Master thesis suggestion:

Competition or facilitation? Effects of excluding moose browsing on browsing by hare and small rodents

Supervisors: Karen Marie Mathisen, Simen Pedersen, Kaja Johnsen, Institute for forest and wildlife management, Campus Evenstad, Inland Norway University of Applied Sciences

In cooperation with the project SustHerb at NTNU: https://www.ntnu.edu/museum/sustherb

Fieldwork: Late April/Early May in southern Hedmark/Akershus, car or driving license necessary

Abstract: Large herbivores can modify resource use and habitat structure for smaller herbivores living in the same ecosystem. Browsing by moose (*Alces alces*) may reduce the growth of trees, and biomass production, depending on the intensity of browsing, and the resources available for plants. Browsing may also induce compensatory growth responses in woody plants, producing large palatable shoots, with high nutrient content and low content of plant secondary compounds. This may affect other herbivores competing for the same food resources, such as mountain hare (*Lepus timidus*). Also small rodents (especially field voles *(Microtus agrestis)*, and bank voles *(Clethrionomys glareolus*)) may forage on the bark of saplings. In Fennoscandia, we have a high density of deer species, with moose as the largest cervid. At the same time the populations of cervids have increased, the hare population has experienced a decrease. One of the mechanisms suggested behind this decrease, is the competition with cervids. Potentially moose may decrease the availability of forage for hares, but also increase the palatability of winter forage, through plant growth responses. The task for this master thesis is to investigate the effects of exclosures, excluding moose browsing, on forage availability and browse utilization by hare in winter. We also want to evaluate small rodent activity and browsing, in relation to moose browsing.

Effects of moose exclusion on flowering and activity of flower-visiting insects

Supervisor: Karen Marie Mathisen, Institute for forest and wildlife management, Campus Evenstad, Inland Norway University of Applied Sciences

In cooperation with the project SustHerb at NTNU: https://www.ntnu.edu/museum/sustherb

Fieldwork: Summer in southern Hedmark/Akershus, car or driving license necessary

Abstract: Large herbivores can modify resource use and habitat structure for smaller herbivores living in the same ecosystem. Moose (*Alces alces*) browsing, trampling and defecation can effect vegetation composition and nutrient cycling, and structure of the habitat and microclimate. Moose browsing may open up the canopy, and lead to increased light availability and wind. This may in turn affect flowering in the field layer vegetation, and flower visiting insects. We have access to 16 moose exclosures of 20 x 20 m south in Hedmark/north in Akershus. Field layer vegetation has been surveyed here for several years, for abundance and diversity of species. This master thesis will investigate the effects of excluding moose browsing on flowering in the field layer, and the resources available for pollinating insects. In addition, they will survey activity of pollinating insects, to investigate effects of moose on pollination, and important ecosystem process. Knowledge of plant

and pollinating insect species would be an advantage. It would be optimal to follow flowering in June, July and august, hence two students could share this topic, as there is extensive fieldwork, or focus on the peak of flowering in July.