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# The herpetofauna of Lipsi (Dodecanese, Greece) and nature conservation aspects

Die Herpetofauna der Insel Lipsi (Dodekanes, Griechenland) und Aspekte des Naturschutzes

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KURZFASSUNG

Von der Nord-Dodekanes Insel Lipsi waren bisher eine Amphibien- und fünf Reptilienarten nachgewiesen. Nun kommen *Ablepharus kitaibelii* und *Cyrtopodion* (*M.*) *kotschyi* dazu. Lipsi soll Teil eines geplanten Meeres-Nationalparkes werden. Es werden darum die derzeit nicht nachhaltigen Aspekte der Landnutzung kommentiert und einige Anregungen für Verbesserungen unterbreitet. Als größtes Problem wird die Überbestoßung durch Kleinvieh geortet. Weiters sollte die Zersiedelung der Insel durch raumplanerische Maßnahmen verhindert werden. Für *Bufo* (*P.*) *viridis* sind Rettungsmaßnahmen zur Erhaltung der Laichplätze vordringlich.

ABSTRACT

The island of Lipsi in the Northern Dodecanese was known to be home to one amphibian and five reptile species. *Ablepharus kitaibelii* and *Cyrtopodion* (*M.*) *kotschyi* have now been added to the list. Lipsi is to become part of a maritime national park. In this context the paper addresses today's non-sustainable aspects of land use and makes suggestions for improvements. The biggest problem identified is excessive grazing by small livestock. Spatial planning measures are also proposed to prevent uncontrolled real estate development. Above all there is an urgent need for measures to protect the spawning grounds of the *Bufo* (*P.*) *viridis*.

KEY WORDS

Amphibia, Reptilia: *Cyrtopodion* (*Mediodactylus*) *kotschyi*, *Ablepharus kitaibelii*, herpetofauna, new island records, nature conservation aspects, island of Lipsi, Dodecanese, Greece

## INTRODUCTION

The Northern Dodecanese island of Lipsi (Lipsoi) has an area of just17 km$^2$ and is an insider tip for for those who want to spend individual Greek island holidays. Lipsi lies 12 km east of the island of Patmos and 11 km north of Leros. It has a maximum elevation of 277 m. The west of the island in particular is extremely dry and stony, while the eastern part has some gentle fertile valleys that permit cultivation and human settlement in places. Lipsi's about 600 inhabitants are concentrated in the port, while new holiday homes are mainly to be found along the east coast. The Lipsiots live mainly on tourism and agriculture, with a focus on stock farming and fishing.

In 1999 Lipsi and the 24 islets in the vicinity form an archipelago, which – together with Arki and Agathonisi – was made the subject of scientific study by the HELLENIC ORNITHOLOGICAL SOCIETY (HOS) in the framework of the Natura 2000 programme (proposed Sites of Community Interest pSCI GR 4210010, Special Protected Areas SPA GR 4210013). The main focus was directed on the marine ecosystems and avifauna (e.g. *Larus audouinii*). The flora is also diverse and includes a number of endemic species such as *Allium dodecanesii* (PANITSA & TZANOUDAKIS 2001; HELLENIC ORNITHOLOGICAL SOCIETY 1999).

In the Northern Dodecanese a wildlife refuge has been established comprising fourteen islets in the Arki area. There are plans to extend it to create a maritime park called "Northern Dodecanese Islands and Islets National Park" in the archipelago of Lipsi, Arki and Agathonisi" with a total of 52 islands and islets (personal communication by Anastasia MILIOU on 16.1.2007 and < www.archipelago.gr >).

The focus of this paper is put on the herpetofauna of Lipsi and the nature conservation measures to be taken in anticipation of the island's inclusion in a maritime national park.

## HERPETOFAUNA

### The literature

Little herpetological research was done on Lipsi until well into the 1980s (Foufopoulos 1997), with just three bibliographic references to be found relating to the two snake species *Hemorrhois nummifer* (Reuss, 1834) (Chondropoulos 1989) and *Montivipera xanthina* (Gray, 1849) (Nilson & Andren 1986; Tiedemann & Grillitsch 1986). Clark (1968) was the first to record the Ottoman Viper in the Eastern Aegean, on Leros und Patmos. The first find on Lipsi is dated 1984 (Naturhistorisches Museum Wien, Inv. Nr. 28303, shedding of the skin, leg. Grillitsch). In her herpetological survey of the Dodecanese, Dimaki (2002) mentions only these two snake species, which testify that in an earlier geological period Lipsi was connected to Anatolia.

Heinz Grillitsch (personal communication on 21 January 2007) also mentions his sighting of *Bufo* (*Pseudepidalea*) *viridis* tadpoles in a pool near the port, which he visited at the beginning of May 1984 (Naturhistorisches Museum Wien, Inv. Nr. 28317, leg. Tiedemann).

Andreas Meyer of the Office for the Protection of Amphibians and Reptiles in Switzerland (KARCH) visited Lipsi in April and October 1996. He was able to observe *Bufo* (*P.*) *viridis* Laurenti, 1768, *Platyceps najadum* (Eichwald, 1831), *Ophisops elegans* Ménétries 1832, *Hemidactylus turcicus* (Linnaeus, 1758), *M. xanthina* and – as a new sighting – *Cyrtopodion* (*Mediodactylus*) *kotschyi* (Steindachner, 1870) (unpublished e-mail dated 28.9. 2007).

In his paper on the Northern Dodecanese, Foufopoulos (1997) produced the first records of *H. turcicus turcicus*, *O. elegans macrodactylus* Berthold, 1842 and *P. najadum dahlii* Schinz, 1883 and confirmed *M. xanthina*. Clark (2000) was not familiar with the work of Foufopoulos (1997) when he visited Lipsi and Agathonisi in June and July 1998. He quotes Paul Perry, an Australian herpetologist he met on the island who thought that Lipsi had no lizards. Clark himself saw no lizards during his visit to Lipsi. He said it was unwise to exclude the possibility of their presence on the island, however, but concluded that they must be very rare. During his visit to the island, Foufopoulos (1997) found just one specimen of *Ophisops*. Clark (2000) was also able to confirm the presence of *B.* (*P.*) *viridis* in the vicinity of the port, and he found a freshly killed *M. xanthina*, 72 cm in length.

Grillitsch & Grillitsch (1999) also list *Telescopus fallax* (Fleischmann, 1831) for Lipsi on the basis of records at the Senckenberg Research Institute and Natural History Museum, Frankfurt am Main (SMF 68591, 69029).

The Hellenic Ornithological Society (1999) kindly made available an unpublished table of the herpetological species observed on islands and islets including Lipsi. The table provides the first record of *Ablepharus kitaibelii* (Bibron & Bory de Saint-Vincent, 1833) and includes sightings of *P. najadum*, *T. fallax*, *H. nummifer*, *M. xanthina* and *B.* (*P.*) *viridis*, but not *C.* (*M.) kotschyi*, *H. turcicus* or *O. elegans*. *Emys orbicularis* (Linnaeus, 1758) is also to be found on the list. When queried, it was stated that that sighting related to a shell found in a dry channel near Mersina on the north coast, which may have been washed up from the sea.

### The author's observations

During my visit to the island from 9 - 20 April 2007, no surface water was to be found. The vegetation was suffering from an extremely dry and warm winter, and it had become necessary to import water from Rhodes.

The first day of my visit brought a sighting of a Snake-eyed Lizard (*O. elegans*). It must be a familiar sight on the island and not rare at all. Why Foufopoulos (1997) only saw the species once and several other herpetologists not at all is hard to understand, as it is relatively easy to find. Perhaps the explanation is the season in which they did their field work.

Confirmation was also found for *A. kitaibelii* as listed by the Hellenic Ornithological Society (1999). The Snake-

Fig. 1: A brightly colored juvenile *Montivipera xanthina* (GRAY, 1849) on the road near Agios Giannis, Island of Lipsi, Dodecanese, Greece.

Abb. 1: Leuchtend gefärbtes Jungtier von *Montivipera xanthina* (GRAY, 1849) auf der Straße bei Agios Giannis, Insel Lipsi, Dodekanes, Griechenland.

eyed Skink is also common throughout Lipsi, and was found particularly frequently in the west of the island around Moschato. Dahl's Whip Snake (*P. najadum dahlii*) was sighted on 16 April 2007 to the west of the port in the area of Limni. In the vicinity of Agios Giannis in the east of the island, a young farmer described ritualized combat between two snakes, which from the description were identified as Dahl's Whip Snakes. The Turkish Gecko (*H. turcicus*) was observed several times in and near wells around the village.

Fig. 2: The juvenile from figure 1 was sighted following the new kerb of a road with edge stones on both sides – a veritable trap for the Ottoman Viper.

Abb. 2: Das Jungtier von Abbildung 1 wurde beim Abgehen der neuen, an beiden Seiten der Straße angebrachten Bordsteinkanten beobachtet.

A 60 cm specimen of *M. xanthina* was found recently killed on the road near Moschato on 10 April 2007. A brightly colored juvenile, about 30 cm long, was seen following the kerbstone of the road near Agios Giannis on 11 April 2007 (Fig. 1). We also found an intact skin shedding, measuring about 70 cm, to the north of the village in a vegetable garden. There have been reports of Ottoman Viper bites on the island, but they are not thought to have been fatal. On Leros it is known that victims have been hospitalized.

On 12 April 2007 Peter GOOP found the carcass of a Loggerhead Sea Turtle *Caretta caretta* (LINNAEUS, 1758) near Kissiria on the north coast of the island. There are many reports of the turtles being trapped in fishing nets. There are no suitable biotopes for *E. orbicularis* on Lipsi.

Andreas MEYER's unpublished sighting of Kotschy's Gecko *C.* (*M.) kotschyi* was confirmed. FOUFOPOULOS (1997) found this gecko on Lyra, an islet lying just a few hundred metres to the south-east of Lipsi. The HELLENIC ORNITHOLOGICAL SOCIETY (1999) also recorded its presence on Lyra as well as on North and South Aspronisia to the east. On the last day of our stay on Lipsi, after repeated searches of the island's numerous dry-stone walls, we managed to find Kotschy's Gecko on an elevation near Papadria, which is within sight of Lyra in the south. In view of the many suitable bio-

topes on the island, it is difficult to say why this gecko, which is otherwise common in the Aegean, should be so rare on Lipsi.

From descriptions given by vegetable growers, I consider it possible that the worm-snake *Typhlops vermicularis* (Merrem, 1820) is to be found on Lipsi. The presence on the island of the agama *Laudakia stellio daani* (Beutler & Frör, 1980), on the other hand, can be ruled out, although I have seen it on Leros and Patmos.

With one amphibian and seven reptile species, the herpetofauna of Lipsi is meager. On nearby Leros which is, however three times as big, there are also populations of *Testudo graeca* Linnaeus, 1758, *L. stellio*, *Blanus strauchi* (Bedriaga, 1884), *T. vermicularis*, *Eryx jaculus* (Linnaeus, 1758), *Dolichophis caspius* Gmelin, 1789, *Eirenis modestus* (Martin, 1838) and *Natrix natrix* (Linnaeus, 1758) (Broggi 1997).

## NATURE CONSERVATION AND ENVIRONMENTAL PROTECTION ASPECTS

Like the Southern Dodecanese island of Tilos, Lipsi is an attractive individual holiday destination for nature-lovers and culture tourists (Broggi 2006). For package holidays, on the other hand, the island has little to offer in the way of attractive beaches or historical sights, and is also relatively remote. Even so, there are certain things on Lipsi that are not conducive to sustainable development and need to be addressed in the context of the creation of a national park. These aspects are discussed below with the emphasis on conservation of the island's herpetofauna.

### Water supply

There is a shortage of water on Lipsi. Demand for water for irrigation and above all tourism outstrips supply, and it accordingly has to be imported. Open tanks were originally used to collect water, but they have been largely replaced by groundwater pumps in the valley flats. The high level of consumption is causing the watertable to sink so that the pumps have to be relocated at a greater depth. That in turn causes increased intrusion of salt water from the sea and thus higher levels of salinity in the groundwater. These changes in water management and the properties of the water are an existential threat to *B.* (*P.*) *viridis*, which is losing its last spawning grounds of anthropogenic origin – having long since lost its natural spawning grounds. Unless targeted measures are taken to protect their spawning grounds, the Green Toad populations on Lipsi will die out.

### Infrastructure upgrade projects with EU funding

Lipsi, too, has its blue EU notice boards showing the funds invested in the individual case. Whereas the money may have been spent wisely in the island's port, there is reason for scepticism with regard to the new oversized roads leading to infertile areas. Above all, highway construction is a door-opener for uncontrolled real estate development. Sealed asphalt roads instead of the traditional dirt tracks are a threat to *M. xanthina* in particular, as shown by the dead specimen found. The juvenile reported above was sighted following the new kerb of a road with edge stones on both sides – a veritable trap for the Ottoman Viper (see Fig. 2).

### Waste disposal

Most of the islands are still far from having a properly managed waste disposal system. Most of them have uncontrolled tips, which are usually left burning, and waste material sometimes drops into the fissures and gullies and ends up in the sea. That is the case on Lipsi. The result is improved nutrition for the Brown Rat (*Rattus norvegicus*) and Carrion Crow (*Corvus corone*), which can impact the whole ecosystem. The Brown Rat is a common sight on Lipsi, and the Hooded Crow (*Corvus cornix*) appears to be unusually numerous. Together with the Little Owl (*Athene noctua*), they are one of the most striking features of the island's fauna.

## Spatial planning

Greece does not have a land register. Any plot of 4 stronas (= 4000 $m^2$) or more may normally be used to construct a building that is up to 200 $m^2$ on plan. That general rule permits uncontrolled property development, and this is in fact happening on Lipsi on the north-east, east and south-east coasts. Signs offering land for sale are a frequent sight in the open country. The focus of these construction activities is beach locations and other picturesque spots, which are also of importance for the island's herpetofauna.

## Overgrazing

The overstocking of the Greek islands with goats and sheep that has been encouraged by EU subsidies is the biggest environmental problem in the Aegean, with the traditional shepherd culture replaced by a system of uncontrolled grazing that takes no account of the grazing capacity of the land. Such developments are even to be observed on a number of islets around Lipsi. The result is degradation of the flora and increasing erosion. The miles of fences built on the island have become almost insuperable obstacles for tourists, and fire has also become a hazard, as the shepherds previously employed controlled burning to encourage fresh growth on the pastures. Among other things, overgrazing is a general threat to the endemic plant species on the islands. Overstocking also reduces the ecological margins and niches and hence the biotopes for the herpetofauna and their prey.

## Energy supply

Electricity is delivered to Lipsi via a cable from Leros. With their attractive wind conditions and long hours of sunshine, the islands would be well equipped to achieve independence in terms of energy supply.

## Organic farming

Given the island's attraction for nature lovers and culture tourists, it would make sense for local farmers to offer some organic produce for these visitors. A small step in that direction has already been taken with regard to the island's surprisingly large stocks of cattle, which are marketed as Lipsi Beef in one of the island's taverns.

## Protection of the species

From conversations with the local people, it is clear that they distinguish between the different snake species on the island. It is mainly the Ottoman Viper that they kill, and they do so whenever they find one. It is a wonder that the Ottoman Viper is still to be found on this little island; normally *M. xanthina* prefers locations that are rich in flora and even wet to semi-wet sites, whereas Lipsi is a dry place with meagre vegetation. It is true that the Ottoman Vipers on Lipsi are probably concentrated in the areas with the most vegetation, such as the flat land behind Lipsi village, where there are gardens and glasshouses, but that is also where conflict with human beings is most likely. Were these ecological niches to disappear as a result of further extensification of agriculture and subsequent overgrazing, the Ottoman Viper's future on Lipsi would become very uncertain indeed.

There is little awareness on the island of the need to protect the species. That is reflected in the treatment meted out to protected species like the Monk Seal (*Monachus monachus*) and sea turtles, which fishermen say they still kill. The empty shotgun shell cases lying around everywhere are indicative of the pressure of hunting on Lipsi, and the Chukar Partridge (*Alectoris chukar*), for example, is now a rare sight. That in turn means a loss of prey for snakes.

## Information for tourists

It would be beneficial to provide the individual tourists on Lipsi with more information, e.g. in the form of an illustrated nature guide. That would help extend the tourist season, which is currently concentred on the peak months of July and August. During our visit in spring, which is so interesting in terms of natural history, on the other hand, there were hardly any tourists on Lipsi. Signposted paths are also needed for tourists wishing to discover the natural environment.

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