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The failure of the introduction of wild boar *Sus scrofa* in the island of Cyprus: a case study

Received: 21 February 2005 / Accepted: 6 September 2005 / Published online: 4 April 2006
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Abstract Wild boar (*Sus scrofa* L.) were introduced in the island of Cyprus in 1990, when five animals were imported from Greece for game farming. In 1994, wild boars were illegally released in Lemesos (Limassol) Forest and in 1996 in the Troodos National Forest Park. Soon the population increased and dispersed throughout the park. In 1997, the government of Cyprus decided to eradicate wild boar because of the danger of transmitting diseases to livestock and to prevent possible environmental destruction. To control the wild boar, hunting was permitted and game wardens were instructed to eliminate the free-ranging animals. In 2004, no animals were observed in localities where they had been seen before. Surveys in September 2004 (Troodos National Park) and January/February 2005 (Troodos Forest, Pafos Forest, and Lemesos Forest) revealed no signs of recent wild boar presence. The reasons for the possible failure of wild boar to establish in Cyprus are discussed.

Keywords Alien species · Inbreeding depression · Reintroduction

Introduction

Originally, no free-ranging wild boar occurred in Cyprus, the largest game mammal on the island being the hare (*Lepus capensis*). In 1990, a farmer imported five wild boars from Greece for game farming. In December 1994, five pregnant females and one male wild boar were released from the farm in the Lemesos Forest. In November

1995, it was estimated that they had increased up to 60–90 animals. In 1996, a new release took place at the edge of the Troodos National Forest Park, near Kato Amiantos village (Hadjisterkotis 2000, 2004). In 2001–2002, the estimated population in the area between Troodos and Platres was 80 animals.

On 29 of September 1997, the Cypriot government decided to take steps for removing the wild boar from the wild. Game wardens of the Game Fund were instructed to eliminate all free-ranging animals. In October 1999, the Minister of the Interior declared wild boar a game species and permitted its hunting from 31 October 1999 until the end of the year (only on Wednesdays and Sundays). Wild boar hunting has been permitted since then, approximately for the same time period each year, although unregulated hunting also occurs.

The purpose of this paper was to investigate the current status of the population of the wild boar, and to evaluate the extermination campaign and its results.

Materials and methods

In August 2004 and in January/February 2005, we searched for signs of wild boar in the regions where animals had previously been seen by foresters, hunters, game wardens, and other people. In addition, we interviewed numerous foresters, farmers, hunters, and people working in the forest, in an attempt to locate past and present localities of wild boar. During the survey, we visited the villages of Gerakies, Kambos, Tsakistra, Milikouri Agios Nikolaos, Vretsia, Panayia, and the Royal Monastery of Saint Mary of Kykkos in or near Pafos Forest; Phini, Amiantos, Platres, and Kakopetria in Troodos Forest; Prastio Kellakiou, Vasa Kellakiou, Asgata, Kellaki, and Eftagonia near or in Lemesos Forest, where we spoke with local farmers, hunters, and the local authorities. At the monastery of Kykkos, we spoke with the monks who work in the vineyards and the orchards of the monastery, located inside the forest. We spoke with foresters from Stavros tis Psokas Forest Station (located at the center of

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Pafos Forest), Kambos Forest Station (Pafos Forest), and Platania Forest Station (Troodos National Park), and with foresters from the central Forestry Department Office in Nicosia, where information from all district forest stations in Cyprus is gathered. We also spoke with officials of the Environmental Service of the MANRE, and game wardens. We searched for signs of wild pigs by searching the gullies on foot and also by traveling the roads using a four-wheel drive car and on foot, searching for signs of digging, scats, footprints, rubbing on trees, and mud wallows. In our search, we were assisted at times by foresters and hunters.

Results and discussion

No recent signs of wild boar were observed in localities where they had been common in the past. According to the interviewed people, no agricultural damage has been observed recently in the villages around Troodos. No wild boar were ever seen in other parts of Cyprus, with the exception of Lemesos Forest, where they have not been seen for the last few years. In the Pafos Forest, a small number of wild boar were seen by one of the Kykkos Monastery monks 6 km east of the monastery in September 2004. A wild boar hunter also told us that wild boar were seen in the summer of 2004 near the Kykkos Monastery. According to this hunter and several foresters from Platania Forest Station, 2002 was a year with very poor acorn production. This lack of food, and perhaps chasing by hunters, may have caused the animals to move into new localities in search for food, although the pigs did not rely completely on acorns for their diet. Pafos Forest, which is a game reserve, is a possible destination because it is next to Troodos Forest and can provide refuge from hunters. Despite an extensive search, no signs of wild boar were found around the monastery and in the area where the animals had been previously seen.

In other European countries, wild boar numbers have increased (Baubet 2002; Markov et al. 2002; Franzetti et al. 2002; Ferreira et al. 2002; Fruzinski and Łabudzki 2002; Sodeikat and Pohlmeier 2002) to the extent that wild boar are seen in European cities such as Barcelona (Cahill and Limona 2002) and Hannover (G. Sodeikat, personal communication 2002), searching for food in garbage cans. In almost any country to which these animals were introduced, they increased in number and extended their range, e.g., in Australia (Heise-Pavlov and Hadjisterkotis 2005) and USA (Waithman et al. 1999). According to Birmingham (1983), in most areas where feral hogs become established, it is unlikely that they can be completely exterminated. Unsuccessful hunting will make hogs keep covering, and a change in feeding habits will occur. Most of the Cypriot hunters lack dogs and are using cartridges with lead pellets designed for chukar partridge (*Alectoris chukar cypriotes*) and hare. Therefore, hunters in Cyprus are less capable of controlling wild boar than hunters in other European countries. Hadjisterkotis (2000) predicted that the mode of hunting and chasing of wild boar practiced in Cyprus was likely to force the animals to find

refuge in remote areas, to disperse them over a wider range, and to teach them to avoid humans.

An unexpected event took place in October 2004, which changed the ability of the Cypriot hunters to kill wild boar. One month before the hare and partridge hunting season of November–December 2004, the Game Fund announced that thousands of cartridge shells containing single slugs (for big game hunting) were brought to Cyprus and sold to the public.

Another factor which might have contributed to the decline of wild boar might be inbreeding, because only five wild boar were introduced from Greece (four females, one male). The population was fragmented in 1994 when some animals were released in Lemesos Forest, and in 1996 when a few animals were released in Troodos Forest. Inbreeding and inbreeding depression will occur more rapidly within smaller fragments, as will genetic drift and loss of genetic diversity. This may lead to reduced reproductive fitness in smaller compared to larger populations (Woodworth 1966; Frankel and Soulé 1981; Bryant et al. 1999; Frankham et al. 2003). The effect of inbreeding in pigs was demonstrated by McPhee et al. (1931) in an experiment on the effects of sibling (brother–sister) mating. The experiment lasted only for two generations because of a precipitous drop in the fitness of the inbred line.

In conclusion, the drastic reduction or the possible extermination of the free-ranging wild boar of Cyprus was probably caused by a combination of food shortage, the improved ability of Cypriots to kill wild boar (improved ammunition), and inbreeding.

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