THE HERPETOFAUNA OF THE DODECANESE ISLANDS

Augusto Cattaneo[1]*, Cristina Cattaneo[2] & Mauro Grano[3]

[1] Via Cola di Rienzo 162, 00195 Rome, Italy
[2] Via Eleonora d'Arborea 12, 00162 Rome, Italy
[3] Via Valcenischia 24, 00141 Rome, Italy
** Corresponding author, e-mail: augustocattaneo@hotmail.com*

Summary: A list of reptiles and amphibians occurring on the Dodecanese Archipelago is provided with the latest taxonomic updates. Notes relating to animals' ecology and to critical habitats are also given. Observations are also made regarding the subspecies *Dolichophis jugularis zinneri* Cattaneo, 2012 endemic to Rhodes and its Archipelago, and a survey on the Amphibians and Reptiles species known from the southwestern Turkey, whose presence in the Dodecanese Islands has not yet been detected, is discussed.

Key Words: Dodecanese, Greece, amphibians, reptiles, conservation, herpetofauna.

Riassunto: Viene fornito un elenco di Rettili e Anfibi presenti nell'Arcipelago del Dodecaneso con gli ultimi aggiornamenti tassonomici. Vengono inoltre fornite note relative all'ecologia di questi animali e sugli habitat critici in cui vivono. Vengono inoltre effettuate osservazioni su *Dolichophis jugularis zinneri* Cattaneo, 2012 sottospecie endemica di Rodi e del suo arcipelago, e viene fornita una disamina sulle specie di Anfibi e Rettili viventi nella vicina Turchia sudoccidentale la cui presenza nelle isole del Dodecaneso non è stata ancora rilevata.

Parole Chiave: Dodecaneso, Grecia, anfibi, rettili, conservazione, erpetofauna.

INTRODUCTION

Starting with the French scientific expedition Morea (Expédition Scientifique de Morée 1828–1833), numerous naturalists were drawn to the herpetological wealth of Greece and carried out extensive fieldwork during the 19th century, describing several new species (Pafilis 2010). In the 20th century a great contribution was made to the knowledge of the Aegean herpetology thanks to valued herpetologists as the Austrian Franz Werner, who worked extensively on the Archipelago, publishing in 1930 and 1935 his most important papers (Werner 1930, 1935), where he described two new endemics of the Aegean, the lizard *Podarcis gaigeae* (endemic to Skyros Island) and the viper *Macrovipera schweizeri* (endemic to Milos). Later, Otto von Wettstein carried out extensive researches on the Aegean Islands, which were summarized in the exhaustive work Herpetologia Aegea (Wettstein 1953). Followed the contributions of talented herpetologists as Robert Mertens (1959, 1968), Karl Buchholz (1961, 1962) and Ulrich Gruber (Gruber & Schultze-Westrum 1971; Gruber & Fuchs 1977). This trend has continued with an increasing number of herpetologists visiting Greece (Donihue *et al.* 2020). However, herpetologists, whether they were foreigners or Greeks, had a preference for islands thanks to their richness in terms of herpetofauna (Christopoulos *et al.* 2019; Annousis *et al.* 2021). Since 2008 (Valakos *et al.* 2008) to date the list of newly described species on the Aegean Archipelago has increased due to the rapid development of innovative molecular tools for studying biodiversity, which unveiled considerable cryptic diversity that led to the redefinition of the current taxonomy (Lymberakis *et al.* 2018). Greece is home to one of the richest herpetofaunas in Europe, including 69 reptiles (12 endemic) and 26 amphibians (three endemic) (Lymberakis *et al.* 2018). It is worth noting that in the Dodecanese Archipelago there are among amphibians two endemic species (*Pelophylax cerigensis* endemic to Karpathos, and *Lyciasalamandra helverseni* endemic to Karpathos, Kasos and Saria islands), and among snakes an endemic subspecies (*Dolichophis jugularis zinneri* endemic to the Rhodes Archipelago). Rhodes and all of the islands that make up the Dodecanese Archipelago are very important from an environmental and naturalistic point of view. The vertebrate fauna, and in particular the herpetofauna, is particularly interesting and rich. Most of the species are of Anatolian origin because several million years ago these islands were connected with Asia Minor. Recent evidence from the investigation of genetic variation in amphibians and reptiles shows the potential role of the Anatolia region as a major refugium and a source of re-expansion for several amphibian and reptile taxa during the Pliocene and Pleistocene. Unfortunately, a strong anthropic impact, including new forms of agriculture, pollution and global warming, has modified many natural habitats and has led to the rarefaction of some of the herpetofauna species. Numerous studies car-

ried out in the last twenty years have increased the knowledge of the species present in the Dodecanese Islands (see also Cattaneo *et al.* 2020). Currently, six species of tortoises and terrapins, fourteen species of saurians, thirteen species of snakes and eight species of amphibians are known to inhabit these islands.

MATERIAL AND METHODS

This work aims be an update of the data relating to the herpetofauna of the Dodecanese Islands (Tables 1, 2). The results of this update rely on the authors personal data, (published and unpublished), and from the consultation of the scientific literature concerning the Dodecanese and the Aegean herpetofauna as a whole. Furthermore, all the numerous taxonomic revisions that have affected reptiles and amphibians in Greece in recent years have been carefully analysed.

RESULTS

Lizards, Tortoises, Terrapins, and Amphibians in Dodecanese Archipelago

Cristina Cattaneo & Mauro Grano

Lizards

In the Dodecanese Archipelago thirteen lizard species have been reported.

Within the family Agamidae, quite common on several islands, we have the rough–tailed rock agama, *Stellagama stellio* (Linnaeus, 1758) (κροκοδειλάκι). The genus *Stellagama* Baig, Wagner, Ananjeva et Böhme, 2012 has seven recognized subspecies and two subspecies can be found specifically in Greece: *S. stellio stellio* (Linnaeus, 1758) and *S. stellio daani* (Beutler & Frör, 1980). In the Dodecanese Archipelago, we find *S. stellio daani* (Fig. 1), a diurnal lizard that is always found in rocky habitats and in a variety of Mediterranean, arid and semi–arid environments.

It can be found on rocks, trees, and stone walls. The head and body are moderately depressed, head coloured dorsally like the back or darker, not distinctly coloured from the back, back usually with four - five yellowish vertebral spots on a dark grey background, whitish belly, whitish throat, dark spot generally on half of the area; tail length about one and a half times the snout–vent distance (Baig *et al.* 2012). This lizard has been reported on Leros, Kalymnos, Telendos, Kos, Patmos, Agathonisi, Nisyros, Tilos, Symi, Seskli, Chalki, Alimia (Grano *et al.* 2015), Karpathos (Grano & Cattaneo 2019b) Rhodes and Kastellorizo.

As concern the family Gekkonidae two gecko species are found in the Dodecanese Archipelago: *Hemidactylus turcicus* (Linnaeus, 1758) (σαμιαμίδι) and *Mediodactylus oertzeni* (Boettger, 1888) (κυρτοδάκτυλος).

Hemidactylus turcicus (Linnaeus, 1758) (Fig. 2), the Turkish gecko, is a nocturnal reptile that generally looks for wet environments. It lives in a great variety of stony habitats, such as: building walls, stone walls found in fields, under stones and inside cisterns. It has been reported on Astypalea, Patmos, Leros, Lipsi, Arki, Agathonisi, Kalymnos, Nisyros (Cattaneo 2006), Symi, Tilos, Chalki, Alimia, Rhodes, Karpathos, Kasos, Saria (Itescu *et al.* 2016) and Kastellorizo. A form of insular gigantism of this gecko has been reported for the island of Kasos (Itescu *et al.* 2016).

Mediodactylus oertzeni (Boettger, 1888) (Fig. 3) belongs to the *M. kotschyi* complex. *Mediodactylus kotschyi* (Steindachner, 1870) is a small gecko native to Southeastern Europe and the Levant, which displays great morphological variation with a large number of recognized subspecies. Through genetic and phylogenetic studies, five new species have been identified within the *M. kotschyi* complex: *M. kotschyi* (Steindachner, 1870) (mainland Balkans, most of Aegean islands, and Italy), *M. orientalis* (Štěpánek, 1937) (Levant, Cyprus, S Turkey, and SE-Aegean Islands as Samos, Ikaria and neighbor islets), *M. danilewskii* (Strauch, 1887) (Black Sea region and SW-Turkey, and Gavdos Island), *M. bartoni* (Štěpánek, 1934) (Crete, and nearby islets), and *M. oertzeni* (Boettger, 1888) (Kasos and southern Dodecanese Islands).

Mediodactylus oertzeni (Boettger, 1888) (raised to the rank of species following the genetic and phylogenetic studies) is found in the Dodecanese Archipelago and specifically on Astypalea, and on two of its offshore islets Kounoupi and Koutsomyti (pers. obs.), Kalymnos, Symi, Karpathos, Kasos, Saria, Chalki.

Instead on Kastellorizo occurs *M. danilewskii* (Kalaentzis *et al.* 2018). On Megali Sofrano (south of Astypalea) the subspecies *M. oertzeni stepaneki* (Wettstein, 1937) is present. Only on Kos Island can *M. kotschyi kotschyi* (Steindachner, 1870) (Kotsakiozi *et al.* 2018) be found and on Agathonisi, we find *M. orientalis* (Stepánek, 1937). *Mediodactylus oertzeni*, unlike *Hemidactylus turcicus*, is more diurnal and less anthropophilic. Seeking dry habitats, it is primarily found in arid, stony environments with phryganic vegetation, such as among stones and on stone walls.

Regarding the family Lacertidae in the Dodecanese Archipelago, we find *Anatololacerta pelasgiana* (Mertens, 1959), *Lacerta diplochondrodes diplochondrodes* Wettstein, 1953, *Ophisops elegans* Ménétries, 1832 and *Podarcis erhardii* (Bedriaga, 1876).

	AG	AR	PM	LS	LR	KL	TD	PS	KO	AP	NS	SY	SK	TL	RD	PN	CH	AL	KP	KS	SR	AM	KT
Lyciasalamandra helverseni																			X	X	X		
Lyciasalamandra luschani																							X
Pelobates syriacus									X														
Bufo bufo									X														
Bufotes viridis				X	X	X			X			X		X	X								X
Hyla orientalis									X						X								
Pelophylax bedriagae									X	X					X								
Pelophylax cerigensis																			X				
Testudo graeca					X	X			X			X	X										
Emys orbicularis									X														
Mauremys rivulata									X			X		X	X		X						
Trionyx triunguis					X	X			X						X								
Stellagama stellio	X		X		X	X	X		X		X	X	X	X	X		X	X	X				X
Hemidactylus turcicus	X	X	X	X	X	X				X	X	X		X	X		X	X	X	X	X		X
Mediodactylus kotschyi (*s.l.*)	X					X			X	X		X		X			X		X	X	X		X
Anatololacerta pelasgiana											X	X	X	X	X	(X)		X		X			X
Lacerta diplochondrodes diplochondrodes									X						X								
Ophisops elegans	X	X	X		X	X	X		X	X	X	X	X	X	X			X	X				
Podarcis erhardii										X#													
Ablepharus kitaibelii					X				X	X	X	X		X	X		X	X	X	X		X	X*
Chalcides ocellatus											X				X	X			X	X			
Heremites auratus									X			X			X								X
Ophiomorus kardesi																							X
Pseudopus apodus									X														
Blanus strauchi					X	X		X	X		X	X			X								X

Table 1. Amphibians, Tortoises and Lizards of the Dodecanese Archipelago. * = The populations of Kastellorizo Island could belong to a different species. # = The neighboring islets are also included. Legenda: AG = Agathonisi; AR = Arki; PM = Patmos; LS = Lipsi; LR = Leros; KL = Kalymnos; TD = Telendos; PS = Pserimos; KO = Kos; AP = Astypalea; NS = Nisyros; SY = Symi; SK = Seskli; TL = Tilos; RD = Rodi; PN = Pentanisos; CH = Chalki; AL = Alimia; KP = Karpathos; KS = Kasos; SR = Saria; AM = Armathia; KT = Kastellorizo (this legend also applies to the Table 2).

	AG	AR	PM	LS	LR	KL	PS	KO	NS	SY	SK	TL	RD	CH	AL	KP	KS	AM	KT
Xerotyphlos vermicularis			X		X	X		X		X			X						
Eryx jaculus					X	X		X											
Dolichophis caspius	X		X			X		X	X							X			
Dolichophis jugularis					X			X		X	(X)	X	X	X	(X)				X
Eirenis modestus					X	X				X	X								X
Hemorrhois nummifer			X	X	X	X		X		X			X						X
Platyceps najadum		X	X	X	X	X		X	X				X						X
Telescopus fallax				X		X	X	X		X		X	X			(X)	X	X	X
Zamenis situla								X					X	X					
Natrix natrix					X			X					X			X	X		
Natrix tessellata													(X)						
Malpolon insignitus						X		X					X						X
Montivipera xanthina			X	X	X	X		X		X		(X)							

Table 2. The snakes of the Dodecanese Archipelago (the brackets indicate “presence to be confirmed”).

Until recently four species were recognized in the genus *Anatololacerta* Arnold, Arribas et Carranza, 2007: *A. anatolica* (Werner, 1900), *A. danfordi* (Günther, 1876), *A. budaki* (Eiselt & Schmidtler, 1986), and *A. pelasgiana* (Mertens, 1959) (Bellati *et al.* 2015). A recent molecular study revealed the presence of cryptic diversity within the genus which led to the raise of a subspecies to species level. The results revealed the occurrence of one more cryptic lineage which should be regarded as a separate species with the name *A. ibrahimi* stat. nov. The current name *A. budaki* was synonymized with *A. pelasgiana* because specimens of the type-locality of *A. budaki* are assigned genetically to *A. pelasgiana*. The genetic lineage including specimens currently assigned to *A. budaki* was named *A. finikensis* stat. nov., raising the subspecies *A. b. finikensis* to species level (Karakis *et al.* 2021). Therefore, in the Mediterranean basin the following species of *Anatololacerta* are currently present: *A. anatolica* (Werner, 1900) (W Turkey, up to the north of the Büyük Menderes River, and the Aegean islands of Samos and Ikaria); *A. danfordi* (Günther, 1876), (Southeasternmost Turkey, east of Göksu River, province of Mersin); *A. finikensis* (Eiselt & Schmidtler, 1986) stat. nov. (SW- Turkey from Kaş to Antalya, and the Aegean islet of Psomi); *A. ibrahimi* (Eiselt and Schmidtler, 1986) stat. nov. (S Turkey from Burdur city to Göksu River); *A. pelasgiana* (Mertens, 1959) (SW-Turkey and the Aegean islands of Symi and Rhodes).

Anatololacerta pelasgiana (Mertens, 1959) (πελασγική σαύρα) (Fig. 4) is found in rocky habitats, cultivated areas, and orchards, but also inside villages and towns. More or less striated or banded, frequently with pale fairly broad dorsolateral stripes separating vertebral and lateral bands that may be reticulate, particularly in males. Background colour light bluish green to light brown with scattered small black spots and white flecks. No blue ocelli in shoulder region. Underside usually whitish or bluish, but throat often reddish especially in males and subadults; chin and throat often with dark spots; blue spots present on outer row of ventral scales; tail bright green-blue in

Figures 1–4. Figure 1. *Stellagama stellio* (Rhodes, photo by Manolis Sarris). Figure 2. *Hemidactylus turcicus* (Tilos Island). Figure 3. *Mediodactylus oertzeni* (Saria Island). Figure 4. *Anatololacerta pelasgiana* (Tilos Island).

hatchlings (Arnold *et al.* 2007). In the Dodecanese, it can be found on Nisyros (Cattaneo 2006), Tilos (Broggi 2006), Symi and Seskli, Alimia, Rhodes (probably also on Pentanisos islet), Strongili (NW of Rhodes), Kastellorizo and on Kasos (Kornilios & Thanou 2016).

The three-lined lizard, *Lacerta trilineata* Bedriaga, 1886 (τρανόσαυρα) is the largest Lacertide in Greece. It is found throughout the mainland as well as on many islands. It inhabits environments with lower elevations and fairly good vegetation. Recent genetic and mitochondrial studies could highlight that the populations of *L. pamphylica*, *diplochondrodes* lineage (east Aegean islands, Anatolia and Thrace), *citrovittata* (central Aegean islands), and *trilineata* (remaining Balkan populations and islands), are separate clusters. In the east Mediterranean the *L. trilineata* group comprises three species: *L. media* Lantz & Cyrén, 1920 (from central Turkey and eastwards), *Lacerta pamphylica* Schmidtler, 1975 (central south coast of Turkey) and *L. trilineata* Bedriaga, 1886 (Greek mainland and islands). Whereas *L. media* is a morphologically and genetically distinct taxon, the taxonomic situation for the *trilineata* + *pamphylica* clade has historically been problematic. A recent study proposed formal changes to the taxonomy of the *L. trilineata pamphylica* group to properly reflect the phylogenetic relationships (Kornilios *et al.* 2019). Recent molecular study revealed the presence of diversity within the *trilineata* group which led to the raise of several subspecies to species level, and specifically the subspecies *L. trilineata citrovittata* Werner, 1935 raised to *L. citrovittata*, *L. trilineata diplochondrodes* Wettstein, 1952 to *L. diplochondrodes* subsp. *diplochondrodes*, *L. trilineata cariensis* Peters, 1964 to *L. diplochondrodes cariensis* and *L. trilineata dobrogica* Fuhn & Mertens, 1959 to *L. diplochondrodes dobrogica*. Therefore the current proposed taxonomy for the Aegean green lizards is the following: *L. trilineata trilineata* Bedriaga, 1886 (North Macedonia, Peloponnesos, east of Pindos Mt., including adjacent Aegean and south Ionian islands); *L. trilineata major* Boulenger, 1887 (west of Pindos Mt., including Corfu and Paxos islands); *L. trilineata hansschweizeri* Müller, 1935 (west Cyclades islands: Milos, Kimolos, Polyegos, Kithnos, Serifos, Sifnos); *L. trilineata polylepidota* Wettstein, 1952 (Crete and Kythera island); *L. cit-*

rovittata Werner, 1935 (endemic of the central Aegean islands: Andros Tinos, Syros, Mykonos, Naxos, Paros, Antiparos, Ios, possibly other islands); *L. diplochondrodes diplochondrodes* Wettstein, 1953 (Rhodos and Kos islands); *L. diplochondrodes cariensis* Peters, 1964 (Samos, Chios, Lesbos islands); *L. diplochondrodes dobrogica* Fuhn & Mertens, 1959 (northeast Greece).

The snake-eyed lizard, *Ophisops elegans* Ménétries, 1832 (οφίσωψ) (Fig. 5) is a small lizard common to the eastern Aegean islands. It is a very thermophilic species, it remains active even in the hottest hours of the day in the summer season, when the other lizards are resting. It moves extremely fast, observable in bushy open environments and arid fields. Olive or bronze above, with black spots usually forming longitudinal series, sometimes forming a network; frequently with two light longitudinal streaks on each side; lower surfaces white. Length up to 15 cm. In the Dodecanese, we find the subspecies *O. elegans macrodactylus* Berthold, 1842 on Astypalea, Patmos, Arki, Agathonisi, Leros, Kalymnos, Telendos, Kos, Nisyros, Symi, Seskli, Tilos (with the islet of Gaidouronisi), Rhodes, Alimia and Karpathos.

The Erhard's wall lizard *Podarcis erhardii* (Bedriaga, 1876) (σιλιβούτι) is highly diversified in Greece and especially in the southern Aegean region. This species shows a great morphological and ecological plasticity and inhabits many different habitats. The Erhard's wall lizard is a medium-sized species, relatively slender and only slightly flattened, with a body that is no more than 6–8 cm long and a tail about twice as long. The posterior parts are of variable color: brownish, copper, sand, green or olive. Males often have a reticulated pattern on the flanks and blue marginal shields on the belly. The belly is white or yellow, in males orange or red without spots, only sometimes with slight dark spots on the throat. Out of the 28 recognized subspecies, 27 are found in Greece. It is present on the mainland and in many Aegean Islands (North Sporades, Cyclades and Crete), but it is almost completely absent from the Dodecanese, except for Astypalea and its surrounding islets and Pachia and Pergousa, two islets offshore Nisyros (Valakos *et al.* 1995), which could be a case of recent colonization from the Cyclades (Poulakakis *et al.* 2003). Specifically, on Astypalea, Syrna, Dio Adelphi and most likely on Kounoupi and Koutsomyti (pers. obs.) we find *P. erhardii syrinae* (Wettstein, 1937); on Ophidoussa *P. erhardii ophidusae* (Wettstein, 1937); on Megalo Sofrano *P. erhardii zafranae* (Wettstein, 1937); and on Tria Nisia *P. erhardii suboscurus* (Wettstein, 1937). Also found on Kinaros is *P. erhardii kinarensis* (Wettstein, 1937), and on Levitha, *P. erhardii levithensis* (Wettstein, 1937).

The family Scincidae in the Dodecanese Archipelago is represented by four species: *Ablepharus kitaibelii* (Bibron & Bory, 1833) (αβλέφαρος), *Chalcides ocellatus* (Forskål, 1775) (λιακόνι), *Ophiomorus punctatissimus* (Bibron & Bory, 1833) (οφιόμορος) and *Heremites auratus* (Linnaeus, 1758) (χρυσίζουσα σαύρα).

Regarding *Ablepharus kitaibelii* (Fig. 6), on Kos, Leros, Astypalea (Grano & Cattaneo 2019a), Makronisi (SW of Lipsi) (Foufopoulos 1997), Nisyros (Cattaneo 2006), Tilos (Masseti 1999), Chalki, Alimia, Symi and Rhodes we find *Ablepharus kitaibelii kitaibelii* (Bibron & Bory, 1833). On Karpathos, Kasos, Armathia and Mikronisi (islet of Crete) instead we find *Ablepharus kitaibelii fabichi* (Štěpánek, 1937). On the island group of Kastellorizo and on the opposite southwest coast of Turkey some individuals of the snake-eyed skink were collected, perhaps belonging to a clade with features of both *A. kitaibelii* and *A. budaki*, which could be ascribed to *A.* (*budaki*) *anatolicus* Schmidtler, 1997 and suggests a case of cryptic species that requires further study (Skourtanioti *et al.* 2016). The skin of the snake-eyed skink is bronze-coloured, with dark sides. The eyelids are immovable, in contrast to many other skinks. It is usually found in maquis, phrygana and on the ground in leaf litter. It has also been observed in inhabited areas, probably driven there by the increased moisture present.

The ocellated skink *Chalcides ocellatus* (Forskål, 1775) is a large skink that is frequently encountered on sandy beaches and in cultivated areas, gardens and leaf litters on Nisyros (Cattaneo 2006), Rhodes, Pentanisos, Karpathos and Kasos (Kornilios & Thanou 2016). It is 20-30 cm long, tail included, with almost cylindrical body. The back, mainly greyish brown, with smoot and glossy scales, shows a crowd of ocelli: black small dots with white centre arranged in longitudinal series.

The golden skink *Heremites auratus* (Linnaeus, 1758) (Fig. 7) is a species with an eastern distribution and in the Dodecanese is found on Kos, Symi, Rhodes and Kastellorizo. It usually lives in damp places, such as cultivated areas or grasslands near rivers and streams, but it can be also observed between stone walls. Less terrestrial than the previous species, they rarely share the same habitat. The colour of the back is brown or brown-grey. The flanks are dark and are broken up at regular intervals by more or less faded, vertical light bars (Valakos *et al.* 2008).

Ophiomorus punctatissimus (Bibron & Bory, 1833) is a limbless skink that occurs in Greece (primarily on the mainland) and south western Turkey. The body is cream-coloured, light brown above and paler elsewhere. In most cases there are dark lines running along the length of the body, which become thinner on the tail (Valakos

Figures 5–8. Figure 5. *Heremites auratus* (Rhodes, photo by Manolis Sarris). Figure 6. *Ablepharus kitaibelii fabichi* (Kasos Island). Figure 7. *Heremites auratus* (Symi Island). Figure 8. *Testudo graeca* (Symi Island).

et al. 2008). On the Aegean Islands, it is found only on Kythera and Kastellorizo. Recent genetic and morphological studies have highlighted the divergences between the western and the eastern populations of *O. punctatissimus*, which has led to the identification of the Anatolian population and the population of Kastellorizo, as a separate species: *O. kardesi* (Kornilios *et al.* 2018).

Within the family Anguidae, we have the European glass lizard *Pseudopus apodus* (Pallas, 1775) (τυφλίτης), which in Greece is represented by the subspecies *P. apodus thracius* (Obst, 1978). In the Dodecanese Archipelago, it is only found on Kos. In 1953, Wettstein reported its occurrence on Rhodes, but since then no other original reports have been made suggesting further inquiry is required (Bader *et al.* 2009). This legless lizard mainly lives in environments with bushy vegetation, but also in dry rocky places, wooded hills, maquis and phrygana. The lateral and dorsal colouring is dark brown to slightly green brown with scattered darker brown scales. The dorsum of the tail is slightly lighter than the body coloration. The head is lighter than the rest of the body being light brown green in contrast to the dorsal head and body as well as the tail. The ventral colouring is uniformly light.

Blanus strauchi (Bedriaga, 1884) (αμφίσβαινα) is the only species belonging to the family Blanidae that occurs in Greece. It lives underground, in places with sand or soft soil. Its length is about 20 cm or less. Colour varies from a dark brown to grey or violet (Valakos *et al.* 2008). It is a rare species, found on Kalymnos, Kos, Pserimos (Sindaco *et al.* 2014), Leros, Symi, Nisyros (Cattaneo 2006), Rhodes and Kastellorizo. On these islands, the species is represented by the nominate form.

In 1983, one specimen of *Chamaeleo chamaeleon* (Linnaeus, 1758) (μεσ□γειακός χαμαιλέ□ντας) was reported on Rhodes, but it could be a case of passive introduction. This would be the first report of a European chameleon in the island of Rhodes after more than 100 years (Bader *et al.* 2009). According to the literature, this species has been seen on Crete, Chios and Samos, though its presence has only been confirmed on the last island. The populations of Crete and Chios appear to be extinct (Valakos *et al.* 2008).

Tortoises and Terrapins

In the Dodecanese the only tortoise species that has been recorded so far is *Testudo graeca,* Linnaeus, 1758 (ελληνηκή χελώνα).

Testudo graeca (Fig. 8) lives from sea level to about 2,700 m a.s.l. and occurs on dry open steppes, barren hillsides and wastelands, where vegetation varies from sea dune grasses to scrub thorn or dry woodland. According to the IUCN classification and to the CITES the species is considered Vulnerable in all of its distribution ranges (Cox & Temple 2009; Baillie *et al.* 2004), and it is included in the EU Wildlife Trade Regulation (3626/82, Annex C1, Appendix II. Moreover, the Washington Convention has listed it as globally threatened (Annex II). The species is mostly threatened by habitat destruction and fragmentation with its specific threats, partly due to the over-collecting for the pet trade and regionally for food consumption (Lambert 1979; Pérez *et al.* 2004; Anadon *et al.* 2007; Türkozan *et al.* 2008; Ljubisavljevic *et al.* 2011). It is found on Leros, Symi, Kalymnos and Kos with the subspecies *ibera* Pallas, 1814. In addition, a deceased juvenile specimen of *T. graeca* was found on Seskli Islet (south of Symi) in August 2017 by the authors of this contribution. Although the species' presence on the islet is very plausible given the proximity to Symi, further confirmation is needed.

On Rhodes in two different locality, two specimens of *Testudo hermanni*, belonging to the subsp. *boettgeri* Mojsisovics, 1889, were found (Bader & Riegler 2004; Bader *et al.* 2009). Most likely, the animals escaped or was released from captivity. The natural occurrence of *Testudo hermanni* Gmelin, 1789 (μεοσογειακή χελώνα) on the Aegean Islands would be less likely due to ecological factors: *T. graeca* chooses drier and more open environments (distinctive features of the Aegean Islands) while *T. hermanni* lives in wetter, grassy habitats. The ecological differentiation remains even where the two species live in syntopy, as happens on the mainland. It is worth noting that *T. graeca* is always parasitized by ticks (*Hyalomma aegyptium*) while this is not the case for *T. hermanni* (Cattaneo 2008). Fossil remains of *Testudo marginata* Schoepff, 1972 belonging to the Pleistocene, was found in the Charkadio Cave on Tilos Island (Bachmayer & Symeonidis 1975).

Figure 9. *Emys orbicularis* (Kos Island).

With regards to the terrapin species in the Dodecanese Archipelago, *Emys orbicularis* (Linnaeus, 1758) (Fig. 9) (στικτή νεροχελώνα) is reported only on Kos (Broggi & Grillitsch 2012).

The caspian terrapin *Mauremys rivulata* (Valenciennes, 1883) (γραμμωτή νεροχελώνα) is widespread throughout the mainland, but it is also present on many islands. In the Dodecanese Archipelago it is reported on Rhodes, Symi, Tilos and Kos (Broggi 2012). Only one specimen of *M. rivulata* has been found on Chalki, so its presence on the island requires further investigation (Grano & Cattaneo 2017). *Mauremys rivulata* is a medium-sized freshwater turtle (carapace length to ca. 240 mm in females, ca. 185 mm in males) inhabiting various natural and manmade habitats, including rivers, seasonal ponds, lakes, brackish coastal lagoons, irrigation canals, and reservoirs. It is adapted to a warm Mediterranean climate, is common, widespread and can be found in high densities; it is not considered particularly threatened. Habitat destruction and degradation has lead to some population declines, however, and in some cases, extirpation of marginal and island populations.

It is worth noting that some specimens of *Trionyx triunguis* (Forskål, 1775), a terrapin species that is found in Africa and West Asia, have been detected in the open sea surrounding Rhodes, Leros, Kalymnos and Kos (Taşkavak *et al.* 1999; Corsini-Foca & Masseti 2008).

As for marine turtles, *Caretta caretta* (Linnaeus, 1758) (χελώνα καρέττα) and *Chelonia mydas* (Linnaeus, 1758) (πράσινη χελώνα) are found in the Aegean Sea with reports also coming from the Dodecanese Archipelago.

The common turtle (*Caretta caretta*) is abundant in the Mediterranean and many of its main nesting aggregations are found in Greece. Less common is the green turtle (*Chelonia mydas*) whose regional population is estimated to have been decimated due to past exploitation in the eastern Mediterranean (Margaritoulis & Panagopoulou 2010).

Amphibians

In the Dodecanese, only eight amphibian species have been found, mainly due to the increasingly dry climate that characterized this Archipelago. There are, however, two species of salamander, which is particularly interesting given the

close dependence that these salamanders also have on aquatic environments. The Karpathos salamander *Lyciasalamandra helverseni* (Pieper, 1963) (σαλαμάνδρα της Καρπάθου) and the Luschan's salamander *Lyciasalamandra luschani* (Steindachner 1891) (σαλαμάνδρα του Καστελλόριζου) have recently been recognized as two distinct species (Veith & Steinfartz 2004).

The Karpathos salamander has a maximum length of 14 cm, and the females are bigger than the males. Upperparts dark brown, sometimes with a purplish sheen, covered with small scattered yellow spots, usually more numerous on the mid-dorsal part. Dark parotoid. Legs and tail brownish, paler than the back, with dark brown markings. Flanks whitish, sometimes marbled with blue. Underparts translucent, orange yellow to pinkish yellow underside. It feeds on invertebrates and seeks cooler temperatures and humid conditions, as noted previously. This species occurs on Karpathos, Kasos and Saria (Lymberakis *et al.* 2009) (Figs. 10, 11).

The Luschan's salamander has the same dimensions and ecological characteristics, but lives only on Kastellorizo where it is represented by the subsp. *basoglui* (Baran & Atatür 1980). The base color of the back varies from brown to pale red, and is brighter on the parotoid glands. The brown or black spots that are distributed across the back are more extensive in females than in males. The head, tail and sides of the extremities are bright red-pink and sparsely covered with brown spots. The large yellow ovaria in females can be seen through the skin of the back.

There is record of the Syrian spade-foot, *Pelobates syriacus* (Boettger, 1889) (πηλοβάτης) on Kos (Dimaki 2002; Cattaneo 2005a; Džukic *et al.* 2008). It is mainly a fossorial species, and the terrestrial habitats in which it lives are generally open, uncultivated lands such as light forests, steppe, semi-desert and rocky areas. It is generally less selective than *Pelobates fuscus* in terms of soil choice, inhabiting not only the soft soils preferred for fossorial life, but also solid, rocky soils and friable clay with pebbles.

Spawning sites include: stagnant temporary waterbodies, river or lakeside temporary waterbodies and large permanent pools, but it can also be found in slightly modified environments, such as intensively grazed areas (Agasyan *et al.* 2009). The dorsal coloration is yellowish or grey with large dark-greenish spots. The ventral surface is white-greyish, without pattern.

The common toad *Bufo bufo* (Linnaeus, 1758) (χωματόφρυνος) has been reported on Kos (Cattaneo 2005a). The common toad is more active in wet seasons and is most commonly found in areas close to the water such as woodlands, forests, marshes and meadows. The common toad is also a nocturnal animal, spending the daylight hours hidden and hunting by night.

Another toad species, the green toad (Laurenti, 1768) (πράσινος φρύνος), is found on Rhodes, Leros, Lipsi (Broggi 2008), Kalymnos, Kastellorizo, Kos, Symi and Tilos. The presence of the Anatolian subspecies *B. viridis sitibundus* (Pallas, 1771) has recently been highlighted for Kos and Rhodos (Dufresnes *et al.* 2021). *Bufotes viridis* (Fig. 12) is dependent on water for reproduction, like most amphibians, but it can also be found in dry habitats and away from water sources. The main threat to its survival appears to be the loss of breeding habitats through wetland drainage, desiccation and aquatic pollution. Local populations may also be declining due to mortality on roads, which often occurs when they are on the move during their reproductive periods (Cattaneo 2005a, b). *Bufotes viridis* is a medium-sized toad, with pale white, grey or brownish background colour, randomly covered with green patches, resulting in a camouflage pattern. Red or orange warts might be scattered on the dorsal area, whereas the ven-

Figure 10. Habitat of *Lyciasalamandra helverseni* (Olympos, Karpathos Island).
Figure 11. Habitat of *Lyciasalamandra helverseni* (Kali Limni Mt., Karpathos Island).

tral side is pale, whitish and patternless (Arnold & Ovenden 2002). An albino population was recently discovered in mainland Greece (Strachinis & Tsarouhas 2021).

One of the frogs with the most impressively distinctive appearance is the eastern tree frog, *Hyla orientalis* Bedriaga, 1890 (ανατολικός δενδροβάτραχος) (Fig. 13) which can reach a length of five cm, but is usually shorter, and the females are bigger than the males. *H. orientalis* is mainly nocturnal, usually inhabits open, well-illuminated broad-leaved and mixed forests, bush and shrub lands, meadows, gardens, and lake shores with low riparian vegetation. Rhodes and Kos are the only islands of the Dodecanese where this species is found. On Kos Island, the largest population is found in the salt lake of Alikes (Cattaneo 2005a).

The Bedriaga's frog, *Pelophylax bedriagae* (Camerano, 1882) (βάτραχος του Μπεντριάγκα) is found on Kos, Astypalea and Rhodes (Fig. 14). In the past, this frog has also been reported on Tilos (Papatheodorou & Pagkas 2001) but this is not the case in recent times (Broggi 2006; Cattaneo 2009; Grano *et al.* 2018). The total length can reach up to 15 cm, though it is usually shorter. The dorsum of *P. bedriagae* is typically greenish or brownish, sometimes with a narrow, light-yellowish or green mid-dorsal stripe that extends from the tip of the snout to the urostyle. Large orange, light brown, or dark spots are scattered over the body. The limbs have dark crossbars on the dorsal surface and the inner part of the thighs have black marbling on white or brown background. The ventral sides appear whitish and may be marbled with grey or black. The ventrum is dirty white. A largely aquatic species, it makes its home in permanent wetlands with rich aquatic vegetation such as: ponds, rain pools, streams, rivers, irrigation channels, reservoirs, marshes, springs and fishponds, though it is sometimes also found in the surrounding terrestrial habitats and can occur in modified habitats where suitable wetlands exist.

The Karpathos frog *Pelophylax cerigensis* (Beerli, Hotz, Tunner, Heppich et Uzzell, 1994) (βάτραχος της Καρπάθου) (Fig. 15) is an endemic species of Karpathos. It mates in spring and females lay their eggs in clusters of a few hundred. It is a single island-endemic and it is considered the most endangered anuran amphibian in Europe because its range is restricted to Karpathos island, where it occurs with two populations only in two streams: Nati and Argoni (Temple & Cox 2009; Pafilis *et al.* 2019). Both these streams have a much reduced water flow and, especially in the summer period (Fig. 16), they decrease into small pools that are sometimes very spaced-out from each other. In addition, the global warming and the low rainfall, contribute negatively to the survival of this species. Due to these reasons, it currently faces a high risk of extinction and is classified as "Critically Endangered" on the red list of IUCN. A feeding study of *P. cerigensis* showed that Argoni frogs are larger and heavier and have a wider mouth width than Nati's (Pafilis *et al.* 2019). The *Pelophylax* populations occurring on Rhodes, that were previously assigned to this species, are now allocated to *P. bedriagae* (Lymberakis *et al.* 2007). Recent studies (Toli 2018) have suggested that specimens from Karpathos and Rhodes constitute a single clade, indicating the occurrence of *P. cerigensis* on Karpathos and Rhodes, which contrasts previous studies, and suggests that further research is needed.

Snakes of the Dodecanese Archipelago

Augusto Cattaneo

Thirteen snake species have been reported in the Dodecanese.

The European blind snake, *Xerotyphlops vermicularis* (Merrem 1820) (τυφλίνος) is a snake that resembles an earthworm, and is adapted to live underground. It has been reported on Patmos, Leros, Kalymnos, Kos, Symi and Rhodes. The species also occurs on some islands off the south western Turkish coast like Domuz, Tersane and Kizkumu (Lo Cascio & Masseti 2004).

The Javelin sand boa, *Eryx jaculus* (Linnaeus, 1758) (έρυξ) (Fig. 17), is the only boa species in Europe. This species, much smaller than its "relatives", has been reported on Leros, Kalymnos and Kos, where it is represented by the subsp. *turcicus* (Olivier, 1801).

The European whip snake, *Dolichophis caspius* (Gmelin, 1789) (έφιος) (Fig. 18), is one of the most common snake species. It is a diurnal snake and easily observed, being found in gardens, farms and cultivated lands. In the Dodecanese it has been reported on Agathonisi, Patmos, Kalymnos, Kos, Nisyros and Karpathos. On Nisyros, in addition to specimens with the typical colouring, we also find adult individuals with dorsal spots that vary in pattern from those found in juveniles and are comparable only to the specimens found on the Ionian island of Corfù (Cattaneo 2006).

The black whip snake, *Dolichophis jugularis* (Linnaeus, 1758) (μαύρος έφιος), is one of the biggest European snakes. It is found on Leros, Kos, Tilos, Symi, Rhodes, Chalki, Kastellorizo. Its presence is also highly likely on the small islands of Alimia and Seskli. It is also found on the island of Göcek (SW Turkey) (Lo Cascio & Masseti 2004). On Kos Island, *D. jugularis* coexists with its sister species *D. caspius*. In this case both whip snakes seem to have mostly non-overlapping habitats,

Figures 12–17. Figure 12. *Bufotes viridis* (Lipsi island). Figure 13. *Hyla arborea* (Kos, photo by Manolis Sarris). Figure 14. *Rana bedriagae* (Rhodes, photo by Marco Masseti). Figure 15. *Pelophylax cerigensis* (Karpathos Island). Figure 16. *Habitat of Pelophylax cerigensis* (Nati River, Karpathos Island). Figure 17. *Eryx jaculus* (Leros Island).

with *D. caspius* being more common along wet coastal stretches, and *D. jugularis* mostly seeking out hilly inland areas (Fig. 19). Even so, being generic this spatial separation would not exclude areas of syntopy (Cattaneo 2005b). In the Rhodes Archipelago (Rhodes, Symi, Tilos, Chalki) the endemic subspecies *zinneri* (Cattaneo 2012a) is found, mainly characterized by a less intense colouring than that of the nominate form, both dorsally and ventrally (and often having a yellow belly instead of red). A different head morphometry and a lower number of ventral scales are other distinctive features. On Kos and Leros the nominate subspecies occurs (Cattaneo 2012a).

The ringheaded dwarf snake, *Eirenis modestus* (Martin, 1838) (θαμνόφιδο) (Fig. 20), is a small snake that can be observed in bushes or under stones. It has been reported on Leros, Kalymnos, Symi, Seskli and Kastellorizo. It is also found on Kameriye Island (SW Turkey) (Lo Cascio & Masseti 2004). On the islands of the eastern Aegean arc (and therefore also in the Dodecanese) the sub-

Figure 18. *Dolicophis caspius* (Patmos Island).
Figure 19. *Habitat of Dolicophis jugularis* (Chalki Island).

species *semimaculatus* (Boettger, 1876) occurs with two phenotypes: one spotless and one with dark spots distributed on the first half of the body. Melanotic specimens have also been found on the island of Kastellorizo (Kalaentzis *et al.* 2018a).

The coin snake, *Hemorrhois nummifer* (Reuss, 1834) (ζαμενής της Ρόδου), in the Dodecanese Archipelago is found on Patmos, Lipsi, Leros, Kalymnos, Kos, Symi, Rhodes and Kastellorizo. This snake has a colouring that resembles that of *Montivipera xanthina*, with which it shares a good part of its range (Aegean-Anatolian distribution). Certainly, its aesthetic similarity to the viper deters predators and increases the snake's fitness (Schätti & Agasian 1985).

The Dahl's whip snake, *Platyceps najadum* (Eichwald, 1831) (σαίτα), is a very slender snake. It has been observed on Arki, Patmos, Lipsi, Leros, Kalymnos, Kos, Nisyros, Rhodes, and recently it has also been reported for Kastellorizo (Kalaentzis *et al.* 2018b). The population of Kalymnos Island exhibits a particular polymorphism (a dark phenotype and a dark olive-grey one) that in the past led to its allocation to the subsp. *kalymnensis* (Schneider, 1979) (Cattaneo 2005a). The Rhodes population seems to belong to the nominate form (adults with iron-grey colour). On all the other Dodecanese Islands, the subsp. *dahlii* (Schinz, 1833) is present.

The cat snake, *Telescopus fallax* (Fleischmann, 1831) (αγιόφιδο) (Fig. 21), is a common species that is not so easily observable as it is active during the night. It is found on Lipsi, Kalymnos, Kos, Pserimos, Tilos, Symi, Rhodes, Karpathos?, Kasos, Armathia, and recently it has also been found on Kastellorizo (Kalaentzis *et al.* 2018b). On Rhodes, Tilos, Kasos and perhaps on Symi and Armathia, there is the endemic subsp. *rhodicus* Wettstein, 1952, characterized, among other things, by its dull and low-contrast colours, a probable expression of its adaptation to dry environments (Grano *et al.* 2018).

The leopard snake, *Zamenis situla* (Linnaeus, 1758) (σπιτόφιδο) (Fig. 22), is the most beautiful European snake. In the Dodecanese Archipelago it has been reported on Kos, Rhodes and Chalki (Grano & Cattaneo 2015). There are two morphs for this species: one spotted (phenotype *leopardinus*) and the other striped (phenotype *situla*); even though they can be found together on the same island, the first seems to be more common on Rhodes and Chalki, and the latter on Kos (Zavattari 1929). The persistence of the species on Kos should however be confirmed (Schulz 2013).

In the Dodecanese both of the water snakes found in Greece have also been reported. The grass snake, *Natrix natrix* (Linnaeus, 1758) (νερόφιδο), is a very common species in Europe and Asia Minor. Its habitat is close to wetlands and, especially in Rhodes, it can be found next to rivers and streams. It has also been reported on Leros, Kos and Karpathos. Based on recent studies by Asztalos *et al.* (2021), the species in these islands is represented by the subspecies *moreoticus* (Bedriaga, 1882) [not *persa* (Pallas, 1814)], also characterized by two clearly marked stripes along the back, with the exception of the specimens from Karpathos which lack stripes (Bogaerts *et al.* 2018). It is worth noting that Werner (1938), exclusively relying on the morphological analysis, had already highlighted that var. *moreoticus* merely represented the melanotic form of var. *persa*. A dead specimen of *N. natrix* on the island of Kasos has been found from the authors in August 2019 (Grano & Cattaneo 2020). The specimen lacked of longitudinal stripes, resembling the phenotype of the specimens found in Karpathos.

On Rhodes, the dice snake *Natrix tessellata* (Laurenti, 1768) (λιμνόφιδο), more adapted to "aquatic" life, can also be found. Where these two species of *Natrix* coexist, their complementary diets make them ecologically compatible: *N. natrix* mainly looks for batrachians while *N. tessellata* mostly for fish. The current presence, however, of *N. tessellata* on Rhodes needs to be confirmed.

Figures 20–23. Figure 20. *Eirenis modestus* (Symi Island). Figure 21. *Telescopus fallax subsp. rhodicus* (Kasos Island). Figure 22. *Zamenis situla* (Chalki Island). Figure 23. *Montivipera xanthina* (Symi Island).

The eastern montpellier snake, *Malpolon insignitus* (Geoffroy Saint-Hilaire, 1827) (σαπίτης), is a common large snake. It is found on Kalymnos (Broggi 1997), Kos, Kastellorizo and Rhodes. On these islands, the species is represented by the subsp. *fuscus* (Fleischmann, 1831), which is smaller in size compared to the westernmost forms of the genus *Malpolon*. It is worth noting that in nature, even at an adequate distance for observation, this snake could be easily confused with *Dolichophis caspius*, especially if young or sub-adult.

The Ottoman viper or coastal viper, *Montivipera xanthina* (Gray, 1849) (οθωμανική οχιά) (Fig. 23), is the only snake that could pose a danger to man due to its potent venom. In general, however, vipers do not bite unless they feel threatened or disturbed. This viper is present on some islands of the Eastern Aegean like in the Dodecanese Archipelago. More specifically, it has been reported on Patmos, Lipsi, Leros, Kalymnos, Kos and Symi. A young specimen was also detected on Tilos Island (Broggi 2006). *Montivipera xanthina* also occurs on Greek mainland, such as in Rhodope and Evros (Cattaneo 2017). The coastal stretch that extends westward from the eastern border of the Rhodope region to the village of Xilaganì, is occupied by the subspecies *occidentalis* Cattaneo, 2017. Along the eastern Aegean arc, the species shows great variability (Cattaneo 2014): on Chios the subsp. *nilsoni* Cattaneo, 2014, is larger in size; on Leros the subspecies *dianae* Cattaneo, 2014, is present and characterized, among other things, by its larger body circumference. Furthermore, on Lipsi, a particular morphotype with exceptional features has also been detected, expression of a high degree of adaptation to the microinsularity (Cattaneo 2018).

The large whip snake of the Rhodes Archipelago, *Dolichophis jugularis zinneri* Cattaneo, 2012

Augusto Cattaneo

Dolichophis jugularis known formerly mostly as *Zamenis gemonensis*, so named, e.g., by Bedriaga (1882), Boettger (1888), Calabresi (1923), was known, until recent years, as *Coluber jugularis* Linnaeus, 1758 (see also Cattaneo *et al.* 2020). This large snake, which can normally exceed two meters in length and 1500 grams in weight, shows a distribution along the Turkish coast in the Southeastern Aegean Islands of Leros, Kos, Rhodes, Symi, Chalki, Tilos, Kastellorizo and conceivably Alimia and Seskli. Moreover, it has also been found

Figure 24. Aegean range of *Dolichophis jugularis.* The distribution of the nominate form is shown in dotted lines, that of the ssp. *zinneri* in black.

on Cyprus and in the Near and Middle East. Currently, *D. jugularis* is regarded as a polytypic species, represented by four subspecies: *D. jugularis jugularis* (Linnaeus, 1758) from SW Turkey and the opposite islands of Leros and Kos, eastern Caucasus, northern Iraq and Iran, central and northern Syria), *D. jugularis asianus* (Boettger, 1880) from southern Syria, Jordan, Lebanon, Israel, and the Sinai Peninsula in Egypt, *D. jugularis cypriacus* (Zinner, 1972) from Cyprus, and *D. jugularis zinneri* Cattaneo, 2012 from Aegean islands of Rhodes, Symi, Chalki and Tilos (Fig. 24). *Dolichophis jugularis* populations inhabiting the Dodecanese Archipelago (Rhodes, Symi, Chalki and Tilos) have always aroused great interest in the herpetologists who have studied them (Wettstein 1953; Clark 1992; Bader & Riegler 2004; Bader *et al.* 2009). Indeed, their morphological features, especially those concerning the colouring, differ from those of the neighbouring continental populations and northern Dodecanese (Leros, Kos). In this regard, Clark (1990) writes: "*On Tilos the snakes are quite different. Those caught, all males, were very nearly black above but the colouring was a dull mat instead of shiny ... The bellies were green/yellow powdered or marked with black ... I postulate that in view of the presence of* C. j. jugularis *on Karpathos the Tilos populations represent an intermediate form between the two subspecies* [back then *Dolichophis caspius* was regarded as a subspecies of *D. jugularis*, ed.s n.]". Furthermore, while Wilson & Grillitsch (2009) point out that the populations of Rhodes and Symi are homogeneous in their morphological characteristics, Schlüter (2010) argues: "*Die Symi-Population scheint eine Position zwischen* D. caspius *und* D. jugularis *einzunehmen. Daher bestehen Probleme bei der taxonomischen Zuordnung. Vielleicht handelt es sich um eine eigene Unterart oder gar kryptische Art*". The features of the Rhodian populations were noted by Zinner (1972), who thought he could describe them with a new subspecies, which he improperly attributed to *D. caspius*. Indeed, in his dissertation, though never published, the *Dolichophis* specimens appear under the name *Coluber caspius eiselti* and are described as follows: black back; upper surface of the head splotchy or spotted; the underside orange to brick red with lack dots from the throat to the subcaudal region; 189–197 ventrals. From a nomenclatural point of view, the description of Zinner (1972) is not valid (Ščerbak & Böhme 1993). Actually, *D. jugularis* populations inhabiting the Rhodes Archipelago have acquired morpho-physiological and behavioural features that bring them closer to their sister species *D. caspius*, so much so that it has led, as is the case here, to identification mistakes. Indeed, these specimens have less intense colouring perhaps in response to drier environments, and are more aggressive than the nominate form. Not only that, but they seem to seek the same kind of environments (moist depression in the soil) as *D. caspius* as well as practice the same by sight hunting habits and straight-line escape technique, all behaviours also detected by Zinner (1972). At this point it is no wonder that Zinner (1972) ascribed the Rhodian population of *Dolichophis* to *caspius* instead of *jugularis*. All of these observations and considerations have led to the description of a new geographical subspecies, endemic of Rhodes and of its Archipelago: *Dolichophis jugularis zinneri* (Cattaneo, 2012), so named in honour of Dr. Hermann Zinner, who though ascribing it to another species, was the first to highlight the specific nature of the Rhodian populations of *D. jugularis*.

The morphological characteristics of the new taxon are summarized below. *Dolichophis jugularis zinneri* differs from the typical form in that it has a wider head with shorter and pointed muzzle (cephalic index: max length/width of the head, is less than 2, while it is more than 2 in *D. jugularis jugularis*), and in the colour the supralabials, the sides of the neck and the throat are always yellow (instead of salmon-red) and it has a less intense dark dorsal colour (the basic colour darkens anterior-posteriorly). Also, characteristics are: the high occurrence of yellow-bellied phenotypes (the nominate subspecies normally has a red belly), the lower number of ventrals (gen-

Figure 25. *Dolichophis jugularis zinneri* (Tilos Island).

erally less than 200), and the persistence of the juvenile habitus over 100 cm of total length. The ventral colour (red or yellow, never black) also helps to distinguish *D. jugularis zinneri* from both *D. jugularis asianus* and *D. jugularis cypriacus*. All of these features in the population of Tilos are more widespread and emphasized, perhaps in relation to the more pronounced isolation conditions than those of the other conspecific neighbouring populations (Fig. 25) (Cattaneo 2009). The holotype, an adult male specimen collected on Rhodes in the locality of "Laerma" on May 2015, is currently part of the Herpetological Collection of the Alexander Koenig Museum in Bonn, Germany.

The amphibian and reptile species known from the southwestern coast of Turkey and not yet found in the Dodecanese islands

Augusto Cattaneo

Introduction

Marcello La Greca (in Sarà 1998) argued that "*from a faunistic point of view Europe is not a separate continent from Asia, but an appendage to it and from it, during the Plio-Pleistocene, received a good part of its animal population...*". From this point of view, the Aegean islands can be considered as rafts or bridges ideally stretched between the Anatolian and the Balkan countries. More specifically, the Aegean islands lined up along the western Turkish coast host several Anatolian faunistic and floristic elements. Among mammals, it is worth noting, for example, the occurrence of the Persian squirrel (*Sciurus anomalus*) in Gökçeada and Lesvos, of the golden jackal (*Canis aureus*) in Samos, and of the fallow deer (*Dama dama*) in Rhodes. Of particular interest is the previous presence in Samos of the Anatolian leopard (*Panthera pardus tulliana*). During the decade 1870-1880, a specimen of this species would have been forced, due to fires or floods, to swim to Samos from the opposite coast of Asia Minor. After its killing, the specimen was naturalized and kept in a display cabinet. It is currently located in the Natural History Museum of Samos (Masseti 2012). *"From a floristic point of view, the eastern Aegean islands were detached from the mainland by shallow waters and joined to it during glaciations. The flora of these islands has more Anatolian than European features..."* (Strid 2016).

In this note a survey on the Amphibians and Reptiles species known from the southwestern Turkish in front of the Dodecanese islands, whose presence in these islands has not yet been detected, is discussed.

Lyciasalamandra fazilae (Başoğlu & Atatür, 1974)
Lyciasalamandra flavimembris (Steinfartz & Mutz, 1995)

Both these species of salamander inhabit the Turkish mainland in front of Rhodes Island. The fact of giving birth to completely metamorphosed newborns is a sign of the good independence of these amphibians from water; therefore, their survival in such dry islands as those of the Dodecanese Archipelago could be possible. Evidence of this is the occurrence in the Dodecanese islands of the following congeneric species: *Lyciasalamandra luschani* (Steindachner, 1891) on Kastellorizo and *Lyciasalamandra helverseni* (Pieper, 1963) on Karpathos, Kasos and Saria.

Chamaeleo chamaeleon Linnaeus, 1758

The common chameleon seems to be widespread along the western Turkish coast of (Franzen *et al.* 2008). Personally, I was able to meet it in the hinterland of Marmaris (Cattaneo 2011) and Kuşadasi (Cattaneo 2012b). As regards the Aegean islands located along and beyond the Turkish coast, the species is present on Samos with a reproductive population, and it has been reported for Chios and Crete where non-viable populations occur (Speybroeck *et al.* 2016). It can be suggested that sooner or later its presence may be detected also in the Dodecanese Archipelago. It is worth noting that Anderson (1898) has already pointed out the presence of *Chamaeleo chamaeleon* in Rhodes and that Bader *et al.* (2009) argue on the occurrence of this species on the island based on an adult female specimen found near the Rhodes airport in July 1983. The first data, however, dates back to more than one hundred and twenty years ago, and the second one has not been confirmed anymore.

Eumeces schneideri (Daudin, 1802)

This skink inhabits North Africa, the island of Cyprus and central-western Asia from sea level up to 1800 m (Baran & Atatür 1998). In this wide range it is splitted in six subspecies, one of which recently described, inhabits western Turkey: *Eumeces schneideri barani* Kumlutaş, Arikan, Ilgaz & Kaska, 2007. In addition, the species has been found among the Ephesus ruins and close the Büyük Menderes River delta (Franzen *et al.* 2008), namely, on the westernmost Turkish coast. The dryness and the harsh rocky substrates of the Dodecanese islands could be suitable with the bioecological requirements of this saurian who lives among rocks, which, however, is difficult to observe due to its very elusive habits (in Cyprus is one of the rarest reptiles: Baier *et al.* 2009).

Elaphe sauromates (Pallas, 1811)

Based on the hemipenis morphology, the vertebrae feature and the biochemical data Helfenberger (2001) and Lenk *et al.* (2001), raised *E. quatuorlineata sauromates* to the rank of species: *Elaphe sauromates* (Pallas, 1811). This species occupies a wide continental area ranging from Southeastern Europe to western Asia, with a vertical distribution up to 2500 m. (Baran & Atatür 1998). In this wide range, it is divided into different geographical forms, one of which has recently been described as a valid species: *Elaphe urartica* Jablonski, Kukushkin, Avci, Bunyatova, Ilgaz, Tuniyev & Jandzik, 2019. Concerning the southwestern Turkish coasts, the species occurs in the stretch of coastline in front of Rhodes Island and further inland near the Koycegiz Lake (Franzen *et al.* 2008). Lotze (1974), based on the label of a specimen preserved in the Natural History Museum of Geneve, reported the occurrence of *Elaphe sauromates* for the island of Kos, but later (Lotze 1977) denied the notice, stating that the concerned specimen was attributable to *Hemorrhois nummifer*. Eminent herpetologists have always claimed the absence of *Elaphe sauromates* from the easternmost Aegean islands (i.e. Werner 1933, 1937), but should be taken into account that the extreme elusiveness of some ophidic species (like the one in question) can sometimes make their finding very difficult, if not nearly impossible [for example consider the record of *Montivipera xanthina* in the eastern Aegean islands, which occurred only in the 1960s thanks to Clark (1968), despite the fact that these islands had previously been extensively investigated by talented and expert herpetologists]. In my view, the dry environmental conditions of the Dodecanese islands are not suitable for the life of this snake, especially since the western populations of *Elaphe sauromates* (more than the eastern ones) seem to require high humidity conditions, marshy stretches and wet places in general, supported by proper climatic conditions. The same applies for other hygro-mesophilic reptiles living on the Greek or Turkish continent, but not in the dry Aegean islands (for example, *Anguis* spp., *and Zamenis longissimus*).

Platyceps cf. ***collaris*** (Müller, 1878)

Platyceps collaris inhabits Southeastern Bulgaria, Turkish Thrace, western and southern Anatolia, Syria, Lebanon, Israel and Jordan, up to 1500 m (Baran & Atatür 1998). As regard the southwestern Turkish coasts *Platyceps collaris* occupies the completely costal region; it would therefore not be surprised if eventually the species were reported from some Dodecanese islands, especially since it has also been found in some offshore Turkish islands of the homonym coast (Franzen *et al.* 2008). Personally, I had the opportunity to study four specimens of this species, found in the Turkish hinterland between Marmaris and Bodrum. All four of these individuals had 17 rows of dorsal scales at mid-trunk, while the species normally has 19, very rarely 21 (Rehak & Obst 1993). Other authors have reported specimens of *Platyceps collaris* with 17 rows of dorsal scales at mid-trunk (Budak *et al.* 1998; Schätti *et al.* 2001; Kumlutaş *et al.* 2004); all these mentions refer to specimens always from the southwestern Turkish coast. Among the authors cited above, Schätti *et al.* (2001) even generalize that " specimens from southwestern Anatolia mostly have 17 rows on the anterior half and at midbody ...". I believe that the number of rows of the dorsal scales at mid-trunk is the most important morphognostic parameter in ophiology and that therefore any variation should be investigated and clarified. Such a specific character can be subject to small and rare individual variations, but it cannot change in a discontinuous and constant way in the same population and / or in adjacent populations; if that happens, we could be looking at a new entity. Personally, also based on some ecoethological feedback (type of habitat and diet, very similar to those of *Eirenis modestus*), I think that these populations of *Platyceps* cf. *collaris* from southwestern Anatolia belong to a new taxon. Very recently Šmíd *et al.* (2020) carried out a comprehensive genetic-molecular study of this species, managing to identify two clades, a levantine one (*Platyceps collaris collaris* (Müller, 1878)) and a Balkan-Anatolian one (*Platyceps collaris rubriceps* (Venzmer, 1919)). Also, according to Šmíd *et al.* (2020), these clades could reflect two different quaternary shelters, one in northern Levant and the other in western Anatolia; from

the Levantine refuge *Platyceps collaris* may have migrated further south, from that one of western Anatolia may have colonized the Balkans and southern Anatolia. It is plausible to assume that the 17 rows of mid-trunk dorsal scales represent a primitive character, precisely of the populations that would have occupied the ancestral refuge of western Anatolia. With the subsequent northward (Balkans) and southward (Southern Anatolia) dispersions, this feature may have changed following adaptation processes (19 rows of mid-trunk dorsal scales result in an increase in body caliber and therefore a greater ability to eat larger preys).

Zamenis hohenackeri (Strauch, 1873)

Zamenis hohenackeri is a polytypic species; so far, three subspecies have been recognized: *Z. h. hohenackeri* (Strauch, 1873) from northeastern Turkey, Transcaucasia, northern Iraq and northwestern Iran; *Z. h. tauricus* (Werner, 1898) from the mountainous regions of southern Turkey; *Z. h. lyciensis* Hofmann, Mebert, Schulz, Helfenberger, Göçmen & Böhme, 2018, from southwestern Turkey. It seems to reach altitudes up to 2500 m (Baran & Atatür 1998). As for the Turkish southwestern coast, i.e., the one opposite the Dodecanese Islands, the species has been found near Lake Köyceğiz and along the coast between Kalkan and Kaş (Franzen *et al.* 2008), as well as in several sites in the Muğla Province (Hofmann *et al.* 2018). *Zamenis hohenackeri* is part of that group of ophidic species (to which *Zamenis situla* also belongs) which hunts micromammals directly into their underground burrows, sunbathes only partially, and attends hideout-rich microhabitats (cf. Bischoff 1993; Obst *et al.* 1993; Schulz 1996), all behaviors also useful to avoid the encounter with large ophiophagous snakes (*Dolichophis*, *Malpolon*) (pers. obs.). Under such conditions, the encounter with these snakes is therefore mostly a random, unpredictable event. Being therefore a very elusive species, it is possible that the presence of *Zamenis hohenackeri* in Rhodes as in other southeastern Aegean islands has gone unnoticed. Moreover, since it seems mainly attend rocky habitats (mostly mountainous), it would find suitable conditions for its survival in the Dodecanese islands.

Final remarks

The Dodecanese islands are separated from the Turkish coast by short sea stretches, so the introduction into these islands of specimens of the herpetological species so far treated, could be through passive transport on large trunks or tangles of vegetation drifting floating ("rafting"). Man (and perhaps even more so) also could indirectly contribute to the spread of the analysed species in the Dodecanese islands through the introduction of wood, building materials, fruit boxes, soil for nursery plants, etc. (anthropochore diffusion). Examining the possibility of settlement of the individual species in question in the aforementioned islands, the following remarks apply.

Lyciasalamandra spp. - As amphibians, arrival by "rafting" is excluded; the particular specialization of these salamanders, that is to give birth to already completely metamorphosed newborns, could increase their adaptive capacity to new environments, such as those of the islands in question.

Chamaeleo chamaeleon - Perhaps it could be one of the most adaptable species, given its recognized presence in some eastern Aegean islands.

Eumeces schneideri - The presence of this species may go unnoticed for a long time due to its strong elusiveness. However, adaptation is possible for the aforementioned reasons.

Elaphe sauromates - Unlikely adaptation due to the incompatibility of this snake with the climatic-ecological conditions of the islands in question.

Platyceps cf. *collaris* - What has been said about *Chamaeleo chamaeleon* is valid; as a species with a particular eco-ethology (cryptozoic species), its presence could go unnoticed for a long time. In the Dodecanese islands inhabited by *Eirenis modestus* (Leros, Kalymnos, Symi, Seskli, Kastellorizo), competitive interactions could occur.

Zamenis hohenackeri - The presence of this snake could go undetected for a long time due to its strong elusiveness. In Kos, Rhodes and Chalki the presence of *Zamenis situla* may compromise its adaptation, as both are sister species and therefore potentially competitive.

Obviously, any future findings of one or more of these herpetological species in the Dodecanese islands could never refer to alive populations (i.e., populations of individuals that reproduce and preserve themselves over time), but only to the occasional arrival of one or a few individuals, dragged to the islands by natural rafts or by man.

REFERENCES

Anadón J.D., Giménez A., Martínez M., Palazón J.A., Esteve M.A. 2007. Assessing changes in habitat quality due to land use changes in the spurthighed tortoise *Testudo graeca* using hierarchical predictive habitat models. Diversity and Distributions, 13: 324–331. https://doi.org/10.1111/j.1472–4642.2007.00343.x

Annousis I., Kapsalas G., Pafilis P. 2021. Review of the herpetofauna of Attica, mainland Greece. Herpetozoa, 34: 1–8. https://doi.org/10.3897/herpetozoa.34e60668

Agasyan A., Tuniyev B., Isailovic J.C., Lymberakis P., Andrén C., Cogalniceanu D., Wilkinson J., Ananjeva N., Üzüm N., Orlov N., Podloucky R., Tuniyev S. & Kaya U. 2009. *Pelobates syriacus*. The IUCN Red List of Threatened Species, 2009: e.T58053A11723660. http://dx.doi.org/10.2305/IUCN.UK.2009.RLTS.T58053A11723660.en. Downloaded on 08 October 2018.

Anderson J. 1898. Zoology of Egypt. Vol. 1. Reptilia and Batrachia. Bernard Quaritch, London, 1 (LXVI), 421 pp.

Arnold E.N., Ovenden D. 2002. A field guide to the Reptiles and Amphibians of Britain and Europe. 2nd Edition, Harper Collins Publishers, 288 pp.

Arnold E.N., Arribas O., & Carranza S. 2007. Systematics of the Palaearctic and Oriental lizard tribe Lacertini (Squamata: Lacertidae: Lacertinae), with descriptions of eight new genera. Zootaxa, 1430: 1–86. 10.11646/zootaxa.1430.1.1

Asztalos Marika, Ayaz D., Bayrakcı Y., Afsar M., Tok C.V., Kindler C., Jablonski D., Fritz U., 2021. It takes two to tango - Phylogeography, taxonomy and hybridization in grass snakes and dice snakes (Serpentes: Natricidae: *Natrix natrix*, *N. tessellata*). Vertebrate Zoology, 71: 813. https://doi.org/10.3897/vz.71.e76453

Bachmayer F.R. & Symeonidis N. 1975. Schildkrötenreste (*Testudo marginata* Schoepff) aus der Höhle "Charkadio" auf der Inseln Tilos (Dodecanes, Griechenland). Annales Géologiques des Pays Helléniques, 28: 8–16.

Bader T. & Riegler C. 2004. Herpetologische Beobachtungen auf Rhodos (Griechenland). ÖGH–Aktuell, 13: 6–9.

Bader T., Riegler C. & Grillitsch H. 2009. The herpetofauna of the island of Rhodes (Dodecanese, Greece). Herpetozoa, 21: 147–169.

Baier F., Sparrow D.J., Wiedl H.J. 2009. The Amphibians and Reptiles of Cyprus. Edition Chimaira, Frankfurt am Main, 364 pp.

Baig K.J., Wagner P., Ananjeva N.B., Böhme W. 2012. A morphology–based taxonomic revision of *Laudakia* Gray, 1845 (Squamata: Agamidae). Vertebrate Zoology, 62: 213–260.

Baillie J.E.M., Hilton–Taylor C., Stuart S.N. 2004. IUCN Red List of Threatened Species. A Global Species Assessment. IUCN, Gland, Switzerland and Cambridge, UK.

Baran I. & Atatür M.K. 1998. Turkish herpetofauna (Amphibians and Reptiles). Republic of Turkey, Ministry of the Environment, Ankara 214 pp.

Bedriaga J. von 1882. Die Amphibien und Reptilien Griechenlands. Bulletin de la Société impériale des naturalistes de Moscou, 56: 278–344.

Bellati A., Carranza S., Garcia–Porta J., Fasola M. & Sindaco R. 2015. Cryptic diversity within the *Anatololacerta* species complex (Squamata: Lacertidae) in the Anatolian Peninsula: Evidence from a multi–locus approach. Molecular phylogenetics and evolution, 82: 219–233. https://doi.org/10.1016/j.ympev.2014.10.003

Bischoff W. 1993. *Elaphe hohenackeri* (Strauch, 1873) - Transkaukasische Kletternatter. Pp. 317–329 in: Böhme W. (ed.), Handbuch der Reptilien und Amphibien Europas, Bd. 3/I, Schlangen (Serpentes) I, Aula–Verlag, Wiesbaden.

Boettger O. 1888. Verzeichniss der von Hrn E. von Oertzen aus Griechenland und aus Kleinasien mitgebrachten Batrachier und Reptilien. Sitzb. königl. - preuß. Akad. Wiss. Berlin, 5: 139–186.

Bogaerts S. Pasmans F., Protopapas D., Pafilis P. & Lymberakis P., 2018. Rediscovery of the grass snake (*Natrix natrix*) on the island of Karpathos, Greece. Herpetology Notes, 11: 303–305.

Broggi M. 1997. Notizen zur Herpetofauna von Kalymnos und Leros (Dodekanes, Griechenland). Herpetozoa, 10: 135–138.

Broggi M. 2006. Isolation und Landnutzungswandel und ihre Einflüsse auf die Herpetofauna - dargestellt am Beispiel der Insel Tilos (Dodekanes, Griechenland). Herpetozoa, 19: 13–16.

Broggi M. 2008. The herpetofauna of Lipsi (Dodecanese, Greece) and nature conservation aspects. Herpetozoa, 21: 79–84.

Broggi M. 2012. The Balkan Terrapin *Mauremys rivulata* (Valenciennes, 1833), in the Aegean islands. Threats, conservation aspects and the situation on the island of Kea (Cyclades) as a case study (Testudines: Geoemydidae). Herpetozoa, 24: 149–163.

Broggi M. & Grillitsch H. 2012. The European Pond Terrapin *Emys orbicularis hellenica* (Valenciennes, 1832) in the Aegean: Distribution and threats. Herpetozoa, 25: 47–58.

Buchholz K.F. 1961. Über *Elaphe quatuorlineata* von der Zykladen und das *Elaphe*–taxon von der Insel Amorgos (Reptilia, Colubridae). Bonner Zoologische Beiträge, 12: 135–148.

Buchholz K. F. 196. Die Smaragdeidechse der Kykladeninsel Tinos. Bonner Zoologische Beiträge, 13: 341–352.

Budak A. Tok C.V., Mermer A., 1998. A report on reptiles collected from Kumluca–Kalkan (Antalya), Turkey. Turkish Journal of Zoology, 22: 185–189.

Calabresi E. 1923. Escursioni Zoologiche del Dott. E. Festa nell'Isola di Rodi. Bollettino dei musei di zoologia ed anatomia comparata della R. Università di Torino, 38: 1–16.

Cattaneo A. 2005a. Nuovo contributo alla conoscenza dell'erpetofauna dell'isola egea di Kalymnos (Sporadi meridionali). Bollettino del Museo civico di storia naturale di Venezia, 56: 153–163.

Cattaneo A. 2005b. Observations on the herpetofauna of the Greek island of Kos (southern Sporades) with an unpublished case of microinsular sympatry of two closely related coloubridae species: *Hierophis caspius* (Gmelin) and *Hierophis jugularis* (L.). Atti Storia naturale della Maremma, 21: 79–91.

Cattaneo A. 2006. Contributo alla conoscenza dell'erpetofauna dell'isola egea di Nisyros (Dodecaneso) (Reptilia). Il Naturalista siciliano, 30: 485–494.

Cattaneo A. 2008. Osservazioni sull'ofidiofauna delle isole egee di Leros e Patmos (Dodecaneso) (Reptilia Serpentes). Il Naturalista siciliano, 32: 201–219.

Cattaneo A. 2009. L'ofidiofauna delle isole egee di Halki e Tilos (Dodecaneso) con segnalazione di un nuovo fenotipo di *Dolichophis jugularis* (Linnaeus) (Reptilia Serpentes). Il Naturalista siciliano, 33: 131–147.

Cattaneo A. 2011. Risultati di ricerche erpetologiche condotte nell'entroterra di Marmaris (Turchia sudoccidentale). Il Naturalista siciliano, Palermo, 35: 177–199.

Cattaneo A. 2012a. Il colubro gola rossa dell'arcipelago di Rodi: *Dolichophis jugularis zinneri* subsp. nova (Reptilia Serpentes). Il Naturalista siciliano, 34: 77–103.

Cattaneo A. 2012b. Osservazioni sull'erpetofauna di alcune località della Turchia costiera occidentale comprese tra i fiumi Küçük e Büyük Menderes. Atti Mus. St. Nat. Maremma, Grosseto, 23: 15–24.

Cattaneo A. 2014. Variabilità e sottospecie di *Montivipera xanthina* (Gray, 1849) nelle isole egee orientali (Reptilia Serpentes Viperidae). Il Naturalista siciliano, 38: 51–83.

Cattaneo A. 2017. Note sull'erpetofauna dell'Evros sudoccidentale (Grecia NE) e nuovo contributo alla conoscenza di *Montivipera xanthina* (Gray, 1849) della Tracia greca centro–orientale, con descrizione di *Montivipera xanthina occidentalis* subsp. nova (Reptilia Serpentes Viperidae). Il Naturalista siciliano, 41: 53–74.

Cattaneo A. 2018. L'erpetofauna (Reptilia) delle isole egee di Oinousses (Egeo nordorientale) e di Lipsi (Dodecaneso settentrionale). Il Naturalista siciliano, 42: 15–39.

Cattaneo A. Cattaneo C. & Grano M., 2020. Update on the herpetofauna of the Dodecanese Archipelago (Greece). Biodiversity Journal, 11: 69–84. https://doi.org/10.31396/Biodiv.Jour.2020.11.1.69.8

Clark R.J. 1968. A collection of snakes from Greece. Brit. J. Herpetol., London, 4: 45–48.

Clark R.J. 1990. An appraisal of the status of *Coluber jugularis* and *Elaphe quatuorlineata* in Greece. Part 1. Herptile, Dudley, 15: 42–56.

Clark R.J. 1992. A collection of reptiles from the islands of Symi, Tilos and Gaidaronisi; Dodecanese, Greece. Herptile, Dudley, 17: 19–27.

Corsini-Foka M. & Masseti M., 2008. On the oldest known record of the Nile Soft–shelled Turtle, *Trionyx triunguis* (Forskål, 1775), in the Eastern Aegean islands (Greece), Zoology in the Middle East, 43: 108– 110. https://doi.org/10.1080/09397140.2008.1063 8276

Cox N.A., Temple H.J. 2009. European Red List of Reptiles. Luxembourg: Office for Official Publications of the European Communities.

Christopoulos A., Verikokakis A.G., Detsis V., Nikolaidis I., Tsiokos L., Pafilis P., Kapsalas G. 2019. First records of *Eryx jaculus* (Linnaeus, 1758) from Euboea Island. Greece (Squamata: Boidae). Herpetology Notes, 12: 663–666.

Dimaki M. 2002. Herpetofauna of Rhodes and the rest of the Dodecanese. In: Masseti M. (Ed.), Island of deer. Natural history of the fallow deer of Rhodes and of the vertebrates of the Dodecanese (Greece). City of Rhodes, Environmental Organization, Rhodes: 63–69.

Dimitropoulos A., Ioannidis G. 2002. The Reptiles of Greece and Cyprus. Koan Publications, 275 pp.

Donihue C.D., Herrel A., Martín J., Foufopoulos J., Pafilis P., Baeckens S. 2020. Chemical signal evolution is rapid and repeatable: lizards evolve more complex chemical fingerprints on experimental islets. Journal of Animal Ecology, 89: 1458–1467. https://doi.org/ 10.1111/1365–2656.13205

Dufresnes C., Probonas N.M. & Strachinis I. 2021. A reassessment of the diversity of green toads (*Bufotes*) in the circum–Aegean region. Integrative Zoology, 16: 420–428. https: //doi.org/10.1111/1749–487.12494

Džukic G., Beškov V., Sidrovska V., Cogalniceanu D. & Kalezic M.L. 2008. Contemporary chorology of the spadefoot toads (*Pelobates* spp.) in the Balkan Peninsula, Zeitschrift fur Feldherpetologie, 15: 61–78.

Foufopoulos J. 1997. The reptile fauna of the northern Dodecanese (Aegean islands, Greece). Herpetozoa, 10: 3–12.

Franzen M., Bussmann M., Kordges T., Thiesmeier B. 2008. Die Amphibien und Reptilien der Südwest–Türkei. Laurenti Verlag, Bielefeld, 328 pp.

Grano M., Cattaneo C. & Cattaneo A., 2015. First observations on the herpetological and theriological fauna of Alimia Island (Rhodes Archipelago, Aegean Sea), Biodiversity Journal, 6: 73–78.

Grano M. & Cattaneo C. 2015. First record of *Zamenis situla* (Linnaeus, 1758) (Reptilia Serpentes) for the Aegean Island of Chalki (Dodecanese, Greece). Il Naturalista siciliano, 39: 375–381.

Grano M. & Cattaneo C. 2017. The Balkan Terrapin *Mauremys rivulata* (Valenciennes in Bory de Saint–Vincent, 1833) (Testudines Geoemydidae) in the Aegean island of Chalki: native or introduced? Biodiversity Journal, 8: 851–854.

Grano M., Cattaneo C. & Cattaneo A. 2018. Nuovo contributo alla conoscenza dell'erpetofauna dell'isola egea di Tilos (Dodecaneso, Grecia) (Amphibia et Reptilia). Il Naturalista Siciliano, 42: 3–13.

Grano M. & Cattaneo C. 2019a. First evidence for the snake–eyed skink *Ablepharus kitaibelii* (Bibron et Bory de Saint–Vincent, 1833) (Sauria Scincidae) in Astypalea Island (Dodecanese, Greece). Biodiversity Journal, 10: 3–6. https://doi.org/10.31396/Biodiv. Jour. 2019.10.1.3.6

Grano M. & Cattaneo C. 2019b. First record of the Rough–tailed agama *Stellagama stellio* (Linnaeus, 1758) (Reptilia, Agamidae) from Karpathos island (Dodecanese, Greece). Parnassiana Archives, 7: 51–54.

Grano M. & Cattaneo C. 2020. A new record of the grass snake, *Natrix natrix* (Linnaeus, 1758) (Squamata, Serpentes) in Kasos island (Dodecanese Greece). Parnassiana Archives, 8: 13–16.

Gruber U. & Fuchs D. 1977. Die Herpetofauna des Paros Archipels (Zentral–Ägäis). Salamandra, 13: 60–77.

Gruber U. & Schultze–Westrum, T. 1971. Zur Taxonomie und Ökologie der Cycladen–Eidechse (*Lacerta erhardii*) von der Nördlichen Sporaden. Bonner Zoologische Beiträge, 22: 101–130.

Itescu Y., Schwarz R., Moses M., Pafilis P., & Shai M. 2016. Record sizes for the Turkish house gecko, *Hemidactylus turcicus*, from Aegean islands, Greece. The Herpetological Bulletin, 138: 24–26.

Kalaentzis K., Kazilas C. & Strachinis I. 2018a. Two cases of melanism in the Ring–headed Dwarf Snake *Eirenis modestus* (Martin, 1838) from Kastellorizo,

Greece (Serpentes: Colubridae). Herpetology Notes, 11: 175–178.

Kalaentzis K., Strachinis I., Katsiyiannis P., Oefinger P., & Kazilas C. 2018b. New records and an updated list of the herpetofauna of Kastellorizo and the adjacent islet Psomi (Dodecanese, Greece). Herpetology Notes, 11: 1009–1019.

Karakasi D., Ilgaz Ç., Kumlutas Y., Candan K., Güçlü Ö., Kankılıç T., Beser N., Sindaco R., Lymberakis P. & Poulakakis N. 2021. More evidence of cryptic diversity in *Anatololacerta* species complex Arnold, Arribas and Carranza, 2007 (Squamata: Lacertidae) and re-evaluation of its current taxonomy. Amphibia-Reptilia, 1–16. https://doi.org/10.1163/15685381–bja10045

Kornilios P. & Thanou E. 2016. Two Additions to the Herpetofauna of Kasos (Aegean Sea, Greece) and the Role of Human–mediated Dispersals. Herpetological Review, 47: 633–635.

Kornilios P., Thanou E., Lymberakis P., Ilzag Ç., Kumlutaş Y. & Leaché A. 2019. A phylogenomic resolution for the taxonomy of Aegean green lizards. Zoologia Scripta, 00: 1–14. https://doi.org/10.1111/zsc.12385

Kornilios P., Kumlutaş Y., Lymberakis P. & Ilgaz Ç. 2018. Cryptic diversity and molecular systematics of the Aegean *Ophiomorus* skinks (Reptilia: Squamata), with the description of a new species. Journal of Zoological Systematics and Evolutionary Research, 56: 364–381. https://doi.org/10.1111/jzs.12205

Kotsakiozi P., Jablonskic D., Ilgazd Ç., Kumlutaşd Y., Avcıe A., Meiri S., Itescu Y., Kukushkinh O., Gvoždík V., Scillitani G., Roussos S.A., Jandzik D., Kasapidis P., Lymberakis P. & Poulakakis N. 2018. Multilocus phylogeny and coalescent species delimitation in Kotschy's gecko, *Mediodactylus kotschyi*: Hidden diversity and cryptic species. Molecular phylogenetics and evolution, 125: 177–187. https://doi. org/10.1016/j.ympev.2018.03.022

Kumlutas Y., Öz M., Tunç M.R., Kaska Y., Özdemir A., Düsen S. 2004. On snake species of the western Taurus range, Turkey. Natura Croatica, Zagreb, 13: 19–33.

Helfenberger N. 2001. Phylogenetic relationships of Old World ratsnakes based on visceral organ topography, osteology, and allozyme variation. Russian Journal of Herpetology, 8: 1–62. https://doi.org/10.30906/1026–2296–2001–8–0–1–62

Hofmann S., Mebert K., Schulz K.–D., Helfenberger N., Göçmen B. & Böhme W., 2018. A new subspecies of *Zamenis hohenackeri* (Strauch, 1873) (Serpentes: Colubridae) based on morphological and molecular data. Zootaxa, 4471 (1): 137–153.

Lambert M.R.K. 1979. Trade and the Mediterranean tortoise. Oryx 15: 81–82.

Lenk P., Joger U. & Wink M. 2001. Phylogenetic relationships among European ratsnakes of the genus *Elaphe* Fitzinger based on mitochondrial DNA sequence comparisons. Amphibia–Reptilia, Leiden, 22(3): 329–339.

Lo Cascio P. & Masseti M. 2004. Distributional records for some herpetofaunal species in the islands of SW Turkey, with notes on the diet of *Laudakia stellio*. Herpetological Bulletin, 87: 25–28.

Lymberakis P., Poulakakis N., Manthalou G., Tsigenopoulos C.S., Magoulas A. & Mylonas M. 2007. Mitochondrial phylogeography of *Rana* (*Pelophylax*) populations in the Eastern Mediterranean region. Molecular phylogenetics and evolution, 44: 115–25. https://doi.org/1016/j.ympev.2007.03.009

Lymberakis P., Ugurtas I.H., Papenfuss T., Sparreboom M., Kuzmin S., Anderson S. & Denoël M. 2009. *Lyciasalamandra helverseni*. The IUCN Red List of Threatened Species 2009: e.T61918A12572637. http://dx.doi.org/10.2305/IUCN.UK.2009.RLTS.T61918A12572637.en. Downloaded on 07 October 2018.

Lymberakis P., Pafilis P., Poulakakis N., Sotiropoulos K., Valakos E.D. 2018. The Amphibians and Reptiles of the Aegean Sea. In: Sfenthourakis S., Pafilis P., Parmakelis A., Poulakakis N., Triantis K.A. (Eds) Biogeography and Biodiversity of the Aegean. In honour of Prof. Moysis Mylonas. Broken Hill Publishers Ltd, Nicosia, 169–189.

Ljubisavljević K., Džukić G. & Kalezić M.L. 2011. The commercial export of the land tortoises (*Testudo* spp.) from the territory of the former Yugoslavia: a historical review and the impact of overharvesting on wild populations. North–Western Journal of Zoology 7: 250–260.

Lotze H.U. 1974. Eine Vierstreifennatter (*Elaphe quatuorlineata*) von der Sporadeninsel Kos. *Salamandra*, Frankfurt am Main, 10: 27–30.

Lotze H.U. 1977 - Eine Berichtigung: *Coluber ravergieri* non *Elaphe quatuorlineata* von der Sporaden–Insel Kos. Salamandra, Frankfurt am Main, 13: 117.

Margaritoulis D., Panagopoulou A. 2010. Sea Turtle in the Mediterranean: Distribution, Threats & Conservation Priorities. IUCN SSSC/Marine Turtle Specialist Group. Gland, Switzerland and Cambdrige, UK.

Masseti M. 1999. Terrestrial vertebrate fauna on Mediterranean islands: Tilos (Dodecanese, Greece) a case study. Abstracts of the 8th International Congress on the Zoogeography and Ecology of Greece and Adjacent Regions. Kavala, 17–21 May 1999. The Hellenic Zoological Society, Athens: 94.

Masseti M. 2012. Atlas of terrestrial mammals of the Ionian and Aegean islands. Walter de Gruyter & Co, Berlin, 302 pp.

Mertens R. 1959. Zur Kenntnis der Lacerten auf der Insel Rhodos. Senckenbergiana Biologica, 40: 15–24.

Mertens R. 1968. Eine schwarze Zornnatter von den Cycladen: *Columber gemonensis gyarosensis* n. subsp. Senckenbergiana Biologica, 49: 181–189.

Obst F.J., Ščernbak N.N., Böhme W. 1993. *Elaphe situla* (Linnaeus, 1758) - Leopardnatter. Pp. 431–453 in: Böhme W. (ed.), Handbuch der Reptilien und Amphibien Europas, Bd. 3/I, Schlangen (Serpentes) I, Aula–Verlag, Wiesbaden.

Pafilis P. 2010. A brief history of Greek herpetology. Bonn Zoological Bulletin 57(2): 329–345.

Pafilis P., Kapsalas G., Lymberakis P., Protopapas D. & Sotiropoulos K. 2019. The Karpathos marsh frog (*Pelophylax cerigensis*): what does the most en-

dangered frog in Europe eat? Animal and Conservation, 42, 1: 1–8. https://doi.org/10.32800/abc.2019.42. 0001

Papatheodorou F. & Pagkas N., 2001. Creation of a Natural Park in Tilos for the rescue and enrichment of fauna, flora and indigenous as well as migrating birds. Municipality of Tilos, 324 pp.

Pérez I., Giménez A., Sánchez–Zapata J.A., Anadón J.D., Martínez M., Esteve M.A., 2004. Non–commercial collection of spur–thighed tortoises (*Testudo graeca graeca*): a cultural problem in southeast Spain. Biological Conservation 118: 175–181. 10.1016/j.biocon.2003.07.019

Poulakakis N., Lymberakis P., Antoniou A., Chalkia D., Zouros E., Mylonas M. & Valakos E., 2003. Molecular phylogeny and biogeography of the wall–lizard *Podarcis erhardii* (Squamata: Lacertidae), Molecular Phylogenetics and Evolution, 28: 38–46. https:// doi.org/10.1016/S1055-7903(03)00037-X

Rehak I., Obst F.J., 1993. *Coluber rubriceps* (Venzmer, 1919) – Rötliche Schlanknatter. Pp. 155–166 in: Böhme W. (ed.), Handbuch der Reptilien und Amphibien Europas, Bd. 3/I, Schlangen (Serpentes) I, Aula-Verlag, Wiesbaden.

Sarà M., 1998. I mammiferi delle isole del Mediterraneo. L'Epos ed., Palermo, 166 pp.

Ščerbak N.N. & Böhme W., 1993. *Coluber caspius* Gmelin, 1789 - Kaspische Pfeilnatter oder Springnatter. In: Böhme W. (Ed.), Handbuch der Reptilien und Amphibien Europas, Bd. 3/I, Schlangen (Serpentes) I. Aula–Verlag, Wiesbaden, pp. 83–96.

Schätti B. & Agasian A., 1985. Ein neues Konzept für den *Coluber ravergieri - C. nummifer* Komplex (Reptilia, Serpentes, Colubridae). Zoologische Abhandlungen Museum für Tierkunde, Dresden, 40: 109–123.

Schätti B., Baran I, Maunoir P., 2001. Taxonomie, Morphologie und Verbreitung der Masken–Schlanknatter *Coluber* (s.l.) *collaris* (Müller, 1878). Revue Suisse de Zoologie, Genève, 108: 11–30. 10.5962/bhl.part.79617

Schlüter U., 2010. Die Herpetofauna von Symi. Elaphe. Rheinbach, 18: 62–67.

Schulz K.D., 1996. A monograph of the Colubrid Snakes of the Genus *Elaphe* Fitzinger. Koeltz Scientific Books, Havlickuv Brod, Czech Republic, III + 439 pp.

Sindaco R., Kornilios P., Sacchi R. & Lymberakis P., 2014. Taxonomic reassessment of *Blanus strauchi* (Bedriaga, 1884) (Squamata: Amphisbaenia: Blanidae), with the description of a new species from south–east Anatolia (Turkey), Zootaxa, 3795: 311–326. http://dx.doi.org/10.11646/zootaxa.3795.3.6

Skourtanioti E., Kapli P., Ilgaz C., Kumlutaş Y., Avcı A., Ahmadzadeh F., Isailović J.C.N., Gherghel I., Lymberakis P. & Poulakakis N., 2016. A reinvestigation of phylogeny and divergence times of the *Ablepharus kitaibelii* species complex (Sauria, Scincidae) based *Update on the herpetofauna of the Dodecanese Archipelago (Greece)* 81 on mtDNA and nuDNA genes, Molecular Phylogenetics and Evolution,103: 199–214. http://dx.doi.org/10.1016/j.ympev.2016.07.005

Šmid J., Aghová T., Velenská D., Moravec J., Balej P., Naumov B., Popgeorgiev G., Üzüm N., Avci A. & Jablonski D., 2020. Quaternary range dynamics and taxonomy of the Mediterranean collared dwarf racer, *Platyceps collaris* (Squamata: Colubridae). Zoological Journal of the Linnean Society, 20: 1–18. 10.1093/zoolinnean/zlaa151

Speybroeck J., Beukema W., Bok B. & Van Der Voort J., 2016. Field Guide to the Amphibians & Reptiles of Britain and Europe. Bloomsbury, London, 432 pp.

Strachinis I., Tsarouhas N., 2021. First record of albino green toads *Bufotes viridis* in Greece. The Herpetological Bulletin, 155: 44 – 45. https://doi.org/10.33256/hb155.4445

Strid A., 2016. Atlas of the Aegean Flora. Part 1: Text & plates. Part 2: Maps. Berlin: Botanic Garden and Botanical Museum Berlin, Freie Univ. Berlin, 700 + 878 pp.

Taşkavak E., Reimann M.J. & Polder W.N., 1999. First record of *Trionyx triunguis* from Kos Island, Greece with comments on its occurrence in the eastern Mediterranean, Chelonian Conservation and Biology, 3: 510–512.

Temple H.J. & Cox N.A., 2009. European Red List of Amphibians. Office for Official Publications of the European Communities. Luxembourg.

Toli E.A., Siarabi S., Bounas A., Pafilis P., Lymberakis P. & Sotiropoulos K., 2018. New insights on the phylogenetic position and population genetic structure of the Critically Endangered.

Karpathos marsh frog *Pelophylax cerigensis* (Amphibia: Anura: Ranidae), Acta Herpetologica, 13. http://dx.doi.org/10.13128/Acta_Herpetol-23189

Türkozan O., Özdemir A., Kiremit F., 2008. International *Testudo* Trade. Chelonian Conservation and Biology 7: 269–274. 10.2744/CCB–0724.1

Valakos E., Maragou P. & Mylonas M., 1995. Geographical distribution: *Podarcis erhardii*. Society for the Study of Amphibians and Reptiles. Herpetological Review, 26: 155.

Valakos E., Pafilis P., Sotiropoulos K., Lymberakis P., Maragou P. & Foufopoulos J., 2008. The Amphibians and Reptiles of Greece. Edition Chimaira, Frankfurt am Main, 463 pp.

Veith M. & Steinfartz S., 2004. When non-monophyly results in taxonomic consequences - the case of *Mertensiella* within the Salamandridae (Amphibia: Urodela), Salamandra - German Journal of Herpetology, 40: 67–80.

Werner F., 1930. Contribution to the knowledge of the reptiles and amphibians of Greece, especially the Aegean islands. Occasional papers of the University of Michigan Museum of Zoology, 211: 1–47.

Werner F., 1933. Ergebnisse einer zoologischen Studien–und Sammelreise nach den Inseln des

Ägäischen Meeres. I. Reptilien und Amphibien. Sitzb. Akad. Wiss. Wien, math.–nat. Kl., Abt. I, 142: 103–133.

Werner F., 1935. Reptilien der Ägäischen Inseln. Sitzungsberichte der Mathematischen–Naturwissenschafftlichen Klasse Abteilung A, 144: 81–117.

Werner F., 1937. Ergebnisse der vierten zoologischen Forschungsreise in die ägäis (1936). Sitzb. Akad. Wiss. Wien, math.–nat. Kl., Abt. I, 146: 89–118.

Werner F., 1938 - Die Amphibien und Reptilien Griechenlands - Zoologica, Stuttgart, 35: 1–117.

Wettstein O. 1953. Herpetologia Aegaea. Denkschriften der Kaiserlichen Akademie der Wissenschaften / Mathematisch–Naturwissenschaftliche Classe, 162: 651–833.

Wilson M.J. & Grillitsch H. 2009. The Herpetofauna of Simi (Dodecanese, Greece) (Amphibia, Reptilia). Herpetozoa, 22: 99–113.

Zavattari E. 1929. Ricerche faunistiche nelle isole italiane dell'Egeo. Parte seconda. Fauna terrestre e fluviale. Anfibi e Rettili. Archivio zoologico italiano, Torino, 13: 31–36.

Zinner H. 1972. Systematics and Evolution of the Species Group *Coluber jugularis* Linnaeus, 1758 - *Coluber caspius* Gmelin, 1789 (Reptilia, Serpentes).