

Social dispersal of raccoon dog at the edge of their distribution range in northern Europe



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Introduction

The raccoon dog (*Nyctereutes procyonoides*) is an invasive species in Europe, native to eastern Asia. It was introduced as a fur game species to the western parts of the Soviet Union in the 1930s-1950s. Apart from causing ecological damage on the native fauna (especially wetland bird species and amphibians) the raccoon dog is also one of the main vectors of rabies in Europe and an important vector of several parasites dangerous to humans.



Figure 1. The raccoon dog is an excellent swimmer which can be seen on the web between its toes. Photo: P. Nikander.

Background

In the period from 1935 to 1984 the raccoon dog colonised 1.4 million km² of Europe by secondary expansion (Nowak 1984). The raccoon dog is already established in Finland and is at the moment invading Sweden and Norway via Finland/Russia, and Denmark via Germany. The first Swedish raccoon dog project started in 2008, in 2010 we were approved a LIFE+ project (LIFE09 NAT/SE/ 000344) including also Denmark and Finland. The overall goal is to stop the raccoon dog from establishing in Sweden, Denmark and Norway. More specifically; In Norrbotten and Jylland where there already exist small populations the goal is to minimize and contain the populations, reduce/stop reproduction and stop further spread. In Finland close to the Swedish border, the goal is to reduce the population as far as possible and stop it from spreading to Sweden and Norway. There has already been done a substantial amount of research on the raccoon dog in Europe, however, there is a lack of knowledge connected to new establishments; dispersal in low density populations being one of the most urgent factors to learn more about to be able to support the successful management of the species. From other studies we know that raccoon dog is monogam and that the couple stay in their territory all their life. If they lose their mate they will try to find a new mate as soon as possible. We also know that the males stay in the den to nurse the pups while the female is hunting during the nursing period, otherwise the male and the female rarely leave each other.

Aim with this study

Can the movements and dispersal affect how we can best manage the species in its expansion front? More specifically we wanted to find out if there is a difference in the movements and dispersal between a dense population in southern Finland and a low density population in the expansion front in northern Sweden. We also compared home range sizes between south Finnish pairs and northern Swedish pairs, and between northern Swedish pairs and single males in Sweden.

Methods

In this study we used male study animals for comparisons between countries. In total 8 animals were used in the south and 13 animals in the north. The study animals were equipped with radio collars, tracked and recaptured approximately once every month. At the capture and recurrent re-captures partners were removed to follow the study animals reaction and movement. We also followed five GPS collared pairs in northern Sweden.

Results

Two different movement patterns were detected;

1. Some animals moved repeatedly in a limited activity area – they did not disperse and leave the initial home range totally.
2. Some left their previous home range and did not return

Movement type 1. The Swedish animals moved on average further from their capture position after losing their partner than the Finnish animals (figure 2).

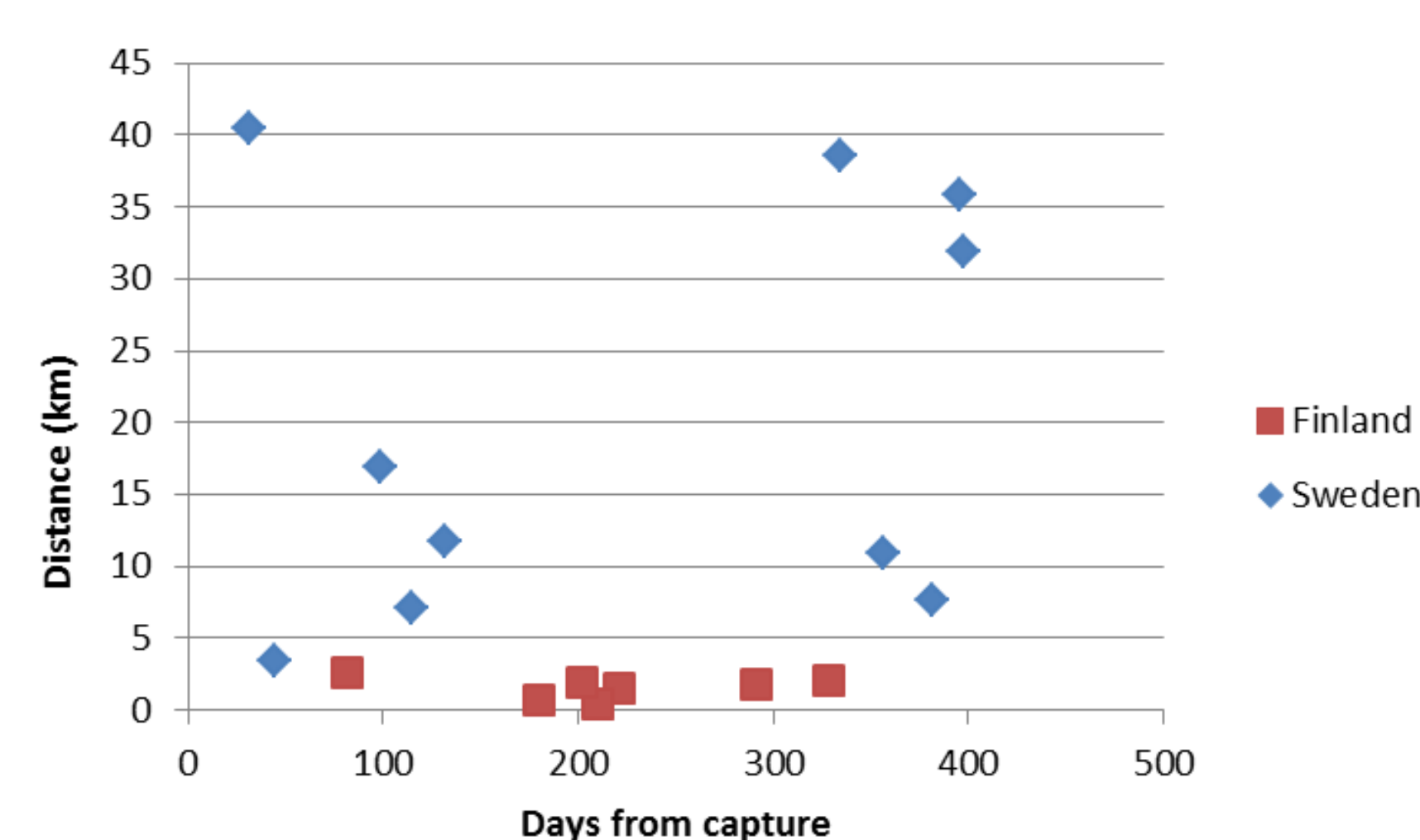


Figure 2. Maximum confirmed distance from the first capture in Finland (1,5 km) and Sweden (20,5 km)

Movement type 2: One out of eight Finnish animals showed a distinct dispersal behavior after losing its partner and dispersed 49 km from the capture. Three out of eleven Swedish animals showed a distinct dispersal and dispersed up to 390 km from the capture position (figure 3).

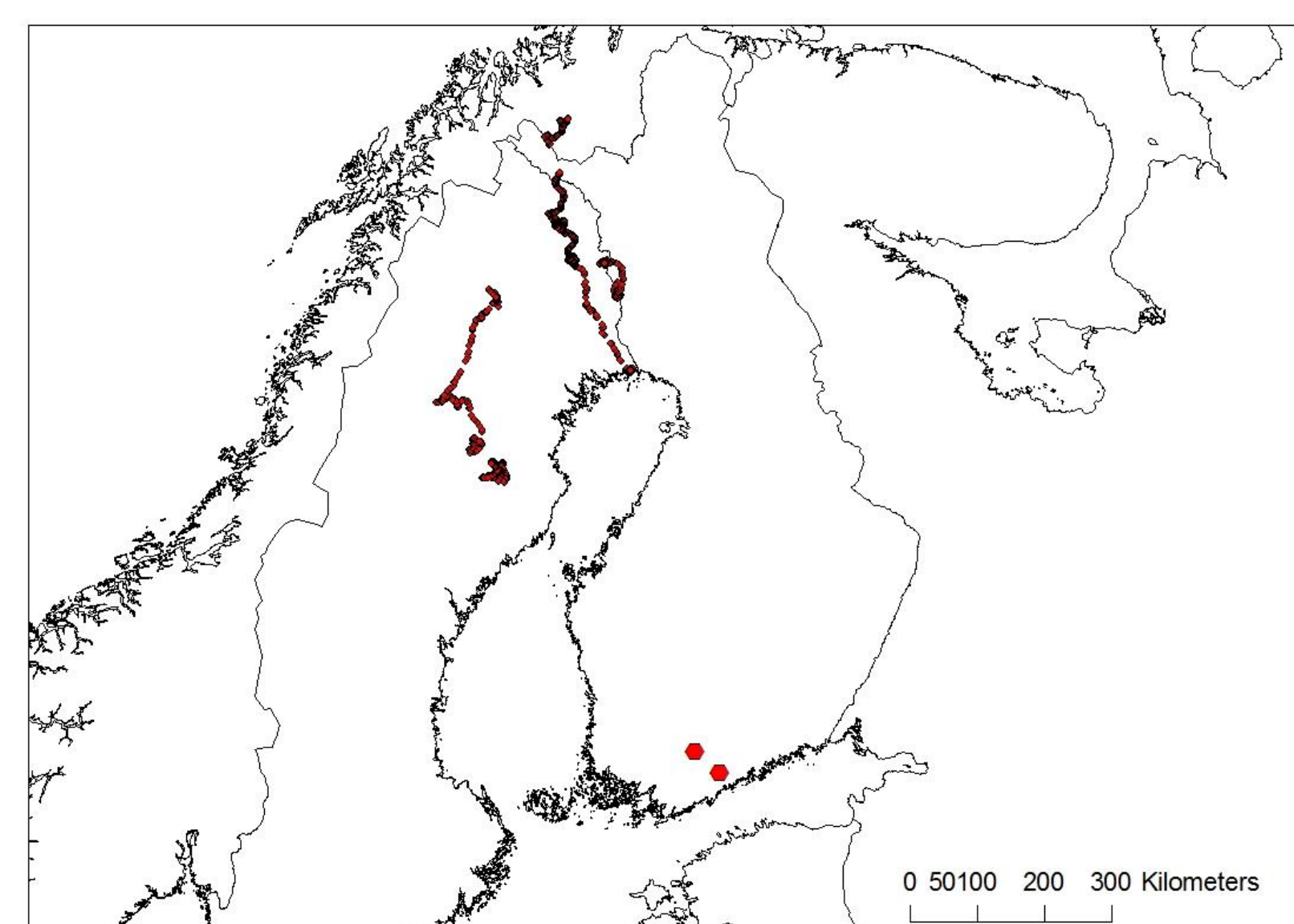


Figure 3. Dispersal from capture of Finnish and Swedish raccoon dogs leaving their original home range.

The Swedish animals had a home range of 31 000 ha on average when they were assumed alone. The GPS collared pairs had a home range of 2200 ha on average (figure 4). In southern Finland raccoon dog pairs have an average home range of about 700 ha (Kauhala et al 1993).

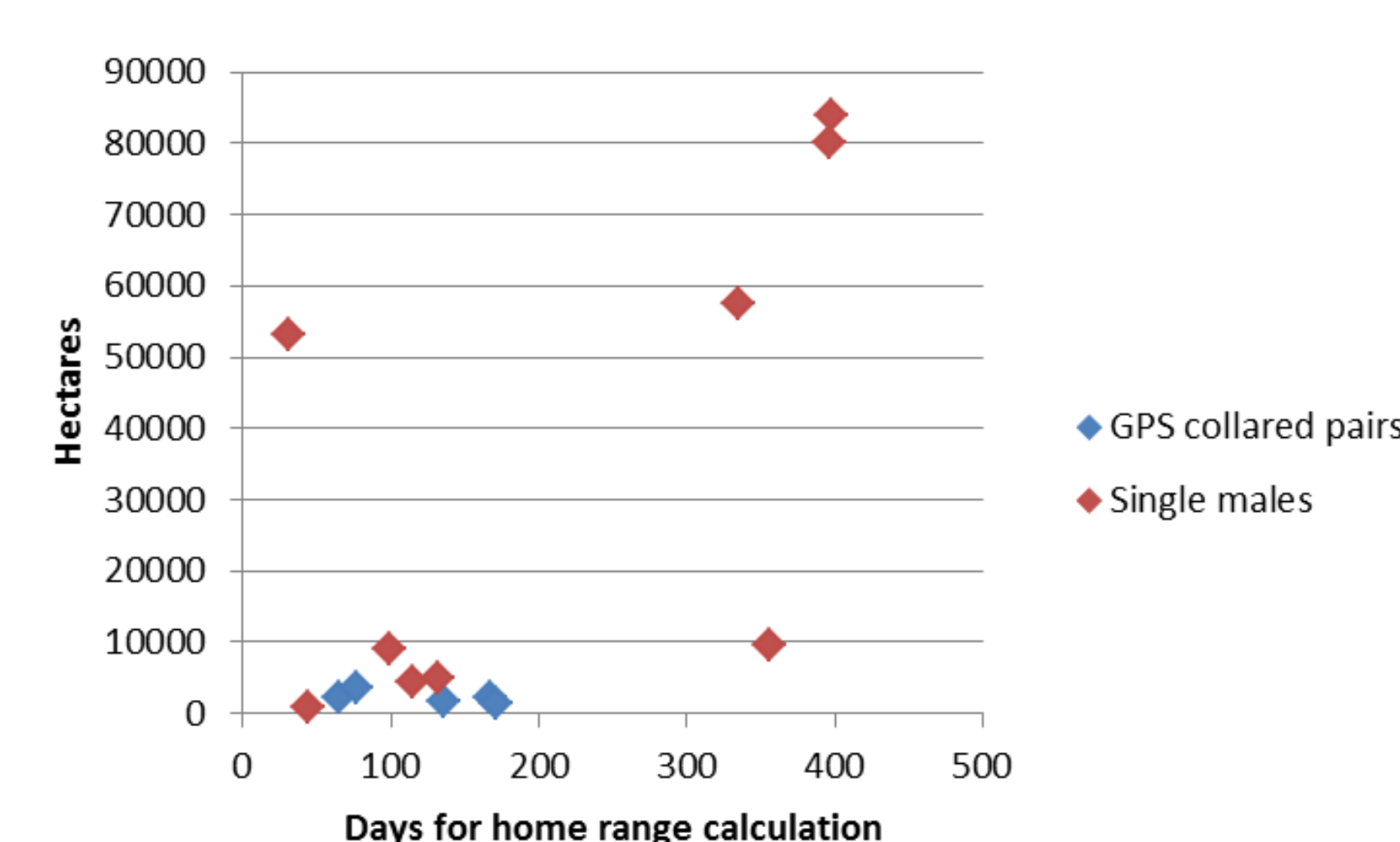


Figure 4. Size of home ranges of GPS collared pairs and assumed single males in northern Sweden.

Discussion

From this study we have learnt that;

- Home ranges of established pairs are larger in northern Sweden than in southern Finland
- When losing their mate, raccoon dogs in the expansion front in northern Sweden move over much larger territories and disperse further than in southern Finland
- Presumed single males move over much larger territories than established pairs in the north

From a related study "Spatial and temporal variation in movement pattern of raccoon dog" we further know that;

- Males and females movement rate is similar
- Invasion front is likely to consist of both males and females
- This increases the chance of reproduction in new areas

It is likely that the presumed worse habitat in the north forces the raccoon dog to utilise larger areas to be able to survive, as found by the comparison between established couples in the south and in the north. This does not, however, explain why single animals in the north start utilising a much larger area when losing their partner. It is likely that the low population density in the north forces the raccoon dog, independent of sex, to roam over larger areas to find a new partner.

Management implications

In the raccoon dog project we cooperate a lot with voluntary hunters. Hunting of raccoon dog is allowed all year around due to its status as an invasive species in the project countries. Since there are nearly 300 000 hunters in Sweden quite a lot of raccoon dogs get killed by hunters, usually by chance during other hunting. Animals left behind will however move or disperse, sometimes very long distances, and try to find a new partner. Thus, general hunting may induce dispersal and hurry up the spread of the species. Due to this new knowledge from our study we have now implemented that when a raccoon dog is killed during hunting, hunters are encouraged to immediately report the kill and hand in the carcass to the project to confirm the animal. If it is likely that there are more animals in that area, and especially if the killed raccoon dog was one of a pair, the project places cameras and if necessary a Judas animal in that area to find other animals before they start moving. The combination between many local hunters and professional management has shown to be very successful.



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