

ReadMe - V_snowbed_shrub_abundance_intensive

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1 Protocol

Recording of dwarf shrubs in snowbeds has been, since 2009, conducted according to the COAT protocol 'protocol_snowbed_shrub_abundance_intensive'.

1.1 Timing of sampling and changes in that

The counts are conducted once per year, soon after snowmelt (during 8.-11.7.), at the same time as the pellet counts in snowbeds. If snowmelt is late, the plots will be re-visited later in July. If they are still not snowfree, and data cannot be collected during the July fieldwork period, they are revisited in early September.

1.2 Spatial layout of sampling and changes in that

From 2009 onwards the sampling was conducted at three localities (Ifjordfjellet, Komagdalen and Vestre Jakobselv). Within these, two spatially separate sections along altitudinal transects of mountain slopes were included in the design. The sections are some kilometers from the nearest neighbouring section. In each section, 19-30 snowbeds were originally selected as sampling sites.

Each snowbed has 4 plot-pairs. Shrub presence is recorded in the control plots of each pair. Herbivore pellets are recorded in (and removed from) removal plots of each pair [see dataset V_rodents_pellets_abundance_snowbed_intensive].

From 2013 onwards, number of snowbeds per section was reduced to 19-20.

From 2017 onwards, Ifjordfjellet was excluded from the design.

More detailed information about which sites were included in the study design can be found in the auxiliary file 'V_snowbed_shrub_abundance_intensive_aux.txt'.

1.3 Changes in the sampling protocol

Sampling: From 2009 to 2016, the plots were photographed in the field, and similar data recorded from the images.

Sampling dates: For data from 2009 to 2016, the sampling dates were reconstructed afterwards from dates when images were taken. In unclear situations dates for pellet counts were checked, and comments are added. Since 2017, sampling dates are recorded in the field.

2 Description of the dataset

The dataset includes three different types of files and all files are saved as ;-separated txt-files:

- One data file per year (`_YEAR.txt`)
- One coordinate file with coordinates of all sites (`_coordinates.txt`)
- One auxiliary file with information about which sites are included in the study design (`_aux.txt`)

2.1 `V_snowbed_shrub_abundance_intensive_YEAR.txt`

These files contain presence/absence data of dwarf shrubs animals per subplot. Additional plant species that can reliably be recored independent of phenology are also included. The following species and species groups are included in the dataset:

```
[1] "Betula nana"          "Empetrum nigrum"      "Huperzia selago"
[4] "Nardus stricta"       "Phyllodoce caerulea"  "Salix herbacea"
[7] "Vaccinium myrtillus"  "Vaccinium uliginosum" "Vaccinium vitis-idaea"
```

Example of the first rows of the data files:

```
sn_region  sn_locality  sn_section  sn_site  sn_plot  sc_plot_treatment
1  varanger  ifjordfjellet  eastordalen  if_ea_sn_1      1      control
2  varanger  ifjordfjellet  eastordalen  if_ea_sn_1      1      control
3  varanger  ifjordfjellet  eastordalen  if_ea_sn_1      1      control
sn_subplot t_year      t_date  v_observer  v_species  v_presence  v_comment
1          1    2009  2009-07-08      <NA>    bet_nan      0      <NA>
2          1    2009  2009-07-08      <NA>    emp_nig      0      <NA>
3          1    2009  2009-07-08      <NA>    vac_myr      0      <NA>
```

Description of the columns included in the data files:

Column name	Description	Possible values
sn_region	Study region	varanger
sn_locality	Locality (within region)	ifjordfjellet, komagdalen, vestre_jakobselv
sn_section	Section (within locality)	eastordalen, storelva, kjoltindan, ruossachokka, bearalveaijohka, torvhaugdalen
sn_site	Unique Site ID	e.g. if_ea_sn_1, if_ea_sn_13, if_ea_sn_18, if_ea_sn_4, if_ea_sn_9, if_st_sn_13, if_st_sn_18, if_st_sn_4, if_st_sn_9, ko_kj_sn_13
sn_plot	Plot number within snowbed site	1, 2, 3, or 4
sc_plot_treatment	Treatment of plot	control
sn_subplot	Subplot number within plot	a number between 1 and 12
t_year	Sampling year	YYYY
t_date	Sampling date	YYYY-MM-DD
v_observer	Initials of observer	e.g. es (Eeva Soininen)
v_species	Species	bet_nan, emp_nig, vac_myr, vac_uli, vac_vit, hup_sel, nar_str, phy_cae, sal_her
v_presence	Presence/absence of species within subplot	0 for absence, 1 for presence
v_comment	Comments	[character]

2.2 V_snowbed_shrub_abundance_intensive_coordinates.txt

This file contains the coordinates of all sites included in the study design. Coordinates are given in decimal degrees and UTM 33 (WGS 84).

Example of the first rows of coordinate files:

```
sn_site    e_dd    n_dd    e_utm33  n_utm33
1 if_ea_sn_1 27.35208 70.42404 959119.7 7860013
2 if_ea_sn_2 27.35316 70.42437 959151.9 7860058
3 if_ea_sn_3 27.35785 70.42369 959339.5 7860019
```

2.3 V_snowbed_shrub_abundance_intensive_aux.txt

This file contains further information about the dataset such as old site names (for example used in raw data files before 2019) and the years when sites were first included in the study design and when sites were excluded from the study design.

Example of the first rows of auxiliary files:

	sn_region	sn_locality	sn_section	sn_site	sn_site_old	year_first
1	varanger	ifjordfjellet	eastordalen	if_ea_sn_1	ia01	2009
2	varanger	ifjordfjellet	eastordalen	if_ea_sn_2	ia02	2009
3	varanger	ifjordfjellet	eastordalen	if_ea_sn_3	ia03	2009
	year_last	v_comment				
1	2016	NA				
2	2016	NA				
3	2016	NA				

* year_last is NA if the site is still included in the study design

3 Data cleaning and formatting

Rawdata from 2005 to 2018 has been cleaned and formatted according to the requirements of the COAT dataportal by Eeva Soinen and Hanna Boehner.

From 2019 onwards, rawdata is cleaned and formatted using the script

01_edit_raw_data_shrubs_in_snowbeds_COAT.R

The script checks that all entries are correct (e.g. site_id, species names), possible errors are corrected in the script and the cleaned data is saved as a txt-file.

In particular the script checks for:

- Correct spelling of all variables.
- **t_date:** Correct format (yyyy-mm-dd), dates in other formats are reformatted. NA is added for sites that were not visited.
- **v_observer:** Correct format (initials and lowercase letters), observer is reformatted e.g. if full names were used.
- **v_comment:** Correct spelling and format (lowercase letters and english). Comments are edited or translated if necessary.
- **v_presence:** Values are zero or one, NA is added for empty cells, other numbers are double-checked.
- The columns are renamed according to the requirements of the COAT dataportal.

All corrections that go beyond simple typing mistakes and lead to differences between rawdata and cleaned data are double-checked in the fieldbooks and a comment is added.