Effects of habitat selection & supplementary feeding on moose body weight & reproduction

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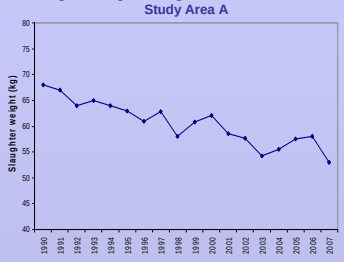
Aims:

1) To understand the effects of forage availability & habitat selection on moose body condition, reproductive rates & autumn slaughter weights
2) To determine how supplementary feeding in winter affects habitat selection & consequently body condition & reproduction

Rational:

1) Slaughter weights & reproductive rates have been declining over recent decades (Fig. 1).
2) Supplementary feeding in winter is an increasingly common management tool, e.g. to reduce traffic accidents & forest damage, but the ecological consequences for moose are unknown.

Fig. 1. Slaughter weights of moose calves in Study Area A



Methods:

1) Capture & weigh 15-20 adult female moose + calves in early winter each year. Fit cows with GPS collars. Study area A: 2007, 2008; study area B: 2009, 2010.
2) Re-capture & re-weigh individuals at end of winter.
3) Check calving status of collared cows in June.
4) Cull marked individuals in autumn & weigh, age & collect jaw bones & ovaries. Recover GPS collars.
5) Plot & analyse GPS data to determine habitat selection & use of supplementary feeding stations.

Fig. 2. Live weights of moose in Study Area A

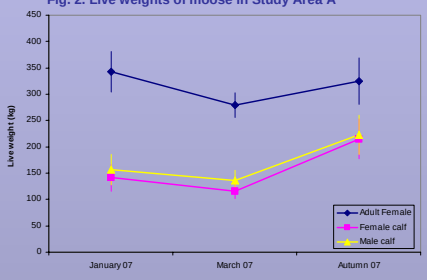


Fig. 3. Live weights of moose in relation to calving in Study Area A

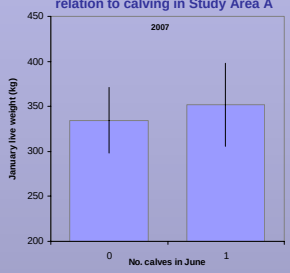


Fig. 4a. Selection by adult female moose of forest stand age in relation to daylight & season.

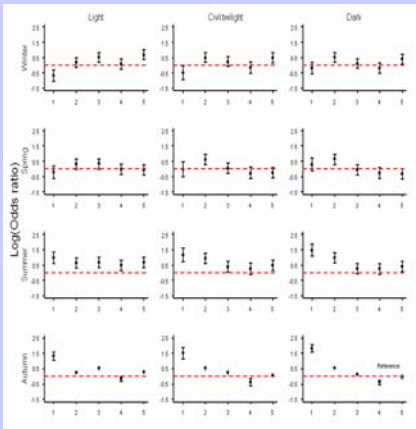
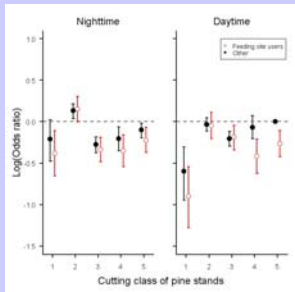


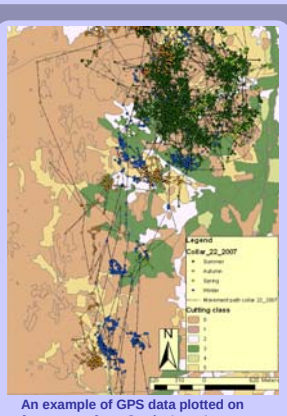
Fig. 4b. Differences in winter selection of pine stands in relation to daylight and use of feeding stations.



Points above the lines are preferred relative to the reference point (Fig. 4a cutting class 5 in autumn & Fig. 4b cutting class 5 for non-users) while points below the line are avoided.

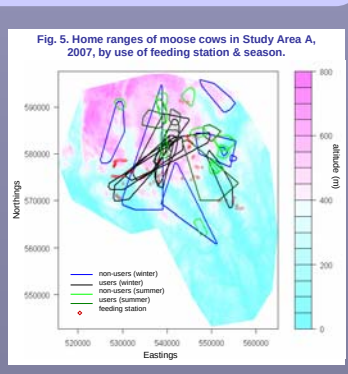
Preliminary Results:

1) Moose cows lost more weight over winter than calves (Fig. 2) but winter weight change was similar in individuals using & not-using feeding stations.
2) Low calving rates: 55% (pregnancy rate 85% in Jan), but no difference between feeding station users and non-users. Cows with calves tended to be heavier than those without in 2007 (Fig. 3).
3) Habitat selection differed between seasons with avoidance of young stands in winter (cutting class 1) but positive selection in summer and autumn (Fig. 4a). Interestingly, supplementary feeding did not alter selection for vulnerable young pine stands in winter but use of mature pine stands did differ between feeding station users & non-users (Fig. 4b).
4) Home range size during winter did not differ between feeding site users and non-users (95% MCP: $P = 0.151$ & 95% Kernel: $P = 0.189$).
5) Individual variation in home range size was greater than any effect of using feeding stations (Fig. 5) and was dependent on whether an individual migrated between summer and winter ranges or not.



An example of GPS data plotted on forest map from Study Area A

Fig. 5. Home ranges of moose cows in Study Area A, 2007, by use of feeding station & season.



Discussion:

1) Only results from 1st of 4 years are currently available so sample size is small but high individual variation is already observed.
2) Supplementary feeding started recently in study area A compared with study area B so we don't expect such strong effects of feeding on moose in this area
3) Full analysis of ecological fitness in relation to habitat use & use of supplementary forage will be carried out in 2011..... **Look out for our results!**

Project Partners

Stor-Elvdal Grunneierforening

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Further details: http://english.hihm.no/forestwildlife/Research/mooseforage.htm • **Contact:** jos.milner@hihm.no