

THE INTRODUCTION OF WILD BOAR *Sus scrofa* L. ON THE ISLAND OF CYPRUS

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ABSTRACT

In 1990, five wild boars (*Sus scrofa* L.) from Greece were introduced to the island of Cyprus for game farming. Examination of the coloration of piglets born in captivity indicated that they were the product of crossbreeding with domestic pig. In 1994, wild boars were illegally released in Lemesos (Limassol) Forest and, in 1996, in Troodos National Forest Park. Quickly, the population increased and dispersed throughout the park. The Troodos National Forest Park has an area of 9,337 ha and, with 72 endemic plants, the highest biodiversity in Cyprus. For that reason, wild boars have the potential to cause considerable damage to the local flora and fauna. On 6 November 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 wild boar, hunting was permitted and the game wardens were instructed to eliminate free-ranging animals. The attempt to eradicate wild boar failed. The reasons for the failure are discussed.

Key words: Alien species, Cyprus, Cyprus mouflon, reintroduction, wild boar.

INTRODUCTION

Cyprus is an island of oceanic origin that has been isolated from the nearby mainland for the last 5 million years (Hadjisterkotis et al. 2000). Geographic isolation has led to the evolution of a large number of endemic species of plants and animals (Anonymous 1992, Hadjisterkotis and Masala 1995, Christodoulou 1996, Hadjisterkotis et al. 2000). Late Pleistocene fossil and subfossil sites in Cyprus consist almost exclusively of the extinct endemic pygmy hippopotamus *Phanourios minutus* Cuvier (Simmons 1988a, 1988b, 1989, 1991a, 1991b, 1991c, 1992, Reese 1992, 1995, Hadjisterkotis and Masala 1995, Reese 1996, 2001) and the extinct pygmy elephant *Elephas Cypriotes* Bate (Simmons 1988a, 1989, 1991a, 1991b, 1991c, 1992, Reese 1992, Hadjisterkotis and Masala 1995, Reese 1995, 1996, Simmons 1996, 1999, 2001, Reese 2001).

Recent evidence from excavations at Akrotiri-Aetokremnos (or «Eagle's Cliff») indicates an association between cultural remains and extinct fauna on Cyprus, which indicates that man was involved in the extinction of these species (Simmons 1988a, 1988b, 1989, 1991a, 1991b, 1991c, 1992, 1996, Reese 1996). After the extinction of

the endemic large mammals of Cyprus, humans began experimenting with the introduction of several large game species and early strains of domestic animals, such as the Mesopotamian fallow deer *Dama mesopotamica* Brook, mouflon *Ovis gmelini* Blyth, domestic pigs *Sus scrofa* L., Bezoar goat *Capra aegagrus* Erxleben, wild ox *Bos primigenius* Boianus, and red fox *Vulpes vulpes* L. According to Vigne (2001), the introduction of those species occurred as early as the end of the 9th millennium cal B.C.E. Some of those species, such as deer, fox, and mouflon, managed to spread to the wild, and became important game species. Of those species, only the mouflon and the fox remain.

For several thousand years, no large wild mammals were introduced to the island. In the last two decades, two new species have been introduced. About 20 years ago, the Department of Forestry introduced European fallow deer *Dama dama* Linné. Although it was brought to the island as a “reintroduced” species, after authorities realized that the introduced animals were not Mesopotamian fallow deer, they were not released into the wild.

In 1990, Nicolas Fournaris, from the village of Pareklisia, imported five wild boars from Greece for game farming. Hunters, the owner of the farm, and several government officials saw the introduction of wild boar on the island as a great opportunity for Cyprus to acquire a large game mammal.

In this paper, I report on the introduction of wild boar on Cyprus, how and where it was introduced, and the problems expected from this introduction. Finally, I analyse the decision and attempts to eradicate wild boar from Cyprus, and why attempts to date have failed.

TO RELEASE OR NOT TO RELEASE – THE DEBATE

The first person to recommend the release of wild boar to the wild from the Pareklisian wild boar farm was the late Officer of the Game and Fauna Service for Lemesos District, Savvas Savva (From the files of the Ministry of the Interior, file No. 97/93). On 5 July 1993, Savva prepared a manuscript entitled, “Suggestions for the release of wild boar in Lemesos Forest.” This report was submitted officially by the District Officer of Lemesos District to the Permanent Secretary of the Ministry of the Interior, accompanied by a letter providing his full support for the release of wild boar. The suggestion was followed by a letter from the owner of the farm dated 9 September 1993, which informed the Permanent Secretary of the Ministry of the Interior and President of the Game Fund that the farm owner wanted to supply the Game Fund with male wild boar for £800 Cyprus pounds (1365 Euros) each, and females for £1000 C.P. (1706 Euros) each.

The Head of the Game and Fauna Service, Mr. Costas Papamichael, wrote to the Permanent Secretary of the Ministry of Agriculture, Natural Resources and Environment (MANRE) on 6 October 1993, informing them about the intentions of the Game Fund, and asking for their opinion. The MANRE, with a letter dated 29 November 1993, strongly rejected the release of wild boar into the wild.

I also wrote a report in which I presented the negative aspects of such an introduction. In addition, I requested the opinion of the former professor of wildlife Biology at McDonald College of McGill University Dr. Roger Bider. In a letter dated 13 December 1993, Professor Bider advised us “not to allow an introduction”.

After these developments, on 17 February 1994, the director of the Game Fund wrote to the owner of the farm to inform him that there would not be a release of wild boar. Ultimately wild boar “escaped” from the Pareklisia farm into several localities.

THE INTRODUCTION OF WILD BOAR ON CYPRUS

In the summer of 1990, the first wild boar, a female, escaped from the Pareklisia farm, but her owner recaptured her eight months later. The owner of the farm took that as proof that wild boar can survive in the wild in Cyprus without difficulty and without causing any agricultural damage (N. Fournaris, pers. commun. 1990). On 6 September 1991, the first four piglets were born in captivity and, from that time, the number of animals began to multiply. In 1992, I visited the farm and I noticed that the colour of the piglets was variable. Not all of the piglets had the characteristic stripes of wild boar piglets. Some of the piglets were white or had stripes mixed with white patches, which indicates that they were the product of crossbreeding between wild boar and domestic pig.

In December 1994, five pregnant females and one male were released from the farm into the Lemesos Forest. Although the owner claimed that the release was done in the night and without his permission by persons unknown to him, he demanded that the government compensate him for the cost of the animals (about 1365 Euros each) because the released animals could be used for hunting. His demand was rejected. In November 1995, it was estimated that there were 60-90 animals in Lemesos Forest and, in August, the first five animals were shot by hunters (Anonymous 1995, Hadjisterkotis 2000).

In 1996, a new release took place by hunters at the edge of the Troodos National Forest Park, near the village of Kato Amiantos. At the beginning of 1997, small groups of wild boar were present in three parts of the forest. At the same time, a

group of animals was invading crops in the Amiantos area. Another group was damaging orchards, potato fields, and vegetables near Kyperounta, which brought many complaints from individual farmers and the three farmers's unions.

DECISIONS AND ACTIONS TAKEN FOLLOWING THE RELEASE OF WILD BOAR

Following the release of wild boar, a number of animals invaded agricultural crops and created numerous problems, which brought many complaints from farmers. Because of the complaints and the fear of the spread of disease, on 29 September 1997, the Council of Ministers decided to give the Minister of the Interior and MANRE the right to remove the wild boar from the wild using all possible means.

After that decision, on 20 November 1997, the problem of free-ranging wild boar was discussed in a meeting at the Ministry of Agriculture, Natural Resources and Environment, under the direction of the Permanent-Secretary of the Ministry. There, it was decided that game wardens of the Game Fund must eliminate the free-ranging animals. The decision was repeated in the decisions of the Council of Ministers 153/99 (dated 17 June 1999). In addition, it was suggested to the owner that the animals on his farm be used for meat production, only. In the same month, the late S. Savvas (d.1999), who became the director of the Game Fund in 1997, said that he had the opportunity to shoot 10 wild boars near Kato Amiantos, but he chose not to do (Anonymous 1997). Pantelis Hadjigerou, Officer of the Game Fund in Lemesos, told me that the released wild boars appeared to be rather tame. In one instance, he followed them with his dog and came across a female boar, which gave birth under the cover of a golden oak *Quercus alnifolia* Poech. The sow came out of her cover and attempted to chase away the dog by pushing the dog with her head, but she did not cause harm to the dog. The sow was unharmed and left to tend to her piglets.

According to Dr. Christos Papachristophorou of the Agricultural Institute of Cyprus (pers. commun.), a farmer in Amiantos used poisoned bait in his apple orchard to eradicate wild boar. The bait was discovered by the game wardens of Lemesos, who kept a close eye on the population, but never acted to harm the pigs. The game wardens removed the bait, and warned farmers that if they did it again they would be reported to the appropriate authorities. In areas with considerable crop damage, the Game Fund did not take measures to eradicate the pigs; rather, they gave farmers propane-powered noisemaking cannons to scare the animals away from the area (Hadjisterkotis 2000).

In a confidential letter to the director of MANRE, which was published in the magazine "*O Kynigos*" (The Hunter) as "confidential" (Anonymous, 1998) and dated

30 March 1998, the Director of the Game Fund stated, “during the hunting season five or six animals were shot by hunters near the villages of Kato Amiantos, Pelentri, Dymes, and Potamitissa. In October 1997, a farmer killed two or three animals. Four dead animals, which probably were poisoned, were found by hunters.

In October 1999, the Minister of the Interior declared that the wild boar is a game species, and permitted hunting between 31 October 1999 and the end of the year, on Wednesdays and Sundays, only. Wild boar hunting has been permitted since then, at approximately the same time period each year.

On 16 November 2000, the Council of Ministers decided to compensate the owner of the wild boar farm with £180,000 C.P., and to slaughter all of the animals.

Following the decision of the Council of Ministers, the Game Fund did occasional patrols in search of wild boar, but without success (file No. red 26, Aug. 18, 2000).

After 18 August 2000, Hadjigerou, who replaced the late Savva as the director of the Game Fund, reported that the game wardens began armed night patrols in the areas having wild boar and that they shot nine animals (File No. red 152, 4 September 2000).

During a meeting at MANRE on 17 October 2000, it was decided to create a committee that included members of the Forestry Department, the Environmental Service, the Agriculture Department, the Veterinary Service, the Game Fund, and the Ministry of the Interior, under the direction of the Ministry of the Interior, who would supervise the eradication program.

On 18 December 2000, the committee held its first meeting where they reviewed the situation. To give the director of the Game Fund time to consider possible solutions and to present them to the committee, the committee decided to meet again on 28 December 2000.

During the second meeting the committee decided that the Game Fund should bait wild boar with potatoes at five locations in the Troodos Mountains, to attract the pigs for future trapping. The Veterinary Department recommended that the animals should be fed for nine days and, on the tenth day, shot using rifles from the police force.

In a report to the committee, the Game Fund stated that, from 8 January 2001 to 4 March 2001, they used corn and the liquid leftovers from the process of making Cypriot cheese, Halloumi (which is very attractive to domestic pigs), as bait at seven bait stations. Corn, but not the liquid leftovers, was used during snowy conditions.

During the third meeting on 16 March 2001, the director of the Game Fund concluded that the bait trials were a failure. To eradicate the wild boar, they recommended that foresters and game wardens drive the animals towards a line of hunters. The director of the Game Fund strongly opposed the idea because he tried that approach and felt that it is very dangerous. Troodos Forest is covered with black pine *Pinus nigra*, and visibility is limited; therefore, there is a possibility

that the shooters might accidentally shoot the individuals driving the animals. During that meeting, I made three recommendations, and identified methods that are used with some success in other countries. My first recommendation was to use warfarin, which was rejected because of the danger of poisoning foxes that scavenge dead pigs. It should be noted that foxes are not a protected species and are considered vermin by the Game Fund. My second recommendation, also rejected, was to use females in estrous to lure males into traps. My third recommendation was to capture wild boar using more than 500 Aldrich spring-activated snares (see design in Anderson 1971, page 511). Eric Baubet of the O.N.C. informed me that hunters use those snares to capture wild boar in Japan. That recommendation was accepted, but the Game Fund had difficulties using Aldrich spring-activated snares, so they decided to use conventional snares. Finally, the committee decided to experiment with using snares in one valley and a line of hunters to search for and shoot the pigs in another valley, a method supported mainly by the Game Fund. The snares and the three consecutive drives were unsuccessful.

On 24 March 2001, a live trap was constructed and used. On 3 June, 2001, a pig was captured, but it escaped after damaging the trap. On 16 June 2001, a pregnant female with seven embryos was captured. After that success, locals visited the area and interfered with the trap, which forced the game wardens to move the trap to another location, where another female was trapped. There were reports, however, that locals constructed their own, similar traps, and they set them up to trap pigs. The last meeting of the committee was on 23 April 2001.

WILD BOAR HUNTING

Although wild boar was declared a game species, it did not attract many hunters. The number of wild boar shot in the last three years ranged from three to five animals per year. Although it did not attract big game hunters, based on information from local individuals and game wardens, local people (mainly from Amiantos) were actively involved in the poaching of wild boar. The game wardens encountered people who were using broccoli as bait to attract the pigs for shooting. In addition, they were setting up their own live traps, and were making every attempt to prevent others from interfering with the pigs. No record of total numbers of boars killed is available.

According to Birmingham (1983), in most areas that have feral hogs, it is unlikely that every hog can be eradicated. Theoretically, it is possible, but the cost of doing so is prohibitive. Unsuccessful hunting will make hogs seek cover and a change in feeding habits can occur. According to Elman (1986), a hunter probably should use nothing lighter than 180-grain loads in a .30-06 rifle, which are not allowed on Cyprus.

Dogless hunters rarely encounter boars because boars will usually detect a man's scent before he comes into view, and a wild boar's erect ears detect slight sounds from a distance. In Cyprus, only 12-gauge two-barrel shotguns are allowed, and hunters use lead shot for hunting chukar partridge and hare. Most of the hunters hunt without dogs; therefore, it appears that it is unlikely for the inexperienced Cypriot hunters to eradicate wild boar.

According to Papachristophorou, no agricultural damage has occurred in the area of Troodos recently. It is probable that a change in feeding habits occurred, as was reported by Birmingham (1983). Wild boars have learned to avoid gardens and, instead, search for acorns and other wild plants, thereby exerting greater pressure on local endemic and indigenous species.

Currently, the way in which hunting and chasing of wild boar is done on the island is expected to force the animals to seek refuge in remote areas, disperse over a wider range, and to condition them to avoid humans, particularly hunters. That will make the eradication of wild boar more difficult and more expensive, and will prolong the problem.

The most appropriate time for the eradication of wild boar was immediately after the decision of the Council of Ministers in 1997. It appears that at that time there was no willingness by officers assigned to the task to take serious action. Currently, wild boar control is still at a very low intensity. According to Lowe et al. (2000), management of this invasive species is complicated because complete eradication is often not acceptable to communities that value pigs for hunting and food, which seems to be true in Cyprus. The people who were assigned to execute the eradication are the same people who first recommended releasing wild boar. The local people who are interfering with traps are the same people who bought the animals and released them in the forest.

PROBLEMS EXPECTED FROM THE INTRODUCTION OF WILD BOAR

According to Bibby et al. (1992), Cyprus is the only area with endemic birds in Europe and the Middle East. In addition, Cyprus is a centre of plant diversity (WCMC, 1992), and half of the 11 terrestrial mammals in Cyprus are considered endemic subspecies.

Troodos Forest is one of the most important areas on the island for endemic species. According to Christodoulou (1996) of the Forestry Department of Cyprus, the number of plant species in the Troodos National Park is estimated to be 780. Of the 139 endemic plants in Cyprus, 72 are found in the park, and 16 of these are locally endemic. In addition, 58 non-endemic species are restricted to the

National Park. Of the 19 species protected by the Bern convention (European Community Environmental Legislation 1992), six are found in this National Park, as are 19 taxa, that are threatened (according to the Red List of Threatened Species of the IUCN).

The IUCN/Species Survival Commission (SSC) Invasive Specialist Group set recommendations for reducing the risk of losing biodiversity caused by alien species. Those guidelines are designed to assist governments meet their obligations under the Convention on Biological diversity (Clout and Lowe 1997). According to the guidelines, "... in general, no alien species should be deliberately introduced into any natural habitat, island, lake, sea, ocean or centre of endemism, whether within or beyond the limits of national jurisdiction."

In the last few hundred years, the introduction of alien species by individuals transporting them across biogeographical boundaries has been, along with habitat destruction, a major cause of ecological change throughout the world (Clout and Lowe 1997). Many alien species have become invasive, establishing themselves in natural ecosystems, disrupting ecological processes, and often causing widespread extinctions by competing with or preying on native species. Many of those extinctions have gone unrecorded, but there is an increasing appreciation of the massive ecological costs of biological invasions caused by the irretrievable loss of native biodiversity, and greatly altered ecosystems. Biological invasions threaten biodiversity, globally.

According to Lowe et al. (2000), feral pigs introduced into many parts of the world damage crops, stock and property, and transmit many diseases, such as Leptospirosis and Foot and Mouth Disease. Rooting pigs dig up large areas of native vegetation and spread weeds, which disrupt ecological processes, such as succession and species composition. Wild boar are omnivorous and their diet can include juvenile land tortoises, sea turtles, sea birds, and endemic reptiles. Pigs are predators of lambs in New South Wales, Australia (Pavlov et al. 1981, Pavlov and Hone 1982), and carriers of exotic diseases (Pavlov et al. 1992). According to Hadjisterkotis (2000), free-ranging wild boar are expected to cause considerable damage to Cypriot endemic plant species and wildlife, including competing with the endemic Cyprus mouflon *O. g. ophion*. The most vulnerable plants are probably the lilies, which might be selectively eliminated by wild boar. Nesting partridges are also expected to be affected, which would reduce the numbers of a major game species for Cyprus, as well as the endemic Cypriot whip snake *Coluber cypriensis*.

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