

# **SPATIAL BEHAVIOUR OF THE WILD BOAR IN GENEVA, SWITZERLAND: TESTING THE METHODS AND FIRST RESULTS**

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## **ABSTRACT**

The Basin of Geneva is divided into four administrative areas involving France and Switzerland. In those areas, wild boar (*Sus scrofa* L.) populations and resulting damages have increased dramatically in the last decade. To cope with the problem, the authorities and local hunting associations initiated a joint study on the spatial behaviour of the species as a basis for the management of the species in the Basin. In the beginning, the methods and equipment needed to be tested and adapted to the local conditions in a preliminary study. In particular, the use of ear-transmitters was evaluated, and appear to be a good option, based on initial experiences. With the first ear-transmitters tested, we experienced problems with the antennas because they were not sufficiently robust and several of them broke. Our preliminary results are based on four individuals equipped with ear-transmitters, which were radio-tracked intensively from June to the end of September, 2002. Home ranges were very small (mean area <200 ha. Now, we have to apply the methods developed in this preliminary study on a broader spatio-temporal scale and with more individuals.

Key words: ear-transmitters, home range, *Sus scrofa*, Switzerland, wild boar.

## **INTRODUCTION**

In the Basin of Geneva, wild boar (*Sus scrofa* L.) populations and the damage they can cause have increased dramatically since the 1990s. This situation, which occurs throughout much of central Europe, poses particularly difficult management problems in this region, where two countries, France and Switzerland, and four administrative systems are involved, each having its own way of management and of hunting. One of those administrative areas, the canton of Geneva (Switzerland), which is in the middle of the Basin, is specific because hunting was abolished following a public vote in 1974. In that area, animals can only be shot by official game wardens. As the canton is densely populated, culling is restricted to night shoots, for the safety of the inhabitants.

Given the importance of the damages caused by wild boars, and the impossibility of coping with the problem alone, the authorities and the local hunting associations created a co-ordination group for the management of the species at the level of the Basin. Prevention measures, such as supplemental feeding and fencing of vulnerable fields, are now common. In addition, a study of the wild boar population at the regional level is planned.

The aims of the study are (1) to gain insights into the movements of the boars in each area and, especially, the movements across the borders of the management units, (2) to determine the role of the canton of Geneva as a potential refuge area, given that hunting is largely absent, and (3) to evaluate the effectiveness of the various prevention methods (supplemental feeding, fencing of vulnerable fields, and culling).

In 2002, a preliminary study was initiated in the canton of Geneva by the SFPNP (Service des Forêts, de la Protection de la Nature et du Paysage) to test and adapt trapping and manipulation procedures, as well as telemetry equipment, especially ear-transmitters. In this paper, we present the methods and first results.

## STUDY AREA

The Basin of Geneva is at the far western tip of Switzerland and Lake Geneva (Figure 1), and is mainly surrounded by wooded mountains that reach an elevation of 1.600 m. The lowlands (between 350 and 600 m asl) are a mosaic of cultivated land, scattered woods and extensive urbanisation (over 500.000 people living within about 680 km<sup>2</sup>), with the agglomeration of Geneva at its core. A large network of roads and urbanised areas restricts the movements of the fauna in the Basin.

The canton of Geneva has an area of 240 km<sup>2</sup> and 400,000 people inhabit this small area. The canton can be divided into 3 faunistic compartments (north, west, and southeast) that are delineated by the city and the lake. The conurbation accounts for half of the area, and cereal crops, especially wheat and maize, in the southeast and north, dominate the remaining 110 km<sup>2</sup>. In the western compartment, the area is divided in half by the Rhône River, but it can be crossed easily by wild boars. Cereal crops dominate the southern half and in the north there are extensive vineyards. Patches of forest are scattered throughout the rural area and account for about 10% of the area. Larger forests are located along the French border and along the major rivers (Rhône and Allondon). Other wooded areas consist of small patches, often smaller than 1 ha in size. Forests are dominated by oak stands, which produce substantial amounts of acorn mast in autumn and winter.

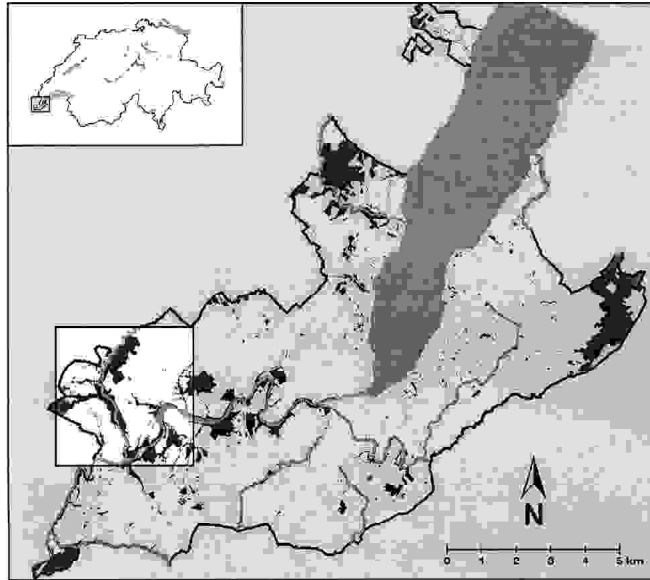


Figure 1. Location of the Canton of Geneva and the study area (unshaded square), which corresponds to the area shown in Figure 3. Forests are in dark grey and rivers are in light grey.

## METHODS

Wild boars were captured in live-traps (2x1x1 m, Figure 2) baited with maize. Adult individuals were fitted with radio-collars (1 individual per group), and smaller females and males with body masses of 20-60 kg and 20-90 kg, respectively, were fitted with ear-transmitters (1 per group). Smaller individuals or group mates of radio-tagged individuals were marked with regular cattle ear-tags, only. Each tag has a unique number and is colour-coded according to administrative area. Boars up to 60 kg were handled by game wardens without the use of anaesthetic and larger individuals were anaesthetised.

We tested two sizes of ear-transmitters. Radio-transmitters used on boars with body masses between 20 and 40 kg weighed 29 g, and those used on individuals over 40 kg weighed 43 g. Each boar was fitted with two tags: the first one with an activity sensor that was turned on immediately, and the second with a delayed turn-on mode, which is activated 9 months (small tags) or 12 months (large tags) later. In that way, it should be possible to track an individual for 18 to 24 months.

Radio-marked boars were tracked at regular intervals:

- twice a week, all radio-tagged individuals were located five times between 18:00 h and 06:00 h, at 3-h intervals.

- every second week, each animal was tracked throughout an entire night with fixes recorded at 15-min intervals.

Home range sizes were calculated using the 100% Minimum Convex Polygon (Mohr 1947).



Figure 2. A photograph of a mobile trap used to catch wild boars in our study.

## RESULTS

From the beginning of May to mid-June 2002, 57 captures of 42 different boars were made (20 piglets, 10 individuals of 20 to 40 kg, 12 of more than 40 kg to 60 kg). Twenty-two individuals were marked with ear-tags (12 females and 10 males), nine were fitted with ear-transmitters (six females over 50 kg and three males between 20 and 40 kg), and 15 individuals were recaptured.

During this preliminary study, we did not capture any adult boars; thus, none of those individuals were fitted with a radio-collar.

With the smaller transmitters, reception was possible up to 1-1.5 km, and with the larger transmitters, up to 2.5 km on open flat ground. We lost contact with five of the nine fitted individuals within the first 2 months. It appeared that antennas were broken or bitten off.

From June through the end of September, we tracked four individuals intensively (three females over 50 kg, and one male of 20 kg at capture). During that period, the

animals were very sedentary with a mean home-range size of only 190 ha (range = 50-420 ha; Figure 3). The young male was the most sedentary individual, and he spent most of his time within an alluvial forest. The home range of one of the females was twice as large as those of the other two (420 ha, vs. 160 ha and 130 ha, respectively). The home ranges of two females overlapped considerably, although they were never located together.

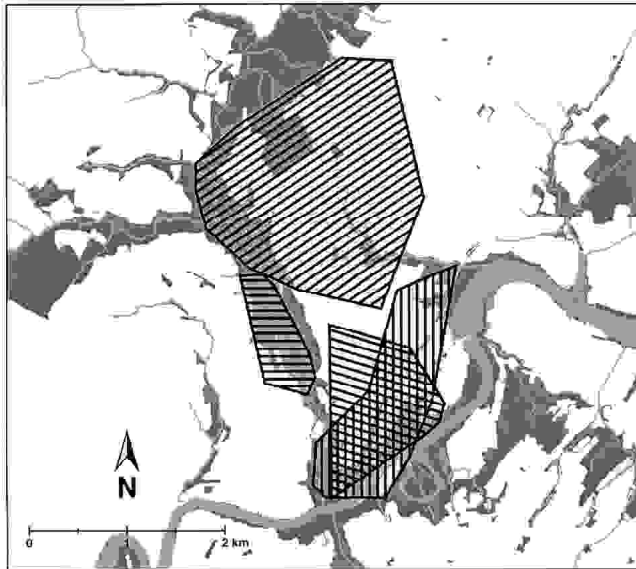


Figure 3. Home ranges of the four individuals tracked intensively over four months (June to September). The horizontal-lined polygon represents the data for the male. Forests are in dark grey, streams and rivers are in light grey. The area in white represents areas dominated by vineyards (90%).

## DISCUSSION

We have now adapted trapping and handling methods to local conditions in the Basin of Genova. Those methods are efficient and now can be applied on a broader scale. Ear-transmitters proved to be a good alternative considering the difficulty of catching adults. The advantage of the ear-transmitters lies not only in their small size, but also in their low cost and the ease with which they can be mounted on an animal that is not anaesthetised. That type of device is also used on brown bear in Italy (*Ursus arctos* Genovesi 2000), on wild pigs in Australia (Jim Mitchel, personal communication), and on wild boars in Germany (Sodeikat and Pohlmeier 1999). Up to now, ear-transmitters have proven to be efficient enough for radio tracking in an agricultural area which includes deep stream beds. However the antennas need to be improved. Several possible modifications are planned and will be tested in the coming year.

Although our preliminary study was limited to four months, it is possible to compare our results with other studies that provide details on seasonal home ranges of wild boars. In comparison to the data presented by Baubet (1998) for wild boars in a mountainous area in France which show mean home ranges between 645 and 1778 ha in summer, and 450 and 3.228 ha in autumn, values from the Basin of Geneva appear to be lower. More similar values were presented by Sodeikat and Pohlmeier (1999), who reported home ranges of between 130 and 600 ha over periods of at least one month in Lower Saxony, Germany, and Massei et al. (1997), who recorded mean seasonal home ranges of between 313 and 247 ha for females in two consecutive years in Maremma Natural Park, Italy. The very small home ranges observed to date in Geneva probably reflect favourable living conditions, i.e., good shelter and abundant food, as also proposed by Harestad and Bunnell (1979), and Saunders and McLeod (1999) for feral pigs. In northern Switzerland, Baettig (1995) observed annual home ranges of between 800 and 3000 ha in a forested landscape.

Our results need to be confirmed using a larger sample of individuals over more than one year and must include animals living in the neighbouring administrative units in the Basin of Geneva. Our aim is to gain a better understanding of the effects of various factors on the spatial behaviour of the wild boars, like the influence of hunting in autumn and food shortage in winter, for example.

### ***Prospectus***

The radio-tracking study is being continued. The methods have been adapted to suit local circumstances, and the equipment only needs modest improvement. The lifespan of the transmitters needs to be determined, as does the effectiveness of the delayed turn on function. In 2003, the project was extended to include the entire Basin of Geneva, with captures resuming in the spring.

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