

## The reptile fauna of the Island of Elafonisos (Peloponnese, Lakonia, Greece)

The Island of Elafonisos covers 18 km<sup>2</sup>; it has 25 km of coastline and a population of about 600 registered inhabitants (Fig. 1). The island, located in the Neapoli Bay at the southeastern tip of the Peloponnese, has not long been an island separate from the mainland, which is less than 600 m away. Elafonisos probably formed a peninsula of the Peloponnese until the Late Roman period. The Greek geographer STRABO and the Greek writer PAUSANIAS both wrote that Elafonisos was a “mainland island” (LEHMANN 1980). The cape was possibly detached in an earthquake that occurred in 375 A. D., although other dates have also been proposed (GLASER 2014). In the ancient period, the peninsula was called Ονου γνάθου [Onou Gnathou] or “Donkey’s Jawbone”. The modern name Elafonisos means “Deer Island”. The point separating the island from the mainland is thought to be the site of an Early Helladic city (2800–2000 B.C.), whose remains lie on the shallow seabed. The island was uninhabited for many centuries and served as a refuge for pirates. Resettlement, by Cretans and others, did not begin until the middle of the 19th century (LEHMANN 1980).

Elafonisos is roughly triangular in shape, with the apex pointing towards the mainland in the north and the base in the south extended to form promontories. The highest points are Siros (178 m a.s.l.) on the western side and Vardhia (276 m a.s.l.) in the east. Between them lies the deep arced bay of Sarakino, which has about two kilometers of attractive sandy beaches.

Elafonisos has no permanent superficial freshwater bodies, although in 1968 sixty wells were in use, chiefly by farmers for irrigation (JAGEL 1992). Today the vegetation on the island is mainly phrygana (syn. garrigue). The fertile areas in Lefki, Kato Nisi and the upland plain north of Vardhia are agricultural land. There are olive groves around Vardhia and on the northern coast.

Outstanding natural assets.- The island has little in the way of cultural sights. Nor is the landscape of this relative-

ly flat island in any way striking, although its location in the sound with its blue waters across from peninsular Lakonia and the Parnon mountains has a certain charm (LEHMANN 1980). With regard to plant sociology, the phrygana communities are classified under the Cisto-Micromerietea association. JAGEL (1992) studied the flora of Elafonisos in a thesis written at the Ruhr-Universität Bochum (Germany) and made the results available on the internet.

In terms of natural assets, the almost untouched sandy beaches – something that few Aegean islands can offer – are remarkable. Along the sandy coast there are white dune communities (Ammophiletum arenariae) (Fig. 2). The adjoining dune forests with *Juniperus oxycedrus macrocarpa* are typical in character, and the dune successions are still dynamic. For its part, wind-borne sand is to be found at the highest elevations on the island. A temporary pond some 1000 m<sup>2</sup> in size found in the northwest area of the island during the April visit (Fig. 3) was the site of flowering *Ranunculus peltata fucoides*, which JAGEL (1992) classified under the Isoeto-Nanojuncetea association.

The primary purpose of the field trip to the island was to see the unique sites of the endemic plant *Saponaria jagelii*, which is present on the island in two small communities and is classed as critically endangered (CR) on the IUCN list (MONTMOLLIN & STRAHM 2005).

The island of Elafonisos forms part of the Natura 2000 site GR 2540002 (Periochi Neapolis Kai Nisos Elafonisos) with a total area of 5,494 hectares. The site comprises the peninsula around Cape Maleas on the Peloponnese mainland, Strongyli Lagoon to the east of Pouda and the whole island of Elafonisos. It is of special interest to the natural scientist for its diversity and especially with regard to the endemic plant species *Linaria hellenica*, *Linum phytosianum* and *Saponaria jagelii* (Fig. 4) (NATURA 2000 DATA FORM GR 2540002 1995, 2009).

Herpetology notes.- No dedicated herpetological study was made of the island of Elafonisos except for a short note by PAFILIS (2012), which makes reference to the most southerly island occurrence of *Malpolon insignitus* (GEOFFROY DE SAINT-HILAIRE, 1809). On two days (14 and 15

September, 2011) he saw three specimens of this species and interpreted this as evidence of a larger population. He also remembered having seen *Lacerta trilineata* BEDRIAGA, 1886 and *Hemidactylus turcicus* (LINNAEUS, 1758) (PAFILIS in litt. 10 June, 2014).

On the Natura 2000 standard data form for 1995, with additions made in 2009, 21 amphibian and reptile species are listed for the area, although no distinction is made between mainland and island locations (NATURA 2000 STANDARD DATA FORM GR 2540002 1995, 2009). The species listed on the data form, arranged in alphabetical order and using the original names, are as follows: *Ablepharus kitaibelii*, *Algyroides moreoticus*, *Bufo bufo*, *Bufo viridis viridis*, *Coluber gemonensis*, *Coluber najadum dahlia*, *Elaphe situla*, *Eryx jaculus turcicus*, *Hemidactylus turcicus*, *Hyla arborea*, *Lacerta graeca*, *Lacerta trilineata cariensis*, *Malpolon monspessulanus insignitus*, *Maurernys caspica rivulata*, *Natrix natrix persa*, *Natrix tessellata*, *Ophiomorus punctatissimus*, *Podarcis peloponnesiaca lais*, *Testudo marginata*, *Typhlops vermicularis*, *Vipera ammodytes meridionalis*.

One of the sources for the list of species was the manual for the Corine biotopes project (WYATT et al. 1988), which was used for the data on *Ablepharus kitaibelii*, *Bufo viridis* and *Natrix tessellata*. From information provided by the herpetological expert Professor Basil P. CHONDROPOULOS (in litt. 2 June, 2014), it is clear that the list relates largely to the mainland, where only a short field trip was possible due to limited funds, and that the literature was also consulted. It seems possible that potential species were also listed. During a short visit to the island made at that time, Basil P. CHONDROPOULOS himself saw *Testudo marginata* SCHOEPFF, 1792, *Lacerta trilineata*, *Malpolon insignitus* and *Platyceps najadum* (EICHWALD, 1831).

Together with three colleagues, the author of this paper visited Elafonisos from 6-14 April, 2014. The weather was mainly sunny but rather cool, with maximum temperatures of 16-18 °C. The following species were observed during the visit to the island:

*Testudo marginata* SCHOEPFF, 1792 (Fig. 5).- On 8 April, a tortoise was discov-

ered by Günter Stadler and Wilfried Kaufmann at sea-level near the temporary pond in the west of the island near Cape Leptos. On 11 April, the author discovered another specimen, also at sea-level, in the north of the island near Cape Kaloghirou. The length of its carapace was 26.5 cm, while a further specimen with a carapace length of 28 cm was observed on the same day near Cape Leptos. On 13 April, two smaller tortoises were seen at about 200 m above sea-level at the northern foot of Vardhia, namely a semi-adult specimen and a juvenile with a carapace length of about 8 cm (G. Stadler, W. Kaufmann). The sixth specimen, with a carapace length of 29 cm, was observed on 14 April, on the Mavro Akrotiri Peninsula on the island's northern coast (P. Goop and the author). No information was obtained about potential nesting sites of *Caretta caretta* (LINNAEUS, 1758).

*Hemidactylus turcicus turcicus* (LINNAEUS, 1758).- Fewer finds were made of this species and never in the same location as the above gecko. Again, no specimens were observed on buildings, which would normally be the case. On 12 April, about ten specimens were discovered in a well in the Vighla area to the north of Vardhia.

*Mediodactylus kotschyi bibroni* (BEUTLER & GRUBER, 1977).- This gecko was not found, as would be normal for this time of the year, in the dry-stone walls or in other surface locations. A number of specimens were seen, however, in the many wells scattered across the island and, more rarely, under stones. This was the most frequently observed reptile during the field trip to the island.

*Lacerta trilineata trilineata* BEDRIAGA, 1886.- The Balkan Green Lizard seems to be present throughout the island but was not frequently seen.

*Podarcis peloponnesiacus peloponnesiacus* (BIBRON & BORY DE SAINT-VINCENT, 1833).- The visit to the island produced remarkably few lizard sightings, possibly due to the relatively low temperatures at the time. Only in the area of the temporary pond on Cape Leptos several specimens of the Peloponnese Wall Lizard were observed. They were extraordinarily shy, and long periods of observation were required merely to identify the species.



1 2



3 4





5 6



7



- Fig. 1: The Greek Island of Elafonisos south of the Peloponnese (map from GLASER 2014).
- Fig. 2: White dune communities and adjoining dune forests with *Juniperus* along the Sarakimiko Bay, Elafonisos.
- Fig. 3: A temporary pond and its vicinity in the northwestern part of Elafonisos near Cape Lepios; record locality of *Testudo marginata* SCHÖEPPF, 1792 and *Podarcis peloponnesiacus* (BIBRON & BORY DE SAINT-VINCENT, 1833) and important habitat to be protected.
- Fig. 4: *Saponaria iagelii* grows in the western part of the Greek Island of Elafonisos, the only known place to occur worldwide.
- Fig. 5: The Marginated Tortoise *Testudo marginata* SCHÖEPPF, 1792, seems to be common on the beaches of Elafonisos.
- Fig. 6: The legless Greek Snake Skink *Ophiomorus punctatissimus* (BIBRON & BORY DE SAINT-VINCENT, 1833), endemic to the Peloponnese and western Turkey, was not known from Elafonisos before.
- Fig. 7: The Cat Snake *Telescopus fallax* (FLEISCHMANN, 1831), is a new species to this Natura 2000 site.

*Ablepharus kitaibelii* (BIBRON & BORY DE SAINT-VINCENT, 1833).- The Snake-eyed Skink was frequently recorded on the island including the gardens of the Sogno Greco apartments.

*Ophiomorus punctatissimus* (BIBRON & BORY DE SAINT-VINCENT, 1833) (Fig. 6).- The first specimen was found under a wooden board near the beach to the west of Kato Nisi on 8 April (G. Stadler). The 12 cm long specimen was still there on the following day (9 April) and was photographed extensively. On 12 April, a further specimen was found under a stone at Cape Mavro Akrotiri in the north of the island (G. Stadler).

*Hierophis gemonensis* (LAURENTI, 1768).- On 11 April, in the same location as the sighting of the Marginated Tortoise, near Cape Kaloghirou, a fast-moving adult Balkan Whip Snake passed by on a tree-dotted meadow and vanished into a bush.

*Platyceps najadum* (EICHWALD, 1831).- On 7 April, a Dahl's Whip Snake was seen near the restaurant at the end of Kato Nisi. From his description, it seems likely that G. Stadler also saw one at the same locality.

*Malpolon insignitus* (GEOFFROY DE SAINT-HILAIRE, 1809).- On the road leading to the refuse tip above Vighla, a Montpellier Snake about 1.2-1.4 m in length lay stretched out on the road. When disturbed it uttered a loud hissing.

*Telescopus fallax fallax* (FLEISCHMANN, 1831) (Fig. 7).- One 40-50 cm long specimen was recorded in Vighla on the northern edge of Vardhia on 12 April. It was found lying rather inactive under a wooden board, then photographed. This species was not included on the Natura 2000 list.

*Vipera ammodytes meridionalis* BOULENGER, 1903.- On 10 April the author encountered a respectable, 60-70 cm long Sand Viper on a path in the Vighla area. The snake had clear markings, displayed no defensive reaction and retreated without haste to nearby bushes.

During the field trip to Elafonisos, twelve reptile species were observed, five of which had been recorded already earlier by Basil P. CHONDROPOULOS and Panayotis PAFILIS. Accordingly, the remaining seven (*M. kotschyi*, *T. fallax*, *V. ammodytes*, *H. gemonensis*, *A. kitaibelii*, *O. punctatissimus* and *P. peloponnesiacus*) are new finds for

the island. Surprisingly, no reptiles were recorded as roadkill, which unfortunately is otherwise a frequent source of new finds. The following five species were not observed but can be considered potential inhabitants of the island, as they are present on the adjoining mainland (in alphabetical order): *Algyroides moreoticus* BIBRON & BORY DE SAINT-VINCENT, 1833, *Zamenis situla* (LINNAEUS, 1758), *Eryx jaculus turcicus* (OLIVIER, 1801), *Hellenolacerta graeca* (BEDRIAGA, 1886) and *Xerotyphlops vermicularis* (MERREM, 1820). There are no suitable habitats for freshwater species on the island of Elafonisos.

Nature protection.- Until about 1990, there was very little development on Elafonisos, and the island had just a few gravel roads. That has changed in the last twenty years. What was once an almost unknown island, even for Greeks, now receives an annual influx of visitors attracted by its sandy beaches. The island's population of only 300-350 wintering residents are inundated in July and August by a daily total of up to 5,000 visitors and 1,600 cars (WIKIPEDIA Elafonisos - 17 June, 2014; English and German versions). In Lefki and Kato Nisi, large buildings have been constructed for the tourist trade with little consideration for the landscape. So far, the tourist infrastructure has not reached the beaches themselves, but the news headline "Greek Island of Elafonisos on sale" published on 17 May, 2014, bodes ill for the island (KALMOUKI 2014). The Hellenic Republic Asset Development Fund (TAIPED) is putting 175 acres of beach in the bays of Sarakino and Simos up for sale. That has triggered resistance from local and international institutions, whose representatives argue in terms of the island's Natura 2000 status. The local residents and their mayor are concerned that the natural beauty of the area will be destroyed, while the Elafonisos Association of Scientists has pointed out that the beach of Simos is considered one of the top ten beaches of the world. In 2013, Britain's "Guardian" newspaper placed Elafonisos first on a list of the ten areas with the most beautiful beaches in Greece, and the German GEO magazine described the island of Elafonisos in its 2/2014 edition as "heaven on earth" (GLASER 2014).

The strip of land between the beaches and the adjoining green areas would be particularly attractive to property developers. This transitional area with its light covering of juniper is also important for biodiversity. Herpetological observations include tortoises, Balkan Green Lizards, the Snake-eyed Skink and the Peloponnese Wall Lizard. Numerous snake tracks are to be seen on the patches of sand. During the visit to the island, many empty shotgun shells were found, indicating that hunting is common. On Vardhia, three hunters with seven tracker dogs were seen training the dogs to catch living hares (*Lepus!*). They left with one dead and one living hare. According to the local residents, the hunters were from the mainland.

Greece is responsible for the conservation of the endemic plant species listed above, as they are to be found along the coast especially. Their habitats could be destroyed by tourism. During this visit to the island, the site of *Saponaria jagelii* was shown to a local opinion leader, who was educated in Britain and speaks excellent English. He promised to campaign at the level of the state authorities on the subject. Here, Natura 2000 clearly has a problem with regard to implementation.

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**KEY WORDS:** Reptilia: Squamata: Sauria: *Mediodactylus kotschyii bibroni*, *Ablepharus kitaibelii*, *Ophiomorus punctatissimus*, *Podarcis p. peloponnesiacus*; Serpentes: *Hierophis gemonensis*, *Telescopus fallax fallax*, *Vipera ammodytes meridionalis*; Elafonisos, Peloponnese, Greece; new island records, nature conservation

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## Attempted oophagy observed in *Podarcis muralis* (LAURENTI, 1768)

Small lacertid lizards from mainland populations, e. g., *Podarcis muralis* (LAURENTI, 1768), mostly prey on insects and spiders but also other arthropods, gastropods and even small vertebrates and plant matter (ARNOLD 1987; STRIJBOSCH et al. 1980; MOU 1987; CAPULA et al. 1993; PÉREZ-MELLADO & CORTI 1993; RICHARD & LAPINI 1993; VAN DAMME 1999; CARRETERO 2004). Besides, rare dietary events such as cannibalism have been reported for *P. muralis* (POLIS & MYERS 1985; SCHULTE 2008; ŽAGAR & CARRETERO 2012; SIMOVIĆ & MARKOVIĆ 2013).

Consumption of eggs (oophagy) can be either interspecific or intraspecific (cannibalistic). By definition, cannibalism is a special form of predation in which predator and prey are members of the same species (POLIS 1981). In the genus *Podarcis*, cannibalistic oophagy was observed in natural populations of at least three species other than *P. muralis*, namely *P. liolepis* (BOULENGER, 1905) - CASTILLA 1995 [under the name *P. hispanica atrata*], *P. siculus campestris* (DE BETTA, 1857) - CATTANEO (2005) and *P. pityusensis* (BOSCÁ, 1883) - DAPPEN (2011),