

Svalbard reindeer abundance and mortality

Motivation

COAT Svalbard ungulate module: Conduct annual census of the reindeer population in Adventdalen with side valleys to estimate the population abundance (sex and age distribution) and mortality.

State variables:

Svalbard reindeer abundance and demographic structure (summer)

Reference to method:

Aanes, R., B. E. Saether, E. J. Solberg, S. Aanes, O. Strand, and N. A. Oritsland. 2003. Synchrony in Svalbard reindeer population dynamics. *Canadian Journal of Zoology-Revue Canadienne De Zoologie* **81**:103-110.

Le Moulllec, M., A. O. Pedersen, N. G. Yoccoz, R. Aanes, J. Tufto, and B. B. Hansen. 2017. Ungulate population monitoring in an open tundra landscape: distance sampling versus total counts. *Wildlife Biology*.

Spatial study design

The study area for this reindeer census includes the main valley itself, adjacent mountain plateaus and side valleys (Fig. 1.). These side valleys and plateaus include: Bjørndalen, Platåfjellet, Longyeardalen, Lindholmhøgda, Gruvedalen, Endalen, Todalen, Bolterdalen, Breinosa, Foxdalen, Janssondalen, Janssonhaugen, Brendtskaret, Brendtskarhaugen, Arnicadalen, Helvetiadalen to Kreklingpasset, Koslådalen and Mälardalen. In the valley between Adventdalen and Eskerdalen, only the animals west of the line between Passhytta and Brentskardet are included in the census.

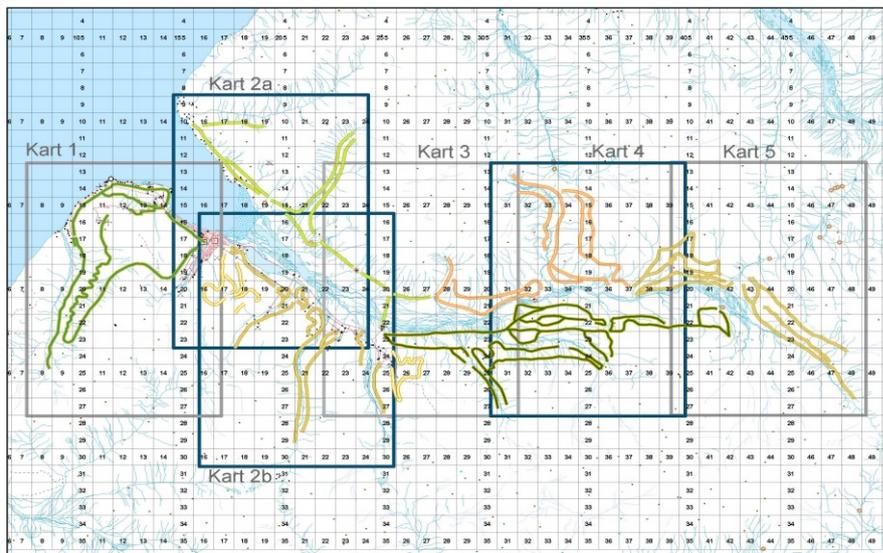


Figure 1. Map of the study area and the approximate routes that are walked.

Temporal study design

June/July every year.

Procedure

The data collection is done along approximate routes walked annually by 5-6 observers. Hand-held binoculars (10 x 42) is used for scanning all areas for reindeer.

Information recorded in the field on reindeer abundance:

Short	Explanation
C	Calf
FY	Female yearling
MY	Male yearling
UY	Unknown sex yearling
MA	Male adult
FA	Female adult
UA	Unknown adult
U	Unknown age/sex of individual

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- 1** Date
 - 2** Time start of the day – time end of the day
 - 3** General area or name of the route you walk
 - 4** Label each group/carcass from number 1 and upwards
 - 5** Group size and group composition (classes as above)
 - 6** NB! Location – mark observation down on field map. Label obs. with the running numbers in your field book for that observation.
 - 7** Observer
 - 8** Mark (collar, ear tag etc.)
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Aging of animals

NB! In doubt about age and sex write that and do not guess!!!!

NB! In doubt – take a photo and label it well and you can look at it afterwards!

NB! In Adventdalen animals will still have winter fur in Ny-Å over a period of a month they will change quite a lot in terms of fur and antler development!

CALVES	Calves are identified by their small body size, infantile behavior and that they are observed together with their mother. Calves are born mostly in the first half of June, but the early survey in Adventdalen can risk overlooking calves or calves not being born. Be aware of that!
YEARLINGS	<ol style="list-style-type: none"> 1. Yearlings (born last year) are identified by their small body size, and small antlers compared to adult animals. Their size is considerably larger than calves but still smaller than adults. 2. The yearlings are more curious of humans than older animals and often operate in groups of several yearlings. This age group contains animals of 12-14 months of age. 3. The width of the stomach and rear parts seen from behind are smaller than for older animals. Younger look. 4. Yearlings and 2 year olds are difficult to distinguish by body size. A large yearling might be as large as a small 2-year old and a small 2 year old might be mistaken as a yearling. To avoid increasing the yearling group with older animals, we classify animals that most likely are 2 years old, but due to small body size (not fully adult size) could be a large yearling into a class named: Yearlings/2 year olds. (see next page).
ADULT	<ol style="list-style-type: none"> 1. Animals older than (24 months) are classified as adults. The body size of adults are considerably larger than the three younger age group classes. 2. The males have large antlers. 3. Females are mostly distinguished by large body size (larger than yearling and 2-year olds).

Sex of animal

ADULT FEMALE	<ol style="list-style-type: none"> 1. The sex of a adult females is identified by the presence of calf. Look especially carefully in Adventdalen since we are early in the summer. 2. Female without calf by observing urine stain on the pelage (behind) (only on winter fur is this possible to see). 3. Shape of the head (more "upward" nose). 4. Antler type. 5. Up close you can wait till the animal pie.
ADULT MALE	<ol style="list-style-type: none"> 1. Large antlers in velvet is used as identification of adult males. 2. In some cases penis of the male is observed.
YEARLING	<ol style="list-style-type: none"> 1. Determination of sex was done by observing urine stain on the pelage (winter fur). 2. Urine in the bottom (behind) FEMALE or under the belly MALE. 3. Observe animal urinate to check where urine is coming from.

Information recorded in the field on reindeer mortality (number of carcasses):

Handling of carcasses

- Use gloves – be careful because of rabies (especially with newly dead animals in the mouth region and brain).
- Mark animal with pink yarn (year color for 2014) in a place where yarn do not fall off (eye, jaw, pelvis).
- Carcasses > 12 months old – do not spend time on them! Often green around them and bones are bleached.

Ageing of animals

- Tooth numbers and wear

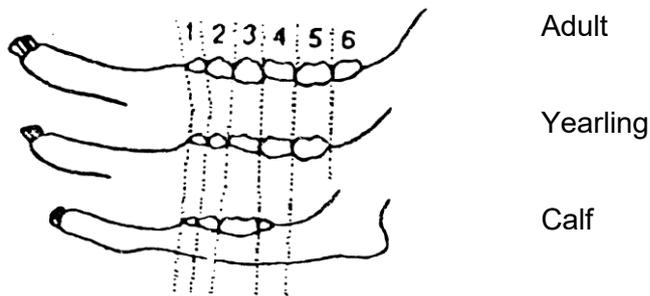


Fig. 1. Age of animal based on tooth development and wear.

Sex of animals

The sex is determined by:

1. Urine stain
2. Genitals
3. Size of antlers
4. Measure medial rim of the acetabulum
5. Diameter of the pedicles (where antlers are placed on head) MALE diameter > 4 cm; FEMALE diameter < 1.5 cm
6. U and V shaped pelvis (bekken)

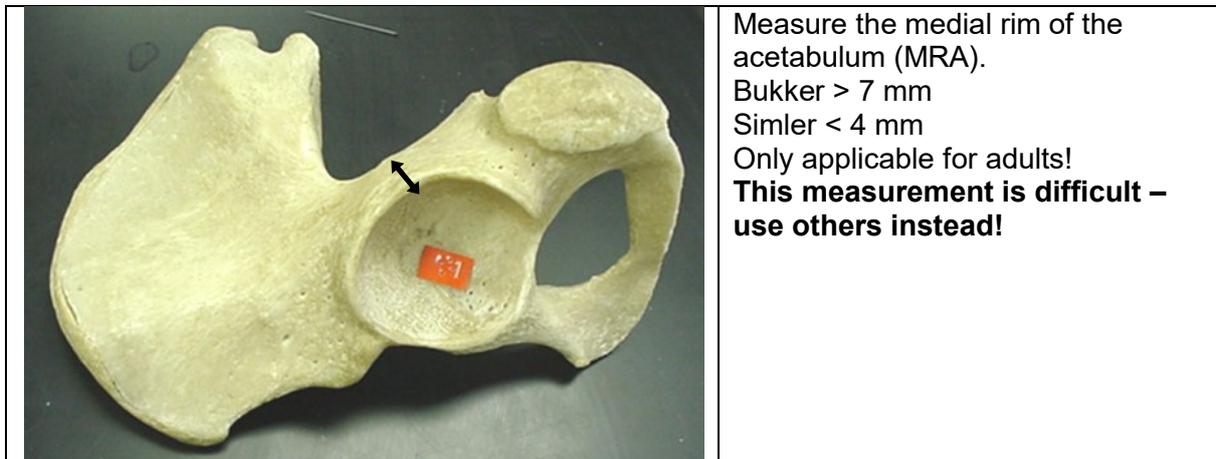


Fig 2. Determination of sex based on measuring the medial rim of the acetabulum. (The acetabulum is a concave surface of the pelvis. The head of the femur meets with the pelvis at the acetabulum, forming the hip joint).

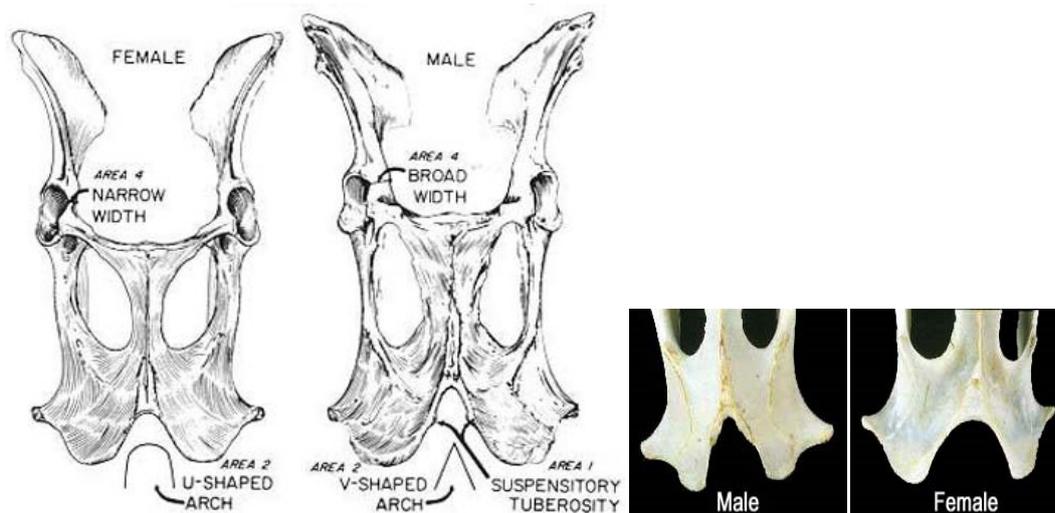


Fig. 3. U (female) and V-shaped (male) pelvis.

Data to record – carcasses

Fill in one field sheet for each animal. To be obtained on request.

Equipment needed

An equipment list is developed and can be obtained on request.

Sample processing after field work

Enter data in excel-files, store samples from dead animals.

Information recorded in the lab

Not relevant.

Data processing

Data are stored at NPI and transformed to the COAT Data Portal format.

References

Appendices

There is a route description available, but it needs to be revise before uploaded.
