Pattern of European Mink *Mustela lutreola* Decline in the North Western France

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Abstract : The western population of European mink *Mustela lutreola* has shown a large decline over 50% of its previous natural range. The European mink *Mustela lutreola* declined from north-western France between 1984 and 1997. The pattern of decline exhibited a division into undersized areas restricting the minks into very small subpopulations. Even though feral American mink *M. vison* may compete with autochthonous carnivores, *M. lutreola* had disappeared from brooks some years before the introduction of the American species, revealing that such competitive interactions were not the major cause for the decline. Moreover, American mink has never been discovered or has remained rare in 62% of the area from which *M. lutreola* was extinct. Although there are many difficulties in ascribing unambiguous cause to such a dramatic change, this decline can be regarded as a result of anthropic pressures on natural habitats.

INTRODUCTION

Considered as one of the most endangered mammal species in the world (Schreiber et al. 1989), the European mink, *Mustela lutreola* L. 1761 suffered a serious decline all over Europe (Youngman 1982).The European mink western population was first evidenced in France, from animals found in the Poitou since 1820 (Didier & Rode 1935). From this date, observations remain rare but suggested that the European mink's western population was restricted in western and southwestern France, from Brittany to the Basque country until 1984 (Bree & Saint-Girons 1966, Youngman 1982, Saint-Girons 1991). Some individuals were mentioned for the first time in northern Spain in 1951 (Ondarra 1955) revealing an expansion of the western population range to the south of Pyrénées. Then the western population has suffered a large decline, the species disappearing from the northern half of its range (Maizeret et al. 1998). In Brittany, the last known minks were found in 1992 and in 1997 in Vendée (Lodé 1999). Currently, the western mink population only occupied south-western France (Maizeret et al. 1998) and some areas of northern Spain in the Ebro valley (Ruiz-Olmo & Palazon 1996). This paper aims to analyze the pattern of the western mink population decline relating changes in distribution to the feral American mink introduction.

RESULTS

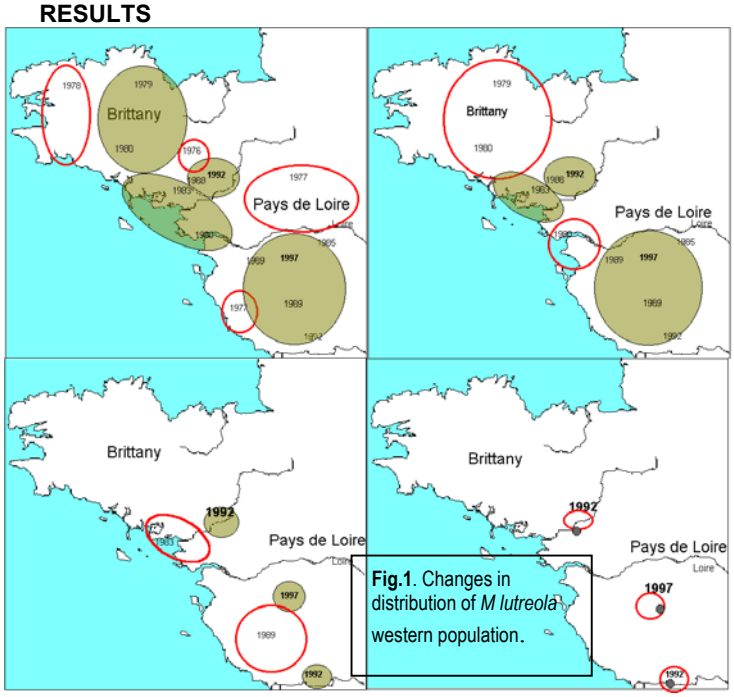
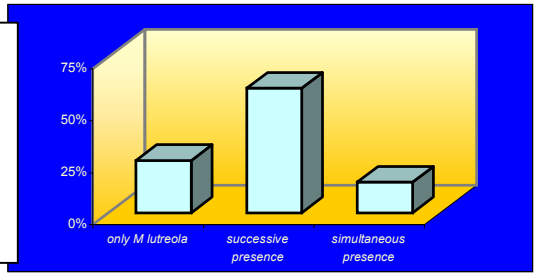


Fig.1. Changes in distribution of *M lutreola* western population.

In France, the European mink, *Mustela lutreola* has disappeared from the northern half of its previous range (53%, Figure 1). The pattern of decline showed a fragmentation restricting the minks into very small areas. First, the decline occurred both in the north of the Loire river before 1977 and in western Brittany. Then, the European mink deserted the central Brittany and wetlands near the Loire estuary. After 1980, the mink was declining in the southwestern Brittany and the central Vendée. At this time, the European mink was only found in a very restricted area in the Vilaine Valley, last data on a small forest brook "le Moulin" in 1992 (at the crossing of the Vilaine and Isac rivers, 47°34N-2°50W). Then, the mink has been only observed in Vendée in 1997, revealing the survival of the last minks on the Lay River (46°48N-0°57W). Thus, last minks chiefly lived on small streams with dense riparian groves (willows *Salix fragilis* and *alba* and ashes *Fraxinus excelsior*).

Fig 2. Watercourses used by *M lutreola* from 1976 to 1997, considering either the absence, the successive or the simultaneous presence of *M. vison*.



The American mink *Mustela vison* farming was beginning in 1926. Most of fur farms settled between 1970 and 1990. From 1987, the American mink was extensively trapped as pest chiefly in central Brittany but only six individuals were found in Pays de Loire. Since 1976, out of 37 observations on *M. lutreola*, the simultaneous presence of American mink and European mink was only attested in 14.9% of watercourses while 25.2% of watercourses were only occupied by *M. lutreola* (Figure 2).

DISCUSSION

The pattern of decline exhibited a division into undersized areas restricting the minks into very small subpopulations in twenty years. Small isolated subpopulations are exposed to extinction because of alteration of breeding exchanges.The southwestern population was already affected by inbreeding (Lodé 1999, Lodé & Le Jacques 1999) increasing the loss in genetic diversity. Genetic depletion showed that breeding exchanges were disrupted affecting the immune response to pathogens worsening the vulnerability of Mink to diseases. Because invasive species can have a major influence on native fauna, the European mink's decline in eastern Europe has been mainly attributed to competition with the American mink (Schröpfer & Paliocha 1989, Maran et al. 1998, Sidorovich 1999). Nevertheless, in northern western France, because *M. lutreola* disappeared from watercourses several years before the introduction of the feral American mink, the competition with American mink could not be the decisive cause for the extinction of *M. lutreola*. Although there are many difficulties in ascribing unambiguous cause to such a dramatic change, this decline can be regarded as a result of anthropic pressures on natural habitats (Lodé et al. 2001).

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