

The distributional history and present status of the American mink (*Mustela vison* Schreber, 1777) in Norway

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The American mink *Mustela vison* is widely distributed in several European countries, mainly as a result of the escape of animals from mink farms. In 1985, an analysis of Norwegian mink farming history (Bevanger & Ålbu 1986a) revealed an excellent correlation between the development of mink farming and the dispersal of feral mink populations in the wild. Up to 1950, mink mainly existed as rather isolated populations in areas where there had been or still were mink farms, but they colonized most of the country in the 1950's and 1960's. Based on questionnaires and other sources of information, the 1985 investigation concluded that only some islands off the coast of central and northern Norway, together with the greater part of Finnmark, were mink-free. In 1993, a questionnaire was sent to every local authority in Troms and Finnmark asking whether mink had been observed. All 25 authorities in Troms and 18 of the 19 in Finnmark confirmed that there were mink populations in their area. The only one reporting no mink populations was Hasvik, which is completely devoid of mainland territory. It is concluded that the Norwegian mainland has now been fully colonized and that only some island areas are mink-free.

1. Introduction

The anthropogenic introduction of exotic species is a classical subject of concern to ecologists (e.g. Lodge 1993). Several mammalian species have been taken from Europe to, for instance, Australia and New Zealand resulting in "pest"

outbreaks, the rabbit plague perhaps being best known (e.g. CSIRO 1959). The American mink *Mustela vison* is probably the most noted mammalian species introduced to Europe from other continents. The mink was brought to several European countries for commercial purposes during the first half of this century, although it was

also deliberately introduced into some areas, e.g. Russia (Aliev & Sanderson 1970, Danilov et al. 1973), to increase the number of species that could be trapped. The first mink farm was established in Norway in 1927 (Øvrebø 1951) and within about 30 years escaped animals had established wild populations in vast areas of the country.

The aims of this paper are to sum up existing knowledge of how the feral American mink managed to colonize Norway and to describe the present distribution. The factors that are thought to have been instrumental in steering the distribution and causing the obviously successful dispersal are also examined.

2. Material and methods

Available literature was examined to reconstruct how the species has spread, two earlier reviews (Wildhagen 1956, Bevanger & Ålbu 1986a) being particularly useful. An update of the present situation was made through a questionnaire sent to the local wildlife boards in the counties north of the area known to have vital mink populations, i.e. Troms and Finnmark. The questionnaire asked whether mink had been observed in the district concerned and whether they were thought to be reproducing and to be an ever-present species in the local fauna.

3. Results

Although few data are available from the early phase of mink farming, quite detailed descriptions exist from southwestern Norway about how the first feral mink populations seem to have been established there in the early 1930's after a couple of escapes from fur farms in 1930 (Hantho 1946, Hagen 1966). Augmented by others later, these escapes seem to have formed the basis for a dense mink population in most of the county of Hordaland by the end of World War II.

Some populations were also established in eastern Norway in the early 1930's (Anon. 1938), and in the early 1940's the species had become established in most of the southeastern counties (Fredrichsen 1941, Wildhagen 1949, Vedum 1985, Bevanger & Ålbu 1986a). By about 1950, it had also reached central Norway as far as about 65°N (Bevanger & Ålbu 1986a), and there

were local populations in northern Norway in the counties of Nordland and Troms (Fig. 1A).

During the postwar period, up to about 1965, the mink increased its distribution considerably and most of the country became colonized within a 20-year period. The spread did not pass unnoticed and was particularly well documented through reports sent by local wildlife boards to the Directorate for Nature Management as well as through hunting and bounty statistics (Bevanger & Ålbu 1986a). The distribution in 1960 and 1970 is shown in Fig. 1B and 1C, respectively.

The only large area remaining uncolonized about 1970 was northern Troms and Finnmark. However, a questionnaire sent to the local wildlife boards in 1985 (Bevanger & Ålbu 1986a) revealed that there were still some small mink-free areas in the south of the country, mainly islands or groups of islands and islets on the outermost coast.

The questionnaire sent to the local authorities in Troms and Finnmark in 1993 revealed that all 25 authorities in Troms and 18 of the 19 in Finnmark had a mink population. The only one reporting no mink was Hasvik, which is completely devoid of mainland territory. The present distribution of the feral American mink in Norway is given in Fig. 2D which shows that the whole mainland has been colonized, but some island areas are still mink-free.

The replies to the 1985 questionnaire (Bevanger & Ålbu 1986a) also indicated that there had been a population growth in western and northern Norway during the 1970's and 1980's, whereas a decline was observed in inland districts of southern Norway (Bevanger & Ålbu 1986b).

4. Discussion

The feral American mink managed to colonize the greater part (i.e. about 80–85%) of the Norwegian mainland within a 35 year period, which parallels the observations made in Sweden (Gerell 1967), Finland (Westman 1966) and Iceland (Skirnisson & Petersen 1980). There were obvious relationships between the spread of mink and mink farming. At first, the distribution was

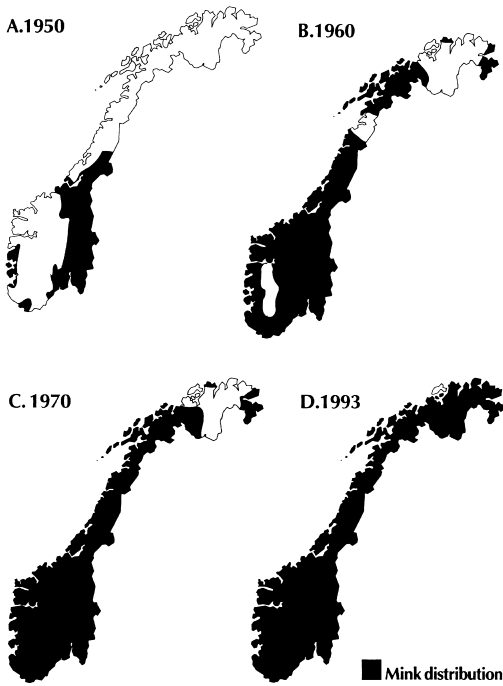


Fig. 1. The distribution of mink in Norway about 1950(A), 1960(B), 1970(C) and 1993(D).

determined by historical factors, particularly the location of mink farms. Until about 1950, when there were still few mink farms, feral mink were mainly found as isolated populations restricted to farming areas. However, the huge expansion in the industry throughout the 1950's and 1960's resulted in rapid dispersal from numerous centres and colonization of the country (Bevanger & Ålbu 1986a).

The population, which shows a sigmoidal growth curve when variations in bounties paid (CBS 1978) are used to reflect population changes, seems to culminate about 1967 (Bevanger & Ålbu 1986a) (Fig. 2). This may indicate that the mink population in southern and central Norway reached the level of carrying capacity at this time. Estimated yield of mink shooting (CBS 1978, 1982, 1987, 1993), however, indicates a population growth even into the 1980's. The questionnaire answers received in 1985 described a stabilization in most of the southern and central parts of the country, par-

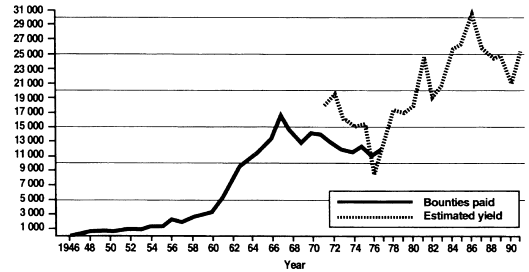


Fig. 2. Variations in bounties paid and estimated mink shooting yield in Norway from 1946 to 1991.

ticularly in inland districts. A significant population decrease in some southern areas may be related to inland areas being strongly affected by acidification and a decrease in freshwater fish, which form an important food item for mink (Bevanger & Ålbu 1986b).

The last area to be colonized in southern Norway was the central fjord district in the west. The delayed colonization of mink there is probably due to topographical barriers. The fjords with their restricted areas of shallow water and frequently steep-sided character may have obstructed rapid, efficient dispersal even for a species with a preference for aquatic habitats (cf. Bevanger 1993). Dispersal inland along water-courses and coastwise in typical skerry areas offered insignificant challenges. As a rule of thumb, a 5 km broad body of open water seems to create an efficient barrier for the mink. However, local currents may make a 1–2 km broad strait into an obstruction (Bevanger & Ålbu 1986a).

As the 1985 questionnaire revealed, northern Troms and Finnmark were then mink-free areas and it was speculated that the environment in Finnmark was unsuitable and too harsh for the species (Bevanger & Ålbu 1986a). However, during the years that followed a steady increase in the number of mink observations arrived at the county wildlife office in Finnmark. When the 1993 questionnaire revealed that all the mainland local authorities believed they had permanent mink populations, the 1985 situation has to be interpreted as due to historical factors. There have never been many mink farms in the county. Thus, the colonization process has depended upon dispersal from south and east, which may explain the delayed colonization.

The success of the feral American mink in Norway is due to several factors. The species has obviously occupied an unexploited food niche with few competitors. As mink have a high reproduction capability and are opportunistic foragers, it was possible for the population to increase rapidly. Moreover, since the mink farming industry in Norway started nearly 60 years ago, at least 6 or 7 subspecies have been used as progenitors (Bevanger & Ålbu 1986a), implying that the wild populations maintain a high degree of genetic variability and thus possess a correspondingly high level of fitness. Moreover, coastal areas of Norway seem to offer an optimal habitat for the mink, particularly flat or undulating skerries with luxuriant vegetation. A variety of food items, especially fish and various small crustaceans are to be found in the tidal zone throughout the year since sea ice in winter is generally restricted to inner stretches of the fjords.

To sum up, from what seems to have been the first feral American mink escape in 1930 it took about 35 years before the greater part (i.e. about 80–85 %) of the Norwegian mainland was colonized. However, the colonization process was closely connected to growth in the mink farming industry. This seems to be particularly well demonstrated through the fact that it took almost another 20 years to colonize the rest of the country, i.e. northern Troms and Finnmark, a colonization which has obviously taken place as a more traditional dispersal not aided by regular contributions from mink farms.

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