ReadMe - V_rodents_snaptrapping_individuals_intensive

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1 Protocol

Snap trapping of small rodents has been conducted using the small quadrat method following the COAT protocol 'protocol_snap_trapping_of_rodents'.

1.1 Timing of sampling and changes in that

The trapping is conducted over two trapnights (i.e. two checks) twice a year (spring and fall).

From 2005 to 2008 spring-trapping was conducted in late July (21.07.-28.07.) and fall-trapping in late August/early September (26.08.-08.09.).

From 2009 on, spring-trapping is conducted in early July (02.07.-04.07.) and fall-trapping in early September (02.09.-04.09.) with some exceptions. Trapping during the summer at Sandfjorddalen is usually done the three days preceding other trapping, due to logistic reasons.

Summer trapping in 2017 was done in mid-July 14.07.-16.07, due to late snowmelt.

1.2 Spatial layout of sampling and changes in that

From 2005 to 2008 the trapping was conducted at three watershed areas (Ifjordfjellet, Komagdalen and Vestre Jakobselv). Within these, three (Vestre Jakobselv and Komagdalen) or four (Ifjordfjellet) spatially separate sections were included in the design, either as sections of river valley/ separate river valleys. The sections were some kilometers from the nearest neighbouring section.

In each section, sampling quadrats are placed as pairs including a quadrat in each of the two habitat types: "thicket" (i.e. meadow and thicket mosaics in riparian habitats, the sampling quadrats being in the meadow habitat with one edge aligned with a thicket edge) and "heath" (i.e. dwarf shrub heath).
Between one and five quadrat pairs per section were included in the design.

From 2009 onwards, four sections (sections Gurrojohka and Suolojavri at Ifjordfjellet, section Jakobselv in Vestre Jakobselv and section Komagdalen_nedre in Komagdalen) were excluded from the design.

From 2013 onwards, three new sections were included in the design (sections Iesjohka and Giksjohka at Ifjordfjelle and section Sandfjorddalen in Komagdalen).

In 2017, three additional sites (ko_ko_m_new1, ko_sa_m_new1 and ko_sa_m_new2) were included in the study design because the regular sites were inaccessible due to late snowmelt.

In 2020, some of the heath sites were moved.

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

1.3 Changes in the sampling protocol

Species: Presence of shrews (*Sorex sp.*) and birds was recorded systematically from 2017 onwards (including 2017). Earlier records exist, but these are not complete.

Reproductive status of male rodents: The category 'post-scrotal' was added during the spring trapping season 2017.

Reproductive status of female rodents has not been collected consistently before 2017. Sometimes only lactiation status was registered and reproductive status was set to NA in such cases.

Lactation status of female rodents: Before 2017, no lactation status was recorded if a female was considered to be non-lactating.

Embryos: Number of embryos was registered systematically from 2017 (including 2017). Earlier records exist, but these are not complete.

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_rodents_snaptrapping_individuals_intensive_YEAR.txt

These files contain individual based snap trapping data, meaning that each row represents one trapped individual. The following species and species groups are included in the dataset:

```
[1] "Aves"
[2] "Cricetidae"
[3] "Lemmus lemmus (Norwegian lemming)"
[4] "Microtus oeconomus (Tundra vole)"
[5] "Myodes rufocanus (Grey-sided vole)"
[6] "Myodes rutilus (Northern-red-backed vole)"
[7] "Sorex araneus (Common shrew)"
[8] "Sorex caecutiens (Masked shrew)"
[9] "Sorex sp (Shrew)"
```

Example of the first rows of the data files:

```
  sn_region   sn_locality  sn_section    sn_site sn_plot
1  varanger ifjordfjellet eastordalen if_ea_hn_a       8
2  varanger ifjordfjellet eastordalen  if_ea_m_c       3
3  varanger ifjordfjellet eastordalen  if_ea_m_d       1
  sc_type_of_sites_ecological     t_date t_season t_session v_species
1                  heath_near 2005-08-30     fall         1   myo_ruf
2                      meadow 2005-08-30     fall         1    sor_sp
3                      meadow 2005-08-30     fall         1    sor_sp
  v_individual_id  v_sex v_reproductive_status v_lactation_status v_embryos
1            <NA> female              pregnant          lactating        NA
2            <NA>   <NA>                  <NA>               <NA>        NA
3            <NA>   <NA>                  <NA>               <NA>        NA
  v_weight_g v_samples v_observer v_comment
1         39      <NA>       <NA>      <NA>
2       <NA>      <NA>       <NA>      <NA>
3       <NA>      <NA>       <NA>      <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, gurrojohka, suolojavri, storelva, komagdalen_ovre, komagdalen_midtre, komagdalen_nedre, torvhaugdalen, bearalveaijohka, jakobselv, iesjohka, giksjohka, sandfjorddalen
sn_site	Unique Site ID	e.g. if_ea_hn_a, if_gu_hn_a, if_st_m_d, ko_km_m_b, ko_ko_hn_d, ko_kn_m_b, vj_to_m_d, vj_be_hn_e, vj_be_hn_c, if_ea_m_e
sn_plot	Plot (Corner of the quadrat, correspond to feces counting plots)	8 ,3 ,1 ,6
sc_type_of_sites_ecological	Habitat type	heath_near, meadow
t_date	Sampling date	YYYY-MM-DD
t_season	Sampling season	fall, spring
t_session	Trapping night	1, 2
v_species	Species (or larger taxa if species cannot be identified)	myo_ruf, sor_sp, mic_oec, lem_lem, cricetidae, myo_rut, aves, sor_ara, sor_cae

v_individual_id	ID of the individual (e.g. if a sample was taken)	[character]
v_sex	Sex of rodent species (not registered for shrews and birds)	female, male
v_reproductive_status	Reproductive satuts of rodents (not registered for shrews and birds)	pregnant, abdominal, closed, scrotal, open, postscrotal
v_lactation_status	Lactation status of female rodents	lactating, nonlactating, postlactating
v_embryos	Number of embryos of pregnant female rodents	[numeric]
v_weight_g	Weight of rodents (not registered for shrews and birds)	[numeric]
v_samples	Sample type (if a sample was taken)	stomach, isotope, faeces, jaw (or a combination of several sample types)
v_observer	Initials of observer	e.g. es (Eeva Soininen)
v_comment	Comments	[character]

2.2 V_rodents_snaptrapping_individuals_intensive_coordinates.txt

This file contains the coordinates of all sites included in the study desgin. 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_hn_a 27.36533 70.40762 959977.6 7858316
2  if_ea_m_a 27.36179 70.40552 959895.0 7858059
3 if_ea_hn_b 27.34243 70.42363 958774.6 7859895
```

2.3 V_rodents_snaptrapping_individuals_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_hn_a        ae1h       2005
2  varanger ifjordfjellet eastordalen if_ea_hn_b        ae2h       2005
3  varanger ifjordfjellet eastordalen if_ea_hn_c        ae3h       2005
  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 Soininen and Hanna Boehner.

From 2019 onwards, rawdata is cleaned and formatted in two steps.

1. Data cleaning: Rawdata (individual data and trapping dates) are entered in excel-templates and are quality checked using the script `01_check_raw_data_snap_trapping_intesive_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.
- **v_embryos** and **v_weight:** Outliers in number of embryos and weight.
- **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.

- Matching number of observations in the different columns.
- The columns are renamed according to the 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.

2. Data formatting: The script `02_produce_reformatted_snap_trapping_data_files_individual_plotbased_trapstatus_COAT.R` is used to produce the three datasets that are derived from snaptrapping data. The files will be formatted according to the requirements of the COAT data portal, will be saved as ;-separated txt-files and will be uploaded to the COAT data portal:

- `V_rodents_snaptrapping_individuals_intensive_YEAR.txt`
- `V_rodents_snaptrapping_abundance_intensive_YEAR.txt`
- `V_rodents_snaptrapping_trapstatus_intensive_YEAR.txt`