



Can weight records as an indicator of body condition of reindeer be improved?

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Background

Adaptive management of grazing resources as well as optimum use of the available pastures require continuous adaptive regulation of animal stocking rates. For the yearly renewable green forage vegetation, inventories seem difficult to accomplish. Indirect monitoring of changes in grazing conditions might be possible via body condition of the animals. Body condition is repeatedly shown to be closely correlated with several life history traits, which determine the herd productivity, and strongly influenced by grazing conditions during the snow-free season.

Extensive monitoring calls for cost-effective monitoring procedures. The use of carcass statistics from commercial slaughter is an option although a selection of slaughter animals might occur. The routine statistics include type of animal (calf, adult female, adult male), carcass weight, EUROP class for conformation, and fat class).

Aim

To investigate possibilities to improve precision of carcass weight records of reindeer by additional recording of animal body size, sex of calf and more precisely determine age of adults (yearlings vs. older).

Material and methods

Sex, age class, reproductive status of adult females (calf or not last summer) and three body size measures (back, jaw and radius lengths) were recorded on 696 reindeer slaughtered in winter 2002/03 in commercial slaughterhouses. Origin of animals and carcass weights were obtained from routine recording at slaughter.

Data were analyzed with linear statistical models and model selection was based on Akaike's information criterion. Improvements of precision were derived from variances explained by different models (R^2 adj. for d.f.).



Results

Consideration of calf sex reduced standard deviation (SD) of calf carcass weight records with 36,2 %.

Discrimination between female yearlings and older females improved precision of adult carcass weight records by reducing SD with 15,5 %.

All body size measures were strongly correlated within animal type ($r = 0.78 - 0.88$). All body size measures gave almost similar results. Adjustment for a body measure reduced SD of weight records with 8 – 30 % (exemplified with adjustment for back in Table 1).

Consideration of reproductive status of females did not improve precision.

Table 1. Reduction of standard deviation for weight by adjustment for back length.

	N	Mean carcass weight (Kg)	SD before adjustment (Kg)	Remaining SD after adjustment (%)
Female Calf	103	20,46	2,70	71,9
Male Calf	312	22,70	2,77	70,5
Female Yearling	44	28,09	3,47	91,0
Male Yearling	77	30,65	2,99	78,7
Female Adult	159	33,63	3,65	89,4

Discussion

It is clearly important to discriminate between sexes when calf records are used as body condition indicators, since varying proportions of the sexes will easily cause a bias. Calf body size is closely correlated with calf carcass weight and seems therefore to be a body condition indicator in itself.

Adjusting calf carcass weights for body size would likely diminish its power as indicator of range conditions and relative stocking rate. Moreover, calf size is also a direct measure of grazing conditions during the same season as the carcass weight and therefore not confused by growth conditions during previous years, as adult body size is.

There are benefits of keeping separate records of yearlings vs. adults in this context, as well as adjusting carcass weights of adult animals for body size. Possible confusion of the indicator may come from a possible selection of inferior adult animals for slaughter.

Additional support is expected from combining adjusted carcass weights with carcass classifications in a multivariate setting.