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7. DISTRIBUTION, STATUS AND CONSERVATION PRIORITIES OF THE EUROPEAN MINK IN THE ROMANIAN DANUBE DELTA

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ABSTRACT: A life trapping survey, conducted in late winter and early spring 2003 revealed that European mink, *Mustela lutreola*, are still numerous in the central and eastern part of the Romanian part of the Danube Delta. They are also present in the south of the Delta in the lagoon complex. No American mink were caught during that trapping effort. However, there is evidence for an established *M. vison* population on the Ukraine side of the Delta and at present this may be considered as the most serious threat for *M. lutreola* in the Danube Delta.

Key words: conservation, Danube Delta, distribution, *Mustela lutreola*, *Mustela vison*, Romania, status.

INTRODUCTION

The European mink (*Mustela lutreola* L.) is one of the most endangered mammals in Europe. Until recently, this was not acknowledged on a European Union level, but since 2002 it is listed as a strictly protected species with priority within the annexes of the Fauna Flora Habitat directive of the European Union (92/43 EWG). The species was once widespread from northern Spain and western France throughout Central Europe towards the Ural Mountains [10]. However, the accurate borders in the south of its distribution are uncertain and it is quite unclear, when the species disappeared from many regions. In Transilvania (Romania) the species was already rare in the 19th century. Moreover confusions with the American mink (*Mustela vison*) may have occurred frequently since the early 20th century, when American mink farms came to being in Europe [1]. Concerning the status of *Mustela lutreola* in the Danube Delta, Youngman (1982) referred to a personal communication and stated that there is still a very large population and that in December 1980 capturing was still going on. In the late 1990s first field trips were carried out to elucidate the status of the species in the Delta. Besides tracks and scats found, ten furs provided by trappers indicated that European mink are still living in the Delta [2]. From Spring 2000 until Autumn 2002 another seven fieldtrips were carried, another 18 European mink furs were collected from trappers and tracks and scats were found in the central and southeastern part of the Delta [4]. In Autumn 2002 a check of mink sculls from the collection of the Danube Delta Museum in Tulcea revealed one American mink, which was erroneously identified as *Mustela lutreola*. It originated from the Delta near Uzlina from December 1999, an area where many mink scats were found in previous excursions. M. Marinov from the Danube Delta Institute in Tulcea identified another American mink scull. It originated some 30 km west of the town Tulcea from the Danube valley. The American mink is considered as a serious threat for the European [5, 8]. A small scale experimental American mink farm had be in function in Murighiol on the southern boundary of the Danube Delta until the late 1980s and a big commercial one was operated on the Ukraine side of the Delta near Izmail until the early 1990s. Accidental escapes from such farms are one common reason for the establishment of feral mink populations in the wild. Once it had become clear that American mink may occur somewhere in the Delta, tracks surveys as carried out in the previous field trips were considered to be an inappropriate method to identify the European mink distribution, since tracks of both mink species are very similar and may not be distinguished without special experience [7]. Hence a life trapping expedition was scheduled for the Romanian part of the Delta for 2003 with the following aims:

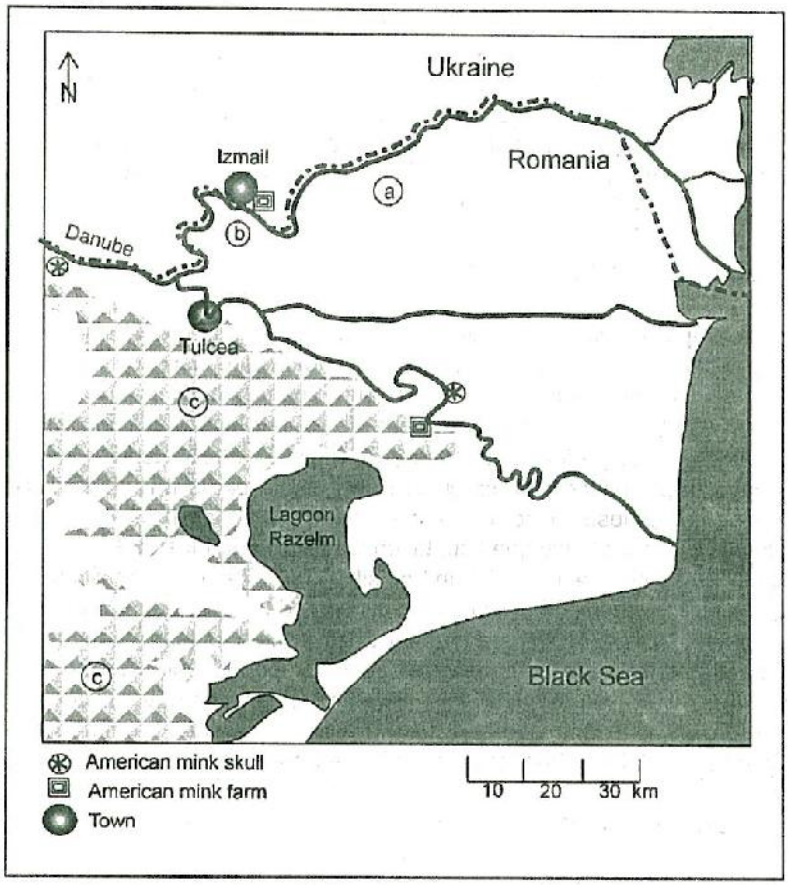
- Trap mink in various localities of the Delta and identify the species;
- Get some indication of the mink density in the Delta as indicated by catching effort (trap nights);

- Collect tissue samples of life trapped European mink for genetic analysis in order to identify their relatedness to European mink populations in Russia and Western Europe.

Besides these main goals, basic data such as sex ratio, weight and habitat types should be collected, if mink were caught successfully.

STUDY AREA

The Danube Delta is located on the west coast of the Black Sea on the border between Romania and Ukraine. The Danube splits into three main branches, the most northern one forms the border to the Ukraine **(See Figure 7-1)**.



Note. The agricultural polders Pardina (*a*) and Sireasa (*b*), the Dobrudscha Mountains (*c*).

Figure 7-1. The Danube Delta with its three main Danube Branches.

The Romanian part of the Delta covers about 5000 km^2 and holds more than 300 major lakes connected by natural river branches and man-made canals along an extensive hydrological gradient. The lakes range from pristine to moderately influenced by man. Geomorphologically, the Delta consists of four different zones:

a) the growing Delta due to sedimentation into the Black Sea, today, this type is only found in the Ukraine part of the Delta;
b) the fluvial, white water zone, the river floodplain in the process of being filled up. The river branches are accompanied by river levees, which are covered by forest or by pasture and are frequently exploited by man (single houses, villages, gardens). The lakes are small and shallow (0,5 m in the dry season). The visibility in the water is low due to a high load of dispersed sediments (muddy = „white" water);

c) the transitional, black water zone, characterised by extensive reed beds and large, 1–3 m deep lakes; these are former lagoons in the final stage of being filled up with peat. There floating layers of fibric peat from reed with a thickness of up to 1,5 m can be found, so called plaur. The water is clear and the visibility therefore high (clear = „black" water);
d) the marine zone, characterised by the presence of parallel sandy beach barriers with shallow depressions in between.

In addition to these natural, moderately modified zones of the Delta, three man-made types of landscape exist in the Delta: the biggest are the agricultural polders, which are used for cattle grazing or maize production, followed by fish ponds and forestry polders. The biggest agricultural polders, Sireasa and Pardina (**See Figure 7-1**) in the north on the border to the Ukraine are still in function, others such as the Babina and Cernovca Bolders further east have undergone ecological reconstruction activities and are in a transient stage. Most of the fish ponds are not functioning as fish farms and are in different stages of natural re-colonisation. Adjacent to the Delta there is a lagoon complex in the south (**See Figure 7-1**). Its western and northern borders are the Dobrudscha Mountains. Towards the east there is the Black Sea separated by a narrow stripe of sand dunes and in the north-east there is the Delta itself. The climate is continental with minus 1.8°C in January and 22.2°C in August. Fresh water may be frozen in winter, but ice cover for longer periods is rare. The precipitation is about 350 mm and the evaporation is about 1000 mm/year, which causes a tendency to spontaneous salinization of humid soils [3].

MATERIAL AND METHODS

Prior attempts of life-trapping mink in the Delta using single large wire traps were not successful [2]. In order to increase the trapping success and to achieve comparability between trapping success in different countries holding *M. lutreola* populations, French and Spanish mink trappers (R. Rosoux, P. Fournier, J. C. Ceña Martínez and S. Palazón Miñano) were visited in March 2002 in order to learn their trapping technique and to take a prototype for constructing own traps. The traps used in the Delta were 50 × 16 × 16 cm single entry cage traps, baited with sardines in vegetable oil as it is done in Spain and France [11]. Animals caught were not anaesthetised, but transferred into a cotton bag. They were sexed, hair samples were taken by pincers and an ear sample was taken with scissors. Most of the animals were marked with a transponder and after weighting released at the trap site. The procedure from arriving at a trap until releasing after handling took about three minutes. Trapping was carried out between 23. February until 11. April 2003. Nine different trapping areas were selected in order to cover both, different geographical areas and different habitat types (**See Table 7-1**). Trapping days depended upon trapping success and logistical reasons. Between 4 and 37 traps were set per night, they were active between 2 and 6 days in a place, rebaited with sardines every three days and controlled at least one per day (between 8 am and 11 am) by foot in the first trapping area and by a small motor boat or a canoe in the other cases.

RESULTS AND DISCUSSIONS

Results

Enisala was the first trapping area. It is located outside the Delta west of the Lake Razelm next to the foot hills of the Dobrudscha Mountains (**See Figure 7-2**). The habitat consists of flooded reed beds and man-made channels. Traps were set about 2 km from the lakeshore. All of them were set on the ice layer in the reed. The ice layer was thick and there was no access to the open water, except small holes kept open by otters (*Lutra lutra*) and mink. The trapping area was about 300 m from the village Enisala and it was frequently visited by people walking on the ice for fishing or collecting fire wood. Trapping itself was hindered, because in the first night 13 traps were stolen and dogs frequently discovered the traps and closed them in the attempt to reach the sardines. On the arrival day, one European mink was envisaged from less than 20 m distance when approaching from a hole in the ice. The animal was identified as a *M. lutreola* by the clearly visible white upper lip. After trapping for eight consecutive nights one male European mink was caught (**See Table 7-1**). Track surveys in the snow revealed mink tracks also between the trapping area and the mouth of Lake Babadag 2 km in the west. In addition mink tracks of several individuals were found in the fish pond complex east of Sălcioara (**See Figure 7-2**). This area is located about 15 km south of Enisala.

Table 7-1

Locations, habitats, trapping periods, trap nights and captures of European mink

Loc.	Name	Habitat	Date	Nights	Trap-nights	Europ. Mink	Sex M/F	Trap-nights / Europ. Mink
1	Enisala	Lagoon	23.II–2.III	8	130	1	1 / 0	130
2	Dovnica	Transitional Z.	4–9.III	6	187	6	4 / 2	31
3	Fortuna	Fluvial Z.	10–14.III	5	146	6	6 / 0	24
4	Dunavăt	Fish pond*	19–21.III	3	105	8	3 / 5	13
5	Uzlina	Fluvial Z.	22–24.III	3	76	4	2 / 2	19
6	Perivolovca	Transitional Z.	25–26.III	2	58	2	2 / 0	29
7	Gorgova	Transitional Z.	27–28.III	2	50	0		
8	Roşu	Marine Z.	2–4.IV	3	98	1	0 / 1	98
9	Nebunu	Transitional Z.	8–11.IV	4	111	0		
Sum				**36**	**961**	**28**	**18/10**	

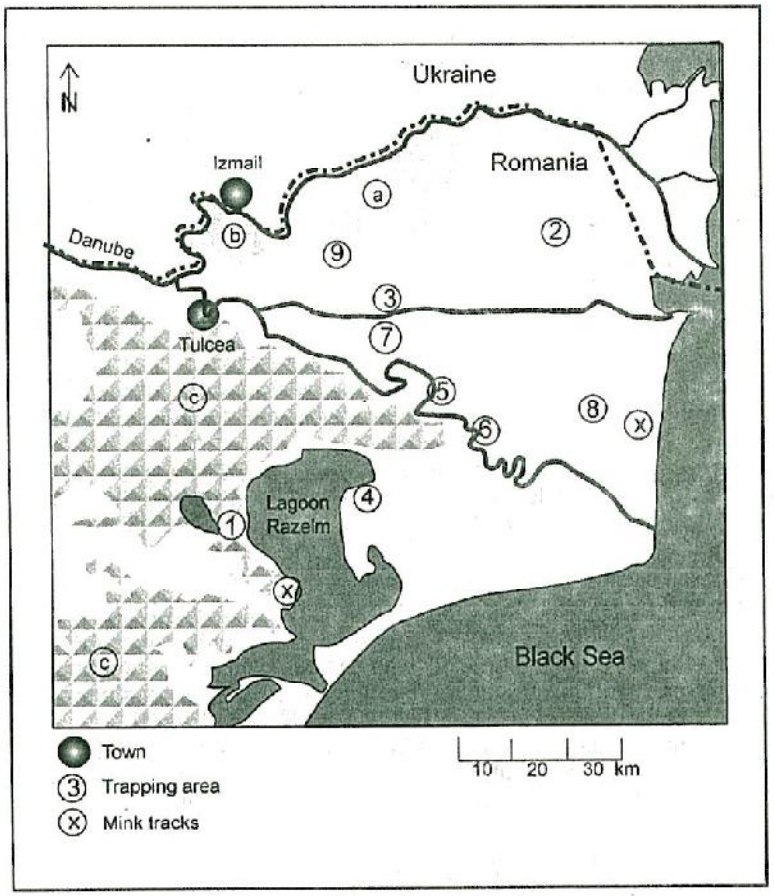
The habitat types correspond with the description in the chapter Study Area, (fish pond* = abandoned fish pond)

The second trapping area, Dovnica (**See Figure 7-2**) was in the Delta about 10 km north of the village Crişan, which is located on the middle of the three main Danube branches (Sulina Branch). The main channel (12 m wide) was not covered by ice. Traps were set along this channel on the banks which are either mostly overgrown by willow trees (*Salix fragilis*) or by reed (*Phragmites australis*) and along one side channel which was 9 m wide, showing similar bankside structure like the other one. The hinterland of the channels are thousands of hectares of monotonous flooded reed beds with a few single small lakes. The area belongs to the transitional, black water zone. It is far from human settlements and not disturbed by people or boat traffic. On the arrival day, one mink was seen scavenging from a hopper swan (*Cygnus olor*), which was lying on the bank of the main channel. There were several dozens more dead swans in the area providing food for various carnivores and white tailed eagles (*Haliaeetus albicilla*). One male European mink was caught at the already mentioned swan carcass in the first night and a female European mink was caught in the following night in the same trap. Another female and male European Mink were caught in another trap and two more in other traps (**See Table 7-1**) during a total of six consecutive nights.

Fortuna was the third trapping area (**See Figure 7-2**). It is located in the very centre of the Delta just south of the big lake Fortuna. The area belongs to the fluvial white water zone getting the water through a channel from the 2 km distant Sulina Branch, one of the three main Danube Branches. It is characterised by a dense network of channels and small lakes. Ice did not restricted the access along the channels, but still covered the big Lake Fortuna. On the first day, some hunters were in the area shooting water fowl, but on the following days, there were no other people nor dogs. Traps were set along the banks of these mostly 10 m wide channels. They were covered by willow trees or reed and sometimes reedmace (*Typha angustifolia*). The hinterland was medium old or old willow forest. From the first trap night onwards, six European mink were caught during five nights (Table 1). One mink escaped from a trap by destroying the cage.

The next trapping area was Dunavăt (**See Figure 7-2**). It was located from the west of the Lake Razelm (lagoon complex) eastwards along 20 and 10 m wide ice free channels in area of abandoned polders and fish farms. The banks, where the traps were set, were overgrown by reed and single willow bushes and the hinterland consisted of flooded red stands. Right in the trapping area, there was a fishermen house with several people and free running dogs. During three nights, three male and five female European mink were caught along the main channel right from the mouth of the Razelm Lake 10 km inland.

Uzlina was the fifth trapping area (**See Figure 7-2**). It is located in the immediate vicinity of the southern main Danube Branch near the village Murighiol, where the experimental fur farm of the Danube Delta National Institute holding also *M. vison* was in function in the 1980s. Uzlina is the origin area of the American mink skull detected in the Danube Delta Museum. The habitat belongs to the fluvial zone, but it is heavily affected by human land use, mainly grazing of cows, horses and pigs. The latter one over-dig almost any square meter of land, which is not permanently flooded by water. Abandoned or semi-abandoned dogs and cats are also plentiful. In addition there is one hotel in Uzlina and several holiday resorts. Motor boat traffic is common. It is one of those parts of the Delta, which are easily reached from the main land by driving by car to Murighiol resulting in an increased pressure of tourism (anglers and bird watchers). Besides the main Danube Branch, there are 10 m wide channels, willow tree forests, small lakes and reed marshes, creating a rich and picturesque landscape. Traps were set during three nights along the channels and within the partly flooded *Salix fragilis* woodland. In total, two male and two female European mink were caught (**See Table 7-1**), both, along the channels and in the woodland. One successful trap was 100 m from the nearest holiday resort set on a bank overgrown by *Tamarix ramosissima*.



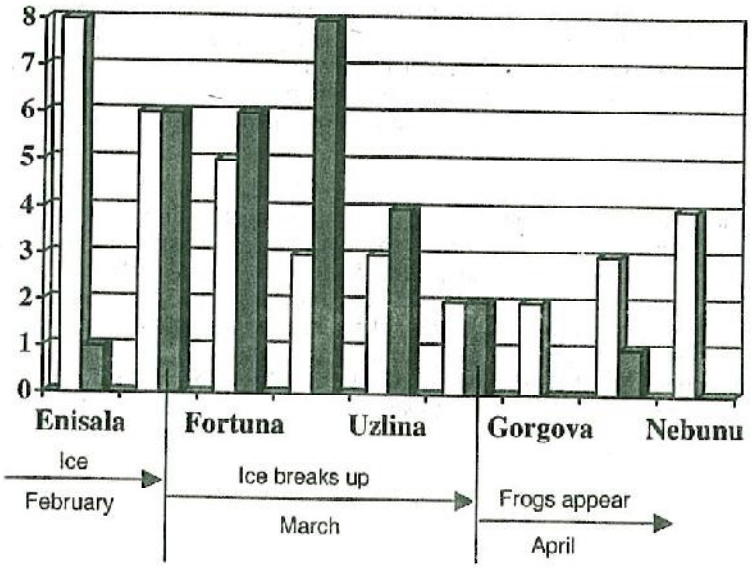
Trapping areas: *1* – Enisala, *2* – Dovnica, *3* – Fortuna, *4* – Dunavăţ, *5* – Uzlina, *6* – Perivolovca, *7* – Gorgova, *8* – Roşu and *9* – Nebunu; *X* indicate sites, where additional mink tracks were found in 2003.

Figure 7-2. Trapping areas during 2003.

Perivolovca was the next trapping area, about 20 km downstream the Danube from Uzlina (**See Figure 7-2**). It was not located right at the main Danube Branch, but north, along two dead end channels, 6 and 10 m wide and free of ice during the trapping period. The hinterland consisted of partly flooded even-aged woodland. The channels were revisited by fishermen who put fykenets there. During two nights, two European mink were caught and one more was seen from a short distance crossing the Channel by swimming, the white upper lip was clearly visible.

The next trapping area was Gorgova situated right in the middle between the southern and the central main Danube Branch. The habitat belongs to the transitional zone of the Delta. It is characterised by large reed beds, floating reed (plaur) and medium to large lakes (Lake Gorgova). Traps were set along short natural branches interconnecting lakes and along the lake shore. Most of the area did not show any or very little signs of human activity or presence. It was the beginning of the vocal activity of amphibians (**See Figure 7-3**) and big reed fires were going on in some adjacent areas. During two nights no mink were caught (**See Table 7-1**). However, tracks and scats indicated that the area is inhabited by mink.

Roşu was the only trapping area in the marine zone of the Delta. It was located south of the Lake Roşu along canals crossing former sandy beach barriers (Grindul Ivancea, etc.). The hinterland consists of shifting sands, pasture and reed. In the trapping area, there was one single hut inhabited by people, cattle and dogs. One female European mink was caught in a cage trap within three nights of trapping and one European mink was identified when swimming over a channel. In addition plenty of mink tracks were found about 5 km eastwards in the marine zone 3 km from the Black Sea.



Note. White bars – duration of trapping in the nine trapping areas; Grey bars – number of European mink caught; The stage of ice and the appearance of frogs are possible factors influencing trapping success.

Figure 7-3. Duration of trapping and number of European mink caught.

The last trapping area, Nebunu (**See Figure 7-2**), was the one located most in the west of the Delta. The area belongs mainly to the transitional zone, consists of large open woodlands and a very dense network of natural branches and channels interconnecting lakes of various size and patches of reed and reedmace. The area is about 15 km from the Fortuna trapping area. There is one hut, permanently inhabited by people. During four nights (111 trap nights), no mink was caught (**See Table 7-1**).

Besides these 28 European mink, 12 Stoats (*Mustela erminea*) and one weasel (*Mustela nivalis*), several *Rattus norvegicus, Pica pica, Gallinula chloropus* and *Turdus merula* were caught in the wire box traps, but no single American mink nor a polecat (*M. putorius*). Signs of *Lutra lutra*, tracks, sign heaps and excrements were plentiful in all 9 trapping areas. Badger (*Meles meles*) sets and tracks were found on the edge of the Delta and in one case inside. In Fortuna, one wild cat *(Felis silvestris*) was seen and field signs (latrines and tracks) of racoon dogs (*Nyctereutes procyonoides*) were common in some areas. Jackals (*Canis aureus*) were found in the marine zone and in the lagoon complex around Lake Razelm. The average weight of male European mink caught was 493 grams (n = 17) ranging from 620 to 1250 grams, the weight of females was on average 473 (n = 9) ranging from 380 – 550 grams. The trapping success (**See Figure 7-3**) and the sex ratio of captured European mink (Table 1) varied considerably between the trapping areas.

Discussions

The life trapping action in late winter, early spring 2003, carried out in the Biosphere Reserve of the Romanian Danube Delta revealed a numerous European mink population in the central, eastern and southern part of the Delta. This was indicated by the generally high trapping success. Low trapping success in the first trapping area (Enisala) and in April, may be more the result of the ice cover and the appearance of frogs (plenty of food available), than differences of mink densities, since tracks and scats indicated that mink were in the areas. The sex ratio of captured mink was biased towards males, this may have come to being because it was mating season, when males are particularly active. Despite two skulls of American mink originating from the Romanian Danube Delta from recent years, no American mink were caught. The polecat is also absent in the Delta, whereas other small Mustelids (weasel and stoat) are found even in the most aquatic parts of the Delta. Otters are numerous as well. It appears that until present the European mink was able to occupy its original niche in the guild of Mustelids. However, M. Smut from the Academy of Sciences of the Ukraine, working in the Ukraine part of the Danube Delta reported in Autumn 2003 that there exists an

American mink population east of Izmail north of the agricultural polder Pardina (**See Figure 7-1**). According to him, this population has established a population in the wild, which covers an area of about 30 × 5 km. east of that area, European mink still do occur on the Ukraine side of the Delta. It may well be that the Pardina polder, not providing suitable habitat for mink, hindered the immigration of American mink to the Romanian part of the Delta. It might also be that in the north of the Romanian Delta, there are already American mink. These areas were not fully covered by the trapping survey in 2003, but it will be done in 2004.

Despite the fact that the European mink population is still in a vital status, it appears to be critically threatened by the American mink, obviously living in a still restricted area in the north of the Delta. It is uncertain, whether any trapping effort aiming at eradicating the species would be successful, but it might decrease the population to a level, which stops immigration to areas occupied by the European mink. Density control of the American mink is possible [6, 9] and may save the native European mink. Besides the American mink menace, by-catch in leghold traps set for muskrats (*Ondatra zibethicus*), and free ranging dogs may be considered as threats for the European mink population living in the Danube Delta. Whereas it might be possible to reduce by-catch by promoting selective traps, any dog control in the Delta appears difficult. The presence of mink in all main habitat types of the Delta indicates that habitat requirements itself are not a limiting factor yet.

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