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Tarentola mauritanica (Squamata: Phyllodactylidae) in Greece: an update on the species' distribution, including new records

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Abstract. The Moorish Gecko (*Tarentola mauritanica*) is a successful colonizer that has been introduced in many European countries. In Greece, the species' presence is documented for at least 150 years now and it has been only recently introduced on the islands of Corfu and Lesvos, and the prefectures of Aetoloakarnania and Attica (Athens city). In this document we unify the current knowledge on the Moorish Gecko's occurrence in Greece, with new, unpublished records, museum archives and citizen science data, in order to generate an updated image of the species' extant distribution. This merge of data fills several distributional gaps and also extends the Moorish Gecko's range in two new areas, namely Fokida prefecture and Kos Island. Concerns about possible threats to native herpetofauna are also discussed.

Key words: Moorish Gecko, introduction, citizen science, museum collection, unpublished records, herpetological surveys.

Introduction

The Moorish Gecko, *Tarentola mauritanica* (Linnaeus, 1758), is a very widely distributed lizard of the family Phyllodactylidae, currently occurring in almost all European and African countries watered by the Mediterranean Sea (Sillero et al., 2014; Speybroeck et al., 2016). Having been introduced to numerous countries, it seems that the Moorish Gecko is an exceptionally successful colonizer (e.g. Harris et al., 2004; Strachinis et al., 2020). This is indicated and supported by both phylogenetic analyses (e.g. Harris et al., 2004; Mačát et al., 2014; Rato et al., 2016) and the increasingly newer reports of introduction cases in Europe (e.g. Deso et al., 2020;

Strachinis et al., 2020; Szabolcs et al., 2021; Jablonski et al., 2022), as well as overseas (e.g. Arredondo & Núñez, 2014; Díaz-Fernández et al., 2019; Ortiz-Medina et al., 2019). Most introduced European populations are characterized by a single mtDNA haplotype that seems to originate from the Maghreb (NW Africa) (Harris et al., 2004; Mačát et al., 2014; Rato et al., 2016).

In Greece, the Moorish Gecko's occurrence is currently documented on the islands of Crete, Corfu, Kephallonia, Ithaca, Zakynthos, Strofades and Lesvos, in the Peloponnese Peninsula (five localities), the cities of Athens, Pireaus and Elefsina, and in three locations within Aetoloakarnania pre-

fecture (Fig. 1; Chondropoulos, 1984; Keymar, 1986; Valakos & Mylonas, 1992; Valakos et al., 2008; Mačát et al., 2014; Mizerakis & Strachinis, 2017; Strachinis & Pafilis, 2018; Strachinis et al., 2020). In this document, we unify the extant knowledge on the Moorish Gecko's distribution in Greece, with new, unpublished data, in order to generate an up-to-date image of the species' distribution that will help to monitor its expansion through the country.

Materials and Methods

We gathered all our unpublished observations of *T. mauritanica* that we have obtained since 2009 from various locations in Greece, and created a dataset of 112 new records of the species. We unified these data

with a) 48 reported localities in the literature regarding the Moorish Gecko's presence in Greece, b) 33 unpublished records of Moorish Gecko from the Natural History Museum of Crete (NHMC) collection vouchers and c) 110 citizen science records derived from the public database iNaturalist (2022), resulting in a dataset of 303 records in total. All locality records are shown in Table 1 (catalogued in Table S1 in detail) and presented on maps in Fig. 1 with corresponding colors. Detailed maps of Crete Island and South Ionian Islands are provided in Appendix 1. The distribution maps were generated using QGIS version 3.22.9 "Białowieża" (QGIS Development Team, 2022). All individuals were identified by the species' distinctive morphological characters.

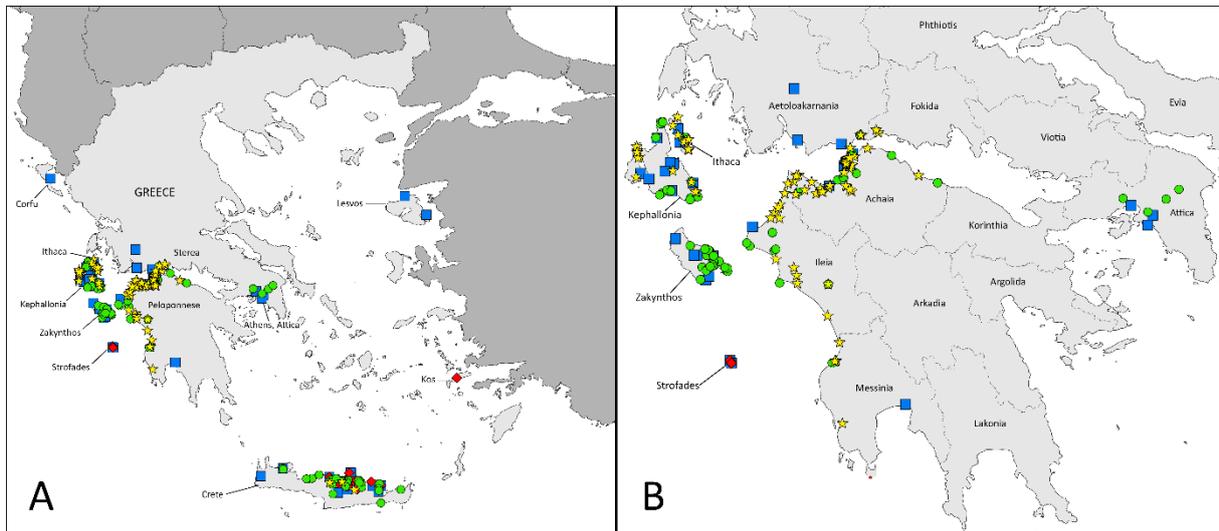


Fig. 1. A) The Moorish Gecko's distribution in Greece. B) Close-up map of the Peloponnese and the neighbor areas. Records of different sources are represented as follows: blue squares > literature; green circles > iNaturalist; red rhombuses > Natural History Museum of Crete vouchers; yellow stars > this work's records. More detailed maps of Kephallonia, Ithaca, Zakynthos, Peloponnese and Crete are available in Appendix 1 (Fig. S1, S2, S3).

Results and Discussion

We created a dataset of 303 locality records of the Moorish Gecko's range in Greece, by merging published and unpublished data. This amalgamation of data resulted in an up-to-date image of the species' distribution that fills several distributional gaps and also extends its known range in two

new areas, namely Fokida prefecture and Kos Island (Fig. 1). Out of the 303 records gathered in total, about 31% correspond to Peloponnese Peninsula and approximately 25% to Crete Island. These are also the areas that seem to host the largest population of the species in Greece at the moment, both in numbers and in range.

Table 1. All locality records (wider regions) of the Moorish Gecko's presence in Greece, as they are reported in Natural History Museum of Crete (NHMC) collection archive, iNaturalist public database of citizen science, this work and the literature, thus far. Underlined Xs ("X") highlight region records published for the first time herein.

Locality	NHMC	iNaturalist.org	Present study	Literature
Attica		X		Strachinis & Pafilis, 2018; Strachinis et al., 2020
Aetoloakarnania		X	X	Strachinis et al., 2020
Fokida			<u>X</u>	
Peloponnese				
- Achaia		X	X	Buttle, 1987; Chondropoulos, 1984; Keymar, 1986; Tzoras et al., 2020
- Ilia		X	X	Keymar, 1986
- Messinia		X	X	Keymar, 1986
Corfu				Macát et al., 2014
Kephallonia		X	X	Clark, 1991; Richter & Mayer, 1990; Werner, 1894; Wilson, 2006
Ithaca		X	X	Strachinis & Artavanis, 2017; Werner, 1894
Zakynthos		X		Clark, 1991; Joger, 1984; Keymar, 1988; Werner, 1894; Wilson, 2006
- Marathonisi islet				Keymar, 1988
Strofades	X			Valakos & Mylonas, 1992
Crete				
- Chania		X		Boettger, 1888; Wettstein, 1931
- Rethymno	X	X	X	Harris et al., 2004
- Heraklion	X	X	X	Boettger, 1888; Perez Mellado et al., 1999; Sowig, 1985; Štěpánek, 1934; Wettstein - Westersheimb, 1968
- Lasithi	X	X		Wettstein, 1931; Wettstein - Westersheimb, 1968
- Dia islet	X			Štěpánek, 1934
- Kolokytha islet	X			Harris et al., 2004
Lesvos				Mizerakis & Strachinis, 2017
Kos		<u>X</u>		

The Moorish Gecko was first reported from Greece back in 1868 (De Betta, 1868). The species was probably introduced in ancient times, as considered in most cases regarding European populations (Harris et al., 2004). Since then, the reports of the Moorish Gecko in new localities in the country were succeeding one another, with the latest ones being from Athens (Strachinis & Pafilis, 2018), Aetoloakarnania pref. (Strachinis et al., 2020), and now

Fokida pref. and Kos Island. It is most probable that the species is accidentally being transferred through human activities in new areas and once established it expands its range actively, when the habitat allows it. Human-mediated dispersal of other lizards has been documented numerous times in Greece in the last decade, regarding both native (e.g. Spaneli & Lymberakis, 2014; Kornilios & Thanou, 2016; Hedman et al., 2017; Kalaentzis et al., 2018; Deimezis-

Tsikoutas et al., 2020; Kapsalas et al., 2020) and alien species (Adamopoulou, 2015; Spilani et al., 2018). So far, of all lizard species that have been introduced in new areas in Greece, the Moorish Gecko seems to be one of the most successful with regard to establishment and spreading rate. In most cases of recent introductions, we observed a high preference of the species in human settlements and buildings, both abandoned and in use, as opposed to low presence in natural habitats of the areas. We also witnessed a high dispersal rate and an almost complete displacement of the Turkish Gecko (*Hemidactylus turcicus*) in a few of the recent urban sites of introduction (i.e. some cases in Sterea Ellada region and Athens city). However, on the South Ionian islands and on Crete, regions where the species is known to occur since the 19th century, the Moorish Gecko can be found as well in natural habitats (such as maquis and phrygana) and olive groves, and regularly in sympatry with native geckos (Fig. 2).

Peloponnese Peninsula

Out of the 755 locations that we investigated in Peloponnese (Fig. S1), we confirmed the presence of *T. mauritanica* in 79 sites, the vast majority of which are published herein for the first time. Those records, together with records from iNaturalist, fill large gaps in the species' distribution within the peninsula, which until now seemed fragmented and scattered. Of all sites surveyed, the Moorish Gecko was only confirmed across the North and the West coasts of Peloponnese, forming an almost continuous range, occurring in altitudes starting from sea level and reaching areas up to 358 m a.s.l. However, the highest elevation recorded in Peloponnese is at 713 m a.s.l., catalogued in iNaturalist public data-base. Regarding the South coast of the peninsula, there is only a single literature report from the town of Kalamata (Keymar, 1986).

Crete

Citizen science records widen the species' range on the island, previously thought to be rather fragmented and localized (Fig. S2). Like in the South Ionian islands, along with

buildings and ruins, the Moorish Gecko can be very often found in agricultural land and natural habitats. We were able to find the species from sea level, up to 520 m a.s.l. The highest altitude record for the island was obtained from iNaturalist database at 858 m a.s.l. (Lat: 35.2802, Lon: 24.8915), which, at the moment, also consists the highest record in Greece, in general.

As a gecko, *T. mauritanica* occupies a very similar niche with those of the native geckos of Greece and this could indicate a potential competitor to the Cretan Thin-toed Gecko, *Mediodactylus bartoni* (Štěpánek, 1934), which is endemic to Crete and satellite islets (Kotsakiozi et al., 2018). However, there hasn't been any alarming signs noticed on its populations' trends, so far. The Cretan Thin-toed Gecko occurs mainly in high altitudes on Crete and it is abundant on the two Crete's satellite islets where it occurs in sympatry with the Moorish Gecko, evidently for near a century now (i.e. Dia and Kolokytha islets).

Attica

Since the first report of the Moorish Gecko in Athens (Strachinis & Pafilis, 2018), it seems that the species achieved a remarkable extension of its urban range. This can be concluded by the several citizen science records that have been subsequently added in public platforms, expanding the previously known range many kilometers both to the NE and the NW of the initially reported introduced population (Fig. 1B).

Fokida

Two new sites were found to host the species, namely, the nearby villages of Efpalio and Monastiraki, in Fokida prefecture. Fokida adjoins Aetoloakarnania prefecture at the SE of the latter, within which the species was firstly reported in 2020 (Strachinis et al., 2020). The two new spots are located approximately 20 km east of the nearest previous known location in Aetoloakarnania (west of Antirio), close to the borders of the two neighbor prefectures (Fig. 1B).

Kos

Kos is the second Aegean island to host the Moorish Gecko after Lesvos (Mizerakis &

Strachinis, 2017). The only evidence so far concerns a juvenile specimen found in a pitfall trap (NHMC code 80.3.86.151) within an olive grove near the island's airport. Therefore, the species' actual distribution on the island is yet unknown and needs further investigation.

Zakynthos and Strofades

Citizen science records contribute to a clearer image of the species' distribution on Zakynthos, adding numerous new sites, especially on the east of the island. The Moorish Gecko's presence on Zakynthos was already known since 1894 (Werner, 1894). Joger (1984) assigned the population of Zakynthos to the subspecies *T. m. fascicularis*, with a specimen deposited in the Zoological Research Museum Alexander Koenig, Bonn, (specimen code ZFMK37257; Joger, 1984), although without clarifying if the assignment was based on morphology, genetics, or both. Valakos & Mylonas (1992) reported the species from Strofades, also assigning it to the ssp. *fascicularis*, without providing relevant justification in their

work. In Valakos et al. (2008) the ssp. from both Zakynthos and Strofades are eventually assigned to the nominate one (*T. m. mauritanica*). Subsequently, based on morphology and mitochondrial DNA analyses on *Tarentola* specimens from Morocco, Algeria, Tunisia, Libya and Egypt, Joger & Bshaenia (2010) proposed the elevation of the ssp. *fascicularis* to full species (*Tarentola fascicularis*). Considering the above, and due to a) the lack of a proper justification of the assignment of these populations to the ssp. *fascicularis* in the literature, b) the lack of genetic evidence on the identification of these populations in a subspecific level in both the literature and genetic databases, and c) the fact that Joger & Bshaenia (2010) proposed taxonomic changes based only on mtDNA analysis and morphology, but using no nuDNA markers or a genomic approach, and to avoid any taxonomic inconveniences, we deem that the populations from Zakynthos and Strofades should be currently treated as *T. mauritanica* in its nominate ssp., as in all other Greek populations, until more robust evidence is presented.

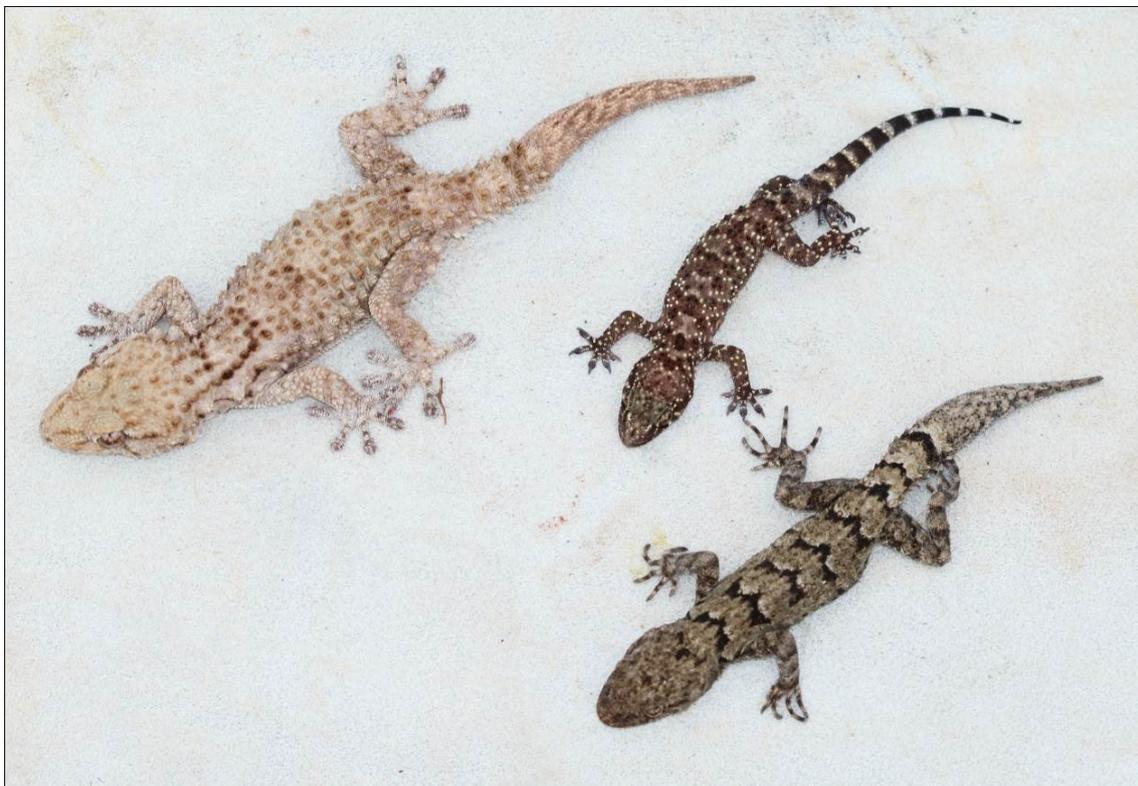


Fig. 2. From left to right: A Moorish Gecko (*Tarentola mauritanica*), a Turkish Gecko (*Hemidactylus turcicus*) and a Kotschy's Gecko (*Mediodactylus kotschy*), all found under the same pile of wooden panels in an olive orchard on Ithaca Island (photo by I.S.).

Conclusions

All the evidence so far imply that the Moorish Gecko's expansion in Greece is in the process. Its dispersal is possibly facilitated by transportation of goods, construction materials and plants, which the species could use to hide in and passively transferred with, as a stowaway. As in the majority of alien species introductions, the introduction of the Moorish Gecko in new areas could possibly pose a threat to native species. It has been reported that, along with invertebrates, *T. mauritanica*'s diet includes also small vertebrates, such as other geckos (e.g. Turkish Gecko; González de la Vega, 1988; Vacher & Deniez, 2010) and *Podarcis* lizards (e.g. *Podarcis lilfordi*, *P. hispanicus*, *P. liolepis* and *P. siculus*), often even adult individuals (Salvador, 1979; Franco, 1980; Rieppel, 1981; Vacher & Deniez, 2010; Pellitteri-Rosa et al., 2015). Whilst, only in a few cases of recent introduction we have witnessed the displacement of the Turkish Gecko locally caused by the introduced *T. mauritanica*, it still remains unclear whether the Moorish Gecko is an actual threat to native and endemic species of Greece, and if so, at which level. More research is needed to understand the dynamics of the species' invasion and to monitor its interaction with native species with which it often shares the same habitats.

Acknowledgments

We thank Bobby Bok and Michail Manonas for providing us with two records from the Peloponnese and one from Kephallonia Island, respectively. For their great company in the field we would like to thank (alphabetically) Anniek Aerden, Thimios Assimakopoulos, Bernard Carrette, Gijs Damen, Jan Van Der Voort, Panagiotis Drakopoulos, Peter Engelen, Kiriakos Galanis, Konstantinos Kalaentzis, Korina Karagianni, Philippos Katsiyiannis, Christos Kazilas, Michail Manonas, Giorgos Pahitsas, Alexis Panagiotopoulos, Sergios Papaioannou, Jereon Speybroeck and Michail Ventouras.

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Received: 28.11.2022
Accepted: 10.02.2023

APPENDIX I

Table S1. All records of the Moorish Gecko's presence in Greece used in this work, in detail (m a.s.l.: meters above sea level | N/A: Not available | NHMC: Natural History Museum of Crete | ZMUA: Zoological Museum of the University of Athens | ZFMK: Zoological Research Museum Alexander Koenig).

Locality	Coordinates		Altitude (m.a.s.l.)	Date	Source	Museum Code
	Latitude	Longitude				
Heraklio, Crete Island	35.32	25.13	N/A	1888	Boettger, 1888	-
Chania, Crete Island	35.51	24.01	N/A	1888	Boettger, 1888	-
Argostoli, Kephallonia Island	38.17	20.49	N/A	1894	Werner, 1894	-
Sami, Kephallonia Island	38.25	20.64	N/A	1894	Werner, 1894	-
Ithaca Island	38.35	20.68	N/A	1894	Werner, 1894	-
Scopos, Zakynthos Island	37.66	20.85	N/A	1894	Werner, 1894	-
Rhodia, Crete Island	35.381	23.639	N/A	1931	Wettstein, 1931	-
Neapoli, Crete Island	35.25	25.60	N/A	1931	Wettstein, 1931	-
Knossos, Crete Island	35.29	25.15	N/A	1934	Štěpánek, 1934	-
Dia islet	35.4513	25.2202	N/A	1944	Štěpánek, 1944	-
Knossos, Crete Island	35.29	25.15	N/A	1968	Wettstein – Westersheimb, 1968	-
Almyros, Crete Island	35.17	25.70	N/A	1968	Wettstein – Westersheimb, 1968	-
Patra, Achaia	38.2416	21.7264	N/A	1984	Chondropoulos, 1984	-
Vathipetro, Crete Island	35.20	25.15	N/A	1985	Sowig, 1985	-
Patra, Achaia	38.25	21.74	N/A	1986	Keymar, 1986	-
Killini, Ileia	37.93	21.14	N/A	1986	Keymar, 1986	-
Kalamata, Messinia	37.03	22.11	N/A	1986	Keymar, 1986	-
Rion (Rio), Achaia	38.30	21.78	N/A	1987	Buttle, 1987	-
Marathonisi islet	37.6854	20.8709	N/A	1988	Keymar, 1988	-
Zakynthos Island	37.79	20.79	N/A	1984	Joger, 1984	ZFMK3725 7
Zakynthos Island	37.79	20.79	N/A	1988	Keymar, 1988	-
Assos, Kephallonia Island	38.37	20.54	N/A	1990	Richter & Mayer, 1990	-
Lixouri, Kephallonia Island	38.20	20.43	N/A	1990	Richter & Mayer, 1990	-
Poros, Kephallonia Island	38.15	20.76	N/A	1990	Richter & Mayer, 1990	-
Lourda, Kephallonia Island	38.11	20.63	N/A	1991	Clark, 1991	-
Argostoli, Kephallonia Island	38.17	20.48	N/A	1991	Clark, 1991	-
Mellisani, Kephallonia Island	38.25	20.62	N/A	1991	Clark, 1991	-

Agia Marina, Zakynthos Island	37.79	20.77	N/A	1991	Clark, 1991	-
Volimai, Zakynthos Island	37.87	20.65	N/A	1991	Clark, 1991	-
Arpya islet	37.2596	21.0027	N/A	1992	Valakos & Mylonas, 1992	-
Stamphani islet	37.2458	21.0119	N/A	1992	Valakos & Mylonas, 1992	-
Knossos, Crete Island	35.29	25.15	N/A	1999	Perez Mellado et al., 1999	-
Rizinia-Festos, Crete Island	35.15	24.99	N/A	1999	Perez Mellado et al., 1999	-
Moni Vosakou, Crete Island	35.38	24.84	N/A	2004	Harris et al., 2004	-
Kolokytha islet, Crete	35.26403	25.7605	N/A	2004	Harris et al., 2004	-
Kephallonia Island	38.21	20.59	N/A	2006	Wilson, 2006	-
Zakynthos Island	37.78	20.89	N/A	2006	Wilson, 2006	-
Corfu Island	39.607787	19.902928	N/A	2014	Macát et al., 2014	-
Ithaca Island	38.42	20.67	N/A	2017	Strachinis & Artavanis, 2017	-
Mithymna, Lesvos Island	39.364788	26.177777	11	2017	Mizerakis & Strachinis, 2017	-
Mytilene, Lesvos Island	39.10629	26.56050	10	2017	Mizerakis & Strachinis, 2017	NHMC 80.3.86.137-139
Athens, Attica	37.992467	23.678053	44	2018	Strachinis & Pafilis, 2018	NHMC80.3.86.142, ZMUA4185
Agrinio	38.624902	21.409562	83	2020	Strachinis et al., 2020	NHMC80.3.86.149 – 150
Mesolongi	38.368675	21.430415	5	2020	Strachinis et al., 2020	-
Agios Polykarpos	38.349959	21.706523	6	2020	Strachinis et al., 2020	-
Elefsina, Attica	38.04	23.54	N/A	2020	Strachinis et al., 2020	-
Pireaus, Attica	37.94	23.64	N/A	2020	Strachinis et al., 2020	-
Theriano, Achaia	38.138284	21.630780	143	2020	Tzoras et al., 2020	-
Elos Agias, Patras, Achaia	38.279525	21.754636	3	11/10/2013	Present study	-
Patras, Achaia	38.261977	21.746897	19	04/06/2014	Present study	-
Liapaiika, Achaia	38.242816	21.776675	175	01/04/2015	Present study	-
Brinias, Ileia	38.046622	21.319586	1	12/06/2015	Present study	-
Araksos, Achaia	38.161547	21.407755	4	01/07/2015	Present study	-
Kotychi Lagoon, Ileia	38.005991	21.284819	0	13/08/2016	Present study	-
Kourtesi, Ileia	37.977202	21.316066	15	07/07/2017	Present study	-
Strofylia wetlands, Achaia	38.151075	21.3703	5	02/10/2017	Present study	-
Karavostasi, Achaia	38.192861	21.436686	1	17/02/2018	Present study	-
Patras, Achaia	38.261986	21.743021	8	12/04/2018	Present study	-

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Karavostasi, Achaia	38.189965	21.422232	1	13/04/2018	Present study	-
Patras, Achaia	38.264755	21.740854	5	18/04/2018	Present study	-
Patras, Achaia	38.265014	21.739120	4	18/04/2018	Present study	-
Patras, Achaia	38.266943	21.739009	0	18/04/2018	Present study	-
Patras, Achaia	38.267625	21.738988	0	18/04/2018	Present study	-
Patras, Achaia	38.268061	21.738971	0	18/04/2018	Present study	-
Patras, Achaia	38.268743	21.739015	0	18/04/2018	Present study	-
Patras, Achaia	38.271273	21.740254	0	18/04/2018	Present study	-
Patras, Achaia	38.272079	21.740420	0	18/04/2018	Present study	-
Patras, Achaia	38.276535	21.745114	2	17/05/2018	Present study	-
Patras, Achaia	38.244108	21.737758	27	04/06/2018	Present study	-
Kounoupeli, Ileia	38.102464	21.349036	6	04/07/2018	Present study	-
Lechena, Ileia	37.978415	21.261016	1	10/07/2018	Present study	-
Kounoupeli, Ileia	38.101988	21.350608	1	11/07/2018	Present study	-
Lapa, Achaia	38.098456	21.420258	16	29/08/2018	Present study	-
Theriano, Achaia	38.141899	21.638090	97	08/09/2018	Present study	-
Patras, Achaia	38.261150	21.745390	14	07/10/2018	Present study	-
Platanovrisi, Achaia	38.137780	21.740194	292	27/10/2018	Present study	-
Patras, Achaia	38.244369	21.773901	182	06/03/2019	Present study	-
Agios Stefanos, Achaia	38.127049	21.626582	30	30/03/2019	Present study	-
Patras, Achaia	38.253623	21.738075	9	02/04/2019	Present study	-
Karia, Achaia	38.100646	21.548529	78	05/04/2019	Present study	-
Platanovrisi, Achaia	38.112939	21.772526	358	13/04/2019	Present study	-
Platanovrisi, Achaia	38.139896	21.735452	274	13/04/2019	Present study	-
Theriano, Achaia	38.140597	21.636126	89	13/04/2019	Present study	-
Patras, Achaia	38.225705	21.761606	72	14/05/2019	Present study	-
Patras, Achaia	38.267436	21.748201	24	31/05/2019	Present study	-
Patras, Achaia	38.264851	21.739508	2	02/06/2019	Present study	-
Patras, Achaia	38.245097	21.734147	13	03/06/2019	Present study	-
Patras, Achaia	38.243252	21.732993	13	10/06/2019	Present study	-
Brinias, Ileia	38.029402	21.308391	1	21/06/2019	Present study	-
Patras, Achaia	38.255748	21.741087	14	27/06/2019	Present study	-
Patras, Achaia	38.249805	21.739550	20	27/06/2019	Present study	-
Patras, Achaia	38.258263	21.738559	3	30/06/2019	Present study	-
Patras, Achaia	38.254802	21.737728	3	30/06/2019	Present study	-
Patras, Achaia	38.253151	21.739743	16	02/07/2019	Present study	-
Patras, Achaia	38.250250	21.738627	16	02/07/2019	Present study	-
Patras, Achaia	38.244314	21.736554	18	12/07/2019	Present study	-
Patras, Achaia	38.247258	21.739486	22	12/07/2019	Present study	-
Patras, Achaia	38.285828	21.791160	76	14/07/2019	Present study	-
Patras, Achaia	38.245542	21.740609	58	23/07/2019	Present study	-
Patras, Achaia	38.250342	21.738554	16	23/07/2019	Present study	-
Patras, Achaia	38.253626	21.739712	14	23/07/2019	Present study	-
Patras, Achaia	38.262937	21.740724	7	24/07/2019	Present study	-
Patras, Achaia	38.250463	21.736839	9	25/07/2019	Present study	-
Patras, Achaia	38.251752	21.737502	8	25/07/2019	Present study	-

Diakofto, Achaia	38.192179	22.196960	10	28/07/2019	Present study	-
Diakofto, Achaia	38.192075	22.196377	10	28/07/2019	Present study	-
Lousika, Achaia	38.113190	21.580138	43	29/07/2019	Present study	-
Lousika, Achaia	38.124745	21.576298	15	29/07/2019	Present study	-
Lefka, Achaia	38.205579	21.726024	15	01/08/2019	Present study	-
Apostoloi, Achaia	38.118256	21.476322	24	04/08/2019	Present study	-
Psathopirgos, Achaia	38.327418	21.873514	9	07/08/2019	Present study	-
Kiparissia, Messinia	37.257424	21.674450	16	01/07/2019	Present study	-
Archea Olimpia, Ileia	37.644198	21.625010	50	01/07/2019	Present study	-
Vounargo, Ileia	37.727854	21.406894	52	24/08/2019	Present study	-
Lousika, Achaia	38.109646	21.589655	50	27/01/2020	Present study	-
Patras, Achaia	38.278531	21.761249	15	14/04/2020	Present study	-
Platanovrisi, Achaia	38.121449	21.761736	353	05/05/2020	Present study	-
Lapa, Achaia	38.097631	21.418983	17	16/05/2020	Present study	-
Agiannakis, Ileia	37.350179	21.696727	2	26/05/2020	Present study	-
Niforeika, Achaia	38.158968	21.519767	24	11/06/2020	Present study	-
Syndriada, Ileia	37.688827	21.424627	12	10/10/2020	Present study	-
Loutra Yrminis, Ileia	38.102537	21.349386	8	30/04/2021	Present study	-
Spiatza, Ileia	37.649206	21.429528	3	01/05/2021	Present study	-
Agios Nikolaos, Ileia	37.485130	21.621516	4	01/05/2021	Present study	-
Kiparissia, Messinia	37.254892	21.666483	3	12/06/2022	Present study	-
Pylos, Messinia	36.93920	21.71488	6	22/10/12	Present study, Bobby Bok	
Kourouta, Ileia	37.771159	21.293599	3	31/05/19	Present study, Bobby Bok	
Nafpaktos	38.393290	21.833908	3	03/08/2020	Present study	-
Nafpaktos	38.393192	21.828774	10	27/09/2020	Present study	-
Monastiraki, Fokida	38.40578	21.94252	3	30/06/2021	Present study	-
Nafpaktos	38.393840	21.830803	9	10/07/2022	Present study	-
Antirio	38.329459	21.764322	3	12/08/2022	Present study	-
Efpalio, Fokida	38.420112	21.928211	90	24/08/2022	Present study	-
Ithaca Island	38.483649	20.671772	1	02/03/2018	Present study	-
Ithaca Island	38.364296	20.721894	2	05/03/2018	Present study	-
Ithaca Island	38.440321	20.641540	2	08/05/2018	Present study	-
Ithaca Island	38.365443	20.709069	77	09/05/2018	Present study	-
Ithaca Island	38.323349	20.740228	269	09/05/2018	Present study	-
Ithaca Island	38.324276	20.739823	277	09/05/2018	Present study	-
Ithaca Island	38.324931	20.740260	285	09/05/2018	Present study	-
Ithaca Island	38.394343	20.673980	571	09/05/2018	Present study	-
Ithaca Island	38.359912	20.713027	169	10/05/2018	Present study	-
Ithaca Island	38.319465	20.741168	269	17/03/2019	Present study	-
Ithaca Island	38.321665	20.740008	268	41749	Present study	-
Ithaca Island	38.371910	20.741140	6	43165	Present study	-
Kephallonia Island	38.109337	20.788715	400	21/04/2019	Present study	-
Kephallonia Island	38.108759	20.791367	365	21/04/2019	Present study	-
Kephallonia Island	38.109806	20.785049	370	21/04/2019	Present study	-
Kephallonia Island	38.287359	20.432236	9	22/04/2019	Present study	-

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Kephallonia Island	38.280000	20.422994	4	22/04/2019	Present study	-
Kephallonia Island	38.315245	20.415985	217	22/04/2019	Present study	-
Kephallonia Island	38.336239	20.412172	8	22/04/2019	Present study	-
Kephallonia Island	38.307521	20.414846	198	22/04/2019	Present study	-
Kephallonia Island	38.182920	20.408960	54	22/04/2019	Present study	-
Kephallonia Island	38.158863	20.759297	308	41747	Present study	-
Kephallonia Island	38.214888	20.641415	95	44704	Present study, Michail Manonas	-
Crete Island	35.19759	25.28681	323	15/09/2022	Present study	-
Crete Island	35.310969	24.845253	520	23/6/2009	Present study	-
Crete Island	35.302633	24.849333	481	23/6/2009	Present study	-
Crete Island	35.318986	25.066339	46	10/10/2021	Present study	-
Kos Island	36.8168	27.0995	122	01/08/2012	NHMC	NHMC80.3 .86.151
Stamphani islet	37.2462	21.0115	12	04/12/1991	NHMC	NHMC80.3 .86.49-78
Stamphani islet	37.2458	21.013	12	27/7/2018	NHMC	NHMC80.3 .86.144-148
Arpya islet	37.2609	21.0039	1	5/12/1991	NHMC	NHMC80.3 .86.79-82
Crete Island	35.2823	25.1654	131	31/3/1995	NHMC	NHMC80.3 .86.1
Dia islet	35.4462	25.1949	25	29/6/1989	NHMC	NHMC80.3 .86.3
Crete Island	35.2991	25.1482	185	16/5/1988	NHMC	NHMC80.3 .86.4
Crete Island	35.3429	25.1561	21	1/5/1994	NHMC	NHMC80.3 .86.19-20
Crete Island	35.3857	24.8418	346	3/2/2000	NHMC	NHMC80.3 .86.21
Kolokytha islet	35.2648	25.7604	13	24/5/1996	NHMC	NHMC80.3 .86.22-23
Crete Island	35.3331	25.1201	44	22/6/2001	NHMC	NHMC80.3 .86.24
Crete Island	35.3396	25.1299	20	20/5/2001	NHMC	NHMC80.3 .86.25-26
Crete Island	35.3181	25.1046	36	1/2/2002	NHMC	NHMC80.3 .86.31
Dia islet	35.4462	25.1949	25	29/6/1989	NHMC	NHMC80.3 .86.32
Crete Island	35.3195	25.5848	220	13/4/1988	NHMC	NHMC80.3 .86.35
Crete Island	35.3244	25.0928	60	4/5/2004	NHMC	NHMC80.3 .86.47
Crete Island	35.333	25.1251	47	11/8/2004	NHMC	NHMC80.3 .86.48
Crete Island	35.3076	25.1525	114	3/11/2005	NHMC	NHMC80.3 .86.83
Crete Island	35.2939	25.0101	224	18/11/2005	NHMC	NHMC80.3 .86.84
Crete Island	35.327831	25.119818	57	1/6/2005	NHMC	NHMC80.3 .86.85
Crete Island	35.3077	25.1528	115	5/1/2010	NHMC	NHMC80.3 .86.115

Crete Island	35.2105	25.3369	335	31/8/2010	NHMC	NHMC80.3 .86.116
Crete Island	35.3403	25.1228	9	21/8/2010	NHMC	NHMC80.3 .86.117, 119, 120
Crete Island	35.330535	25.268561	7	2/7/2012	NHMC	NHMC80.3 .86.121
Crete Island	35.333228	25.143231	37	26/11/2012	NHMC	NHMC80.3 .86.122-124
Crete Island	35.2512	25.1684	378	20/8/1999	NHMC	NHMC80.3 .86.135
Crete Island	35.3352	25.328	1	27/11/2015	NHMC	NHMC80.3 .86.136
Crete Island	35.310761	25.137919	107	10/7/2017	NHMC	NHMC80.3 .86.140
Crete Island	35.3077	25.1528	115	13/3/2018	NHMC	NHMC80.3 .86.143
Crete Island	35.3077	25.1528	115	16/7/2020	NHMC	NHMC80.3 .86.152
Crete Island	35.333228	25.143231	38	26/6/2020	NHMC	NHMC80.3 .86.153
Crete Island	35.3077	25.1528	115	16/11/2021	NHMC	NHMC80.3 .86.154
Crete Island	35.315088	25.107107	15	5/7/2016	NHMC	NHMC80.3 .86.155
Crete Island	35.339579	25.174748	27	2010-06-19	iNaturalist.org	-
Kiparissia, Messinia	37.251231	21.669444	37	2011-06-22	iNaturalist.org	-
Crete Island	35.261543	25.723621	6	2014-05-21	iNaturalist.org	-
Zakynthos Island	37.741541	20.906118	12	2014-07-28	iNaturalist.org	-
Kephallonia Island	38.119883	20.624595	133	2015-08-25	iNaturalist.org	-
Pournarokastro, Achaia	38.202528	21.803369	713	2016-04-22	iNaturalist.org	-
Zakynthos Island	37.715697	20.984605	31	2016-08-25	iNaturalist.org	-
Crete Island	35.01006	25.753944	5	2016-11-14	iNaturalist.org	-
Rio, Achaia	38.302342	21.777292	7	2017-04-14	iNaturalist.org	-
Kephallonia Island	38.102442	20.570628	51	2017-05-05	iNaturalist.org	-
Crete Island	35.239450	25.415668	225	2017-05-07	iNaturalist.org	-
Savalia, Ileia	37.81480	21.283092	9	2017-07-24	iNaturalist.org	-
Crete Island	35.304968	25.158203	103	2017-08-21	iNaturalist.org	-
Longos, Achaia	38.292441	22.026177	1	2018-05-08	iNaturalist.org	-
Crete Island	35.280258	24.891541	858	2018-05-11	iNaturalist.org	-
Zakynthos Island	37.760763	20.934479	10	2018-07-18	iNaturalist.org	-
Savalia, Ileia	37.821851	21.292598	15	2018-07-21	iNaturalist.org	-
Kephallonia Island	38.079753	20.754466	55	2018-07-22	iNaturalist.org	-
Zakynthos Island	37.73994	20.893973	2	2018-08-30	iNaturalist.org	-
Crete Island	35.337273	25.056238	3	2018-10-13	iNaturalist.org	-
Crete Island	35.359688	24.510524	50	2018-12-14	iNaturalist.org	-
Crete Island	35.351566	24.874326	334	2019-05-02	iNaturalist.org	-
Crete Island	35.366968	24.961782	86	2019-05-06	iNaturalist.org	-
Patras, Achaia	38.257290	21.744165	20	2019-06-07	iNaturalist.org	-
Kephallonia Island	38.118057	20.604722	50	2019-06-24	iNaturalist.org	-

Tarentola mauritanica (Squamata: Phyllodactylidae) in Greece: an update

Messatida, Achaia	38.179858	21.721888	99	2019-07-12	iNaturalist.org	-
Vrachneika, Achaia	38.169232	21.684338	37	2019-08-13	iNaturalist.org	-
Crete Island	35.369346	24.534238	6	2019-08-25	iNaturalist.org	-
Zakynthos Island	37.824912	20.848191	27	2019-08-25	iNaturalist.org	-
Zakynthos Island	37.668808	20.816958	188	2019-09-18	iNaturalist.org	-
Crete Island	35.33865	25.373602	3	2019-10-25	iNaturalist.org	-
Crete Island	35.513241	24.016115	12	2020-07	iNaturalist.org	-
Zakynthos Island	37.713590	20.981121	37	2020-07-21	iNaturalist.org	-
Kephallonia Island	38.085187	20.799782	22	2020-08-07	iNaturalist.org	-
Zakynthos Island	37.815118	20.873280	4	2020-08-29	iNaturalist.org	-
Crete Island	35.310152	25.392322	47	2020-09-06	iNaturalist.org	-
Glyfa, Ileia	37.837319	21.128624	8	2020-09-07	iNaturalist.org	-
Crete Island	35.307570	25.400540	29	2020-10-19	iNaturalist.org	-
Crete Island	35.308494	25.402704	14	2020-10-31	iNaturalist.org	-
Crete Island	35.206035	26.105942	4	2020-11-03	iNaturalist.org	-
Crete Island	35.314236	25.135052	98	2020-11-21	iNaturalist.org	-
Chaidari, Attica	38.00896	23.648201	137	2021-03-22	iNaturalist.org	-
Crete Island	35.501413	24.024436	20	2021-06-10	iNaturalist.org	-
Crete Island	35.290066	25.729088	25	2021-06-26	iNaturalist.org	-
Zakynthos Island	37.73137	20.8264	86	2021-07-01	iNaturalist.org	-
Crete Island	35.2187	25.713183	14	2021-07-17	iNaturalist.org	-
Crete Island	35.218278	25.712633	14	2021-07-18	iNaturalist.org	-
Kyparissia, Messinia	37.247158	21.650308	11	2021-07-21	iNaturalist.org	-
Patras, Achaia	38.244936	21.742149	80	2021-07-25	iNaturalist.org	-
Patras, Achaia	38.245075	21.741897	77	2021-07-25	iNaturalist.org	-
Patras, Achaia	38.244926	21.742109	77	2021-07-25	iNaturalist.org	-
Zakynthos Island	37.781413	20.894955	10	2021-07-31	iNaturalist.org	-
Zakynthos Island	37.735325	20.877701	7	2021-08-01	iNaturalist.org	-
Zakynthos Island	37.734529	20.878006	7	2021-08-04	iNaturalist.org	-
Loutra Kyllinis, Ileia	37.852979	21.108780	10	2021-08-07	iNaturalist.org	-
Panorama, Attica	38.073219	23.76337	179	2021-08-09	iNaturalist.org	-
Crete Island	35.189958	25.716416	25	2021-08-14	iNaturalist.org	-
Zakynthos Island	37.757313	20.90128	20	2021-08-24	iNaturalist.org	-
Zakynthos Island	37.743471	20.895725	5	2021-09-11	iNaturalist.org	-
Crete Island	35.361119	24.434205	137	2021-09-22	iNaturalist.org	-
Crete Island	35.314285	25.135051	98	2021-09-25	iNaturalist.org	-
Zakynthos Island	37.718477	20.858282	15	2021-09-26	iNaturalist.org	-
Crete Island	35.314301	25.135061	97	2021-10-11	iNaturalist.org	-
Crete Island	35.307395	25.153872	118	2021-10-13	iNaturalist.org	-
Nafpaktos	38.393895	21.826412	49	2021-10-21	iNaturalist.org	-
Zakynthos Island	37.789602	20.856497	11	2022-02-05	iNaturalist.org	-
Zakynthos Island	37.724649	20.979726	33	2022-06-01	iNaturalist.org	-
Ithaca Island	38.383655	20.723323	7	2022-06-04	iNaturalist.org	-
Zakynthos Island	37.709800	20.988324	13	2022-06-07	iNaturalist.org	-
Zakynthos Island	37.737338	20.892789	7	2022-06-10	iNaturalist.org	-
Zakynthos Island	37.817316	20.868303	4	2022-06-15	iNaturalist.org	-

Kephallonia Island	38.114566	20.630056	13	2022-06-22	iNaturalist.org	-
Zakynthos Island	37.788159	20.898826	3	2022-06-24	iNaturalist.org	-
Zakynthos Island	37.725793	20.987087	18	2022-06-26	iNaturalist.org	-
Zakynthos Island	37.728321	20.870389	5	2022-06-27	iNaturalist.org	-
Ovria, Achaia	38.179713	21.721891	99	2022-07-03	iNaturalist.org	-
Crete Island	35.252288	25.132479	261	2022-07-12	iNaturalist.org	-
Archea Olympia, Ileia	37.644869	21.625521	51	2022-07-17	iNaturalist.org	-
Archea Olympia, Ileia	37.645526	21.625736	50	2022-07-17	iNaturalist.org	-
Archea Olympia, Ileia	37.644040	21.625296	49	2022-07-17	iNaturalist.org	-
Archea Olympia, Ileia	37.644603	21.625119	51	2022-07-17	iNaturalist.org	-
Kephallonia Island	38.458377	20.577056	12	2022-07-18	iNaturalist.org	-
Kephallonia Island	38.449997	20.567651	203	2022-07-19	iNaturalist.org	-
Zakynthos Island	37.713116	20.851922	8	2022-07-26	iNaturalist.org	-
Kephallonia Island	38.449913	20.563471	216	2022-07-30	iNaturalist.org	-
Crete Island	35.336753	25.37827	18	2022-07-30	iNaturalist.org	-
Zakynthos Island	37.839588	20.751382	71	2022-08-02	iNaturalist.org	-
Kephallonia Island	38.461863	20.574822	13	2022-08-05	iNaturalist.org	-
Kephallonia Island	38.070406	20.750202	20	2022-08-07	iNaturalist.org	-
Andravida, Ileia	37.904912	21.271401	14	2022-08-13	iNaturalist.org	-
Andravida, Ileia	37.905916	21.271134	15	2022-08-13	iNaturalist.org	-
Zakynthos Island	37.821967	20.844943	43	2022-08-14	iNaturalist.org	-
Ithaca Island	38.370754	20.719585	14	2022-08-16	iNaturalist.org	-
Crete Island	35.141330	24.904298	416	2022-08-23	iNaturalist.org	-
Crete Island	35.335723	25.356468	6	2022-08-25	iNaturalist.org	-
Fasideri, Attica	38.122441	23.844546	337	2022-08-30	iNaturalist.org	-
Crete Island	35.30747	25.370541	106	2022-09-01	iNaturalist.org	-
Mandra, Attica	38.076862	23.491113	99	2022-09-04	iNaturalist.org	-
Mandra, Attica	38.076869	23.491117	99	2022-09-04	iNaturalist.org	-
Kephallonia Island	38.094217	20.558158	93	2022-09-08	iNaturalist.org	-
Crete Island	35.419172	24.660361	15	2022-09-14	iNaturalist.org	-
Kephallonia Island	38.458166	20.576980	17	N/A	iNaturalist.org	-
Katakolo, Ileia	37.651472	21.31691	1	N/A	iNaturalist.org	-
Kephallonia Island	38.159184	20.759526	306	N/A	iNaturalist.org	-
Kephallonia Island	38.381843	20.533589	127	N/A	iNaturalist.org	-
Lapas, Achaia	38.109318	21.434474	11	N/A	iNaturalist.org	-
Zakynthos Island	37.729655	20.970754	24	N/A	iNaturalist.org	-
Zakynthos Island	37.788160	20.898827	3	N/A	iNaturalist.org	-
Zakynthos Island	37.734935	20.877972	8	N/A	iNaturalist.org	-
Peloponnese	38.154957	22.316367	277	16/10/2022	iNaturalist.org	-

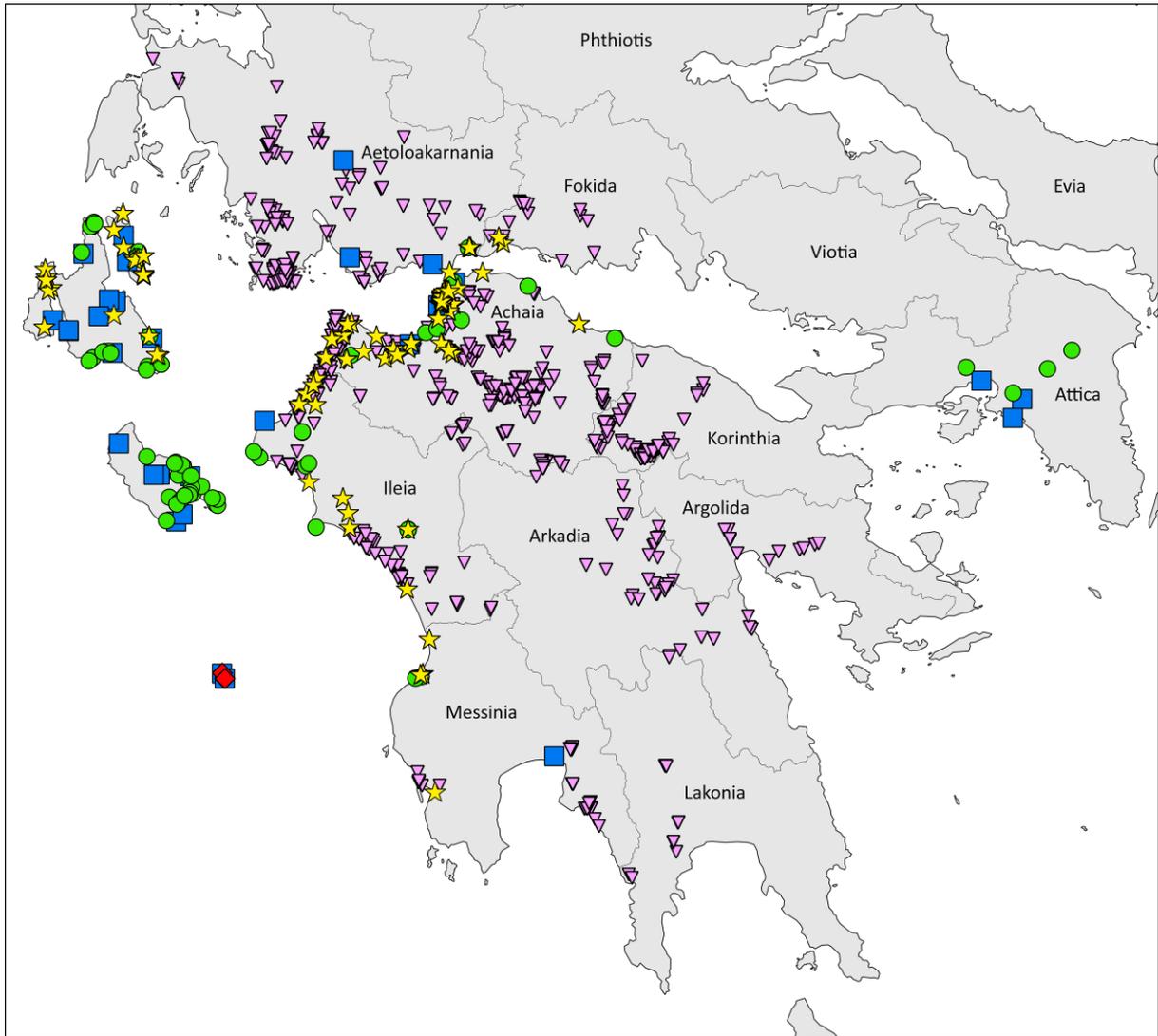


Fig. S1. Close-up map of the Peloponnese and the neighbor areas that shows all the sites surveyed thoroughly by the authors. Sites that didn't result in Moorish Gecko's presence are depicted with pink triangles. Records of different sources are represented as follows: blue squares > literature; green circles > iNaturalist; red rhombuses > Natural History Museum of Crete vouchers; yellow stars > this work's records.

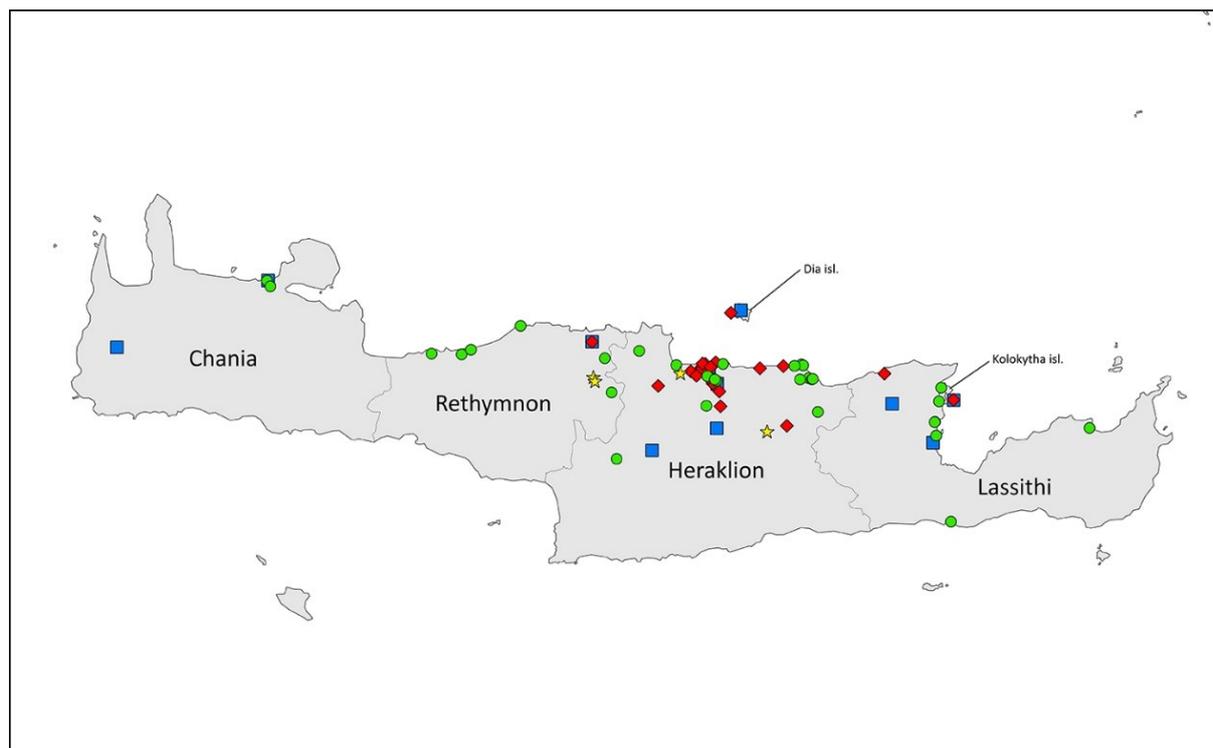


Fig. S2. Moorish Gecko records from Crete Island. Different regions (prefectures) and some islets are also showed on the map. Records of different sources are represented as follows:
blue squares > literature, green circles > iNaturalist, red rhombuses > Natural History Museum of Crete vouchers, yellow stars > this work's records.

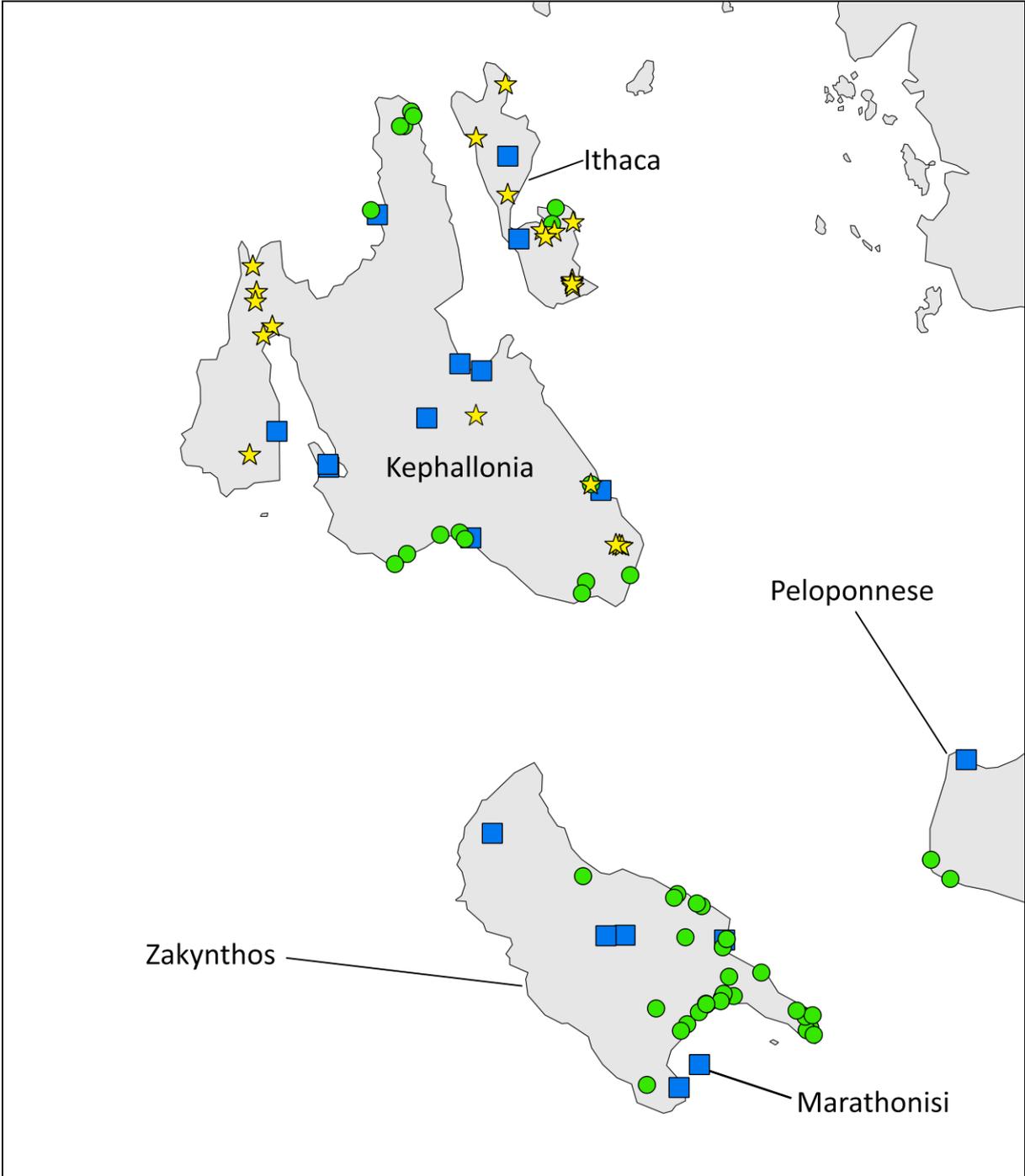


Fig. S3. Moorish Gecko records from the South Ionian islands. Records of different sources are represented as follows: blue squares > literature, green circles > iNaturalist, yellow stars > this work's records.