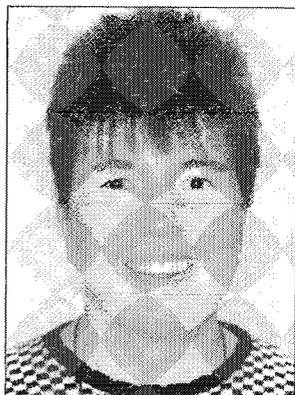


## Dissertation

Eva Wiklund successfully defended her PhD-thesis in Agriculture: "Pre-slaughter handling of reindeer (*Rangifer tarandus tarandus* L.) – effects on meat quality" at the Swedish University of Agricultural Sciences, Uppsala, Sweden, on December 20, 1996.



Eva Wiklund was born in 1962 in Stockholm and was educated at the Swedish University of Agricultural Sciences where she joined the Department of Food Science/Division of Meat Science in 1991. She has studied pre-slaughter handling procedures for reindeer and these effects on technological and sensory meat quality. The effects on blood metabolites, muscular and abomasal lesions, all used as stress markers, have also been included in her studies. The results of her research is of great importance for reindeer herders as well as for the reindeer slaughterer.

The thesis is based on five papers:

- I. Wiklund, E., Andersson, A., Malmfors, G., Lundström, K. & Danell, Ö. 1995. Ultimate pH values in reindeer meat with particular regard to animal sex and age, muscle and transport distance. *Rangifer*, 15, 47–54.
- II. Wiklund, E., Andersson, A., Malmfors, G. & Lundström, K. 1996. Muscle glycogen levels and blood metabolites in reindeer (*Rangifer tarandus tarandus* L.) after transport and lairage. *Meat Science*, 42, 133–144.
- III. Wiklund, E., Malmfors, G., Lundström, K. & Reh binder, C. 1996. Pre-slaughter handling of reindeer bulls (*Rangifer tarandus tarandus* L.) – effects on technological and sensory meat quality, blood metabolites and muscular and abomasal lesions. *Rangifer*, 16, 109–117.
- IV. Wiklund, E., Malmfors, G. & Lundström, K. 1997. The effects of pre-slaughter selection of reindeer bulls (*Rangifer tarandus tarandus* L.) on technological and sensory meat quality, blood metabolites and abomasal lesions. *Rangifer*, 17, 65–72.
- V. Wiklund, E., Barnier, V. H. M., Smulders, F. J. M., Lundström, K. & Malmfors, G. Proteolysis and tenderisation in reindeer (*Rangifer tarandus tarandus* L.) bull longissimus muscle of various ultimate pH. *Meat Science*, (accepted).

*Abstract:* This thesis describes pre-slaughter handling procedures for reindeer and discusses these effects on technological and sensory meat quality. The effects on blood metabolites, muscular and abomasal lesions, all used as stress markers, are also investigated.

Reindeer shot undisturbed in the mountains and reindeer given supplementary feed for 2–5 months had muscle glycogen values comparable to those found in cattle (300–500 mmol/kg dry weight). Helicopter herding of reindeer for 1, 2 or 3 days (20 km per day) was not found to be detrimental to muscle glycogen content, ultimate pH values, or blood metabolites indicating stress, or the frequency of abomasal lesions.

The traditional selection technique of using a lasso was found to be the most glycogen-depleting and stressful event so far studied. High ultimate pH values and low glycogen content were registered in the meat from lasso-selected reindeer. The frequency of abomasal lesions was also highest in groups of lasso-selected reindeer. By contrast, the selection method where the reindeer were captured and sorted out by hand was not found detrimental to ultimate pH values or glycogen content.

Neither road transport of reindeer, by lorry for distances up to 1000 km, nor 2 days' of pre-slaughter lairage with access to hay and water impaired muscle glycogen content or ultimate pH in the meat.

The physical condition and nutritional status of the animals had a considerable effect on their ability to tolerate various stress factors, such as the above-mentioned pre-slaughter handling procedures.

Reindeer meat (*M. longissimus*) was found to be extremely tender, regardless of ultimate pH. A 'stress-flavour' was found in reindeer meat after intensive pre-slaughter handling of the animals, and a 'liver-flavour' was found in reindeer meat with low ultimate pH.