

THE CONSERVATION OF THE ENDEMIC GRASS SNAKE *NATRIX* *NATRIX CYPRIACA* IN CYPRUS

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INTRODUCTION

A pattern affecting historical extinctions for birds and mammals is that they are concentrated on islands (Diamond, 1984). For birds, 171 species and subspecies have gone extinct since 1600, and over 90% of these extinctions have occurred on islands. For mammals out of 115 documented historical extinctions, 36 percent of these have occurred on islands. Although reptiles have lower rates of extinction than birds or mammals (Case and Cody, 1987), similar pattern of extinctions are observed for them as well (Case *et al.* 1992).

This pattern is in part an unsurprising consequence of island populations. They are small and isolated; thus they cannot recover from local extirpation following environmental perturbations or long-term climatic changes by immigration from other areas (MacArthur and Wilson 1967; Leigh, 1981).

Cyprus is the third largest island in the Mediterranean, with an area of 9,251 km². It is a 15 million year old island of oceanic origin which has never been connected to the mainland (Boekschoten and Sondaar, 1972). As a result, all terrestrial mammals or reptiles of the Pleistocene or later date would have had to reach the island by swimming, drifting on floating vegetation or wood, or to have been imported by humans.

Cyprus has a rich endemic fauna, but similar to many other islands, also a high rate of extinctions. Twelve of the 21 recorded mammalian taxa are extinct, including 60% of the endemic species and 20% of the subspecies (Hadjisterkotis and Masala, in preparation). Four avian taxa are extinct of which one was considered by some authors as endemic (Flint and Stewart, 1983). No extinct reptiles are known in Cyprus, although the endemic Grass Snake (*Natrix natrix cypriaca*) was considered as extinct since the 1960s (Teschner *et al.* 1992). Presently, this snake is an isolated endangered species. In this note we review the status of this snake, present some factors which might be limiting for the population, and suggest measures for its conservation.

THE HISTORY OF THE GRASS SNAKE IN CYPRUS AND ITS LIMITING FACTORS

There is only one endemic species of snake on Cyprus (*Coluber cypriensis*) which is rare (Schätti 1985), and only one endemic subspecies, the Cypriot Grass Snake. The Grass Snake, was first mentioned as (water-snake) by Dr. J. Sibthorp, who visited Cyprus in 1787 (Cobham 1908). Boulenger (1888) in his list "On Reptiles and Batrachians from Cyprus" lists the Grass Snake as *Tropidonotus natrix*. This snake was not common in Cyprus, however it was believed that after the early 1960s

it was extinct. A recent literature review on this snake since 1930, was presented by Teschner *et al.* (1992) after the rediscovery of the snake.

The Cypriot Grass Snake presents an amazing variety in colour patterns in what seems to be a mixed population. Although more research is necessary it seems that the genetic (type) composition of this population is unique and must be an endemic species or subspecies of *Natrix natrix*. It is certain that this population is of much scientific interest and more research is necessary to understand its taxonomic status (Teschner *et al.* 1992). However, the major problem which this snake is facing is extinction. The population is estimated to be at least 80 individuals and is restricted to a single artificial dam. The estimate was based on the number of snakes seen by walking around the dam, and might be underestimated. The area of this dam is 9,600m², and is 46 m deep. Searches by the junior author at nearby dams during the last two years had negative results. Also, from 1985 to 1989, during Ph.D. research on the Cyprus mouflon by the junior author at Paphos Forest, he had the opportunity to walk across the river beds of several valleys while searching for mouflon carcasses. These were the valleys Limnitis, Koufoplatanos, Stavros tis Psokas, Ayia and Sarama. During these walks no Grass Snakes were observed.

A danger that this snake might face in its habitat is predation from the introduction of trout (*Salmo* spp.) into the dam by the Fisheries Department to "improve" local fishing. Trout are regular predators on snakes particularly on juveniles and are a major threat for Grass Snakes (Bohme, personal correspondence). Endemic island species are vulnerable to extinction, because they have been isolated on islands lacking predators for long periods of time and have presumably become relatively defenseless to introduced predators (Case *et al.* 1992).

Introduction of non-native fishes and invertebrates to "improve" local fishing has been a worldwide phenomenon for well over a century (Courtenary and Stauffer 1984; Moyle 1986). Introduced fishes occasionally replace native species in natural habitats through competition or predation, but most replacement occurs in altered environments that provide the introduced fishes an ecological advantage.

Trout fishing is a popular sport in Cyprus, and is the attraction of a large number of fishermen to the dams. Cypriots recognize the ecological importance of snakes, however, most of the people believe that only black snakes are not poisonous. As a result they tend to kill any snake which does not look like a *Coluber jugularis*, i.e., is not completely black. As a result many fishermen who might encounter a Grass Snake at the lake throw stones at it trying to kill it.

The conservation of this small and isolated population of endemic Grass Snake is a must, so we will not be responsible for the loss of another island species.

SUGGESTIONS FOR CONSERVATION

The continued existence of this rare aquatic snake will depend on the establishment of aquatic areas managed specifically for their endemic reptilian resident, free from introduced non-native fishes.

No more trout should be introduced into the dam inhabited by Grass Snakes, and the existing fish should be removed.

All fishing activities in the area should be forbidden in order to keep people away from the dam.

A leaflet should be published by the Department of Fisheries of Cyprus informing people about the existence of Grass Snakes in the dams of Cyprus. This leaflet should be given to the fishermen together with their fishing license, informing them that these snakes are not poisonous and that they should be protected.

A number of Grass Snakes should be transferred to nearby dams in order to establish new populations.

Water quality should be monitored to avoid negative effects from pollution on the snakes, or on the frogs (*Rana ridibunda*) in the area, which is the main food item of this serpent.

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