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Abstract: From 1971 to 1976, 16 lynxes – 9 males and 7 females – originating in the Carpathian mountains were released in several places in the Swiss Alps and the Jura. The reintroduction of the lynx in Switzerland was the object of violent disputes between conservationists, hunters and sheep breeders. As the release of the lynxes had never been planned as a scientific program, there was little reliable information on the lynx in Switzerland when in 1982, the authors started their study on the population ecology of the lynx in the Swiss Alps. To obtain data on distribution and feeding habits, the authors attempted to capture lynxes and to follow them by means of radiotelemetry. From their study, the authors concluded that the home ranges of the studied lynxes are large and only those of females and males seem to overlap. They vary between 55 and 1860 km². The size of home ranges depends on the population status (home ranges are smaller in an initial population), but also on the distribution and abundance of the prey.

SPACE USE OF THE LYNX IN SWITZERLAND AND ITS FOOD HABITS

Introduction

As in most other countries of Central Europe, the lynx population became extinct in Switzerland during the 19th century. From 1971 to 1976, 16 lynxes — 9 males and 7 females — originating in the Carpathian Mountains were released in several places in the Swiss Alps and in the Jura. The reintroduction was not successful everywhere, but in the cantons of Obwalden and Neuenburg two small populations developed and spread out. The expansion took place faster to the west than to the east. In the west, the two populations have already reached French territory. Today, about two-thirds of the Swiss Alps have been reoccupied by the lynx, but during the last three years, expansion seems to have slowed. Probably, only a very small number of individuals have already been able to get over the topo-graphical and anthropogenic barriers in the region of the central Alps.

Problems, methods, materials

The reintroduction of the lynx in Switzerland was the object of violent disputes between conservationists, hunters and sheep-breeders, but as the release of the lynxes had never been planned as a scientific program, there was little reliable information on the lynx population in Switzerland when in 1982, Heinrich Haller and I started our study on the population ecology of the lynx in the Swiss Alps. To obtain data on distribution and feeding habits, we attempted to capture lynxes and to follow them by means of radiotelemetry. In the last 5 years, we have caught 14 lynxes in the northern and central Alps and fitted them with radio collars. 6 of them, we were able to track for more than one year.

Spatial organization

In the northern Alps, where the lynx population was first established, we found very large home ranges. The home range sizes for two adult males were 450 km² and 275 km², for two adult females 135 km² and 96 km². Occasionally, lynx roamed outside their home ranges, especially males during the mating season. So when using the MAM-method to determine the activity range of an individual, we get ranges of up to 1860 km² for Male 1. The home range of Male 2 almost completely overlapped that of Female 2. Within this area, no other lynx lived permanently, as we could prove by comparing second-hand-observations of lynxes with our radiolocations. Only one observation did not correspond with the locations of the two radio-fitted lynxes. In February 1984 we were able to catch the daughter of Female 2, while she still was with her mother. This young Female 3 left her mother's home range on March 30 1984. She travelled south and lived for more than 3 months in a small area only 5 km² in a valley not previously inhabited by lynxes. During fall 1984, Female 3 began to rove about the Bernese Oberland and in December 1984, she occupied her own home range west of her parents areas.

We suppose that kind of dispersal was due to the fact that the young female first settled in an area with no other lynxes. When in the fall Female 3 searched for contact with the population, she was forced to leave the region again. The lack of lynxes within this area might also be the reason for the extensive excursions of Male 1.

Population density of the lynx in the northern part of the Swiss Alps is very low. We estimate only 10 to 15 individuals in this area of about 3400 km². The ration is about 1 individual per 85 km² in the most densely settled parts of this region, but there are also less wooded areas of 500 km² supporting no more lynx.

Some years ago in this region the lynx seemed to be more abundant. We suppose, that in the initial stage of reintroduction, when prey species were not yet familiar with the returned predator, lynxes could live and feed in smaller ranges. This might account for why Female 3 was able to live on 5 km² for several months. To prove this hypothesis, we tried to capture lynxes in the canton of Valais, near the leading edge of the expanding population. Five lynxes have been caught there, and two of them have already

been followed for more than a year. They indeed have smaller home ranges, only 60 km² for Male 4 and 55 km² for Female 5. There may however be another factor influencing the size of home ranges: In the canton of Valais, the distribution of prey is extremely clumped.

Food habits

Lynxes in the study area were found to feed mainly on the two smaller ungulates. A total of 152 kills were found: 66 roe-deer, 68 chamois, 2 ibex fawns, 2 domestic sheep, 5 mountain hare, 4 brown hare, 2 marmots, 1 red squirrel and 2 domestic cats. Analyses of faeces showed that neither small rodents nor birds are of any importance as prey. In the northern Alps, Female 2 and Male 2 shared the same hunting area, in which roe-deer and chamois are both abundant, in populations of about equal numbers. We found 33 roe-deer and 21 chamois killed by these two lynxes, but they showed different preferences: The female killed more roe-deer (21) than chamois (7), the male killed only 12 roe-deer against 14 chamois. The locations of the kills we found were distributed over the entire home ranges of the two lynxes. The distances between consecutive kills varied between 5 and 10 km². In the central Alps, Male 4 and Female 9 live in relatively small home ranges, primarily in a valley called Turtmanntal. There the population density of chamois is extremely high: 24 individuals per km², totalling more than 700 chamois in the whole valley. During the last year, Heinrich Haller found 25 killed chamois, but no roe-deer. More than 50% of these kills have been found within an area of only 2 km². Some years ago, a small roe-deer population still lived in the valley. The deer were only able to survive the winters with the aid of supplemental feeding. Today, this small population is extinct, obviously due to predation by lynx.

In the northern Alps, a lynx killed an ungulate every 6 or 7 days. So, the average yearly consumption of an adult lynx is about 60 roe-deer or chamois. In the overlapping hunting area of Male 2 and Female 2, we estimated the yearly impact on the roe-deer population to be 8 — 9%, on the chamois population, about 5%. As a consequence of the irregular distribution of the lynx, the total predation rate is even lower, when the entire region of the northern Alps is considered.

Conclusions

The lynx population in the Swiss Alps has a low abundance and a discontinuous distribution. The home ranges are large and only those of males and females seem to overlap. Differences in size of home ranges or total activity areas (MAM) between individuals are enormous, varying between 55 and 1860 km². The difference is conspicuous between the northern and the central Alps.

The size of home ranges depends on the population status, home ranges are smaller in an initial population, but also on the distribution and abundance of the prey. Where the prey is contagiously distributed, lynxes require smaller home ranges and their impact on the prey population is greater.

The Alps are the largest, and may be the last, region in central Europe still suitable as a habitat for large predators. But the forests, the typical lynx habitat, are very scattered. The densely populated valleys and the large treeless regions above the timberline present strong barriers against the migration of the lynx, and therefore it is to be expected that the lynx population of the Alps will always remain low.