



Anna Skarin

Biography

Anna Skarin successfully defended her Ph-D thesis in Animal Science on 6th October 2006 at the Reindeer Husbandry Unit, Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden. The title was: Reindeer use of alpine summer habitats. Associate Professor Anne Loison, Universite Lyon 1, France was the opponent and the evaluation committee consisted of Professor Eigil Reimers, University of Oslo, Norway, Associate Professor Tomas Willebrand, SLU, Umeå, Associate Professor Birgitta Åhman, SLU, Uppsala, Sweden, FD Annika Hofgaard, NINA, Trondheim, Norway, and FD Jan-Olof Helldin, SLU, Grimsö, Sweden. Supervisors have been Professor Öje Danell, SLU, Uppsala, together with Professor Roger Bergström, Skogforsk, Uppsala and Jon Moen Associate Professor, Umeå University, Umeå.

Anna Skarin (b. 1972), M.Sc. in biology from Uppsala University, became involved in reindeer research in 2000 during her M.Sc. studies dealing with the reindeer habitat use at Långfjället in Idre new reindeer herding district in the county of Dalarna, Sweden. The aim of that study was to evaluate how the reindeer were affected in their choice of habitat from natural factors such as topography, vegetation types, and also from human activities. The work was financed through the Mountain Mistra programme. However, the results from the M.Sc. study were only indicative and a larger study was considered necessary. Thus, the reindeer habitat use was evaluated in three additional areas; one in Handölsdalens reindeer herding district in the county of Jämtland and two in Sirges reindeer herding district in Norrbotten county. This was possible due to further research fund from the Mountain Mistra programme and the Sami fund. The reindeer habitat use was investigated with pellet-group counts and GPS-collars on 48 reindeer during two summer seasons, both methods not earlier used in such a large extent on reindeer.

Thesis

Skarin, A. 2006. Reindeer use of alpine summer habitats. Doctoral thesis, Faculty of Veterinary medicine and Animal Science. – *Acta Universitatis Agriculturae Sueciae* 2006:73. Uppsala. ISSN 1652-6880. ISBN 91-576-7122-2.

The thesis was based on the following five papers:

- I. Skarin, A., Danell, Ö., Bergström, R. & Moen, J. 2004. Insect avoidance may override human disturbances in reindeer habitat selection. – *Rangifer* 24: 95-103.
- II. Skarin, A., Danell, Ö., Bergström, R. & Moen, J. 2006. Summer habitat preferences of GPS-collared reindeer (*Rangifer tarandus tarandus*). – *Wildlife Biology*. In press.
- III. Skarin, A. Habitat use of semi-domesticated reindeer estimated with pellet-group counts. Manuscript.
- IV. Skarin, A., Danell, Ö., Bergström, R. & Moen, J. Reindeer movements in alpine summer ranges. Manuscript.

Abstract: Alpine areas in the Scandinavian mountain region are used for grazing by semi-domesticated reindeer (*Rangifer tarandus tarandus*) during the snow-free season. These areas are also used for outdoor recreation and tourism. In summer the reindeer seek nutritive forage and relief from insect harassment during warm weather. Their habitat selection is also expected to be affected by human occurrence in the ranges. Knowledge of reindeer habitat use is needed in management, both within reindeer husbandry and society as a whole.

This thesis presents research on habitat selection by reindeer at the landscape level within three temporal scales (whole summer, four summer periods, and daily cycles). The study was conducted in four study areas (210 to 4000 km² each) within three reindeer herding districts in Sweden: Idre Nya Sameby (62°00'N), Handölsdalen (63°00'N) and Sirges (67°00'N). The study areas differed in topography, relative abundance of vegetation types, and occurrence of back-country hikers. The reindeer habitat use was surveyed with pellet-group counts and with 48 adult female reindeer equipped with GPS collars. Reindeer preferences for different habitat attributes and reactions to hiking trails were analysed by fitting resource utilisation functions and by analyses of reindeer movements.

The reindeer showed a general preference for high altitudes at all temporal scales. Selection for highquality vegetation types was shown, in the reindeer home ranges within the periods, with preference for meadows, grass heath, and heath. The reindeer seemed limited in their forage intake by insect harassment. Effects of hiking trails were small, but the reindeer movement rates increased close to hiking

trails in areas with low frequency of hikers. In areas with a higher number of tourist-reindeer encounters the reindeer seemed to have habituated to the hikers. When insect relief areas coincided with high abundance of hikers, the reindeer seemed to accept human disturbance in order to get insect relief. Predictions of habitat selection evaluated by cross-validation of estimated resource utilisation functions

showed fairly low predictive capacities with the high resolution of habitat attribute data. For management purposes the results are suggested to be converted to a value point system for range compartments.

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