

weight (summer and early winter), autumn growth rate and the proportion of male calves in the population, so did increasing population density. Finally, increasing population density amplified the negative effect of climate. Consistently, the negative effect of climate and density was mainly attributed to nutritional stress experienced by the calves (*e.g.* foetal development, neonatal growth) or their mother (*e.g.* summer condition before rut, winter condition during pregnancy, post-calving grazing conditions). The results support the following views: (i) patterns in life history traits and population parameters of ungulates vary over space and time, (ii) extrinsic climatic fluctuations and density, as well as their interaction, are important causative factors for the reported variations, their effects being mediated through nutritional stress, (iii) although uncer-

tain, global climate change will have considerable ecological implications, including effect on reindeer population dynamics. For example, reduced body size of reindeer may result from the reported warming trend of the globe, especially in areas where winters will be severe, and this may have consequence on reproductive performance and hence their population dynamics. Through its effect on life history parameters, it is concluded that climate affects population dynamics of reindeer. The implications of the findings for reindeer management are also discussed.

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**Stéphanie C. Lefrère**, born on July 10th 1972 in France, had a background in ethology and anthropology and had studied moose and wolves in the taiga of Finnish Carelia before she started on her inter-disciplinary PhD study in reindeer behaviour and ethnozoology in 1999 with title: “Seasonal variations of diurnal activities and social interactions of semi-domesticated reindeer *Rangifer tarandus tarandus* in Finnish Lapland. Traditional and modern methods of reindeer husbandry”.

Her PhD work was a cooperation between the animal and human Ethology department of René Descartes University (Paris V/ France) and the Reindeer Research Station (FGFRI) in Kaamanen, Finland. She passed her PhD successfully at Sorbonne in Paris, June 30th 2003. The supervisors have been Professor Jacques Goldberg, director of the animal and human Ethology department of René Descartes University and Dr Mauri Nieminen, director of the Reindeer Research Station (FGFRI). The dissertation was evaluated by the following jury: chairman Pr Pierre Parlebas, sociologist, previous Dean of René Descartes university; Pr Jacques Goldberg, PhD director, biologist, René Descartes University; Pr Raymond Pujol, ethnobiologist at National Museum of Natural History; Pr Franklin Rauski, psychologist at Strasbourg University; Dr Jean-Jacques Lauvergne, genetician, ex-director of animal genetic department at INRA; Dr Mauri Nieminen, PhD supervisor, biologist.

The PhD thesis is a monograph of 297 pages. Its different parts will later be published in the form of articles. The study analysed the activities and social interactions of reindeer through seasons under natural pasture conditions and in experimental condition



in corral. Reindeer were studied from birth to weaning analyzing the mother-calf bond until their separation and consequences on suckling behaviour and milk yield. From summer to the beginning of winter, females' activities and their food selection were studied on pasture. During the rut, the changes in males' behaviour associated to their level of testosterone were investigated. In wintertime, the development of the hierarchy and changes in females' activities related to their cardiac rhythm was completed. The last part of the thesis compares the traditional and modern methods of reindeer management, with the different utilization of reindeer, and it emphasizes how humans have succeeded in controlling partial domestication by adaptation of the reindeer in its environment.

Lefrère's PhD scholarship was granted by CIMO (Centre for international mobility - Finnish Government) for three years.