

The effects of variation in fertility on mink (*Neovison vison*) population size

Róbert A. Stefánsson^{AB}, Menja von Schmalensee^{AB} and Páll Hersteinsson^A

A. Faculty of Life and Environmental Sciences, University of Iceland, Sturlugötu 7, 107 Reykjavík, Iceland
B. West-Iceland Centre of Natural History, Hafnargötu 3, 340 Stykkishólmur, Iceland



Mink and mink hunting in Iceland

Mink was introduced to Iceland in 1931. It soon escaped from captivity and had spread throughout all lowland areas by 1975¹. Hunting statistics (Fig. 1) indicate that mink population size kept on increasing with minor downtrends every 5-10 years. Since 2003 the population size seems to have been decreasing rapidly.

Why look at fertility?

Two factors control population growth rate: recruitment and survival. Can variation in population growth rate of the Icelandic mink population be explained by variation in fertility?

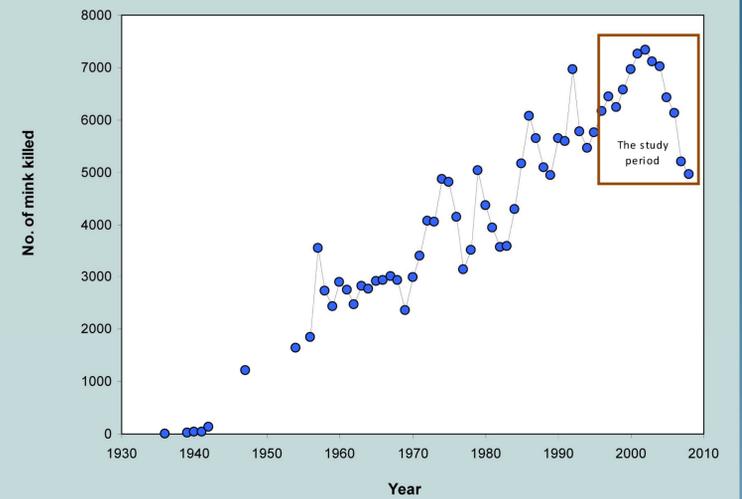


Fig. 1. The number of mink killed annually in Iceland from 1937-2009. Samples for this study were obtained from 1996-2009.

Results

Mink litter size peaked in 1999, four years prior to peak population size, but has decreased since then (Fig. 2). Average fertility explained 33% of the variation in population growth rate (r) between years. If the two years (2005 and 2007) with the far lowest population growth rate were excluded from the analysis, fertility explained 71% of the variation in r (Fig. 3). Our data indicate that for mink the equilibrium mean litter size *in utero* is 6.7 cubs in Iceland given the rate of mortality experienced in recent years.²

Conclusion

It seems that changes in mink population size from 1996-2009 can largely be explained by variation in fertility, although additional factors, most importantly winter mortality, seem to be more important in some years (e.g. 2005 and 2007). The reasons for poor fertility in the last few years are unknown. This subject is currently being addressed in a study on changes in mink diet in the last decade (Rannveig Magnúsdóttir, unpubl.).

Litter size and population size

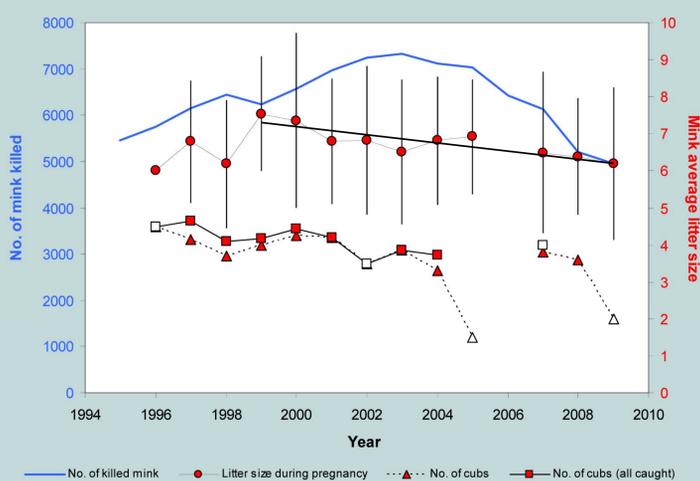
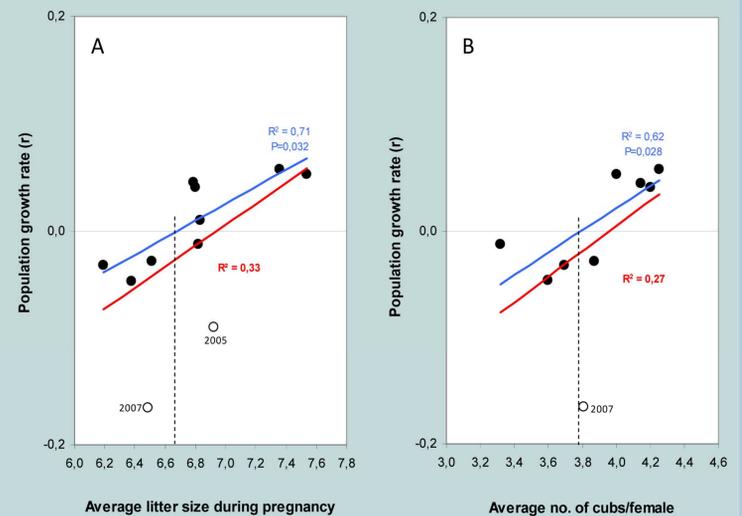


Fig. 2 (left): The total number of mink killed annually from 1995-2009 (blue line), mean litter size during pregnancy (dots), the average number of cubs per female (triangles) and the average number of cubs per female when the hunter estimates that he has caught all cubs (squares). Squares and triangles with $n < 5$ are open. Vertical lines show S.D.

Fig. 3 (right): The relation between the litter size and population growth rate (r). Litter size affects population growth rate, with the exception of the years with the greatest negative population growth rate (2005 and 2007). Regression analysis utilised data for fertility of individual mink but only annual means are shown. R^2 and trendlines with (red) and without (blue) 2005 and 2007.



Methods

In the period 1996-2009, a sample of 3,554 mink carcasses received from mink hunters was investigated in an effort to elucidate the demographic basis for population changes. The data obtained include information on fertility (foetal and placental scar counts). The number of mink killed annually was used as an index of population size (N_t), assuming constant hunting effort between years. Population growth rate was calculated according to the formula

$$r = \ln(N_{t+1}/N_t)$$

References

- 1) Karl Skirnisson & Ævar Petersen 1980. Minkur. In: Villt spendýr (ed. Árni Einarsson). Rit Landverndar 7, 80-94.
- 2) Páll Hersteinsson & Róbert A. Stefánsson 2010. Minkaveiðiátak í Eyjafirði og á Snæfellsnesi 2007-2009. Öbirt frumskýrsla um árangur verkefnisins. Skýrsla unnin fyrir umsjónarnefnd tilraunaverkefnis um svæðisbundna útrýmingu minks.

