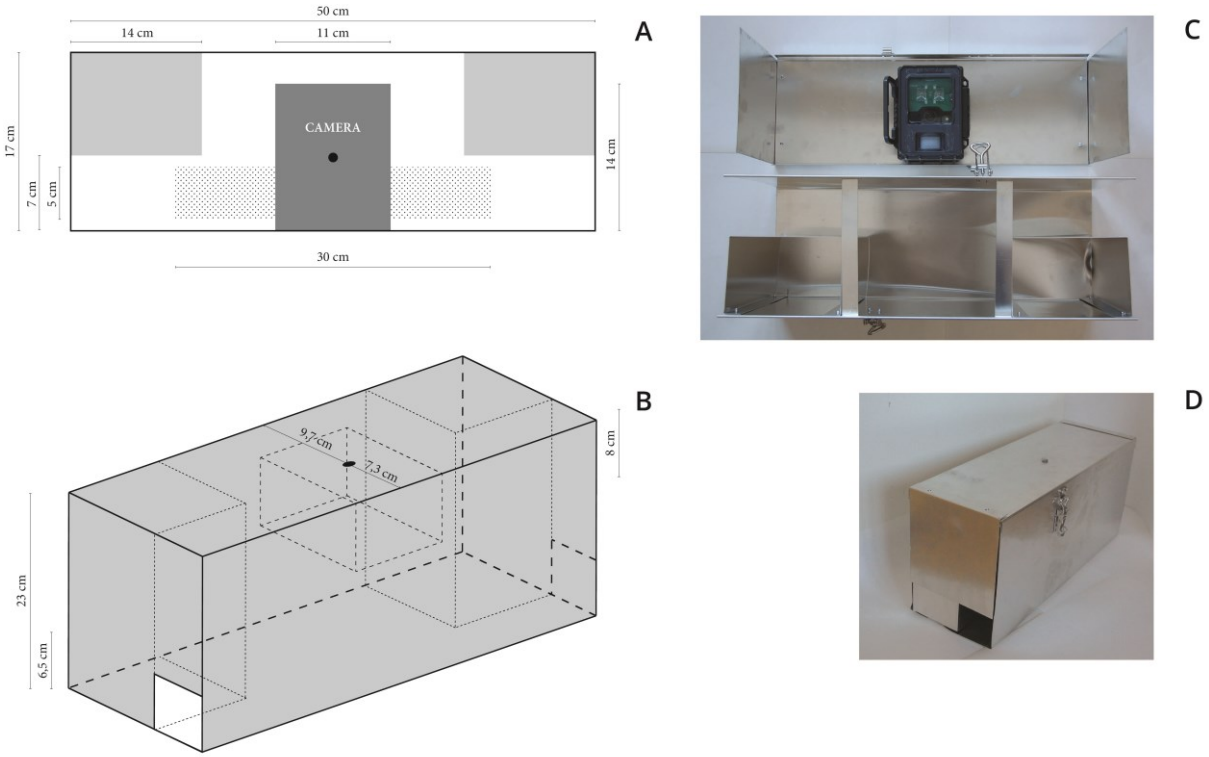


Figure 1. Camera trapping box (image from Soininen et al. 2015). Parts A and B give the internal measures of the box. On the left side are measures of the box, on the right side measures of the camera. Black circle denotes the attachment location of the camera. (A) The trap box from above. Pale gray rectangles indicate blocks inserted in the box in order to direct animals below the movement sensor. Patterned rectangle below the camera shows the extent of the detection field of the camera trap. (B) The trap box from outside. Middle point of the camera attachment screw is indicated. (C) The trap box photographed from opened. Above; lid of the box with camera attached. Note that plates that block snow from entering the box are attached on the lid. Below; bottom part of the box. Note that (i) the blocks guiding animals below the PIR sensor are hollow, allowing storage of external battery, (ii) the box structure is supported by two aluminum straps crossing the box. (D) The trap box photographed from outside.

**Procedure**

During the July visit, silica sheets, silicon fat sealing, batteries and memory cards of all camera traps are changed. It is not recommended to do this work in very wet weather (rain) as the electronics of the cameras are very sensitive to moisture. In case of accidental rain showers, the operations with cameras can be done under a “jervenduk” with the aid of a headlamp.

Open the camera, while the camera is still fasted to the lid of the box. Push the “OK button” to check whether the camera is normally functional; meaning, that it has power left (normally 99%), has taken at least ~650 pictures (time laps photos) and is dry inside. Turn off the camera, remove batteries and memory card. Write the trap number and year on a paper note and store this together with the memory card in a ziplock bag.

If the camera is not normally functional then replace it with a new camera and bring the non-functional camera back from field.

For functional cameras, insert new batteries, a new memory card in the camera, and a new silica sheet placed over the batteries. Wipe away old silicon fat from cover the gasket with a paper wipers and put on new silicon fat. Make sure that the fat doesn’t smear the fronts of the lens, flash and IR sensor. Turn the camera on, check that the power is 99% and press camera armed: OK.

The settings should be:

- Trigger: Motion sensor ON
- Sensitivity: High
- Pictures per trigger: 2
- Picture Interval: Rapidfire
- Quiet period: 1 minute
- Quick set advanced: Time lapse:
  AM time period ON, start AM 08, end AM 09
  PM time period ON, start PM 08, end PM 09
  - Picture interval 1 hour
- Resolution 720 P
- Correct date and hour Temperature Celsius

**Equipment needed**

- Empty memory cards
- Lithium-batteries (12 per camera)
- plastic bags for used batteries
- something to note camera trap number on memory cards (pen/pencil, zip lock/paper bags)
- silica sheets to put inside the cameras (1 per camera)
- wrench or other tool to screw off the camera if needed
- extra screws
- silicon grease
- paper wipers
- extra cameras
- "jevenduk"
- headlamp
- notebook

**Information recorded in the field**

For each camera trap: date and time when you visited the camera [i.e. exchanged batteries and memory cards for each trap], what was the % remaining power and number of pictures taken. If you change the camera, note down the serial number of both the camera you bring back from the field and the newly installed camera.

For cameras that are replaced (and hence brought back to the lab), write what is the problem (e.g. empty battery, water inside) on the back of the camera with a permanent marker pen. Note the serial number of the camera in your notebook and state the problem here as well.

**Data processing**

When back in Tromsø the SD cards and all other material must be handed over to Eeva Soininen.

**Training requirements and specialized skills**

No special skills are needed.

**References**

Soininen, E. M., Jensvoll, I., Killengreen, S. T., & Ims, R. A. (2015). Under the snow: a new camera trap opens the white box of subnivean ecology. *Remote Sensing in Ecology and Conservation*, *1*(1), 29-38.