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Further herpetofaunal records from Kastos and Kalamos islands, with comments on the occurrence of *Emys orbicularis* (Linnaeus, 1758) and *Podarcis ionicus* (Lehrs, 1902) in the adjacent Meganissi, Ionian Islands, Greece

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The Ionian Islands in Greece, also referred to as the Heptanese (*Επτάνησα* in Greek), host a rich herpetofaunal diversity that includes a number of indigenous species, as well as two endemic taxa, both were first described from this region: *Anguis cephallonica* Werner, 1894 and *Algyroides nigropunctatus kephalithacius* Keymar, 1986 (Valakos et al., 2008). The archipelago comprises seven main islands (Kerkyra, Paxos, Lefkada, Ithaki, Cephalonia, Zakynthos, Kythera) and numerous satellite islets, the vast majority of which were connected to the mainland during the Last Glacial Maximum (Ferentinos et al., 2012).

In recent years, significant contributions have been made to the understanding of the herpetofaunal composition of the area, encompassing both smaller and larger islands (Keymar, 1986; Wilson, 2006; Wilson et al., 2014; Stille and Stille, 2017; Sindaco and Rossi, 2020). However, for almost a century, offshore islands such as Kastos and Kalamos have received little attention, with the herpetofaunal records primarily restricted to the initial observations of Cyrén (1935). Moreover, the neighbouring island of Meganissi has only recently been surveyed by Sindaco and Rossi (2020), providing new distribution records and verified previous herpetofauna occurrences along the island.

To date, only a small number of species have been documented from Kastos and Kalamos in the available literature, while the confirmation of certain reptile species is still under question for the adjacent Meganissi Island (Sindaco and Rossi, 2020). We here report new faunistic observations for the islands of Kastos and Kalamos. Furthermore, based on our recent field work and literature overview we briefly discuss the occurrence of *Emys orbicularis* and *Podarcis ionicus* on Meganissi Island.

Kastos (5.9 km²), Kalamos (25 km²), and Meganissi (22 km²) are small Ionian islands located off the southwestern coast of mainland Greece (38.636°N, 20.842°E; Fig. 1). The islands belong to the Tilevoides Island Complex along with several adjacent islets. Their vegetation composition includes habitat types characteristic of the Ionian phytogeographical region, dominated by typical Mediterranean ecosystems such as macchia and phrygana scrublands, along with remnants of evergreen broadleaved woodlands and pine forests (Chousou-Polydouri and Yannitsaros, 2005; Baliousis, 2015). Moreover, on Kalamos and Meganissi islands, fragmented, ephemeral wetlands are formed along the coasts (Fig. 2; A, B).

We conducted brief herpetological surveys during 5–7 April 2023 on Meganissi, 8–9 April 2023 on Kastos, and 11–13 March 2025 on Kalamos. To provide a more extended species list for the island of Kalamos, we included in our dataset unpublished observations made randomly over a period of 24 years, between 1999 and 2023. Herpetofaunal records were performed under direct surveys, focusing on visual observations at suitable microenvironments such as stone walls, stone piles, bushes and tree trunks.

Kastos. The island hosts six reptile species, including three lizard species, two snake species, and one tortoise species.

Ablepharus kitaibelii Bibron & Bory de Saint-Vincent, 1833.—New island record. A single individual was noticed moving amongst the leaf litter of its habitat. The species was found next to the seashore inhabiting openings of macchia vegetation.

Hemidactylus turcicus (Linnaeus, 1758).—New island record. Multiple individuals were recording dwelling

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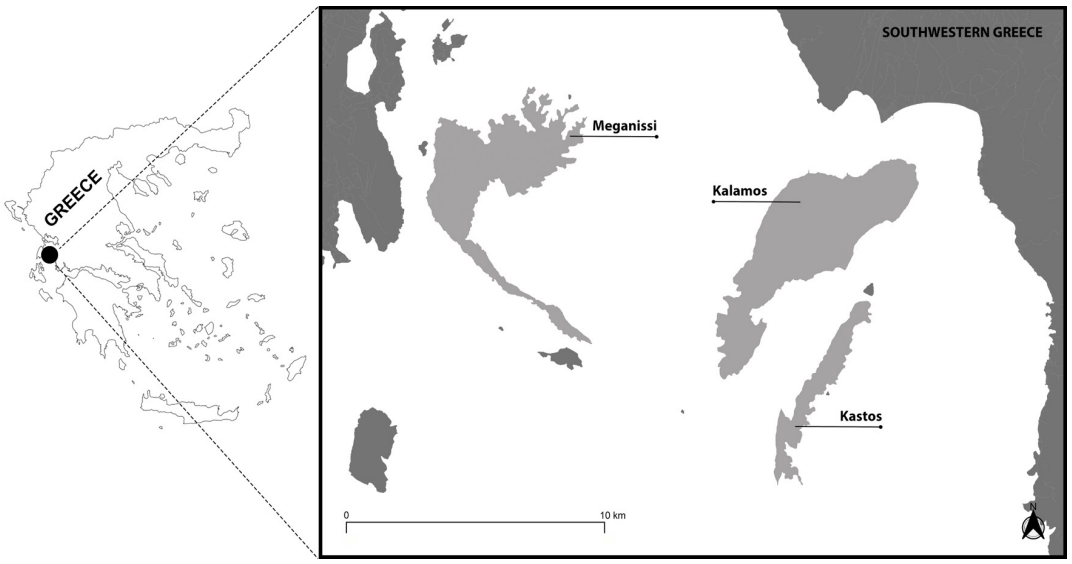

Figure 1. Kastos, Kalamos and Meganissi islands in the central Ionian archipelago are shown in light grey.

tree trunks of olive trees. It is a widely distributed species on the island.

Lacerta trilineata Bedriaga, 1886.—Cyrén (1935) mentioned the species for the first time. We verified the presence of *L. trilineata* on Kastos. Several individuals were found utilising all available habitats throughout the island.

Hierophis gemonensis (Laurenti, 1768).—New island record. Five different individuals were found under rocks in the eastern part of the island. *Hierophis gemonensis* was found mostly in macchia vegetation encompassing extensive dry stone walls.

Platyceps najadum (Eichwald, 1831).—The species is mentioned in the original data of Cyrén (1935). During our faunistic surveys we could not find the species.

Testudo marginata Schoepff, 1793.—The species was reported on the island based on a single individual found at the northeastern edge (Tzoras et al., 2023). We also encountered the species on Kastos (Fig. 2; B), but only at the original location. In total, four adults were found to occupy clearings in dense macchia vegetation.

Kalamos. The island harbours a rich herpetofauna diversity, hosting one amphibian species, four lizard species, as well as five snakes species.

Bufotes viridis (Laurenti, 1768).—The species was firstly recorded by Cyrén (1935). During our targeted surveys we also encountered multiple individuals hidden under rocks. *Bufotes viridis* was commonly found in macchia vegetation and other xeric habitats. In addition, several tadpoles at different larval stages were encountered at the coastal wetland eastward.

Hemidactylus turcicus.—New island record. It was predominantly encountered on vertical surfaces of human settlements within the village of Kalamos. A total of ten individuals were recorded at the main village.

Mediodactylus kotschyi (Steindachner, 1870).—Cyrén (1935) reported this species on the island. We did not record it during our visits.

Algyroides nigropunctatus (Duméril & Bibron, 1839).—New island record. A widespread species across the island but with sparse population density. We encountered the species throughout the island occurring mostly in trees (Fig. 2; D) and much less on ground level.

Lacerta trilineata.—The species was first mentioned by Cyrén (1935) on the island. We recorded five adult individuals in dense macchia vegetation.

Malpolon insignitus (Geoffroy Saint-Hilaire, 1827).—New island record. A single specimen was encountered in the southeastern edge of the island, dominated by low bushy formations (Fig. 2; E).

Elaphe quatuorlineata (Bonnaterre, 1790).—New island record. Two observations have been made for this snake species. A single adult specimen was recorded at the southern edge of the island. Moreover, a dead juvenile specimen was also found at the main village.

Platyceps najadum.—Cyrén (1935) reported the species on Kalamos Island. We have come across

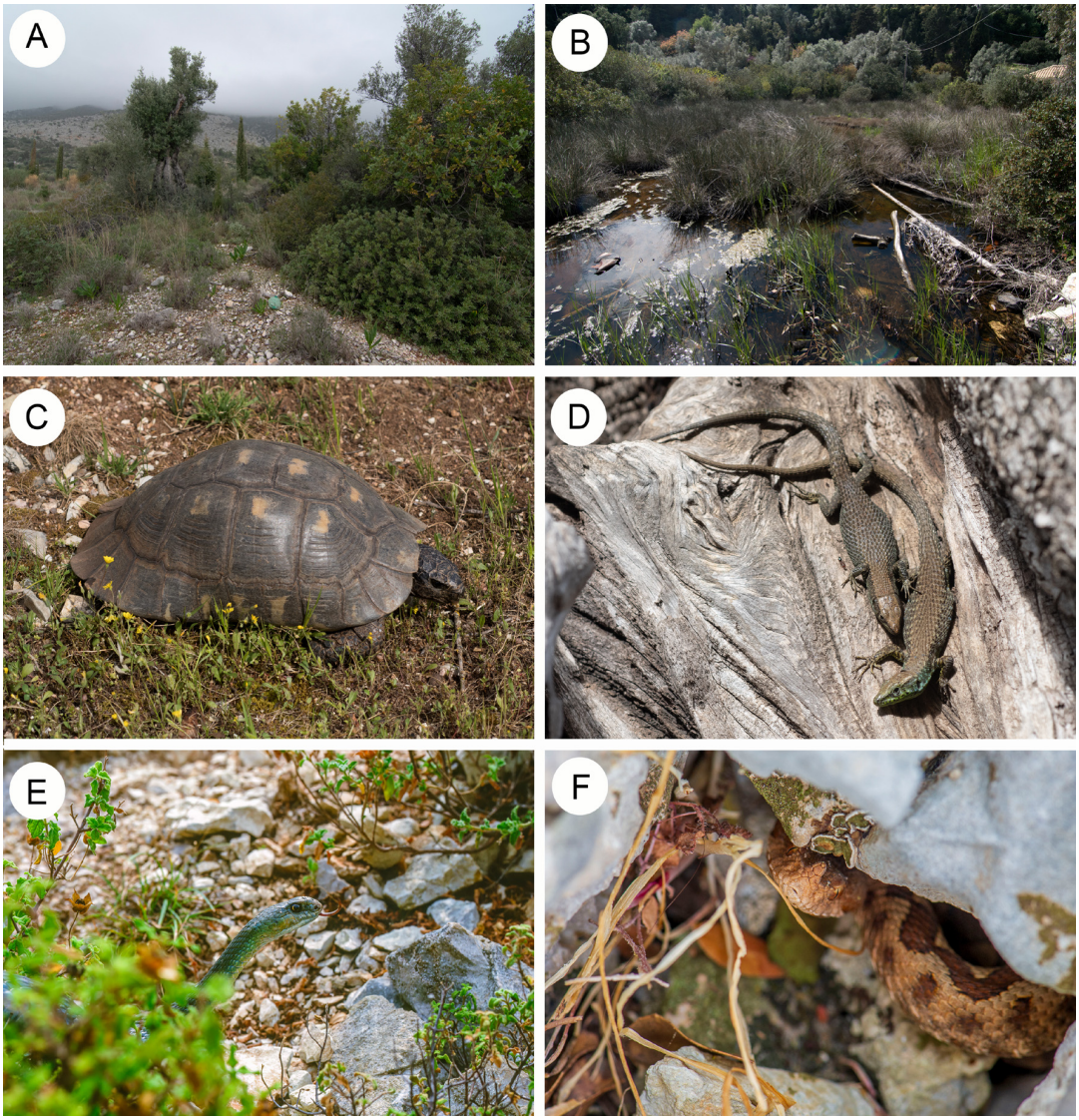

Figure 2. Insular habitats and herpetofaunal diversity of the three main Tilevoides Islands. (A) Macchia vegetation habitat on Kalamos. (B) Coastal fragmented wetland on Meganissi. (C) *Testudo marginata* from Kastos. (D) Breeding pair of the endemic *Algyroides nigropunctatus kephalithacius* basking side by side on Kalamos. (E) Adult *Malpolon insignitus* from Kalamos. (F) Adult female *Vipera ammodytes* from Kalamos. Photos by Elias Tzoras (A, B, C, D) and Labros Logothetis (E, F).

the species only once, at the extreme northeast edge. *Platyceps najadum* was encountered in a forested region dominated by extensive pine forest of *Pinus halepensis*.

Zamenis situla (Linnaeus, 1758).—New island record. A single specimen was encountered northwest of the main village, marking the first known occurrence of the species on such a small island of the Ionian archipelago. *Zamenis situla* was spotted within macchia vegetation bordered by traditional stone walls.

Vipera ammodytes (Linnaeus, 1758).—New island record. A single individual was observed basking in the mountainous zone at an elevation of 651 metres above sea level (Fig. 2; F).

This study presents an updated checklist of the herpetofaunal communities of Kastos and Kalamos islands in the central Ionian Sea, Greece. Previously, three species of reptiles had been reported from Kastos:

L. trilineata, P. najadum, and *T. marginata* (Cyrén, 1935; Tzoras et al., 2023). During our fieldwork we confirmed the occurrence of *L. trilineata* and *T. marginata* across the island. Additionally, we encountered three previously unreported species: *A. kitaibelli, H. turcicus,* and *H. gemonensis*. In the same vein, faunistic observations from Kalamos were only provided by Cyrén (1935), who reported a single species of amphibian (*B. viridi*s), two lizards (*Lacerta trilineata, Mediodactylus kotschyi*), and a single colubrid snake (*Platyceps najadum*). During our recent faunistic surveys, we confirmed the occurrences of *B. viridis*, *L. trilineata* and *P. najadum* but we did not record *M. kotschyi* during either the morning or night surveys. Furthermore, we found six additional reptile taxa, including two species of lizards, *H. turcicus* and *A. nigropunctatus,* and four species of snakes, namely *M. insignitus, E. quatuorlineata, Z. situla,* and *V. ammodytes*. Werner (1938) previously assumed that *E. quatuorlineata* occurs on both islands referring to the original publication of Cyrén (1935). However, Cyrén (1935) did not document the species on Kastos and Kalamos, but reported this snake on the neighbouring islets of Provati and Karlonisi. Therefore, our observation on Kalamos represents the first confirmed record of *E. quatuorlineata* on the island, whereas it has not yet been reported from Kastos.

In terms of species composition, the herpetofaunal structure of these islands exhibits resemblances to the source area of southwestern mainland Greece, as well as with nearby islands of similar size (Cyrén, 1935; Wilson et al., 2014; Stille and Stille, 2017; Tzoras and Mamasis, 2025). Most of the common taxa observed here, such as *M. kotschyi, L. trilineata, E. quatuorlineata, H. gemonensis*, *P. najadum,* and *T. marginata*, are dominant elements on both the nearest islands and the mainland regions, commonly found in the majority of habitats (Sillero et al., 2014; Wilson et al., 2014; Tzoras and Mamasis, 2025). Notably, only the island of Kalamos is home to an endemic reptile species, supporting a sparse population of *A. nigropunctatus kephalithacius*. Given the short distance of the islands with the mainland, it is likely that more species occur on Kastos and Kalamos, though they were not encountered.

Moreover, based on our recent field excursions on the neighbouring island of Meganissi, we reviewed the current occurrence status of *E. orbicularis* and *P. ionicus*. Meganissi Island has only recently been studied from a herpetological approach. Sindaco and Rossi (2020) provided their own field observations and supplemented them with data from the unpublished master's thesis of Tzortzakaki (2012). In summary, both works documented the occurrence of one amphibian and ten reptile species (*B. viridis, E. orbicularis, A. kitaibelli, A. nigropunctatus, H. turcicus, L. trilineata, P. ionicus, E. quatuorlineata, H. gemonensis, M. insignitus,* and *P. najadum*). Nonetheless, the presence of a few species such as *E. orbicularis, P. ionicus, M. insignitus,* and *H. gemonensis* remains uncertain for the island as demonstrated by Sindaco and Rossi (2020).

We conducted direct surveys at coastal wetlands and other sites with suitable habitats for *E. orbicularis* and *P. ionicus*. We surveyed 15 different areas along the largest part of the island, which yielded no results of their presence. Nevertheless, we identified a single suitable aquatic site at the western edge, however, without any sighting of a freshwater turtle. Tzortzakaki (2012) mentioned the occurrence of *E. orbicularis* without specifying the exact location or the number of individuals observed, with the same applying to *P. ionicus* and other species. Throughout insular Greece, *E. orbicularis* is predominantly found on larger islands while its presence on smaller islands is either considered dubious or presumed extinct nowadays (Broggi, 2023). Indeed, fragmented populations of turtles are difficult to locate even in the inland region of Greece. However, considering the limited freshwater bodies and the small extent of the island, along with the findings of Sindaco and Rossi (2020) and our recent field data, we question the validity of a reproductive population on this small island.

On the other hand, *P. ionicus* is well distributed across multiple of the larger Ionian Islands, such as those of Kerkyra, Ithaki, Cephalonia and Zakynthos, but lacking from the adjacent Lefkada, Paxos, Diapontia islets, Kalamos, Kastos and larger Echinades islets (Cyrén, 1935; Keymar, 1986; Wilson et al., 2014; Stille and Stille, 2017; Sindaco and Rossi, 2020; Tzoras and Mamasis, 2025). Similarly to Sindaco and Rossi (2020), we also failed to locate the species on Meganissi. We speculate that during periods of geographic isolation, interspecific competition may have played a key role in the absence of *P. ionicus* on the larger offshore islands. On nearby islets of similar size, *P. ionicus* is absent but instead the larger *L. trilineata* occupies its ecological niche (Tzoras and Mamasis, 2025). In conclusion, the current status of *E. orbicularis* and *P. ionicus* should be considered doubtful on Meganissi Island.

The above-mentioned distribution data highlight the importance of the smaller islands in the Ionian region as refugia for native herpetofauna. More field surveys

would further enhance our understanding of the reptile composition of these islands, providing valuable insights into habitat use among different species inhabiting the offshore islands of the Ionian archipelago.

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