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The distribution and biogeography of amphibians and reptiles in Turkey

Çağdaş YAŞAR[1,2], Kerim ÇİÇEK[2], John MULDER[3] and Cemal Varol TOK[4]

1. Akdeniz Koruma Derneği, Mediterranean Conservation Society, Izmir, Turkey.
2. Section of Zoology, Department of Biology, Faculty of Science, Ege University, TR-35100, Bornova, Izmir, Turkey.
3. Natural History Museum Rotterdam, Department of Vertebrates, Westzeedijk 345, 3015AA, Rotterdam, the Netherlands.
4. Department of Biology, Çanakkale Onsekiz Mart University, Faculty of Arts and Sciences, Çanakkale, Turkey.
* Corresponding author, K. Çiçek, E-mail: kerim.cicek@hotmail.com or kerim.cicek@ege.edu.tr

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Abstract. Knowledge on the spatial distribution of taxa is crucial for the decision-making processes in conservation and management of biodiversity that rely on precise distribution data. We present an annotated list for a total of 37 amphibian (20 caudatans and 17 anurans) and 141 reptile species (11 chelonians, 70 lizards, 3 amphisbaenians and 57 snakes) in Turkey, using both available scientific literature up to December 2020 and our own fieldwork data from 1987 to 2020. We provide a comprehensive listing of taxonomy, names, distribution and conservation status of Turkish amphibians and reptiles. The herpetofauna list will be particularly useful for establishing national conservation priorities as well as for placing Turkish fauna into phylogenetic and biogeographic contexts. We compiled information published in books, journals and various web sources and added our personal data. We projected the data in the WGS84 coordinate system and created an overlay grid with cells of 50x50 km^2. The database comprises more than 500 grid cells and 11,913 records. As a result, the distribution of Turkish amphibians and reptiles has been extensively mapped with geographical information systems and a database has been created. The obtained data will be useful in planning future studies on taxonomy, ecology and conservation of Turkish amphibians and reptiles.

Key words: biogeography, conservation, distribution, GIS, species richness, Turkish herpetofauna.

Introduction

Global biodiversity is being lost at an accelerated rate (Butchart et al. 2010) because of many threats, especially human-induced habitat loss and fragmentation. A precise knowledge of the distribution patterns of species and the identification of hotspot areas are extremely important for the conservation and management of biological diversity (Margules & Pressey 2000, Myers et al. 2000, Sillero et al. 2014).

Turkey is located at the intersection of three biodiversity hotspots: the Caucasus, the Irano-Anatolian, and Mediterranean hotspots (Mittermeier et al. 2005). Its unique tectonic history and location between the temperate and subtropical regions have caused a variety of climates, ecosystems, and habitats (Şekercioğlu et al. 2011). Due to its unique geographical features, a variety of climates, ecosystems, and habitats within a relatively limited area, Anatolia (Asian part of Turkey) is both a bridge and a barrier between Asia and Europe (Sindaco et al. 2000).

The first herpetological researches on Turkish herpetofauna began in the early 19th century and Anatolia particularly has been the focus of European researchers (e.g., Werner 1902, Bodenheimer 1944, Clark & Clark 1973). For this reason, most of the collected data is along main road routes (see Clark & Clark 1973). Bodenheimer (1944) reported 18 amphibians and 67 reptiles from Turkey. Then the number of amphibians raised from 18 (8 caudatans, 10 anurans) to 28 (14 caudatans, 14 anurans) from 1944 to 2012 (Bodenheimer 1944, Başoğlu et al. 1994, Baran & Atatür 1998, Baran et al. 2012). The number of reptiles increased from 69 (5 chelonians, 2 amphisbaenians, 32 lizards, 30 snakes) to 129 (11 chelonians, 1 amphisbaenians, 62 lizards, 55 snakes) in the same period (Bodenheimer 1944, Baran 1976, Başoğlu & Baran 1977, 1980, Sindaco et al. 2000, Baran & Atatür 1998, Baran et al. 2012).

The increasing number of species detected in Turkey during the last decades is not only due to intensive field research, but also to the increased application of genetic markers. A lot of amphibians and reptiles, which were considered as one species in the past, were split into several species recently. This led to an increase in the number of species in Turkey.

Distributional studies on European herpetofauna began with the establishment of the "Societas Europea Herpetologica" (SEH) in 1979 and the atlas by Gasc et al. published in 1997 by this society. The atlas studies of the European herpetofauna were rearranged by Sillero et al. (2014) using Geographic Information Systems (GIS). GIS-based computer programs are used in all disciplines related to biodiversity. In addition, chronological data collection, storage, management, mapping and analysis tools are available in GIS (Sillero et al. 2005). Many studies on Turkish herpetofauna (Baran 1976, Başoğlu & Baran 1977, 1980, Başoğlu et al. 1994, Baran et al. 2012) presented detailed maps of species. However, the distribution maps were prepared without using a coordinate-based database in these studies. The first attempt on GIS mapping was made by Sindaco et al. (2000).

Recent large-scale changes in species names that have long prevailed for Turkish amphibians and reptiles cause difficulties in consulting and interpreting older sources. Increased field inventories have led to the discovery of new taxa. Using better techniques (karyological, biochemical and bioacoustic methods and DNA-sequencing) and applying integrative species delimitation approaches, differences between sibling or cryptic species hidden by morphological similarities, can be revealed nowadays. Application of a biological (evolutionary/genetic/cladistic) versus morphological species concept and all the aforementioned new techniques has led to the description or resurrection of numerous new species and genera. Recent species lists not

only show more species, but sometimes also very different names for largely the same taxa.

The objective of the present study is to (1) prepare an up-to-date list of Turkish amphibians and reptiles, (2) create a GIS-based database and map the distribution of the species, (3) determine and analyze its spatial distribution patterns and (4) document recent taxonomic and systematic changes.

Material and Methods

Study Area

Turkey covers an area of about 783.562 km² (Latitudes= 36° to 42° N, Longitudes= 25° to 45° E). The majority of the territory of Turkey is situated in Asia (755,688 km²), while a small portion is in Europe (23,764 km²). The climate is temperate with average year temperature and precipitation 13.2°C and 622.8 mm respectively (Turkish Meteorology Station between 1970-2017). Turkey has wide range biomes which include the temperate broadleaf and mixed forests, temperate grasslands, savannas, and shrublands, and the Mediterranean forests, woodlands, and scrub (WWF 2020). Fourteen ecoregions are situated in Turkey (Figure 1, Olson et al. 2001).

Data processing and compilation

Distributional data about the herpetofauna of Turkey was collected and compiled from books, journal articles, field reports up to December 2020 (Supplementary material: Appendix 1 – available online), museum collections, websites, interviews with experts, the Global Biodiversity Information Facility (GBIF) and several field surveys in different provinces of Turkey from 1987 to 2020 performed by the authors. Locality information of data without coordinates was obtained by using Google Earth Pro vers. 7.1.5 (Google Inc.). In this case, locality names given by researchers, were translated to coordinates of the nearest settlement or based on explanation in the relevant studies. The distribution records that could not be georeferenced to an actual locality or toponym (e.g., occurrences assigned to mountain ranges, geographical provinces or hydrographic basins) or records with unspecified taxa within genera were not included in the geodatabase. Records were primarily created and stored in a MS Access 2007 database, and later imported in an ESRI file geodatabase using ArcGIS (vers. 10.7 ESRI). For the quality of the data, suspicious and erroneous records of the database have been checked several times. All records and layers were referenced to the WGS-84 coordinate system.

Mapping

As an atlas is usually the representation of the species' distributions by uniform units (Sillero et al. 2005), record points were transformed into a grid as recommended by Sillero et al. (2014). We compiled the occurrence records to the UTM grid system at a spatial resolution of 2,500 km² (50 x 50 km²) and subsequently created distribution maps of all species. After all these operations, the current distribution maps were visualized, using all 2,714 records of amphibians and 9,199 records of reptiles via ArcGIS (Figure 2, Supplementary material: Appendix 2 – available online). Obtained in this study were species richness [SR] (expressed as the total number of species

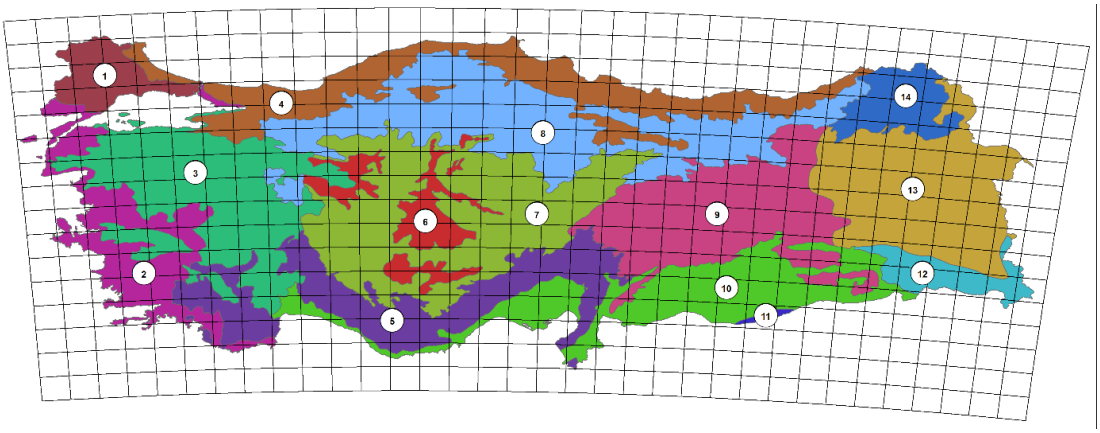

Figure 1. Map of grid codes and terrestrial ecoregions in Turkey. (1. Balkan Mixed Forests, 2. Aegean and Western Turkey Sclerophyllous and Mixed Forests, 3. Anatolian Conifer and Deciduous Mixed Forests, 4. Euxine-Colchic Broadleaf Forests, 5. Southern Anatolian Montane Conifer and Deciduous Forests, 6. Central Anatolian Steppe, 7. Central Anatolian Steppe and Woodlands, 8. Northern Anatolian Conifer and Deciduous Forests, 9. Eastern Anatolian Deciduous Forests, 10. Eastern Mediterranean Conifer-Sclerophyllous-Broadleaf Forests, 11. Middle East Steppe, 12. Zagros Mountains Forest Steppe, 13. Eastern Anatolian Montane Steppe, 14. Caucasus Mixed Forests).

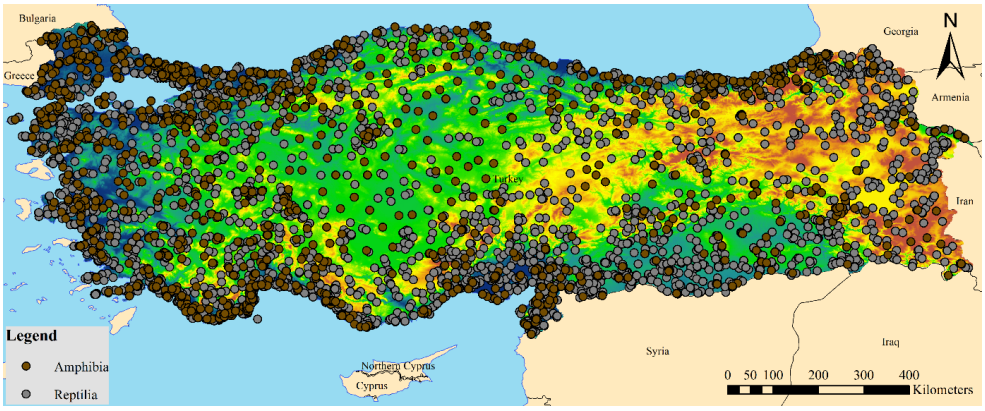

Figure 2. Total number of records for amphibians and reptiles in Turkey.

in a grid cell) and corrected weighted endemism [CWE]. In order to calculate the corrected weighted endemism, first the weighted endemism (WE) of species was calculated according to Laffan & Crisp (2003), which is the sum of the reciprocal of the total number of cells in which each species is found. A WE emphasizes areas that have a high proportion of animals with restricted ranges. The corrected weighted endemism [CWE] for a given cell is then received from dividing WE by SR with the SDMtoolbox (vers.2.4, Brown 2014). Ecoregional distribution and IUCN Red List status of species is evaluated to a better understanding of species diversity. The species are classified into chorotypes as proposed and used by Vigna Taglianti et al. (1999) and Sindaco et al. (2000, 2008).

Taxonomy

A referenced account is composed of changes that occurred in the herpetofauna species list of Turkey in the last four decades, because in this period the amount of species increased considerably and major taxonomic changes took place. Mutations consist of newly described species, new species for the country and taxonomic and systematic changes. Excellent initiatives like Speybroeck & Crochet (2007), Speybroek et al. (2010, 2020), and Baran et al. (2012) inspired us and a huge number of publications were consulted during the preparation of this paper. No taxonomic inferences were made and suggested names were used in case of sufficient convincing proof. Largely the view of the Amphibian species of the World (Frost 2020) and the Reptile Database (Uetz et al. 2020) are followed. In addition, because of the high number of species and rapid developments in taxonomy, no subspecies evaluation was conducted.

Results

Species list and number of taxa

The study revealed the presence of 178 amphibian and reptile species in Turkey, comprising of 37 amphibians (20 caudatans and 17 anurans) and 141 reptiles (11 turtles, 3 amphisbaenians, 70 lizards and 57 snakes) (Tables 1, 2, Figure 3).

The order Caudata is represented by only one family (Salamandridae) and contains 7 genera (Table 2) and 20 species (Figure 3). *Lyciasalamandra* is the largest genus in terms of species count. It is represented by 6 species. The other genera are *Lissotriton* (3 species), *Mertensiella* (1 species), *Neurergus* (3 species), *Ommatotriton* (3 species), *Salamandra* (1 species) and *Triturus* (3 species). Although there are old records of Uludağ (Bursa, Boettger 1888), İzmir (Boettger 1892) and Eskişehir (Eiselt 1958) referring to *Salamandra salamandra*, they have not been found again since then. Moreover, Yılmaz (1983) stated that he did not find this species in Thrace and Öz (1986) stated that he did not find this species in these three localities. Therefore, the distribution records of this species are showed in gray on the map but not added in the list of species.

Anurans (Anura) are represented by six families [Bombinatoridae (2 species), Pelobatidae (2 species), Pelodytidae (1 species), Hylidae (2 species), Bufonidae (4 species), Ranidae (6 species)] and 8 genera [*Bombina* (2 species), *Pelobates* (2 species), *Pelodytes* (1 species), *Hyla* (2 species), *Bufo* (2 species), *Bufotes* (2 species), *Pelophylax* (2 species), *Rana* (4 species)] (Table 1). Although there are historic records from the European side of Istanbul (Eiselt 1986), *Pelobates fuscus* has not been found recently. Therefore, the distribution records of this species are shown on the map, but not added in the species list.

Reptiles are represented by 2 orders [Chelonia and Squamata] and 4 suborders [Cryptodira, Sauria, Amphisbaenia and Serpentes].

Chelonians are represented by 6 families [Chelonidae (2 species), Dermochelyidae (1 species), Emydidae (1 species), Geoemydidae (2 species), Trionychidae (2 species), Testudinidae (2 species)] and 9 genera and 11 species [*Caretta* (1 species), *Chelonia* (1 species), *Dermochelys* (1 species), *Emys* (1 species), *Mauremys* (2 species), *Trionyx* (1 species), *Rafetus* (1 species), *Testudo* (2 species), *Trachemys* (1 species)] (Tables 1, 2). The North-American species *Trachemys scripta* was brought into the country as a pet and has formed wild populations.

The Worm Lizards (Amphisbaenia) are represented by 1 family [Amphisbaenidae (3 species) and 1 genus [*Blanus* (3 species)] (Table 2).

Lizards (Sauria) are represented by 9 families [Agamidae (4 species), Chamaeleonidae (1 species), Phyllodactylidae (1 species), Gekkonidae (7 species), Eublepharidae (1 species), Lacertidae (41 species), Scincidae (10 species), Varanidae (1 species) and Anguidae (2 species)]. There are 32 genera [*Paralaudakia* (1 species), *Stellagama* (1 species), *Phrynocephalus* (1 species), *Trapelus* (1 species), *Chamaeleo* (1 species), *Asaccus* (1 species), *Mediodactylus* (3 species), *Cyrtopodion* (1 species), *Hemidactylus* (1 species), *Stenodactylus* (1 species), *Eublepharis* (1 species), *Acanthodactylus* (4 species), *Anatololacerta* (5 species), *Apathya* (1 species), *Darevskia* (14 species), *Eremias* (3 species), *Iranolacerta* (1 species), *Lacerta* (6 species), *Mesalina* (1 species), *Ophisops* (1 species), *Parvilacerta* (1 species), *Phoenicolacerta* (2 species), *Podarcis* (3 species), *Timon* (1 species), *Ablepharus* (4 species), *Chalcides* (1 species), *Eumeces* (1 species), *Ophiomorus* (1 species), *Heremites* (3 species), *Varanus* (1 species), *Anguis* (1 species) and *Pseudopus* (1 species)], altogether 70 species (Tables 1, 2).

Snakes (Serpentes) are represented by 8 families [Leptotyphlopidae (1 species), Typhlopidae (2 species), Boidae (1 species), Natricidae (2 species), Colubridae (36 species), Lamprophiidae (1 species), Viperidae (13 species) and Elapidae (1 species)], 22 genera [*Myriopholis* (1 species), *Xerotyphlops* (1 species), *Letheobia* (1 species), *Eryx* (1 species), *Natrix* (2 species), *Coronella* (1 species), *Dolichophis* (3 species), *Eirenis* (14 species), *Elaphe* (3 species), *Hemorrhois* (2 species), *Malpolon* (1 species), *Platyceps* (4 species), *Muhtarophis* (1 species), *Rhynchocalamus* (2 species), *Spalerosophis* (1 species), *Telescopus* (2 species), *Zamenis* (3 species), *Macrovipera* (1 species), *Montivipera* (4 species), *Daboia* (1 species), *Vipera* (7 species) and *Walterinnesia* (1 species)] building 57 species (Tables 1, 2).

The Lacertidae family is the most numerous family with 41 species of lizards (Sauria). The family of snakes (Serpentes) containing the largest amount of species is Colubridae with 36 species.

Conservation status

In Amphibia, there are 2 species (5.41%) CR, 5 species (13.51%) EN, 4 species (10.81%) VU, 5 species (13.51%) NT (Table 3, 4, Figure 4). In Reptilia, there are 6 species (4.25%) with status CR, 7 species (4.96%) EN, 5 species (3.54%) VU and 6 species (4.25%) NT (Figure 4). In addition, 94

Table 1. The amphibian and reptile diversity of Turkey.

Class	Order	Suborder	Family	Genus	Total Number
Amphibia					7 familia, 15 genera, 37 species
	Caudata		Salamandridae	*Lissotriton, Lyciasalamandra, Mertensiella, Neurergus, Ommatotriton, Salamandra, Triturus*	7 genera, 20 species
	Anura		Bombinatoridae	*Bombina*	1 genus, 2 species
			Pelobatidae	*Pelobates*	1 genus, 2 species
			Pelodytidae	*Pelodytes*	1 genus, 1 species
			Hylidae	*Hyla*	1 genus, 2 species
			Bufonidae	*Bufo, Bufotes*	2 genera, 4 species
			Ranidae	*Pelophylax, Rana*	2 genera, 6 species
Reptilia					24 familia, 64 genera, 141 species
	Chelonia	Cryptodira	Chelonidae	*Caretta, Chelonia*	2 genera, 2 species
			Dermochelyidae	*Dermochelys*	1 genus, 1 species
			Emydidae	*Emys, Trachemys*	2 genus, 2 species
			Geoemydidae	*Mauremys*	1 genus, 2 species
			Trionychidae	*Trionyx, Rafetus*	2 genera, 2 species
			Testudinidae	*Testudo*	1 genus, 2 species
	Squamata	Amphisbaenia	Amphisbaenidae	*Blanus*	1 genus, 3 species
		Sauria	Agamidae	*Paralaudakia, Stellagama, Phrynocephalus, Trapelus*	4 genera, 4 species
			Chamaeleonidae	*Chamaeleo*	1 genus, 1 species
			Phyllodactylidae	*Asaccus*	1 genus, 1 species
			Gekkonidae	*Mediodactylus, Cyrtopodion, Hemidactylus, Stenodactylus*	4 genus, 7 species
			Eublepharidae	*Eublepharis*	1 genus, 1 species
			Lacertidae	*Acanthodactylus, Anatololacerta, Apathya, Darevskia, Eremias, Iranolacerta, Lacerta, Mesalina, Ophisops, Parvilacerta, Phoenicolacerta, Podarcis, Timon*	13 genera, 43 species
			Scincidae	*Ablepharus, Chalcides, Eumeces, Ophiomorus, Heremites*	5 genera, 10 species
			Varanidae	*Varanus*	1 genus, 1 species
			Anguidae	*Anguis, Pseudopodus*	2 genera, 2 species
		Serpentes	Leptothyplopidae	*Myriopholis*	1 genus, 1 species
			Typhlopidae	*Xerotyphlops, Letheobia*	2 genera, 2 species
			Boidae	*Eryx*	1 genus, 1 species
			Natricidae	*Natrix*	1 genus, 2 species
			Colubridae	*Coronella, Dolichophis, Eirenis, Elaphe, Hemorrhois, Platyceps, Muhtarophis, Rhynchocalamus, Spalerosophis, Telescopus, Zamenis*	11 genera, 36 species
			Lamprophiidae	*Malpolon*	1 genus, 1 species
			Viperidae	*Daboia, Macrovipera, Montivipera, Vipera*	4 genera, 13 species
			Elapidae	*Walterinnesia*	1 genus, 1 species

Table 2. The list of amphibians and reptiles in Turkey. IUCN: Global IUCN categories, TNG: total number of grids, DA: total distribution area. AFRO-I-MED: Afrotropico-Indo-Mediterranean, AFRO-MED: Afrotropico-Mediterranean, ANAT: Anatolian endemic, ARME: Armenian endemic, ARME-CAUC: Armeno-Caucasian endemic, ARME-E-ANAT: Armeno-E-Anatolian endemic, C-ASIA-EUR: Centralasiatic-European, C-ASIA-EUR-MED: Centralasiatic-Europeo-Medirerranean, C-ASIA-MED: Centralasiatic-Mediterranean, CAUC: Caucasian endemic, C-EUR : Centraleuropean, COS: Cosmopolitan, E-MED: E-Mediterranean, EUR: European, EUR-MED: Europeo-Mediterranean, HOL: Holarctic, I-MED: Indo-Mediterranean, KOLK: Kolkhidian endemic, KOLK-ARME: Kolkhido-Armenian endemic, KOLK-CAUC: Kolkhido-Caucasian endemic, KURD: Kurdish endemic, MED: Mediterranean, N-ANAT: N-Anatolian (= Pontic) endemic, NE-ANAT: NE-Anatolian endemic, N-MESOP: N-Mesopotamian endemic, NW-ANAT: NW-Anatolian endemic, PO-CAS: Ponto-Caucasian endemic, SAH-SAL-ARAB: Saharo-Sahelo-Arabian, SAH-TUR-SIN: Saharo-Turano-Sindian, S-ANAT: S-Anatolian (= Taurian) endemic, S-EUR: S-European, SIBER-EUR: Sibero-European, SW-ANAT: SW-Anatolian endemic, SW-ASIA: SW-Asiatic, TUR: Turanian, TUR-EUR: Turano-European, TUR-EUR-MED: Turano-Europeo-Mediterranean, TUR-MED: Turano-Mediterranean, W-ANAT: W-Anatolian endemic, W-IRAN: W-Iranian endemic.

Taxa	IUCN	TNG	DA	Ecoregion	Chorotype
AMPHIBIA (37)					
CAUDATA (20)					
Salamandridae (20)					
Lissotriton schmidtleri (Raxworthy, 1988)	NE	38	95000	1,2,3,4	EUR
Lissotriton kosswigi (Freytag, 1955)	NE	11	27500	2,4	EUR
Lissotriton lantzi (Wolterstorff, 1914)	NE	1	2500	14	CAUC
Lyciasalamandra antalyana (Başoğlu & Baran, 1976)	EN	2	5000	3	S-ANAT
Lyciasalamandra atifi (Başoğlu, 1967)	EN	5	12500	3,5	S-ANAT
Lyciasalamandra billae (Franzen & Klewen, 1987)	CR	3	7500	3,5	S-ANAT
Lyciasalamandra fazilae (Başoğlu & Atatür, 1974)	EN	3	7500	2,5	SW-ANAT
Lyciasalamandra flavimembris (Mutz & Steinfartz, 1995)	EN	3	7500	2	SW-ANAT
Lyciasalamandra luschani (Steindachner, 1891)	VU	5	12500	2,5	SW-ANAT
Mertensiella caucasica (Waga, 1876)	VU	13	32500	4,14	PO-CAS
Neurergus crocatus Cope, 1862	VU	3	7500	12	SW-ASIA
Neurergus strauchii (Steindachner, 1887)	VU	16	40000	9,10,12,13	ANAT
Neurergus barani (Öz, 1994)	NE	3	7500	9	ANAT
Ommatotriton nesterovi (Litvinchuk, Zuiderwijk, Borkin & Rosanov, 2005)	NE	27	67500	3,4,8	NW-ANAT
Ommatotriton ophryticus (Berthold, 1846)	NT	11	27500	4,8,14	TUR-EUR
Ommatotriton vittatus (Gray, 1835)	LC	14	35000	5,10,11	SW-ASIA
Salamandra infraimmaculata Martens, 1885	NT	15	37500	9,10,13	SW-ASIA
Triturus ivanbureschi Arntzen & Wielstra, 2013	NE	39	97500	1,2,3	E-MED
Triturus anatolicus Wielstra & Arntzen, 2016	NE	33	82500	3,4,8	N-ANAT
Triturus karelinii (Strauch, 1870)	LC	2	5000	14	EUR
ANURA (17)					
Bombinatoridae (2)					
Bombina bombina (Linnaeus, 1761)	LC	8	20000	1,4	C-EUR
Bombina variegata (Linnaeus, 1758)	LC	1	2500	2	S-EUR
Pelobatidae (2)					
Pelobates syriacus Boettger, 1889	LC	56	140000	1,2,3,4,5,6,7,8,10,13	TUR-EUR
Pelobates fuscus (Laurenti, 1768)	LC	1	2500	1	C-ASIA-EUR

Taxa	IUCN	TNG	DA	Ecoregion	Chorotype
Pelodytidae (1)					
Pelodytes caucasicus Boulenger, 1896	NT	14	35000	4,14	PO-CAS
Hylidae (2)					
Hyla orientalis Bedriaga, 1890	NE	108	270000	1,2,3,4,5,7,8,10,14	EUR-MED
Hyla savignyi Audouin, 1827	LC	43	107500	5,9,10,11,12,13,14	SW-ASIA
Bufonidae (4)					
Bufo bufo (Linnaeus, 1758)	LC	91	227500	1,2,3,4,5	EUR
Bufo verrucosissimus (Pallas, 1814)	NT	15	37500	5,10,14	KOLK-CAUC
Bufotes sitibundus (Pallas, 1771)	NE	157	392500	2,3,4,5,6,7,8,9,10,11,12,13,14	TUR-EUR-MED
Bufotes viridis (Laurenti, 1768)	LC	15	37500	1,2,4	TUR-EUR-MED
Ranidae (6)					
Pelophylax caralitanus (Arıkan, 1988)	NT	23	57500	5,6,10	SIBER-EUR
Pelophylax ridibundus (Pallas, 1771) group	LC	183	457500	1,2,3,4,5,6,7,8,9,10,13,14	TUR-EUR-MED
Rana dalmatina Fitzinger, 1838	LC	48	120000	1,2,3,4,8	S-EUR
Rana holtzi Werner, 1898	CR	2	5000	5	S-ANAT
Rana macrocnemis Boulenger, 1885	LC	31	77500	2,3,4,5,7,8,9,13,14	SW-ASIA
Rana tavasensis Baran & Atatür, 1986	EN	3	7500	2,5	W-ANAT
REPTILIA (141)					
CHELONIA (11)					
Chelonidae (2)					
Caretta caretta (Linnaeus, 1758)	VU	17	42500		COS
Chelonia mydas (Linnaeus, 1758)	EN	11	27500		COS
Dermochelyidae (1)					
Dermochelys coriacea (Vandelli, 1761)	VU	6	15000		COS
Emydidae (1)					
Emys orbicularis (Linnaeus, 1758)	NT	103	257500	1,2,3,4,5,6,7,8,10,13	TUR-EUR-MED
Geoemydidae (2)					
Mauremys caspica (Gmelin, 1774)	NE	47	117500	5,6,7,8,9,10,13,14	TUR-MED
Mauremys rivulata (Valenciennes, 1833)	LC	82	205000	1,2,3,4,5,10	TUR-MED
Trionychidae (2)					
Trionyx triunguis (Forskål, 1775)	VU	13	32500		AFRO-MED
Rafetus euphraticus (Daudin, 1802)	EN	14	35000	9,10	SW-ASIA
Testudinidae (2)					
Testudo graeca Linnaeus, 1758	VU	231	577500	1,2,3,4,5,6,7,8,9,10,12,13,14	TUR-MED
Testudo hermanni Gmelin, 1789	NT	16	40000	1,2,4	S-EUR
Aliens: Reptilia (1)					
Trachemys scripta (Thunberg in Schoepff, 1792)	LC				HOL
AMPHISBAENIA (3)					

Taxa	IUCN	TNG	DA	Ecoregion	Chorotype
Amphisbaenidae (3)					
Blanus strauchi (Bedriaga, 1884)	LC	25	62500	2,3,5,10	E-MED
Blanus aporus Werner, 1898	NE	7	17500	10	E-MED
Blanus alexandri Sindaco, Kornilios, Sacchi & Lymberakis, 2014	NE	22	55000	9,10,12	E-MED
SAURIA (70)					
Agamidae (4)					
Paralaudakia caucasia (Eichwald, 1831)	LC	15	37500	12,13,14	TUR
Stellagama stellio (Linnaeus, 1758)	LC	107	267500	2,3,4,5,6,7,8,9,10,11,12	E-MED
Phrynocephalus horvathi Méhely, 1894	CR	5	12500	13	SW-ASIA
Trapelus ruderatus (Olivier, 1804)	LC	43	107500	6,7,9,10,11,12	SW-ASIA
Chamaeleonidae (1)					
Chamaeleo chamaeleon (Linnaeus, 1758)	LC	40	100000	2,3,4,5,10	MED
Phyllodactylidae (1)					
Asaccus barani Torki, Ahmadzadeh, Ilgaz, Avcı & Kumlutaş, 2011	NE	3	7500	10	SW-ASIA
Gekkonidae (7)					
Mediodactylus kotschyi (Steindachner, 1870) s.l.	LC	69	172500	2,3,4,5,6,7,8,9,10,11,12,13,14	E-MED
Mediodactylus kotschyi (Steindachner, 1870) s.str.	LC	2	5000	2	E-MED
Mediodactylus heterocercus (Blanford, 1874)	LC	22	55000	9,10,11,12	SW-ASIA
Mediodactylus danilewskii (Strauch, 1887)	NE	22	55000	2,3,4,5,10	E-MED
Mediodactylus orientalis (Stepánek, 1937)	NE	29	72500	2,6,7,9,10	SW-ASIA
Cyrtopodion scabrum (Heyden, 1827)	LC	9	22500	10,11	SW-ASIA
Hemidactylus turcicus (Linnaeus, 1758)	LC	69	172500	1,2,3,4,5,10	MED
Stenodactylus grandiceps Haas, 1952	LC	2	5000	10	SW-ASIA
Eublepharidae (1)					
Eublepharis angramainyu Anderson & Leviton, 1966	DD	2	5000	10,11	SW-ASIA
Lacertidae (43)					
Acanthodactylus boskianus (Daudin, 1802)	NE	4	10000	10,12	SAH-SAL-ARAB
Acanthodactylus harranensis Baran, Kumlutaş, Lanza, Sindaco, Ilgaz, Avcı & Crucitti, 2005	CR	1	2500	11	KURD
Acanthodactylus schreiberi Boulenger, 1878	EN	1	2500	10	E-MED
Acanthodactylus ilgazi Kurnaz & Şahin, 2021	NE	1	2500	9	ANAT
Anatololacerta anatolica (Werner, 1900)	LC	18	45000	2,3	SW-ANAT
Anatololacerta danfordi (Günther, 1876)	LC	9	22500	5,10	S-ANAT
Anatololacerta finikensis (Eiselt & Schmidtler, 1986)	NE	11	27500	2,6,10	S-ANAT
Anatololacerta ibrahimi (Eiselt & Schmidtler, 1986)	NE	13	32500	5,7,10	S-ANAT
Anatololacerta pelasgiana (Mertens, 1959)	NE	11	27500	2,3,5	S-ANAT
Apathya cappadocica (Werner, 1902)	LC	69	172500	6,7,9,10,11,12,13	SW-ASIA
Darevskia adjarica (Darevsky & Eiselt, 1980)	NE	7	17500	8,14	NE-ANAT
Darevskia armeniaca (Méhely, 1909)	LC	4	10000	4,14	ARME

Taxa	IUCN	TNG	DA	Ecoregion	Chorotype
Darevskia bendimahiensis (Schmidtler, Eiselt & Darevsky, 1994)	EN	3	7500	13	ARME
Darevskia clarkorum (Darevsky & Vedmederja, 1977)	EN	13	32500	4,14	KOLK
Darevskia derjugini (Nikolsky, 1898)	NT	7	17500	4,14	KOLK-CAUC
Darevskia bithynica (Méhely, 1909)	NE	24	60000	3,4,8	N-ANAT
Darevskia rudis (Bedriaga, 1886)	LC	21	52500	4,14	PO-CAS
Darevskia parvula (Lantz & Cyrén, 1913)	LC	10	25000	4,14	KOLK-ARME
Darevskia praticola (Eversmann, 1834)	NT	4	10000	2,4	E-MED
Darevskia raddei (Boettger, 1892)	LC	14	35000	13,14	ARME
Darevskia sapphirina (Schmidtler, Eiselt & Darevsky, 1994)	LC	1	2500	13	ARME
Darevskia unisexualis (Darevsky, 1966)	NT	13	32500	8,13,14	ARME
Darevskia uzzelli (Darevsky & Danielyan, 1977)	EN	5	12500	13,14	ARME
Darevskia valentini (Boettger, 1892)	LC	48	120000	5,7,8,10,12,13,14	ARME-E-ANAT
Eremias pleskei Nikolsky, 1905	CR	3	7500	13	SW-ASIA
Eremias strauchi Kessler, 1878	LC	9	22500	13	SW-ASIA
Eremias suphani Başoğlu & Hellmich, 1968	LC	6	15000	13	SW-ASIA
Iranolacerta brandtii (De Filippi, 1863)	DD	3	7500	13	W-IRAN
Lacerta agilis Linnaeus, 1758	LC	10	25000	13,14	C-ASIA-EUR
Lacerta media Lantz & Cyrén, 1920	LC	69	172500	4,5,7,8,9,10,11,12,13,14	SW-ASIA
Lacerta pamphylica Schmidtler, 1975	LC	14	35000	5,10	SW-ANAT
Lacerta strigata Eichwald, 1831	LC	5	12500	13,14	SW-ASIA
Lacerta diplochondrodes Wettstein, 1952	NE	87	217500	1,2,3,4,5,6,8,10	E-MED
Lacerta viridis (Laurenti, 1768)	LC	60	150000	1,2,3,4,8	S-EUR
Mesalina microlepis (Angel, 1936)	NE	3	7500	10,11	SW-ASIA
Ophisops elegans Ménétries, 1832	LC	131	327500	1,2,3,4,5,6,7,8,9,10,11,12,13	E-MED
Parvilacerta parva (Boulenger, 1887)	LC	74	185000	1,3,4,5,6,7,8,9,1,13,14	ARME-E-ANAT
Phoenicolacerta cyanisparsa (Schmidtler & Bischoff, 1999)	LC	1	2500	10	E-MED
Phoenicolacerta laevis (Gray, 1838)	LC	24	60000	2,5,10	E-MED
Podarcis muralis (Laurenti, 1768)	LC	37	92500	1,2,3,4	SIBER-EUR
Podarcis siculus (Rafinesque-Schmaltz, 1810)	LC	14	35000	1,2,3,4	MED
Podarcis tauricus (Pallas, 1814)	LC	14	35000	1,2,4	E-MED
Timon kurdistanicus (Suchow, 1936)	LC	11	27500	9,10,12	N-MESOP
Scincidae (10)					
Ablepharus bivittatus (Ménétries, 1832)	LC	3	7500	13	SW-ASIA
Ablepharus budaki Göçmen, Kumlutaş & Tosunoğlu, 1996	LC	15	37500	2,5,10	E-MED
Ablepharus chernovi Darevsky, 1953	LC	47	117500	5,6,7,8,9,10,12,13,14	SW-ASIA
Ablepharus kitaibelii (Bibron & Bory St-Vincent, 1833)	LC	58	145000	1,2,3,4,5,6,7,8,10	E-MED
Chalcides ocellatus (Forskål, 1775)	LC	28	70000	2,5,10,12	I-MED
Eumeces schneiderii (Daudin, 1802)	LC	53	132500	2,5,6,7,8,9,10,11,12,13	SW-ASIA

Taxa	IUCN	TNG	DA	Ecoregion	Chorotype
Ophiomorus kardesi Kornilios, Kumlutaş, Lymberakis & Ilgaz, 2018	NE	6	15000	2,5	S-ANAT
Heremites auratus (Linnaeus, 1758)	LC	68	170000	2,3,5,6,7,9,10,11,12,13	SW-ASIA
Heremites vittatus (Olivier, 1804)	LC	58	145000	3,5,7,8,9,10,11,12,	MED
Heremites septemtaeniatus (Reuss, 1834)	LC	1	2500	11	SAH-TUR-SIN
Varanidae (1)					
Varanus griseus (Daudin, 1803)	NE	3	7500	10	SAH-TUR-SIN
Anguidae (2)					
Anguis colchica (Nordmann, 1840)	NE	45	112500	1,2,3,4,8,14	EUR
Pseudopus apodus (Pallas, 1775)	LC	75	187500	1,2,3,4,5,8,13	TUR-MED
SERPENTES (57)					
Leptotyphlopidae (1)					
Myriopholis macrorhyncha (Jan, 1860)	NE	24	60000	10,11	SAH-SAL-ARAB
Typhlopidae (2)					
Xerotyphlops vermicularis (Merrem, 1820)	LC	93	232500	1,2,3,4,5,6,7,8,9,10,11,13,14	TUR-MED
Letheobia episcopa (Franzen & Wallach, 2002)	DD	3	7500	10	KURD
Boidae (1)					
Eryx jaculus (Linnaeus, 1758)	LC	71	177500	1,2,3,4,5,6,7,9,10,13	MED
Natricidae (2)					
Natrix natrix (Linnaeus, 1758)	LC	157	392500	1,2,3,4,5,6,7,8,9,10,13,14	C-ASIA-EUR-MED
Natrix tessellata (Laurenti, 1768)	LC	130	325000	1,2,3,4,5,6,7,8,9,10,11,12,13,14	C-ASIA-EUR
Colubridae (36)					
Coronella austriaca Laurenti, 1768	LC	53	132500	1,2,3,4,8,14	EUR
Dolichophis caspius (Gmelin, 1789)	LC	84	210000	1,2,3,4,5,6,7,8,14	TUR-MED
Dolichophis jugularis (Linnaeus, 1758)	LC	63	157500	2,3,5,8,9,10,11,13	SW-ASIA
Dolichophis schmidti (Nikolsky, 1909)	LC	39	97500	3,6,7,8,9,10,11,13,14	SW-ASIA
Eirenis aurolineatus (Venzmer, 1919)	LC	7	17500	5,10	S-ANAT
Eirenis barani Schmidtler, 1988	LC	10	25000	5,10	S-ANAT
Eirenis collaris (Ménétries, 1832)	LC	3	7500	13	SW-ASIA
Eirenis coronella (Schlegel, 1837)	LC	8	20000	10,11	SW-ASIA
Eirenis decemlineatus (Duméril, Bibron & Duméril, 1854)	LC	17	42500	5,9,10,12	E-MED
Eirenis eiselti Schmidtler & Schmidtler 1978	LC	34	85000	9,10,11,12,13	KURD
Eirenis thospitis Schmidtler & Lanza, 1990	DD	2	5000	13	ARME
Eirenis hakkariensis Schmidtler & Eiselt, 1991	DD	3	7500	12,13	KURD
Eirenis levantinus Schmidtler, 1993	LC	11	27500	5,10	E-MED
Eirenis lineomaculatus Schmidt, 1939	LC	9	22500	5,9,10	E-MED
Eirenis modestus (Martin, 1838)	LC	58	145000	2,3,4,5,6,7,8,9,10,13,14	SW-ASIA
Eirenis punctatolineatus (Boettger, 1892)	LC	18	45000	9,10,12,13,14	ARME
Eirenis occidentalis Rajabizadeh, Nagy, Adriaens, Avcı, Masroor, Schmidtler, Nazarov, Esmaeili & Christiaens, 2015	NE	11	27500	10,12	KURD

Taxa	IUCN	TNG	DA	Ecoregion	Chorotype
Eirenis rothii Jan, 1863	LC	8	20000	5,10	E-MED
Elaphe dione (Pallas, 1773)	LC	1	2500	13	C-ASIA-MED
Elaphe sauromates (Pallas, 1811)	LC	50	125000	1,2,3,4,5,6,7,8,9,10,13	TUR-MED
Elaphe urartica Jablonski, Kukushkin, Avcı, Bunyatova, Ilgaz, Tuniyev & Jandzik, 2019	NE	6	15000	13	TUR-EUR
Hemorrhois nummifer (Reuss, 1834)	LC	43	107500	2,3,5,7,9,10,13	TUR-MED
Hemorrhois ravergieri (Ménétries, 1832)	LC	30	75000	5,8,9,10,12,13,14	C-ASIA-EUR
Platyceps collaris (Müller, 1878)	LC	29	72500	2,3,4,5,7,9,10,	E-MED
Platyceps najadum (Eichwald, 1831)	LC	84	210000	1,2,3,4,5,6,7,9,10,13,14	TUR-MED
Platyceps rhodorachis (Jan, 1863)	NE	1	2500	12	AFRO-I-MED
Platyceps ventromaculatus (Gray, 1834)	NE	6	15000	10,11	AFRO-I-MED
Muhtarophis barani Olgun, Avcı, Ilgaz, Üzüm & Yılmaz 2007	DD	3	7500	5,10	S-ANAT
Rhynchocalamus melanocephalus (Jan, 1862)	LC	3	7500	5,10	SW-ASIA
Rhynchocalamus satunini (Nikolsky, 1899)	NE	7	17500	5,10,12	SW-ASIA
Spalerosophis diadema (Schlegel, 1837)	NE	5	12500	10,11	AFRO-I-MED
Telescopus fallax Fleischmann, 1831	LC	61	152500	2,3,4,5,6,9,10,11,13,14	TUR-MED
Telescopus nigriceps (Ahl, 1924)	LC	5	12500	10,11	SW-ASIA
Zamenis hohenackeri (Strauch, 1873)	LC	49	122500	2,5,8,10,12,13,14	SW-ASIA
Zamenis longissimus (Laurenti, 1768)	LC	27	67500	4,8,13,14	S-EUR
Zamenis situla (Linnaeus, 1758)	LC	19	47500	2,3,4,5,10	E-MED
Lamprophiidae (1)					
Malpolon insignitus (Geoffroy Saint-Hilaire, 1827)s	LC	56	140000	1,2,3,4,5,6,9,10,11,13,14	MED
Viperidae (13)					
Daboia palaestinae (Werner, 1938)	LC	1	2500	10	E-MED
Macrovipera lebetinus (Linnaeus, 1758)	NE	42	105000	5,8,9,10,11,13,14	TUR-MED
Montivipera raddei (Boettger, 1890)	NT	7	17500	12,13,14	SW-ASIA
Montivipera wagneri (Nilson & Andrén, 1984)	CR	13	32500	13,14	ARME
Montivipera bulgardaghica (Nilson & Andrén, 1985)	LC	18	45000	5, 7,9,10	ANAT
Montivipera xanthina (Gray, 1849)	LC	72	180000	2,3,4,5,6,7,8,10	E-MED
Vipera ammodytes (Linnaeus, 1758)	LC	29	72500	2,3,4,8,14	E-MED
Vipera anatolica Eiselt & Baran, 1970	CR	2	5000	5	S-ANAT
Vipera berus (Linnaeus, 1758)	LC	21	52500	4,8,14	EUR
Vipera darevskii Vedmederja, Orlov & Tuniyev, 1986	CR	4	10000	9,14	ARME-CAUC
Vipera renardi (Chirstoph, 1861)	VU	10	25000	8,13,14	SIBER-EUR
Vipera sakoi Tuniyev, Avcı, Tuniyev, Ilgaz, Olgun, Petrova, Bodrov, Geniez & Teynié, 2018	NE	1	2500	9	ANAT
Vipera kaznakovi Nikolsky, 1909	EN	4	10000	4,14	CAUC
Elapidae (1)					
Walterinnesia morgani (Mocquard, 1905)	NE	4	10000	10	SW-ASIA

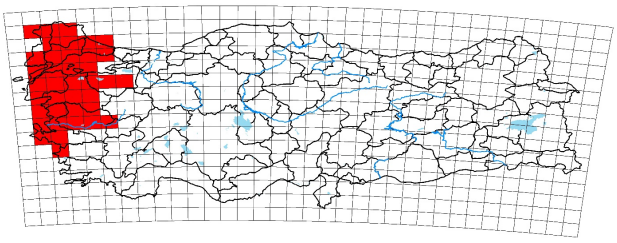

Figure 3.1. *Lissotriton schmidtleri* (Raxworthy, 1988)

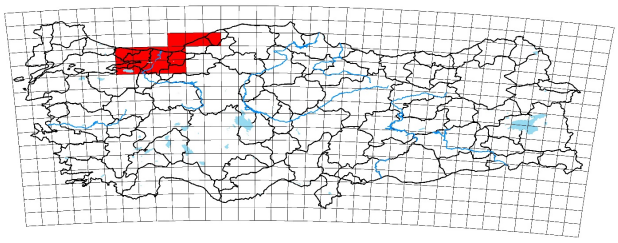

Figure 3.2. *Lissotriton kosswigi* (Freytag, 1955)

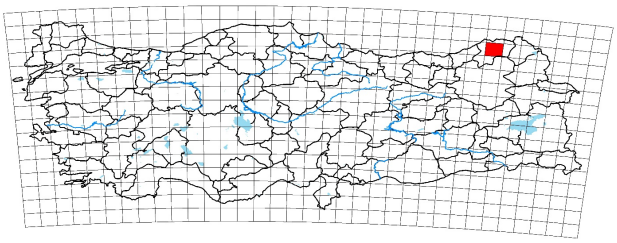

Figure 3.3. *Lissotriton lantzi* (Wolterstorff, 1914)

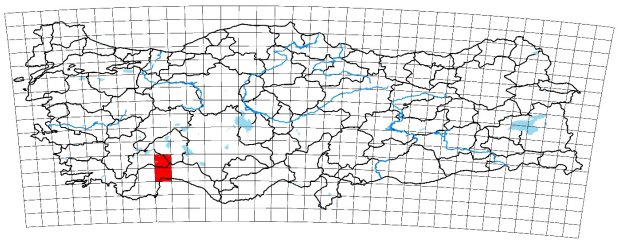

Figure 3.4. *Lyciasalamandra antalyana* (Başoğlu & Baran, 1976)

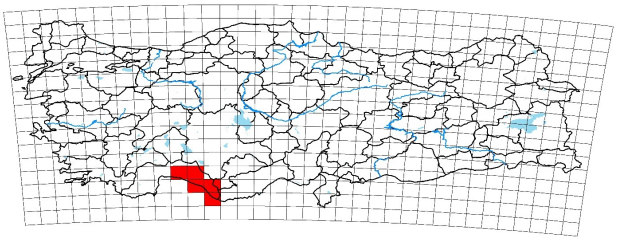

Figure 3.5. *Lyciasalamandra atifi* (Başoğlu, 1967)

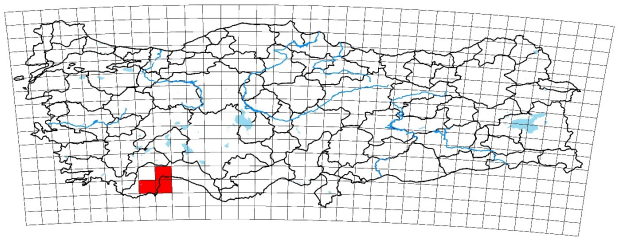

Figure 3.6. *Lyciasalamandra billae* (Franzen & Klewen, 1987)

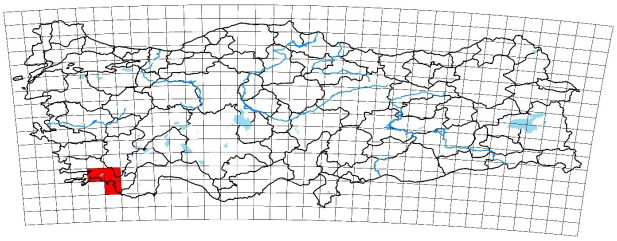

Figure 3.7. *Lyciasalamandra fazilae* (Başoğlu & Atatür, 1974)

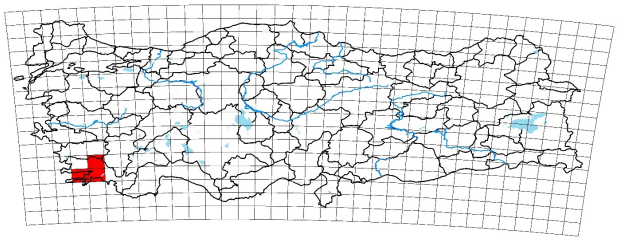

Figure 3.8. *Lyciasalamandra flavimembris* (Mutz & Steinfartz, 1995)

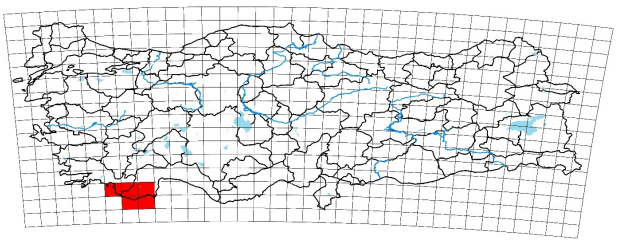

Figure 3.9. *Lyciasalamandra luschani* (Steindachner, 1891)

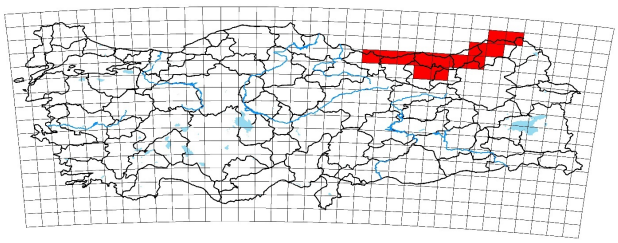

Figure 3.10. *Mertensiella caucasica* (Waga, 1876)

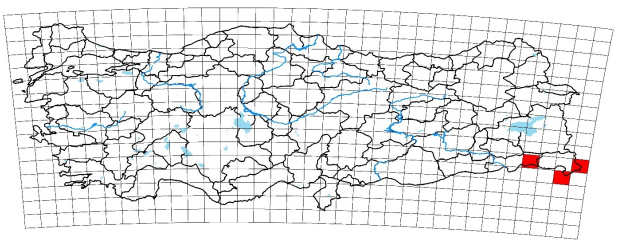

Figure 3.11. *Neurergus crocatus* Cope, 1862

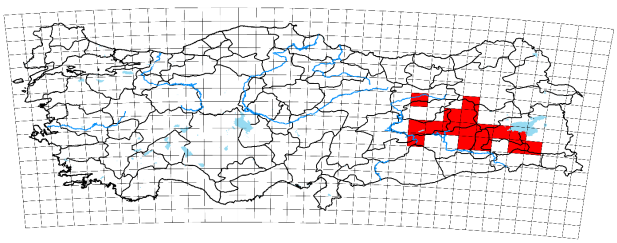

Figure 3.12. *Neurergus strauchii* (Steindachner, 1887)

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 1 of 15).

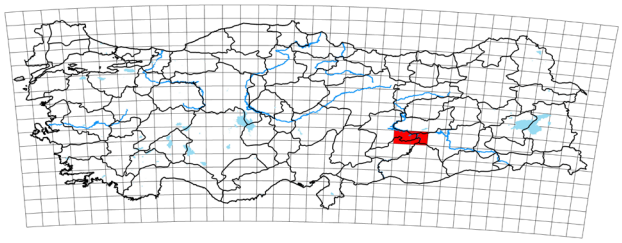

Figure 3.13. *Neurergus barani* (Öz, 1994)

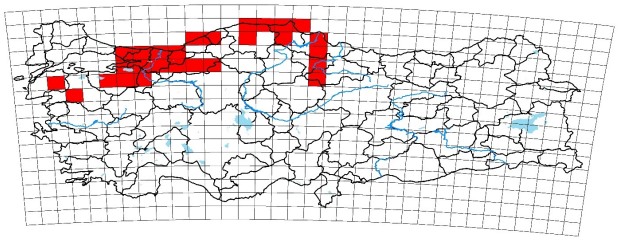

Figure 3.14. *Ommatotriton nesterovi* (Litvinchuk, Zuiderwijk, Borkin & Rosanov, 2005)

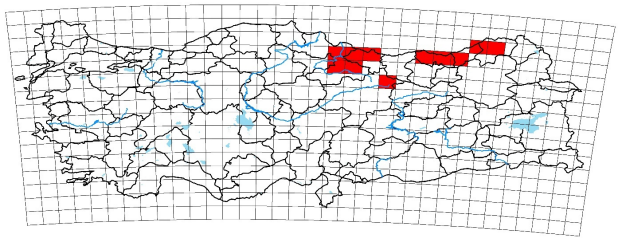

Figure 3.15. *Ommatotriton ophryticus* (Berthold, 1846)

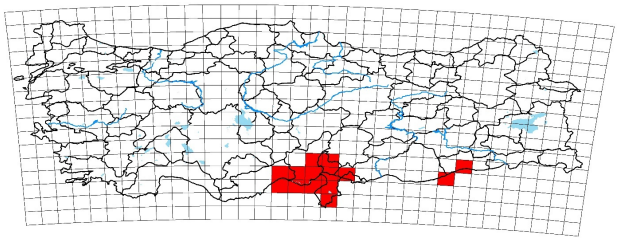

Figure 3.16. *Ommatotriton vittatus* (Gray, 1835)

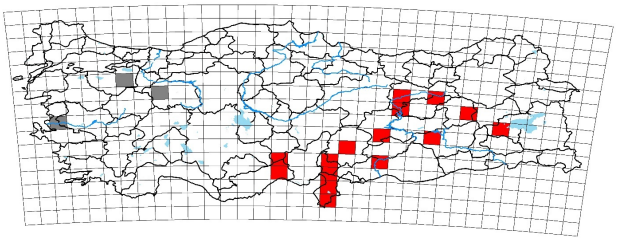

Figure 3.17. *Salamandra salamandra* Linnaeus, 1758 (gray) and *S. infraimmaculata* Martens, 1885 (red)

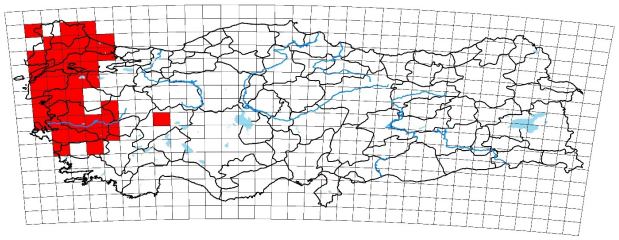

Figure 3.18. *Triturus ivanbureschi* Arntzen & Wielstra, 2013

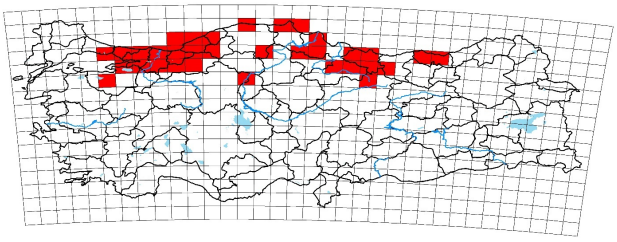

Figure 3.19. *Triturus anatolicus* Wielstra & Arntzen, 2016

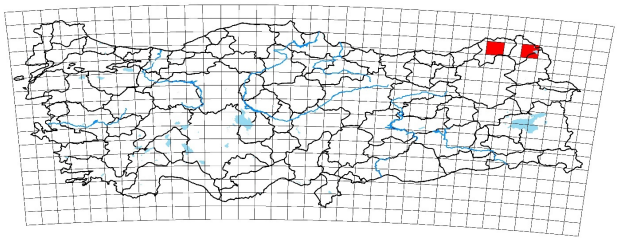

Figure 3.20. *Triturus karelinii* (Strauch, 1870)

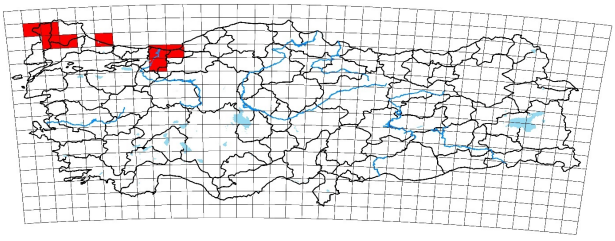

Figure 3.21. *Bombina bombina* (Linnaeus, 1761)

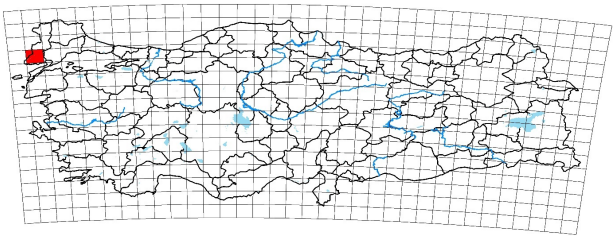

Figure 3.22. *Bombina variegata* (Linnaeus, 1758)

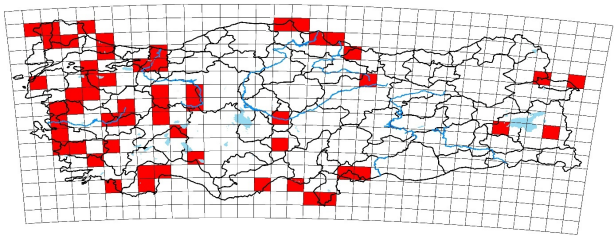

Figure 3.23. *Pelobates syriacus* Boettger, 1889

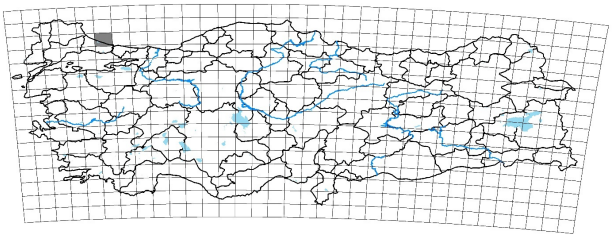

Figure 3.24. *Pelobates fuscus* (Laurenti, 1768)

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 2 of 15).

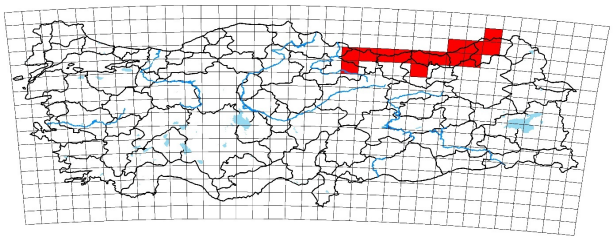

Figure 3.25. *Pelodytes caucasicus* Boulenger, 1896

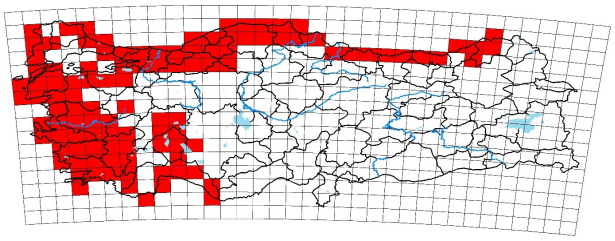

Figure 3.26. *Hyla orientalis* Bedriaga, 1890

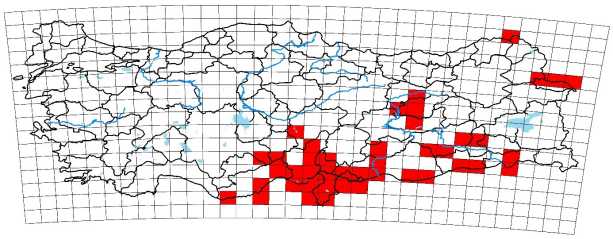

Figure 3.27. *Hyla savignyi* Audouin, 1827

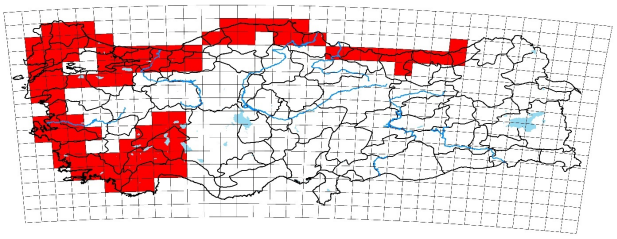

Figure 3.28. *Bufo bufo* (Linnaeus, 1758)

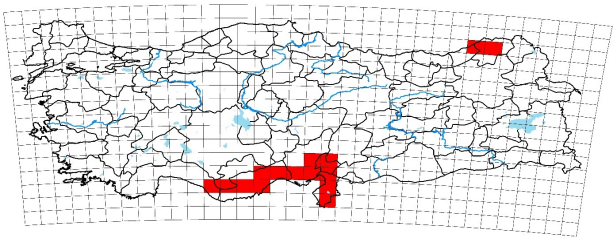

Figure 3.29. *Bufo verrucosissimus* (Pallas, 1814)

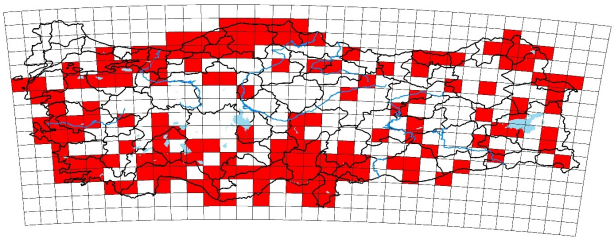

Figure 3.30. *Bufotes sitibundus* (Pallas, 1771)

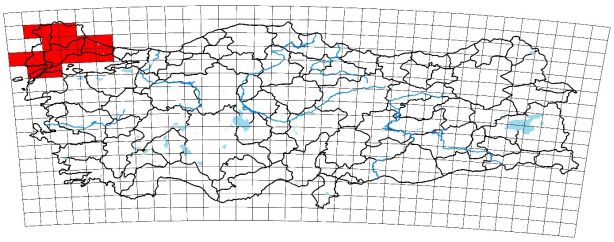

Figure 3.31. *Bufotes viridis* (Laurenti, 1768)

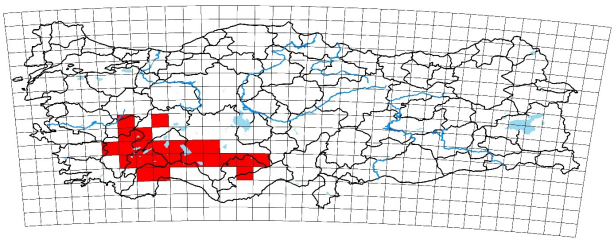

Figure 3.32. *Pelophylax caralitanus* (Arıkan, 1988)

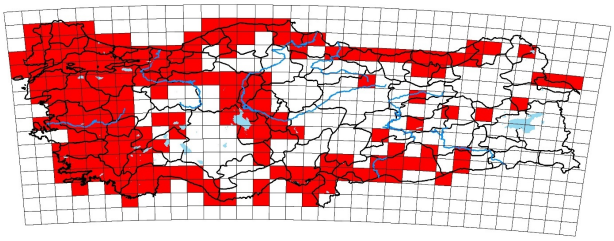

Figure 3.33. *Pelophylax ridibundus* (Pallas, 1771) group

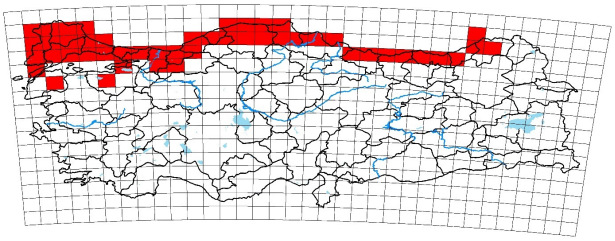

Figure 3.34. *Rana dalmatina* Fitzinger, 1838

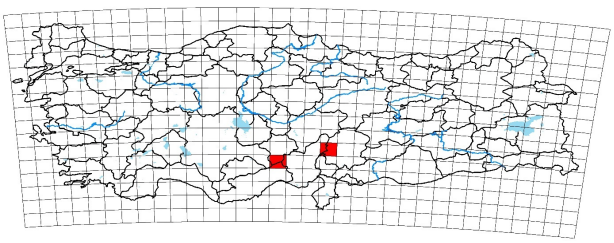

Figure 3.35. *Rana holtzi* Werner, 1898

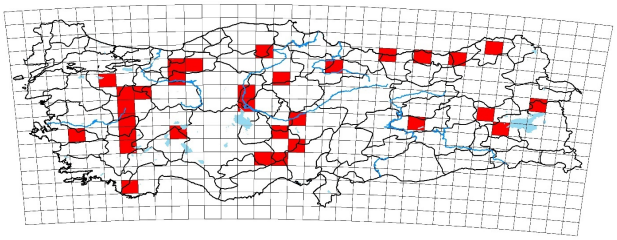

Figure 3.36. *Rana macrocnemis* Boulenger, 1885

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 3 of 15).

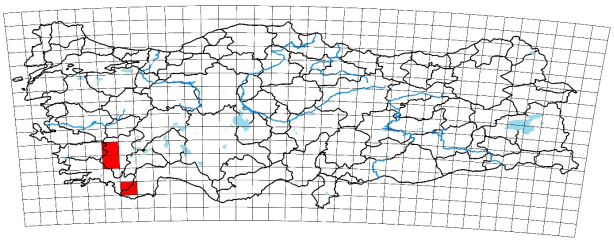

Figure 3.37. *Rana tavasensis* Baran & Atatür, 1986

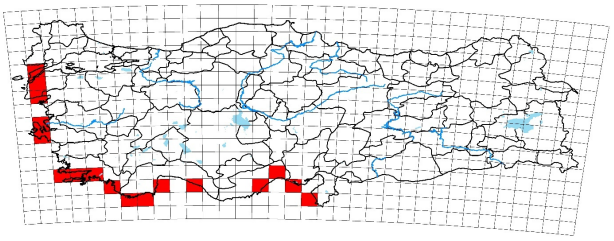

Figure 3.38. *Caretta caretta* (Linnaeus, 1758)

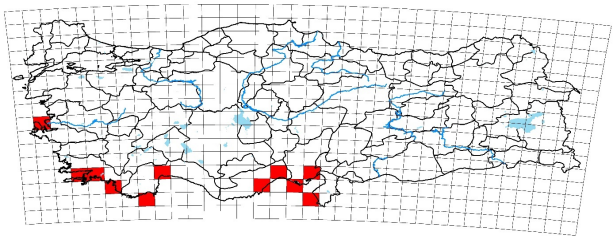

Figure 3.39. *Chelonia mydas* (Linnaeus, 1758)

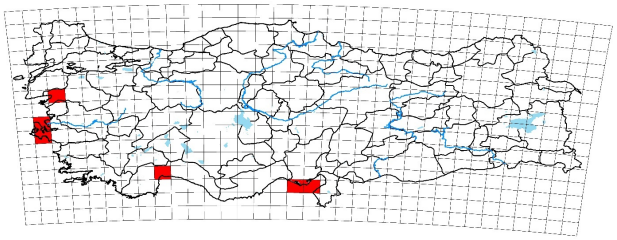

Figure 3.40. *Dermochelys coriacea* (Vandelli, 1761)

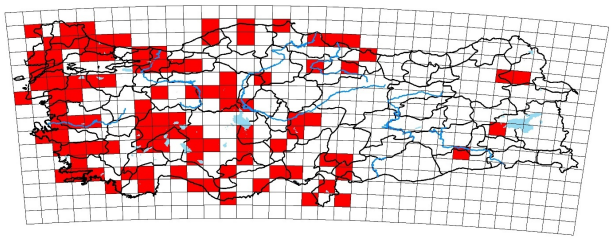

Figure 3.41. *Emys orbicularis* (Linnaeus, 1758)

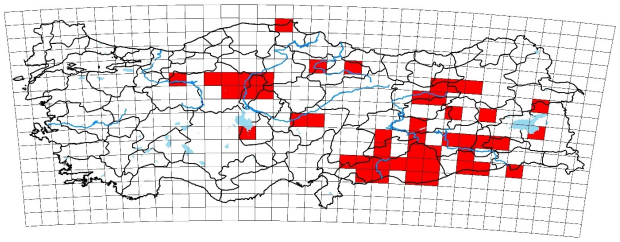

Figure 3.42. *Mauremys caspica* (Gmelin, 1774)

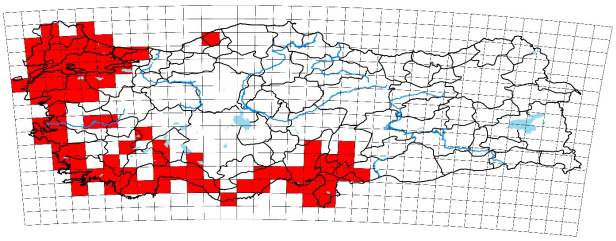

Figure 3.43. *Mauremys rivulata* (Valenciennes, 1833)

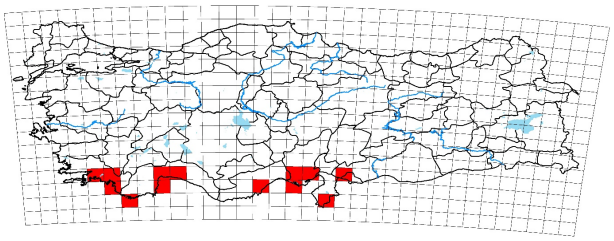

Figure 3.44. *Trionyx triunguis* (Forskål, 1775)

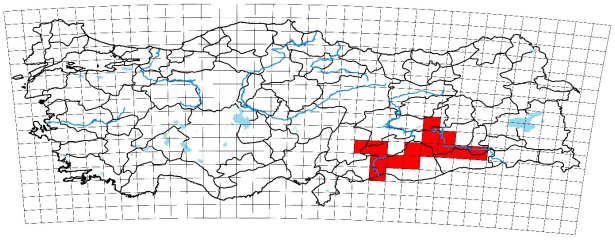

Figure 3.45. *Rafetus euphraticus* (Daudin, 1802)

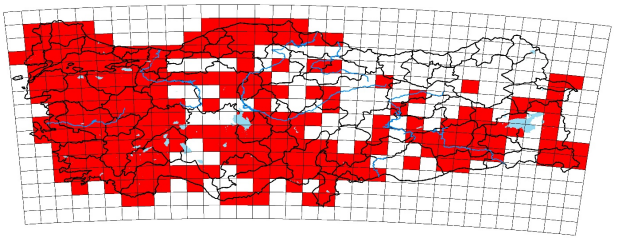

Figure 3.46. *Testudo graeca* Linnaeus, 1758

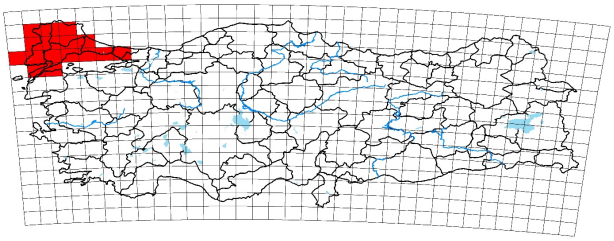

Figure 3.47. *Testudo hermanni* Gmelin, 1789

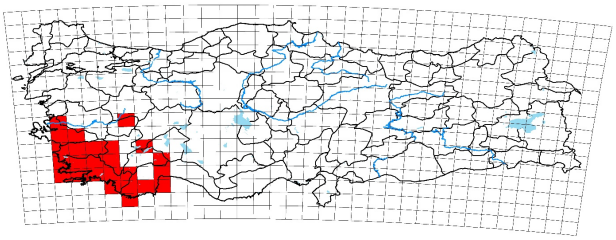

Figure 3.48. *Blanus strauchi* (Bedriaga, 1884)

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 4 of 15).

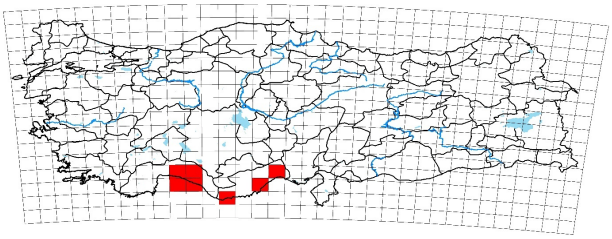

Figure 3.49. *Blanus aporus* Werner, 1898

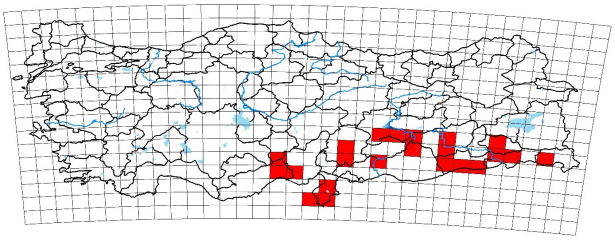

Figure 3.50. *Blanus alexandri* Sindaco, Kornilios, Sacchi & Lymberakis, 2014

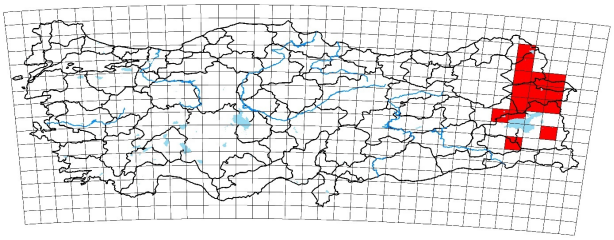

Figure 3.51. *Paralaudakia caucasia* (Eichwald, 1831)

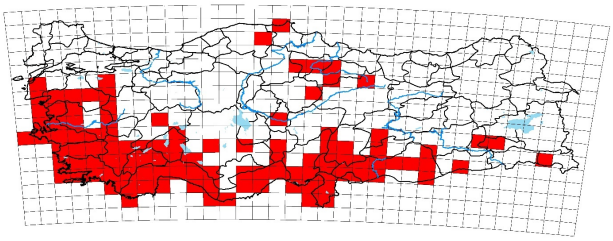

Figure 3.52. *Stellagama stellio* (Linnaeus, 1758)

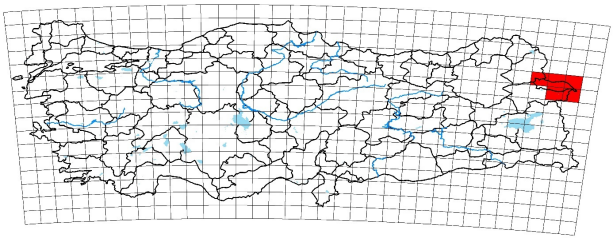

Figure 3.53. *Phrynocephalus horvathi* Méhely, 1894

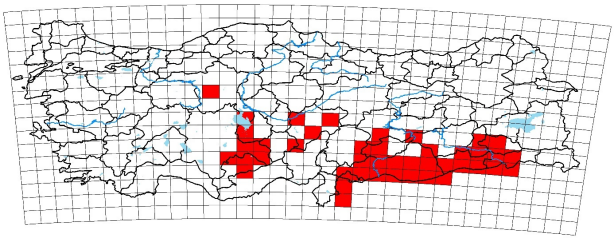

Figure 3.54. *Trapelus ruderatus* (Olivier, 1804)

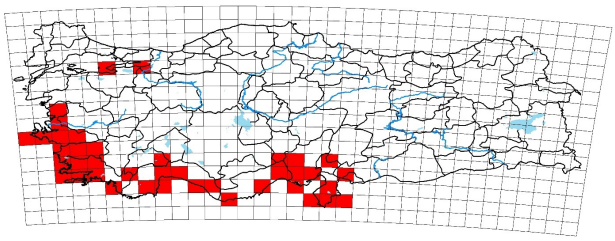

Figure 3.55. *Chamaeleo chamaeleon* (Linnaeus, 1758)

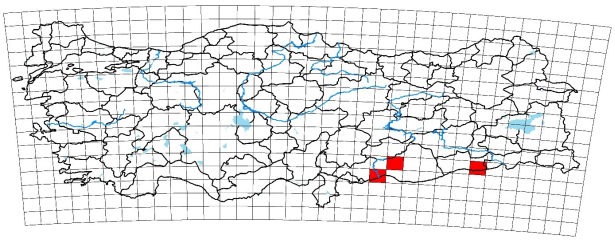

Figure 3.56. *Asaccus barani* Torki, Ahmadzadeh, Ilgaz, Avcı & Kumlutaş, 2011

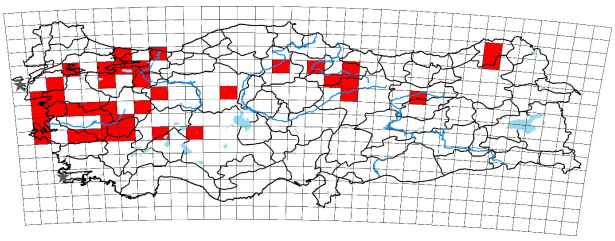

Figure 3.57. *Mediodactylus kotschyi* (Steindachner, 1870) s.str. (stars) and *M. kotschyi* (Steindachner, 1870) s.l. (red square)

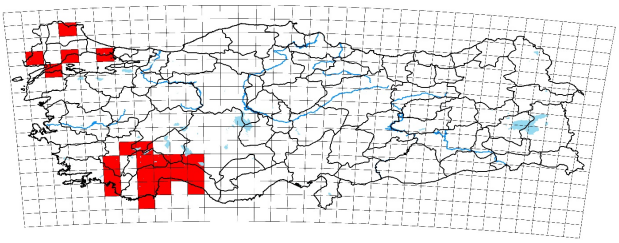

Figure 3.58. *Mediodactylus danilewskii* (Strauch, 1887)

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 5 of 15).

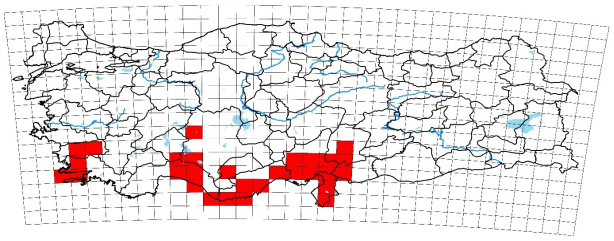

Figure 3.59. *Mediodactylus orientalis* (Stepánek, 1937)

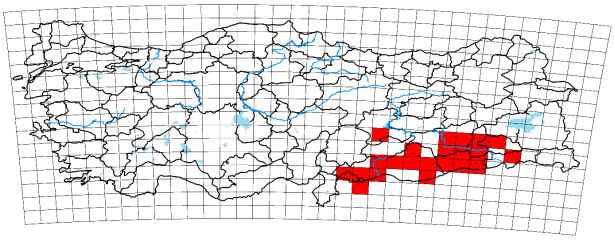

Figure 3.60. *Mediodactylus heterocercus* (Blanford, 1874)

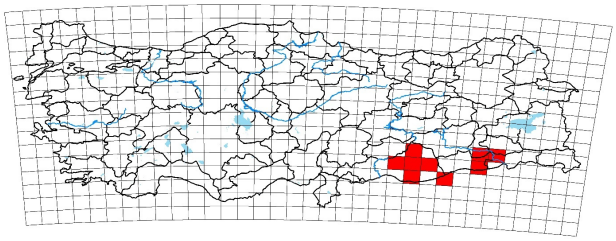

Figure 3.61. *Cyrtopodion scabrum* (Heyden, 1827)

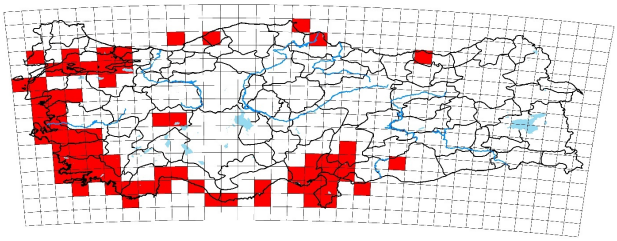

Figure 3.62. *Hemidactylus turcicus* (Linnaeus, 1758)

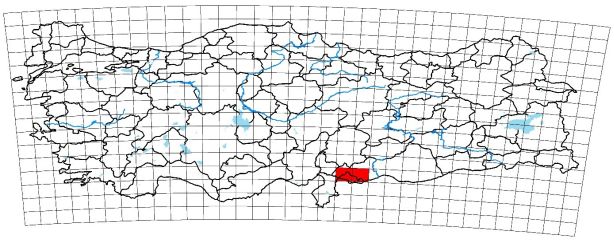

Figure 3.63. *Stenodactylus grandiceps* Haas, 1952

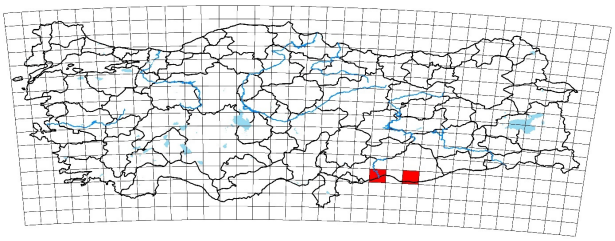

Figure 3.64. *Eublepharis angramainyu* Anderson & Leviton, 1966

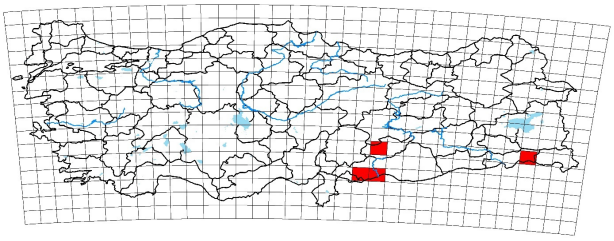

Figure 3.65. *Acanthodactylus boskianus* (Daudin, 1802)

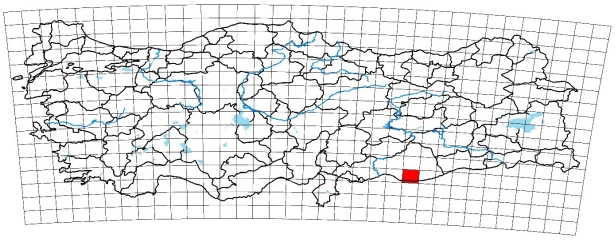

Figure 3.66. *Acanthodactylus harranensis* Baran, Kumlutaş, Lanza, Sindaco, Ilgaz, Avcı & Crucitti, 2005

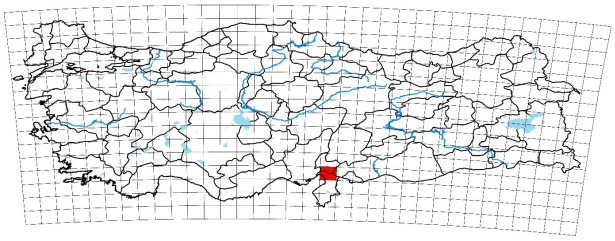

Figure 3.67. *Acanthodactylus schreiberi* Boulenger, 1878

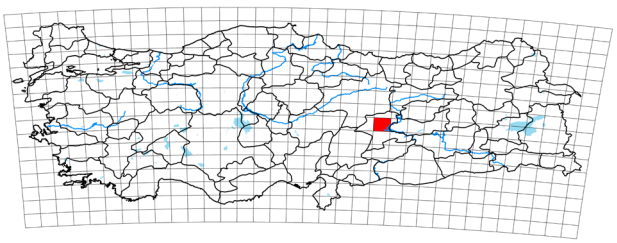

Figure 3.68. *Acanthodactylus ilgazi* Kurnaz & Şahin, 2021

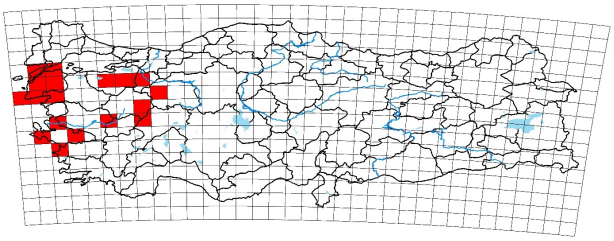

Figure 3.69. *Anatololacerta anatolica* (Werner, 1900)

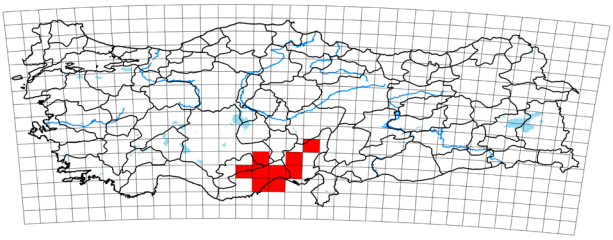

Figure 3.70. *Anatololacerta danfordi* (Günther, 1876)

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 6 of 15).

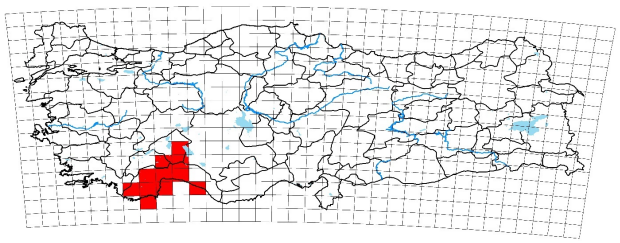

Figure 3.71. *Anatololacerta finikensis* (Eiselt & Schmidtler, 1986)

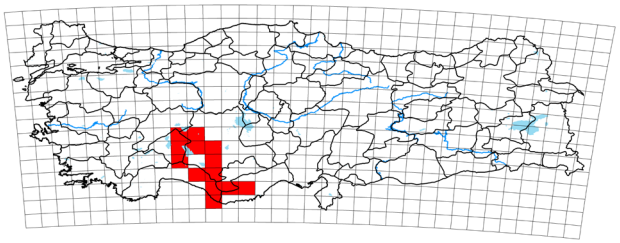

Figure 3.72. *Anatololacerta ibrahimi* (Eiselt & Schmidtler, 1986)

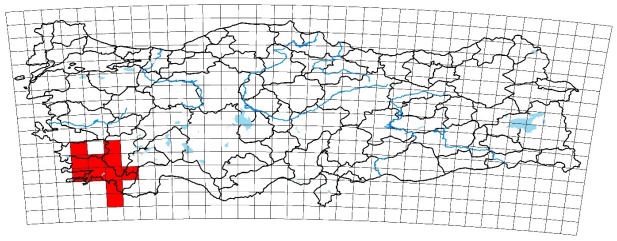

Figure 3.73. *Anatololacerta pelasgiana* (Mertens, 1959)

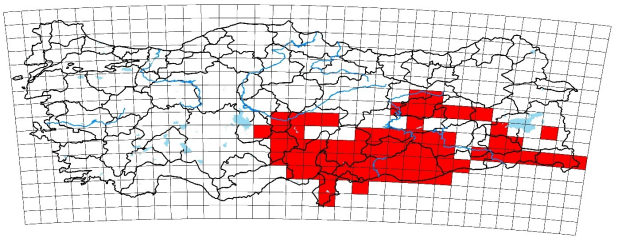

Figure 3.74. *Apathya cappadocica* (Werner, 1902)

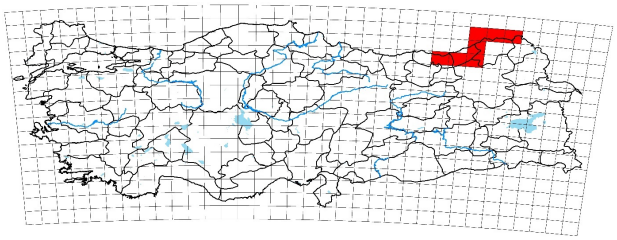

Figure 3.75. *Darevskia adjarica* (Darevsky & Eiselt, 1980)

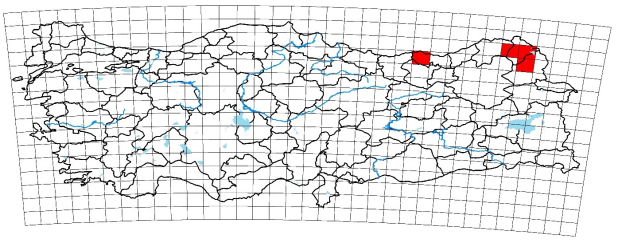

Figure 3.76. *Darevskia armeniaca* (Méhely, 1909)

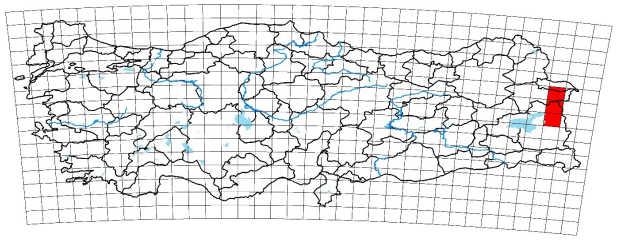

Figure 3.77. *Darevskia bendimahiensis* (Schmidtler, Eiselt & Darevsky, 1994)

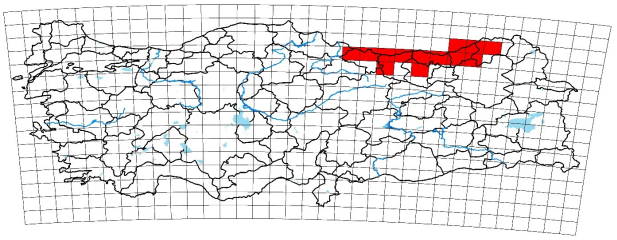

Figure 3.78. *Darevskia clarkorum* (Darevsky & Vedmederja, 1977)

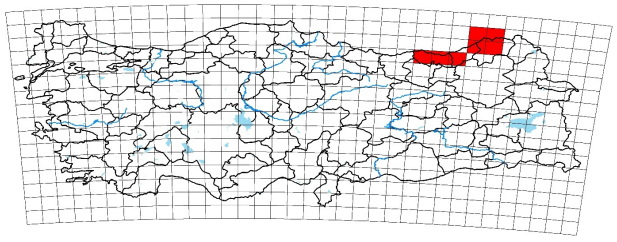

Figure 3.79. *Darevskia derjugini* (Nikolsky, 1898)

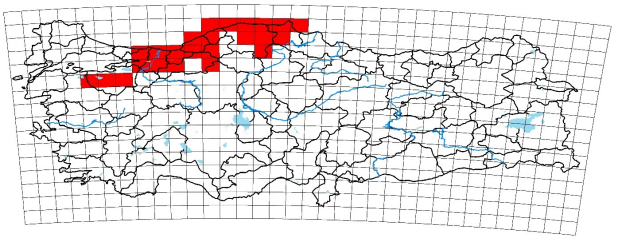

Figure 3.80. *Darevskia bithynica* (Méhely, 1909)

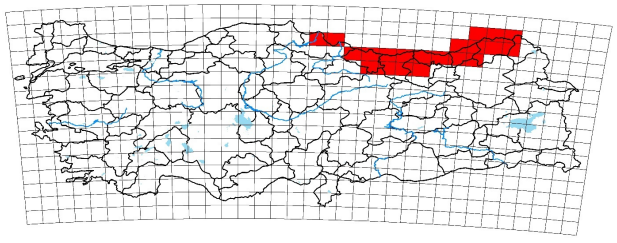

Figure 3.81. *Darevskia rudis* (Bedriaga, 1886)

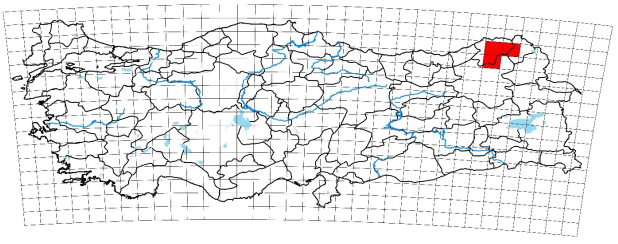

Figure 3.82. *Darevskia parvula* (Lantz & Cyrén, 1913)

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 7 of 15).

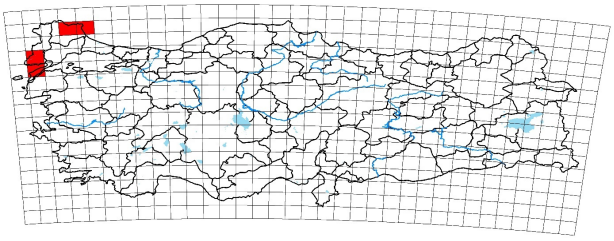

Figure 3.83. *Darevskia praticola* (Eversmann, 1834)

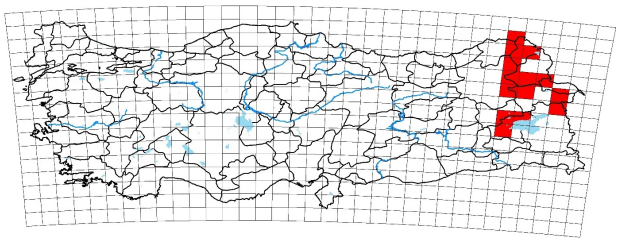

Figure 3.84. *Darevskia raddei* (Boettger, 1892)

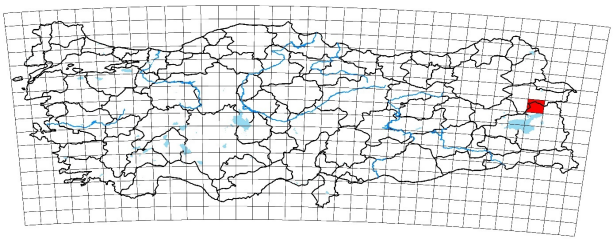

Figure 3.85. *Darevskia sapphirina* (Schmidtler, Eiselt & Darevsky, 1994)

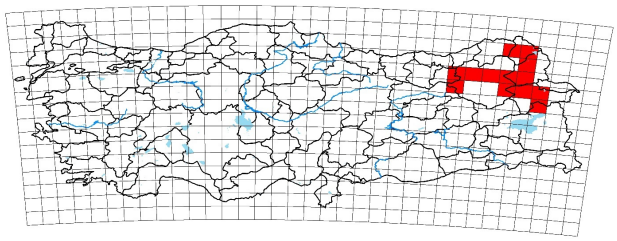

Figure 3.86. *Darevskia unisexualis* (Darevsky, 1966)

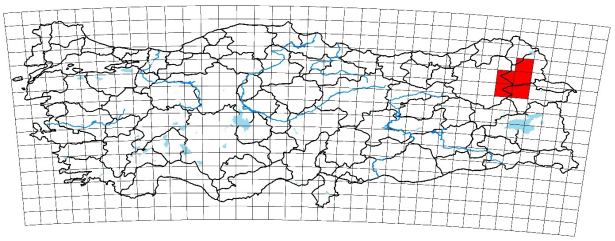

Figure 3.87. *Darevskia uzzelli* (Darevsky & Danielyan, 1977)

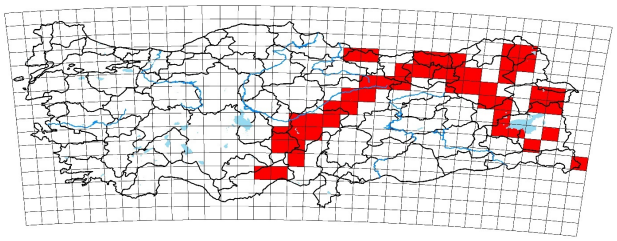

Figure 3.88. *Darevskia valentini* (Boettger, 1892)

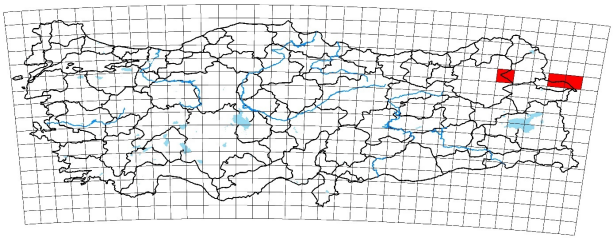

Figure 3.89. *Eremias pleskei* Nikolsky, 1905

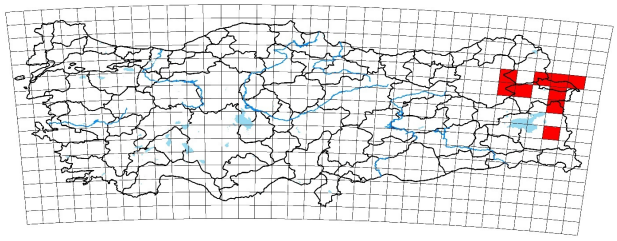

Figure 3.90. *Eremias strauchi* Kessler, 1878

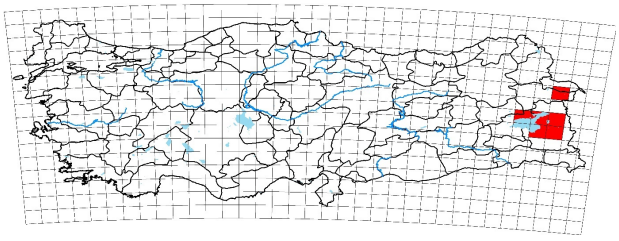

Figure 3.91. *Eremias suphani* Başoğlu & Hellmich, 1968

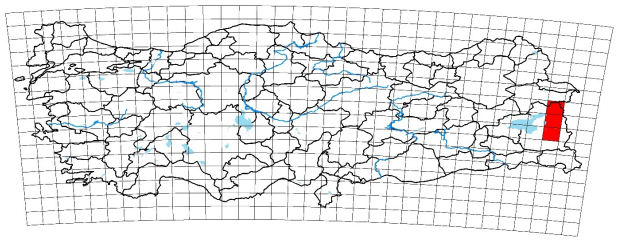

Figure 3.92. *Iranolacerta brandtii* (De Filippi, 1863)

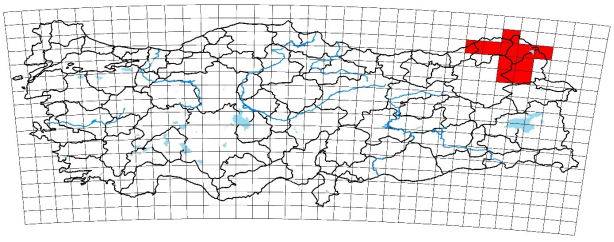

Figure 3.93. *Lacerta agilis* Linnaeus, 1758

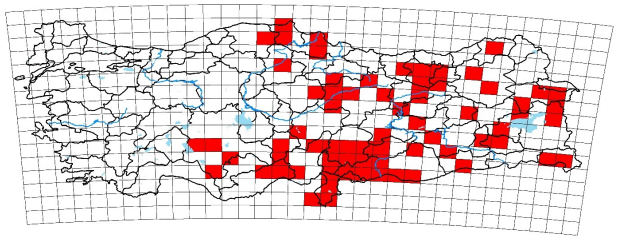

Figure 3.94. *Lacerta media* Lantz & Cyrén, 1920

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 8 of 15).

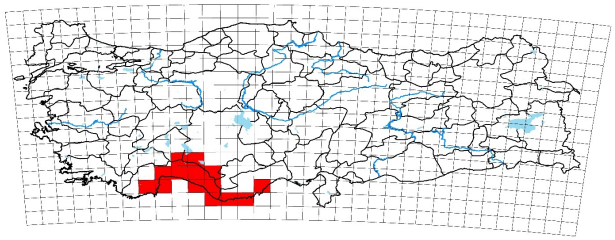

Figure 3.95. *Lacerta pamphylica* Schmidtler, 1975

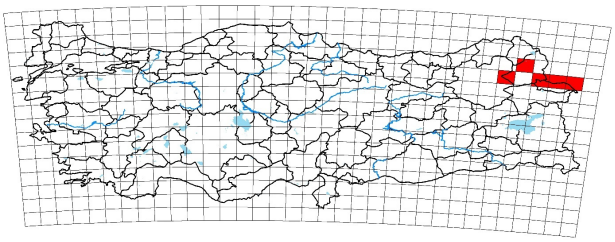

Figure 3.96. *Lacerta strigata* Eichwald, 1831

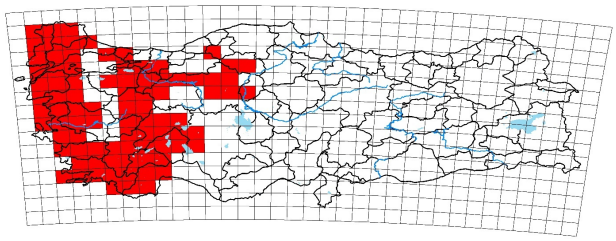

Figure 3.97. *Lacerta diplochondrodes* Wettstein, 1952

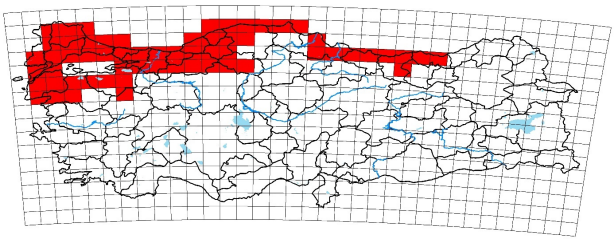

Figure 3.98. *Lacerta viridis* (Laurenti, 1768)

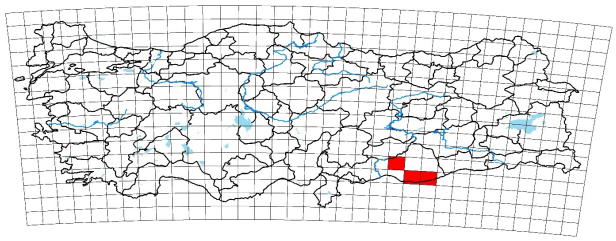

Figure 3.99. *Mesalina microlepis* (Angel, 1936)

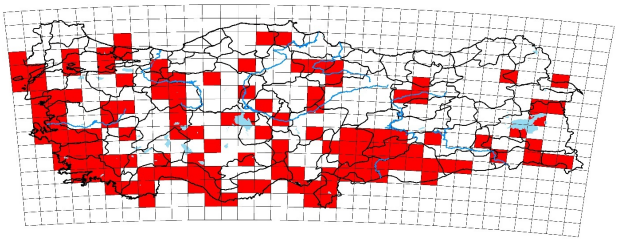

Figure 3.100. *Ophisops elegans* Ménétries, 1832

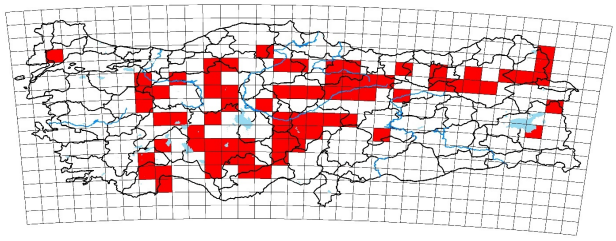

Figure 3.101. *Parvilacerta parva* (Boulenger, 1887)

Figure 3.102. *Phoenicolacerta cyanisparsa* (Schmidtler & Bischoff, 1999)

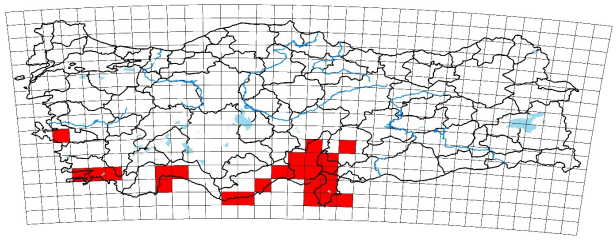

Figure 3.103. *Phoenicolacerta laevis* (Gray, 1838)

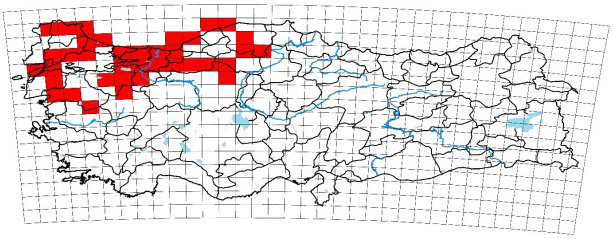

Figure 3.104. *Podarcis muralis* (Laurenti, 1768)

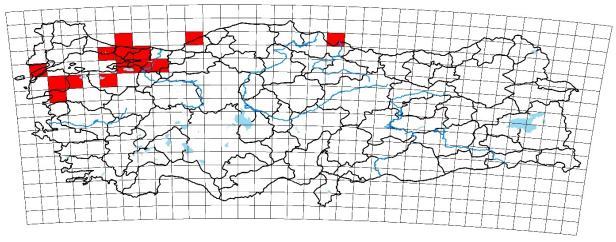

Figure 3.105. *Podarcis siculus* (Rafinesque-Schmaltz, 1810)

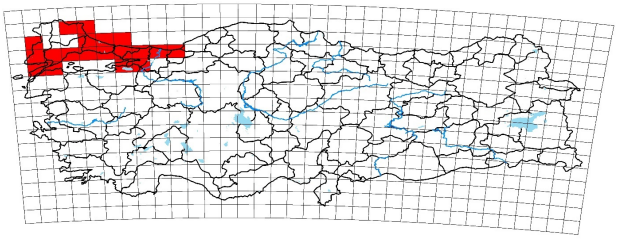

Figure 3.106. *Podarcis tauricus* (Pallas, 1814)

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 9 of 15).

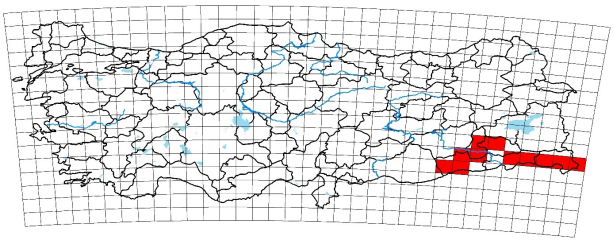

Figure 3.107. *Timon kurdistanicus* (Suchow, 1936)

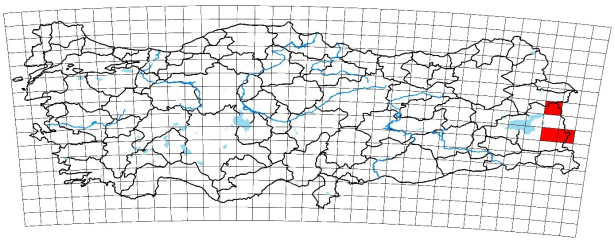

Figure 3.108. *Ablepharus bivittatus* (Ménétries, 1832)

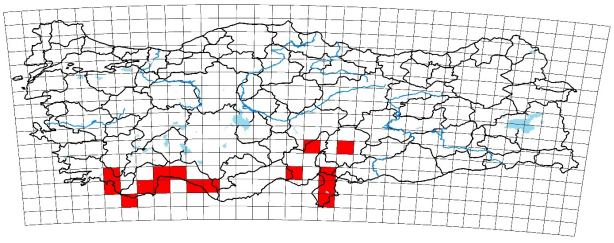

Figure 3.109. *Ablepharus budaki* Göçmen, Kumlutaş & Tosunoğlu, 1996

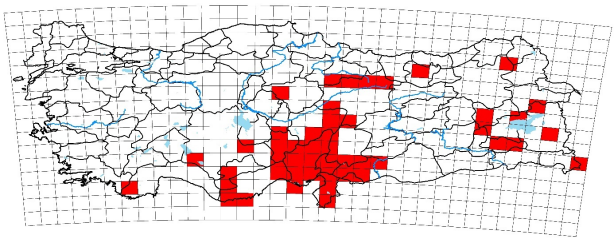

Figure 3.110. *Ablepharus chernovi* Darevsky, 1953

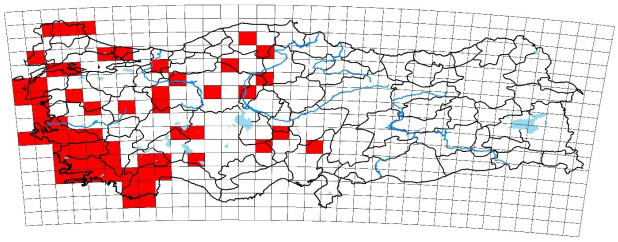

Figure 3.111. *Ablepharus kitaibelii* (Bibron & Bory St-Vincent, 1833)

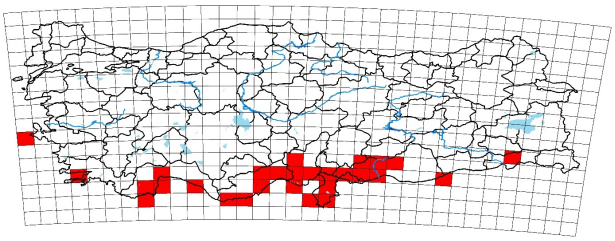

Figure 3.112. *Chalcides ocellatus* (Forskål, 1775)

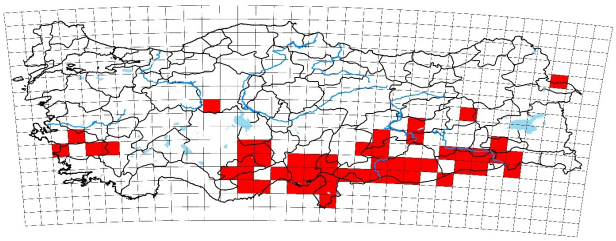

Figure 3.113. *Eumeces schneiderii* (Daudin, 1802)

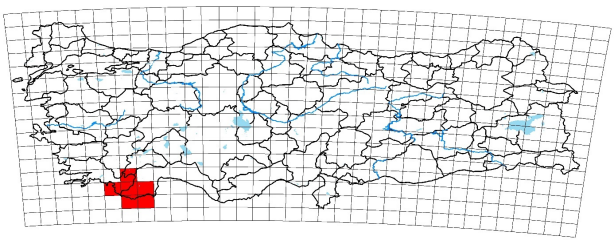

Figure 3.114. *Ophiomorus kardesi* Kornilios, Kumlutaş, Lymberakis & Ilgaz, 2018

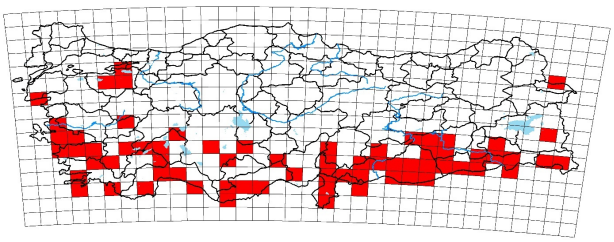

Figure 3.115. *Heremites auratus* (Linnaeus, 1758)

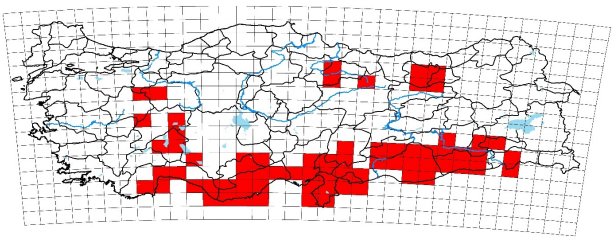

Figure 3.116. *Heremites vittatus* (Olivier, 1804)

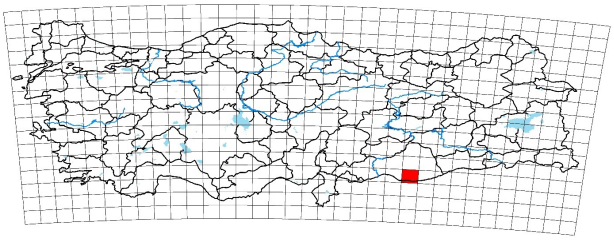

Figure 3.117. *Heremites septemtaeniatus* (Reuss, 1834)

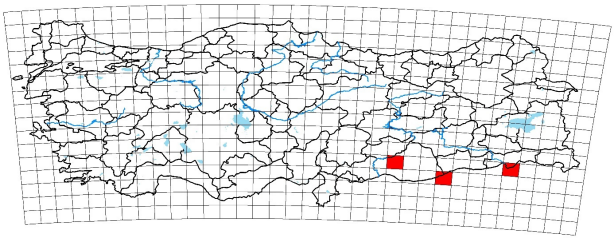

Figure 3.118. *Varanus griseus* (Daudin, 1803)

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 10 of 15).

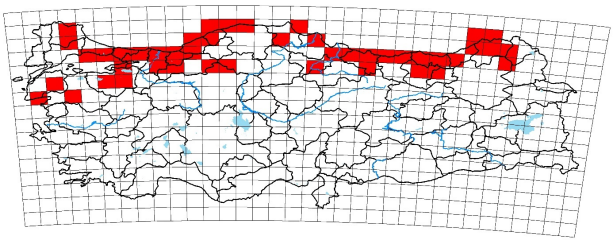

Figure 3.119. *Anguis colchica* (Nordmann, 1840)

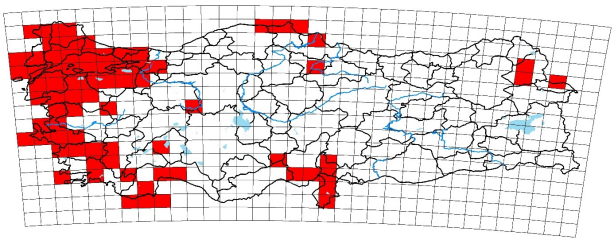

Figure 3.120. *Pseudopus apodus* (Pallas, 1775)

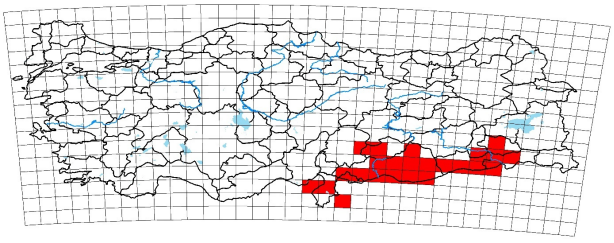

Figure 3.121. *Myriopholis macrorhyncha* (Jan, 1860)

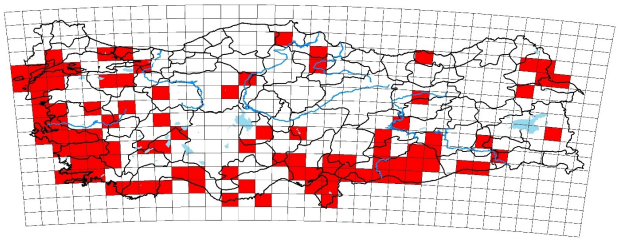

Figure 3.122. *Xerotyphlops vermicularis* (Merrem, 1820)

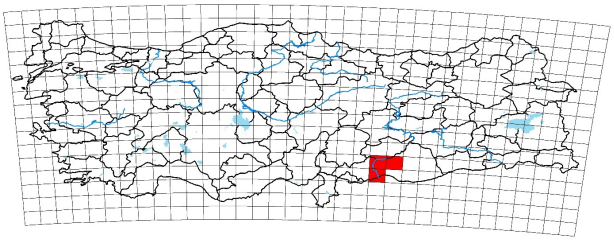

Figure 3.123. *Letheobia episcopa* (Franzen & Wallach, 2002)

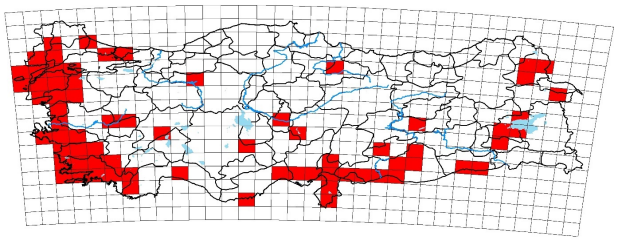

Figure 3.124. *Eryx jaculus* (Linnaeus, 1758)

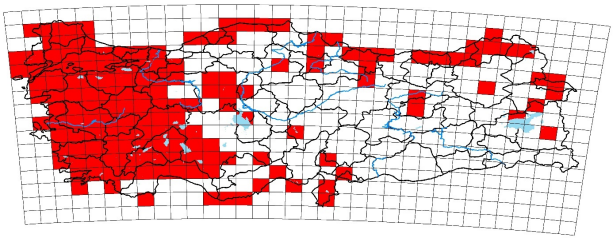

Figure 3.125. *Natrix natrix* (Linnaeus, 1758)

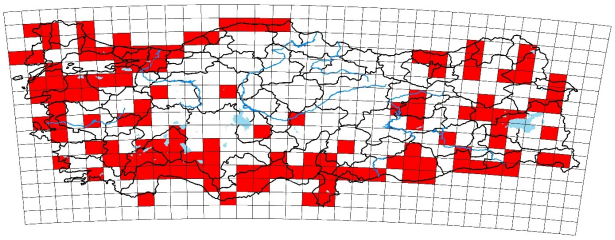

Figure 3.126. *Natrix tessellata* (Laurenti, 1768)

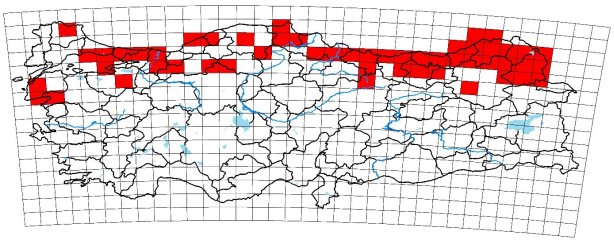

Figure 3.127. *Coronella austriaca* Laurenti, 1768

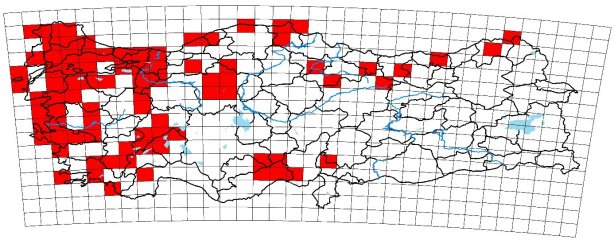

Figure 3.128. *Dolichophis caspius* (Gmelin, 1789)

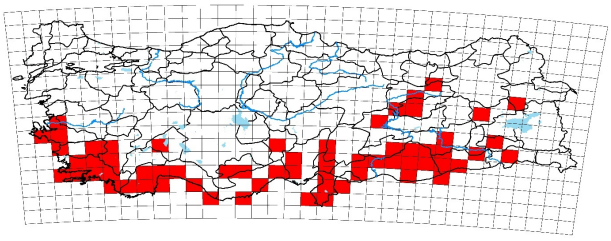

Figure 3.129. *Dolichophis jugularis* (Linnaeus, 1758)

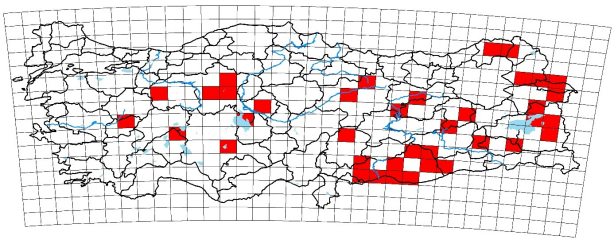

Figure 3.130. *Dolichophis schmidti* (Nikolsky, 1909)

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 11 of 15).

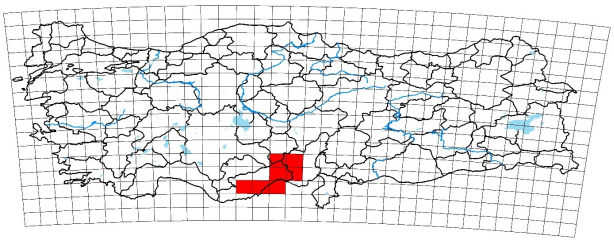

Figure 3.131. *Eirenis aurolineatus* (Venzmer, 1919)

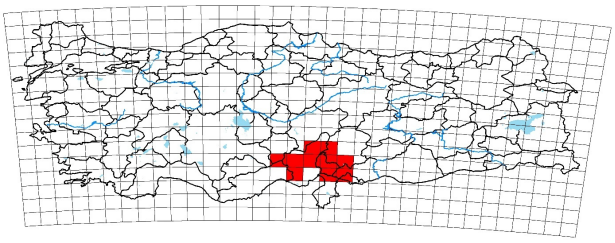

Figure 3.132. *Eirenis barani* Schmidtler, 1988

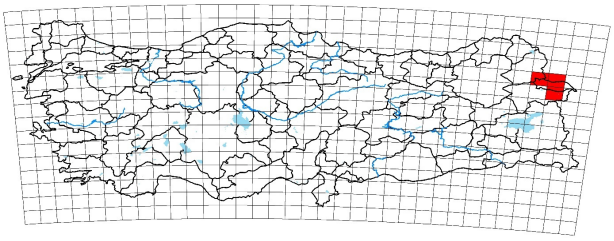

Figure 3.133. *Eirenis collaris* (Ménétries, 1832)

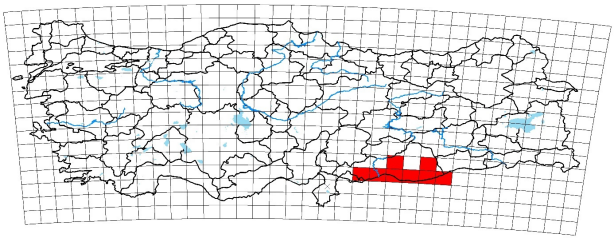

Figure 3.134. *Eirenis coronella* (Schlegel, 1837)

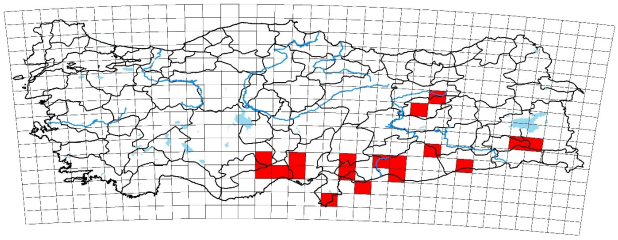

Figure 3.135. *Eirenis decemlineatus* (Duméril, Bibron & Duméril, 1854)

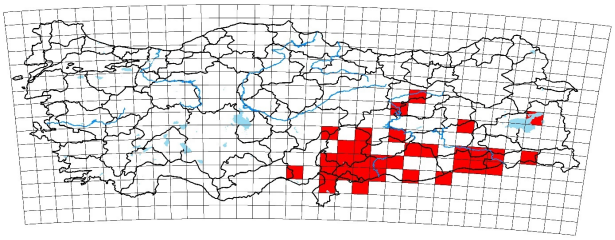

Figure 3.136. *Eirenis eiselti* Schmidtler & Schmidtler 1978

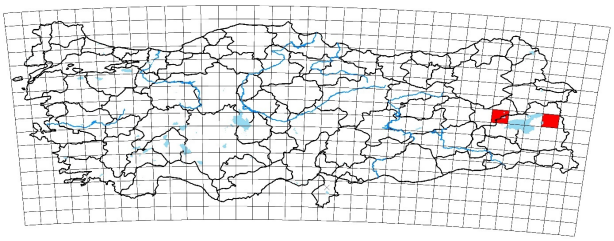

Figure 3.137. *Eirenis thospitis* Schmidtler & Lanza, 1990

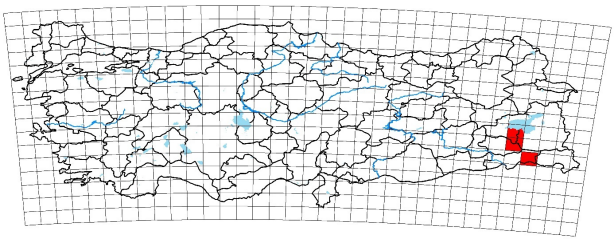

Figure 3.138. *Eirenis hakkariensis* Schmidtler & Eiselt, 1991

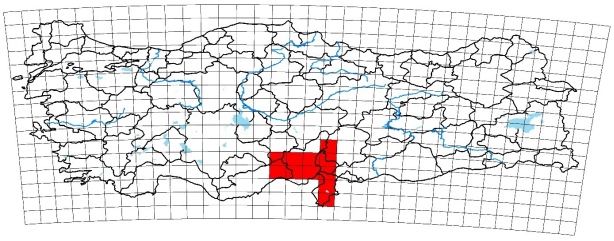

Figure 3.139. *Eirenis levantinus* Schmidtler, 1993

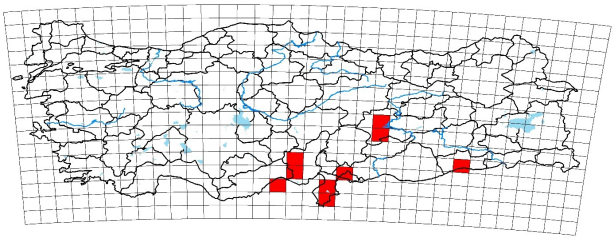

Figure 3.140. *Eirenis lineomaculatus* Schmidt, 1939

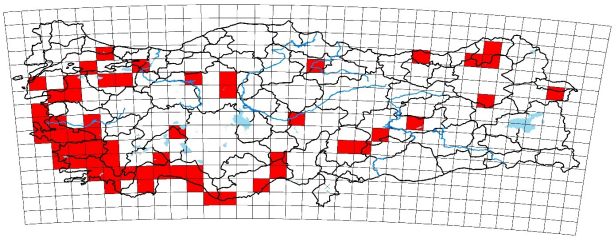

Figure 3.141. *Eirenis modestus* (Martin, 1838)

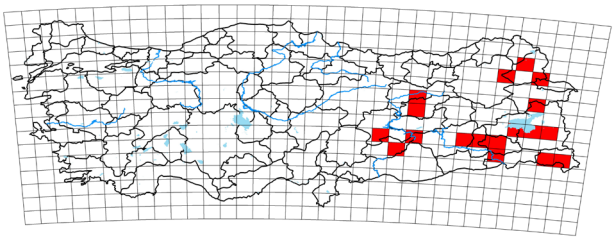

Figure 3.142. *Eirenis punctatolineatus* (Boettger, 1892)

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 12 of 15).

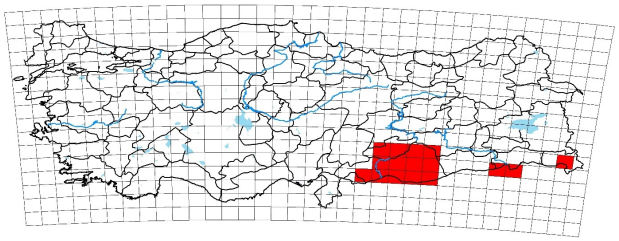

Figure 3.143. *Eirenis occidentalis* Rajabizadeh, Nagy, Adriaens, Avcı, Masroor, Schmidtler, Nazarov, Esmaeili & Christiaens, 2015

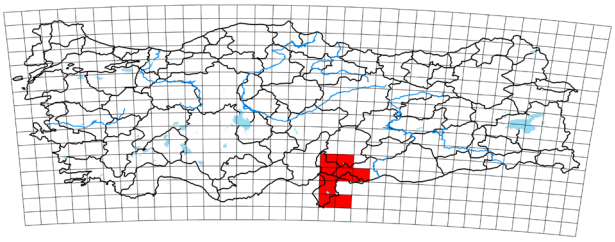

Figure 3.144. *Eirenis rothii* Jan, 1863

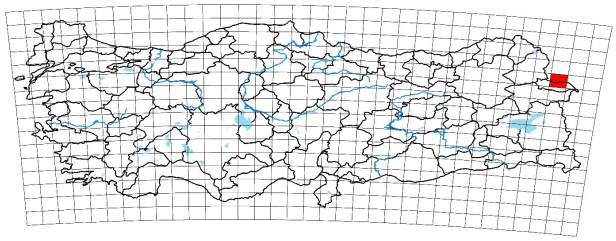

Figure 3.145. *Elaphe dione* (Pallas, 1773)

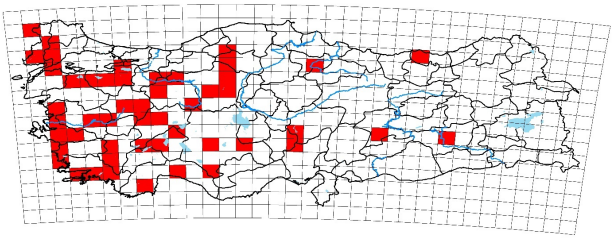

Figure 3.146. *Elaphe sauromates* (Pallas, 1811)

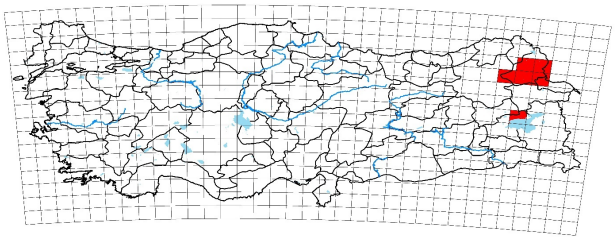

Figure 3.147. *Elaphe urartica* Jablonski, Kukushkin, Avcı, Bunyatova, Ilgaz, Tuniyev & Jandzik, 2019

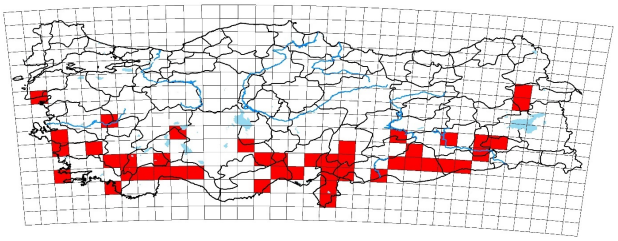

Figure 3.148. *Hemorrhois nummifer* (Reuss, 1834)

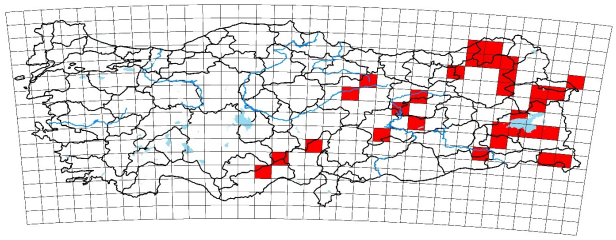

Figure 3.149. *Hemorrhois ravergieri* (Ménétries, 1832)

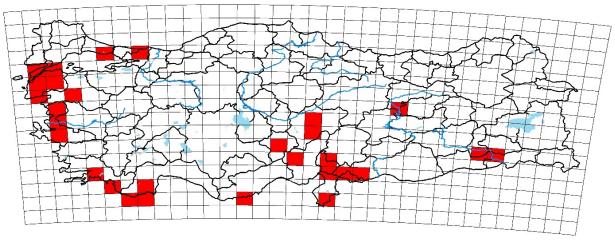

Figure 3.150. *Platyceps collaris* (Müller, 1878)

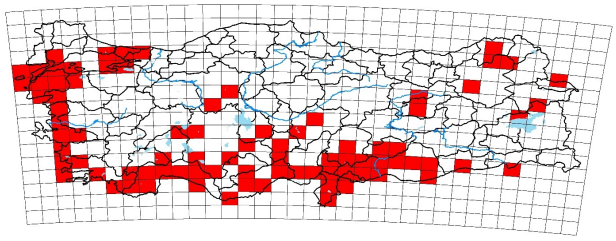

Figure 3.151. *Platyceps najadum* (Eichwald, 1831)

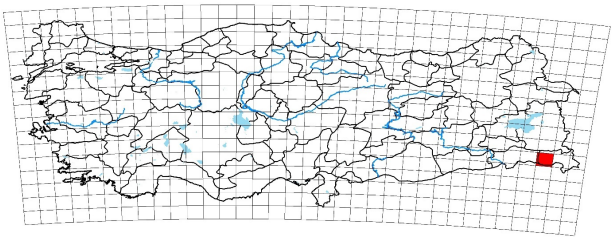

Figure 3.152. *Platyceps rhodorachis* (Jan, 1863)

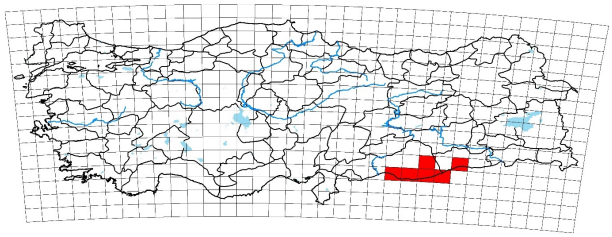

Figure 3.153. *Platyceps ventromaculatus* (Gray, 1834)

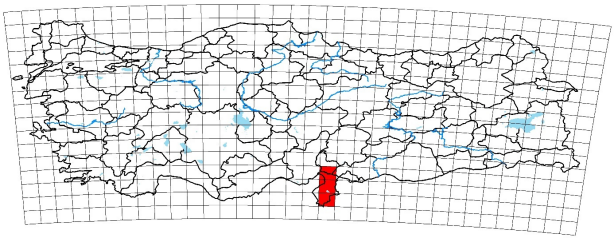

Figure 3.154. *Muhtarophis barani* Olgun, Avcı, Ilgaz, Üzüm & Yılmaz 2007

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 13 of 15).

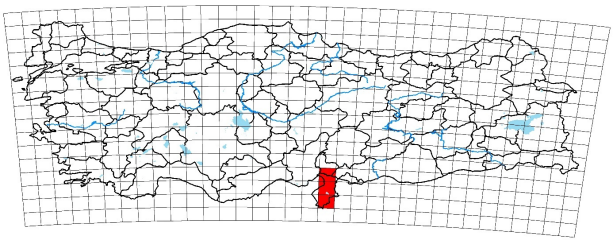

Figure 3.155. *Rhynchocalamus melanocephalus* (Jan, 1862)

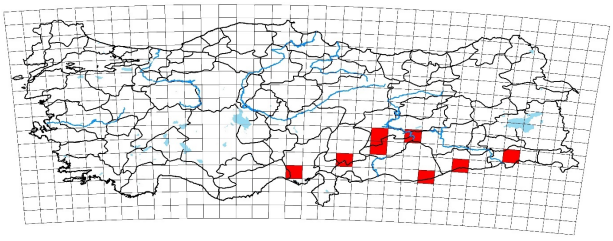

Figure 3.156. *Rhynchocalamus satunini* (Nikolsky, 1899)

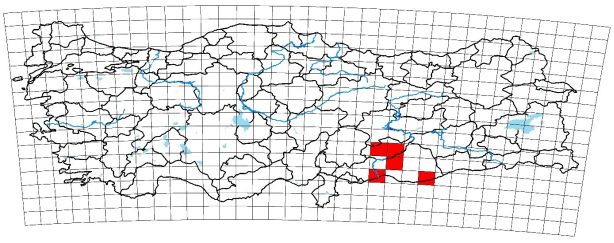

Figure 3.157. *Spalerosophis diadema* (Schlegel, 1837)

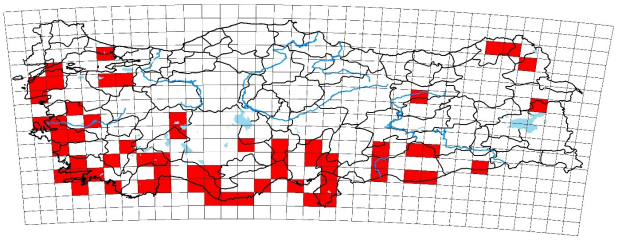

Figure 3.158. *Telescopus fallax* Fleischmann, 1831

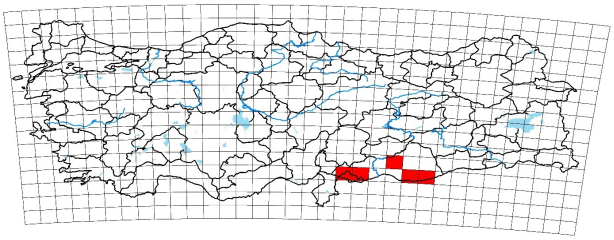

Figure 3.159. *Telescopus nigriceps* (Ahl, 1924)

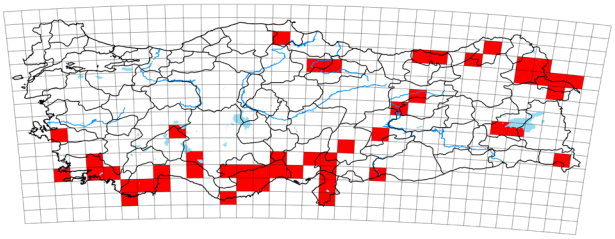

Figure 3.160. *Zamenis hohenackeri* (Strauch, 1873)

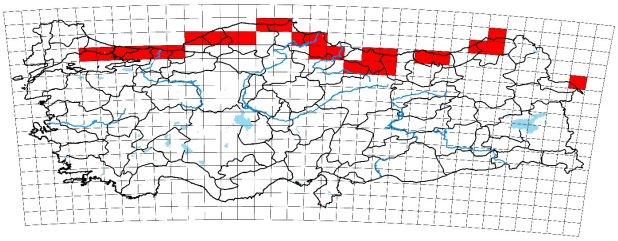

Figure 3.161. *Zamenis longissimus* (Laurenti, 1768)

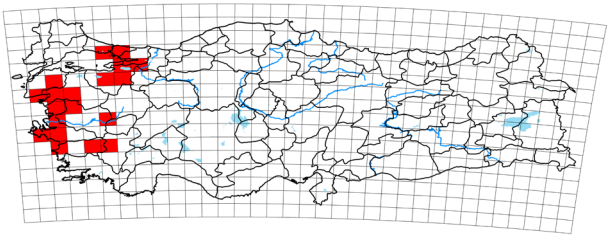

Figure 3.162. *Zamenis situla* (Linnaeus, 1758)

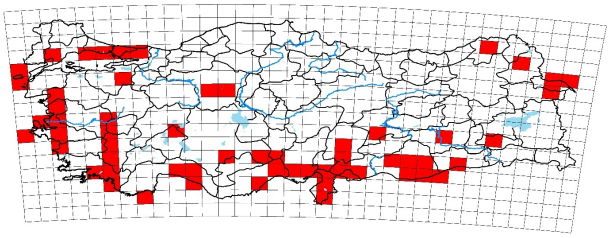

Figure 3.163. *Malpolon insignitus* (Geoffroy Saint-Hilaire, 1827)

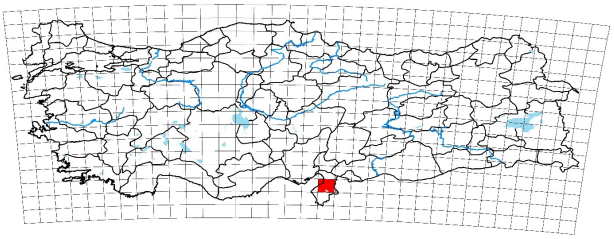

Figure 3.164. *Daboia palaestinae* (Werner, 1938)

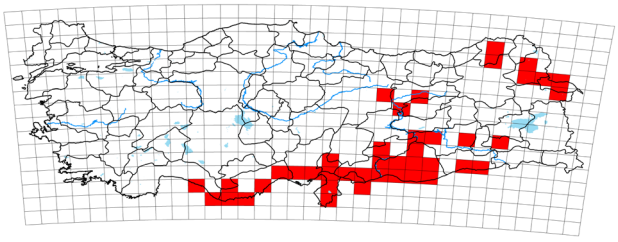

Figure 3.165. *Macrovipera lebetinus* (Linnaeus, 1758)

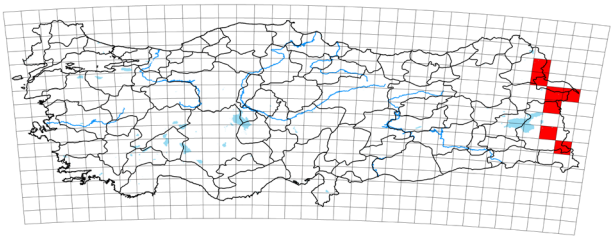

Figure 3.166. *Montivipera raddei* (Boettger, 1890)

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 14 of 15).

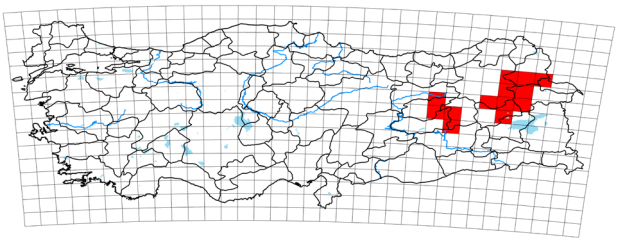

Figure 3.167. *Montivipera wagneri* (Nilson & Andrén, 1984)

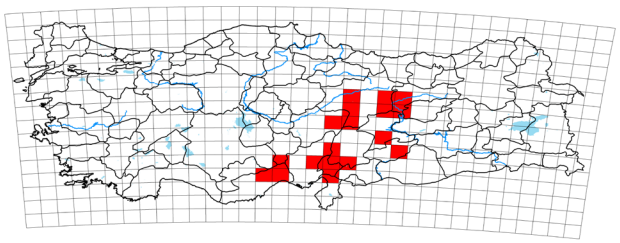

Figure 3.168. *Montivipera bulgardaghica* (Nilson & Andrén, 1985)

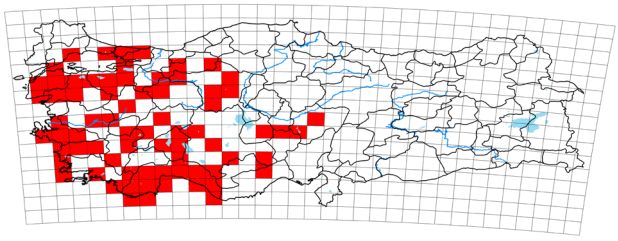

Figure 3.169. *Montivipera xanthina* (Gray, 1849)

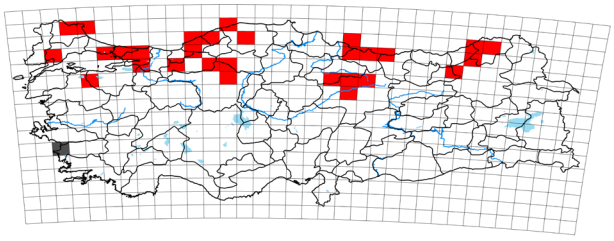

Figure 3.170. *Vipera ammodytes* (Linnaeus, 1758)

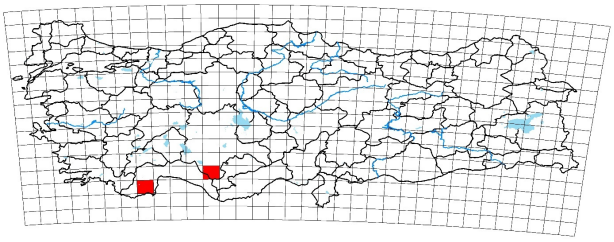

Figure 3.171. *Vipera anatolica* Eiselt & Baran, 1970

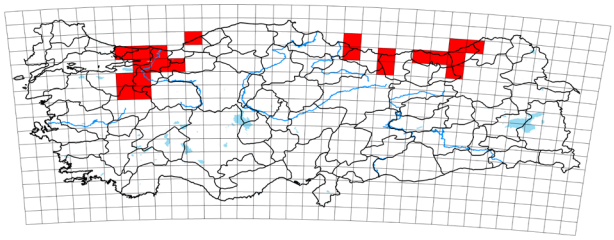

Figure 3.172. *Vipera berus* (Linnaeus, 1758)

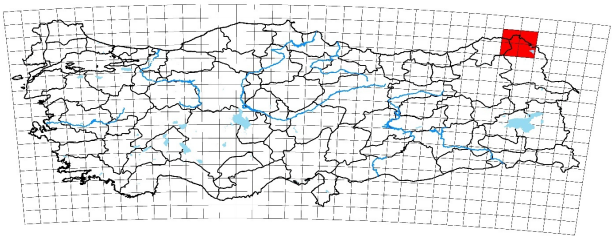

Figure 3.173. *Vipera darevskii* Vedmederja, Orlov & Tuniyev, 1986

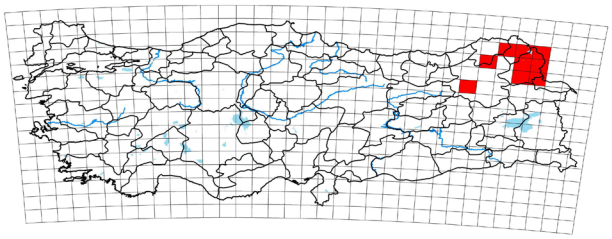

Figure 3.174. *Vipera renardi* (Chirstoph, 1861)

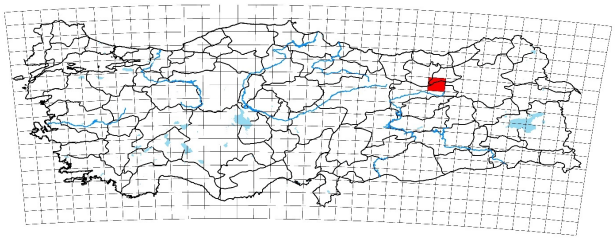

Figure 3.175. *Vipera sakoi* Tuniyev, Avcı, Tuniyev, Ilgaz, Olgun, Petrova, Bodrov, Geniez & Teynié, 2018

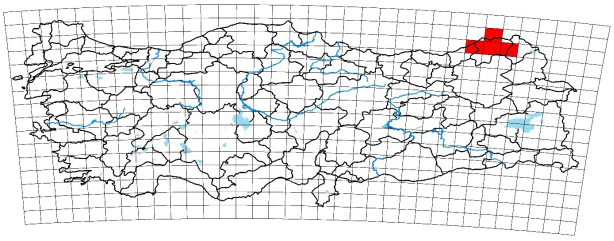

Figure 3.176. *Vipera kaznakovi* Nikolsky, 1909

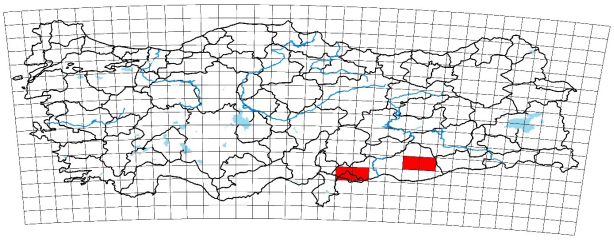

Figure 3.177. *Walterinnesia morgani* (Mocquard, 1905)

Figure 3. Distribution map of amphibians and reptiles in Turkey (page 15 of 15).

Table 3. Summary of conservation status for amphibians and reptiles in Turkey

	Critically Endangered (CR)	Endangered (EN)	Vulnerable (VU)	Near Threatened (NT)	Least Concern (LC)	Data Deficient (DD)	Not Evaluated (NE)
Caudata	1 (2.70%)	4 (10.81%)	4 (10.81%)	2 (5.40%)	2 (5.40%)	0	7 (18.91%)
Anura	1 (2.70%)	1 (2.70%)	0	3 (8.10%)	9 (24.32%)	0	3 (8.10%)
Amphibia	2 (5.41%)	5 (13.51%)	4 (10.81%)	5 (13.51%)	11 (29.72%)	0	10 (27.02%)
Chelonia	0	2 (1.41%)	4 (2.87)	2 (1.41%)	2 (1.41%)	0	1 (0.70%)
Sauria	3 (2.12%)	4 (2.83)	0	3 (2.12%)	43 (30.49%)	2 (1.41%)	15 (10.63%)
Amphisbaenia	0	0	0	0	1 (0.70%)	0	2 (1.41%)
Serpentes	3 (2.12%)	1 (0.70%)	1 (0.70%)	1 (0.70%)	37 (26.24%)	4 (2.83)	10 (7.09%)
Reptilia	6 (4.25%)	7 (4.96%)	5 (3.54%)	6 (4.25%)	83 (58.86%)	6 (4.25%)	27 (19.14%)
Overall	8 (4.49%)	12 (6.74%)	9 (5.05%)	11 (6.17%)	94 (52.80%)	6 (3.37%)	37 (20.78%)

Table 4. The species richness of amphibians and reptiles in ecoregions of Turkey.

Ecoregion no	Caudata	Anura	Amphibia	Chelonia	Sauria	Amphisbaenia	Serpentes	Reptilia	Overall
1	2 (5.40%)	8 (21.62%)	10 (27.02%)	4 (2.84%)	11 (7.80%)	0	10 (7.09%)	25 (17.73%)	35 (19.66%)
2	6 (16.21%)	10 (27.02%)	16 (43.24%)	4 (2.84%)	26 (18.44%)	1 (0.71%)	18 (12.77%)	49 (34.75%)	65 (36.52%)
3	7 (18.91%)	7 (18.91%)	14 (37.83%)	3 (2.13%)	19 (13.48%)	1 (0.71%)	18 (12.77%)	41 (29.08%)	55 (30.90%)
4	6 (16.21%)	10 (27.02%)	16 (43.24%)	4 (2.84%)	24 (17.02%)	0	18 (12.77%)	46 (32.62%)	62 (34.83%)
5	5 (13.51%)	11 (29.72%)	16 (43.24%)	4 (2.84%)	24 (17.02%)	1 (0.71%)	29 (20.57%)	58 (41.13%)	73 (41.01%)
6	0	4 (10.81%)	4 (10.81%)	3 (2.13%)	13 (9.22%)	0	11 (7.80%)	27 (19.15%)	31 (17.41%)
7	0	5 (13.51%)	5 (13.51%)	3 (2.13%)	15 (10.64%)	0	13 (9.22%)	31 (21.99%)	36 (20.22%)
8	1 (2.70%)	6 (16.21%)	7 (18.91%)	3 (2.13%)	14 (9.93%)	0	17 (12.06%)	34 (24.11%)	41 (23.03%)
9	3 (8.10%)	4 (10.81%)	7 (18.91%)	3 (2.13%)	14 (9.93%)	1 (0.71%)	22 (15.60%)	41 (29.08%)	48 (26.97%)
10	3 (8.10%)	9 (24.32%)	12 (32.43%)	4 (2.84%)	28 (19.86%)	3 (2.13%)	32 (22.70%)	67 (47.52%)	79 (44.38%)
11	1 (2.70%)	2 (5.40%)	4 (10.81%)	0	15 (10.64%)	0	13 (9.22%)	28 (19.86%)	32 (17.98%)
12	2 (5.40%)	2 (5.40%)	4 (10.81%)	1 (0.71%)	15 (10.64%)	1 (0.71%)	10 (7.09%)	27 (19.15%)	31 (17.42%)
13	2 (5.40%)	4 (10.81%)	6 (16.21%)	2 (1.42%)	22 (15.60%)	0	25 (17.73%)	49 (34.75%)	55 (30.90%)
14	4 (10.81%)	7 (18.91%)	11 (29.72%)	2 (1.42%)	18 (12.77%)	0	21 (14.89%)	41 (29.08%)	52 (29.21%)

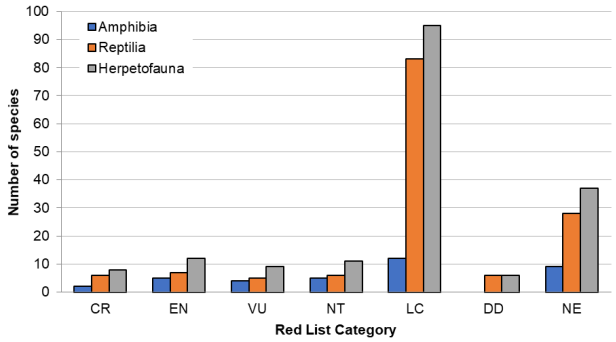

Figure 4. The conservation status of amphibians and reptiles in Turkey.

amphibian and reptile species (52.80%) were LC, 6 species (3.37%) DD and 37 species (20.78%) were of the category NE (Tables 3, 4, Figure 4).

According to the evaluations of the IUCN Red List; 11 of the caudatans [*L. antalyana*, *L. atifi*, *L. billae*, *L. fazilae*, *L. flavimembris*, *L. luschani*, *M. caucasica*, *N. strauchii*, *N. crocatus*, *O. ophryticus*, *S. infraimmaculata*], 5 of the anurans [*P. caucasicus*, *B. verrucosissimus*, *P. caralitanus*, *R. holtzi*, *R. tavasensis*], 8 of the turtles [*C. caretta*, *C. mydas*, *D. coriacea*, *E. orbicularis*, *T. triunguis*, *R. euphraticus*, *T. graeca*, *T. hermanni*], 10 of the lizards [*P. horvathi*, *A. harranensis*, *A. schreiberi*, *D. bendimahiensis*, *D. clarkorum*, *D. derjugini*, *D. praticola*, *D. unisexualis*, *D. uzzelli*, *E. pleskei*] and 6 of the snakes [*M. raddei*, *M. wagneri*, *V. anatolica*, *V. darevskii*, *V. renardi*, *V. kaznakovi*] are threatened on a global scale (Table 3).

Biogeographical analysis

The current distribution of all species in km² (as number of squares times the surface of a square) is specified in the species list (Table 2). In terms of species richness, the richest regions of amphibian species are Thrace (European part of Turkey) and western, southwestern and northern Anatolia (Asian part of Turkey), while the poorest regions are central, southeastern and eastern Anatolia. The regions with the highest richness in reptile species has been identified as Thrace, western, southeastern (East Mediterranean Turkey) and northeastern Anatolia and the poorest regions are central, eastern and central-northern (central Black sea region of Turkey) Anatolia (Table 4, Figure 5). Species found in just a single grid cell are three amphibians [*L. lantzi, B. variegata, P. fuscus*], six lizards [*A. harranensis, A. schreiberi, A. ilgazi, D. sapphirina, P. cyanisparsa, H. septemtaeniatus*] and three snakes [*D. palaestinae, E. dione, V. sakoi*]. The most commonly recorded species *T. graeca* is found in 231 grids.

Aegean and Western Turkey sclerophyllous and mixed forests [ecoregion no: 2] (16 species, 43.24%), Euxine-Colchic deciduous forests [4] (16 species, 43.24%), Southern Anatolian montane conifer and deciduous forests [5] (16 species, 43.24%), and Anatolian conifer and deciduous mixed forests [3] (14 species, 37.83%) have the richest ecoregions for amphibians in Turkey. Ecoregion Eastern Mediterranean conifer-sclerophyllous-broadleaf forests [10] (67 species, 47.5%), Southern Anatolian montane conifer and deciduous forests [5] (58 species, 41.13%), Aegean and Western Turkey sclerophyllous and mixed forests [no: 2] (49 species, 34.75%), Eastern Anatolian montane steppe [no: 13] (49 species, 34.75%), and Euxine-Colchic deciduous forests [4] (46 species, 32.62%) have the richest ecoregions for reptiles in Turkey (Table 4).

The highest species richness (hotspots) of Turkish amphibians are found in Turkish Thrace, southwestern, northwestern (Marmara) and northern (Black Sea) Anatolia (Figure 5A). For the most of Turkey, only 1-4 species per grid cell were recorded. Central, eastern, and southeastern Anatolia are poor regions due to the fact that it has a drier climate than other regions. Reptile richness (hotspots) is higher in western, southern and northeastern Anatolia. For the main part of Anatolia, 1-10 species per grid cell were recorded (Figure 5B). The distribution patterns of species richness are different in amphibians and reptiles (Figure 6C). Species richness of amphibians is the highest in northern and western Turkey, while the western, southern and northeastern Turkey has the highest richness in reptiles.

The analysis of corrected weighted endemism (CWE) highlighted the importance of northeastern, eastern, southeastern Anatolia as centres of endemism for Turkish herpetofauna (Figure 6A-C). For amphibians, the highest CWE values were found in southwestern, eastern, and northeastern Anatolia (Figure 6A). Besides, some grid cells on Turkish Thrace and southern, and central Anatolia stand out with high local endemism values according to the CWE. The highest CWE values of reptiles were found in northeastern, eastern and southeastern Anatolia. In addition, there are some grid cells in central and southern Anatolia that stand out with high local endemism values (Figure 6B).

The herpetofaunal species observed in Turkey were arranged into 40 chorotypes (amphibians in 19, reptiles in 36) (Tables 2, 5, Figure 7). The predominant chorotypes are SW-Asiatic (36 species, 20.45%), E-Mediterranean (25 species, 14.2%), S-Anatolian endemic (12 species, 6.81%) and Turano-Mediterranean (11 species, 6.25%) elements. SW-Asiatic (5 species, 13.5%), European (4 species, 10.8%), Turano-Europeo-Mediterranean (4 species, 10.8%) and S-Anatolian (4 species, 10.8%) elements account for 45.9% of the amphibians. SW-Asiatic (30 species, 21.28%), E-Mediterranean (24 species, 17.02%), and Turano-Mediterranean (11 species, 7.80%) elements constitute 46.10% of reptiles.

Additions to the Turkish fauna taxonomic and systematic changes

Caudata: Salamandridae

Newts of the genus *Triturus*, as such known since a century ago (Rafinesque 1820), were recently found to represent a non-monophyletic group (Weisrock et al. 2006, Steinfarz et al. 2007). García–París et al. (2004) and Litvinchuk et al. (2005) proposed several new genera.

Nowadays the former genus *Triturus* has been split up and, within the region under study, represented by the genera *Triturus* s. str., *Lissotriton* and *Ommatotriton*. Since then, the genus name *Triturus* has been used only for the *cristatus* and *marmoratus* groups. In Turkey, the crested newts are represented firstly by *T. karelinii*. This taxon, though originally described as a full species (*Triton karelinii* Strauch 1870), had been treated as a subspecies of *cristatus* since 1928 (Mertens & Müller 1928), but was given species rank by Bucci-Innocenti et al. (1983). Wielstra et al. (2013)

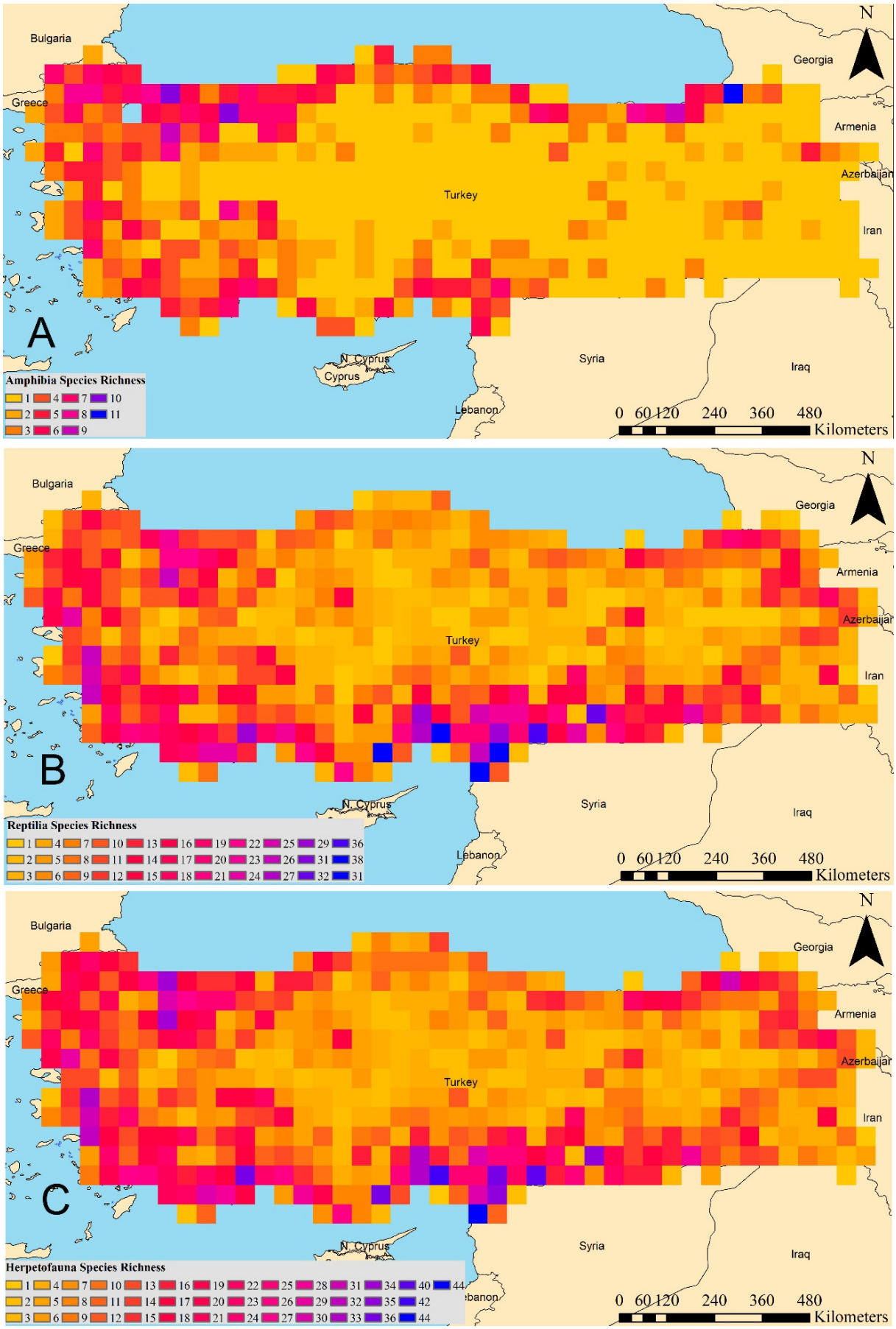

Figure 5. The species richness of amphibians and reptiles in Turkey. (A: Amphibians B: Reptiles C: Herpetofauna).

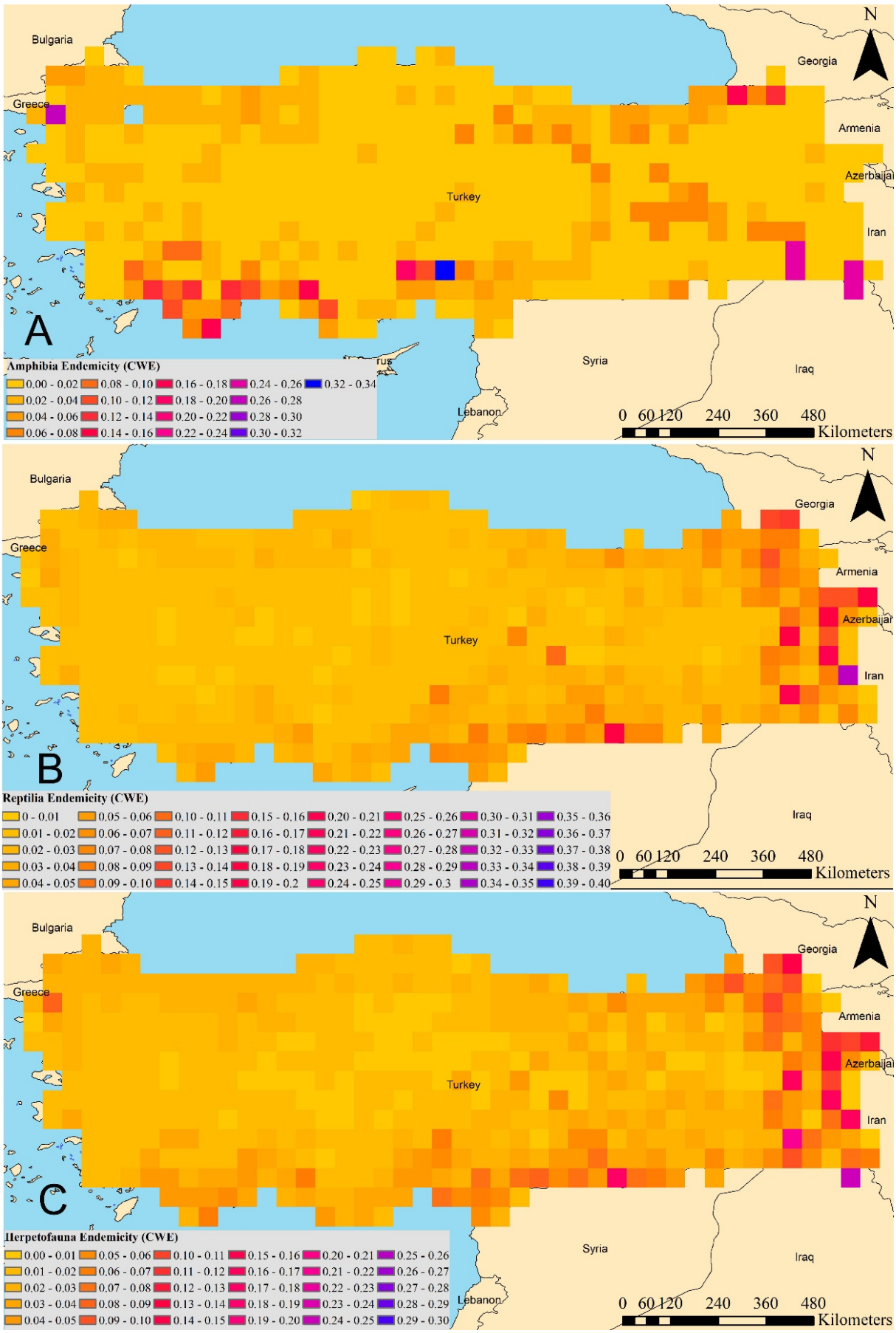

Figure 6. The corrected weighted endemism (CWE) of amphibians and reptiles in Turkey. (A: Amphibians B: Reptiles C: Herpetofauna).

Table 5. Chorotypes of amphibians and reptiles in Turkey.

Chorotypes	Caudata	Anura	Amphibia	Chelonia	Sauria	Amphisbaenia	Serpentes	Reptilia	Overall
AFRO-I-MED	0	0	0	0	0	0	3 (2.13%)	3 (2.13%)	3 (1.69%)
AFRO-MED	0	0	0	1 (0.71%)	0	0	0	1 (0.71%)	1 (0.56%)
ANAT	2 (5.40%)	0	2 (5.40%)	0	1 (0.71%)	0	2 (1.42%)	3 (2.13%)	5 (2.81%)
ARME	0	0	0	0	6 (4.26%)	0	3 (2.13%)	9 (6.38%)	9 (5.06%)
ARME-CAUC	0	0	0	0	0	0	1 (0.71%)	1 (0.71%)	1 (0.56%)
ARME-E-ANAT	0	0	0	0	2 (1.42%)	0	0	2 (1.42%)	2 (1.12%)
C-ASIA-EUR	0	1 (2.70%)	1 (2.70%)	0	1 (0.71%)	0	2 (1.42%)	3 (2.13%)	4 (2.25%)
C-ASIA-EUR-MED	0	0	0	0	0	0	1 (0.71%)	1 (0.71%)	1 (0.56%)
C-ASIA-MED	0	0	0	0	0	0	1 (0.71%)	1 (0.71%)	1 (0.56%)
CAUC	1 (2.70%)	0	1 (2.70%)	0	0	0	1 (0.71%)	1 (0.71%)	2 (1.12%)
C-EUR	0	1 (2.70%)	1 (2.70%)	0	0	0	0	0	1 (0.56%)
COS	0	0	0	3 (2.13%)	0	0	0	3 (2.13%)	3 (1.69%)
E-MED	1 (2.70%)	0	1 (2.70%)	0	12 (8.51%)	3(2.13%)	9 (6.38%)	24 (17.02%)	25 (14.04%)
EUR	3 (8.10%)	1 (2.70%)	4 (10.81%)	0	1 (0.71%)	0	2 (1.42%)	3 (2.13%)	7 (3.93%)
EUR-MED	0	1 (2.70%)	1 (2.70%)	0	0	0	0	0	1 (0.56%)
HOL	0	0	0	1 (0.71%)	0	0	0	1 (0.71%)	1 (0.56%)
I-MED	0	0	0	0	1 (0.71%)	0	0	1 (0.71%)	1 (0.56%)
KOLK	0	0	0	0	1 (0.71%)	0	0	1 (0.71%)	1 (0.56%)
KOLK-ARME	0	0	0	0	1 (0.71%)	0	0	1 (0.71%)	1 (0.56%)
KOLK-CAUC	0	1 (2.70%)	1 (2.70%)	0	1 (0.71%)	0	0	1 (0.71%)	2 (1.12%)
KURD	0	0	0	0	1 (0.71%)	0	4 (2.84%)	5 (3.55%)	5 (2.81%)
MED	0	0	0	0	4 (2.84%)	0	2 (1.42%)	6 (4.26%)	6 (3.37%)
N-ANAT	1 (2.70%)	0	1 (2.70%)	0	1 (0.71%)	0	0	1 (0.71%)	2 (1.12%)
NE-ANAT	0	0	0	0	1 (0.71%)	0	0	1 (0.71%)	1 (0.56%)
N-MESOP	0	0	0	0	1 (0.71%)	0	0	1 (0.71%)	1 (0.56%)
NW-ANAT	1 (2.70%)	0	1 (2.70%)	0	0	0	0	0	1 (0.56%)
PO-CAS	1 (2.70%)	1 (2.70%)	2 (5.40%)	0	1 (0.71%)	0	0	1 (0.71%)	3 (1.69%)
SAH-SAL-ARAB	0	0	0	0	1 (0.71%)	0	1 (0.71%)	2 (1.42%)	2 (1.12%)
SAH-TUR-SIN	0	0	0	0	2 (1.42%)	0	0	2 (1.42%)	2 (1.12%)
S-ANAT	3 (8.10%)	1 (2.70%)	4 (10.81%)	0	5 (3.55%)	0	4 (2.84%)	9 (6.38%)	13 (7.30%)
S-EUR	0	2 (5.40%)	2 (5.40%)	1 (0.71%)	1 (0.71%)	0	1 (0.71%)	3 (2.13%)	5 (2.81%)
SIBER-EUR	0	1 (2.70%)	1 (2.70%)	0	1 (0.71%)	0	1 (0.71%)	2 (1.42%)	3 (1.69%)
SW-ANAT	3 (8.10%)	0	3 (8.10%)	0	2 (1.42%)	0	0	2 (1.42%)	5 (2.81%)
SW-ASIA	3 (8.10%)	2 (5.40%)	5 (13.51%)	1 (0.71%)	18 (12.77%)	0	11 (7.80%)	30 (21.28%)	36 (20.22%)
TUR	0	0	0	0	1 (0.71%)	0	0	1 (0.71%)	1 (0.56%)
TUR-EUR	1 (2.70%)	1 (2.70%)	2 (5.40%)	0	0	0	1 (0.71%)	1 (0.71%)	3 (1.69%)
TUR-EUR-MED	0	4 (10.81%)	4 (10.81%)	1 (0.71%)	0	0	0	1 (0.71%)	5 (2.81%)
TUR-MED	0	0	0	3	0	1 (0.71%)	7 (4.96%)	11 (7.80%)	11 (6.18%)
W-ANAT	0	1 (2.70%)	1 (2.70%)	0	0	0	0	0	1 (0.56%)
W-IRAN	0	0	0	0	0	1 (0.71%)	0	1 (0.71%)	1 (0.56%)

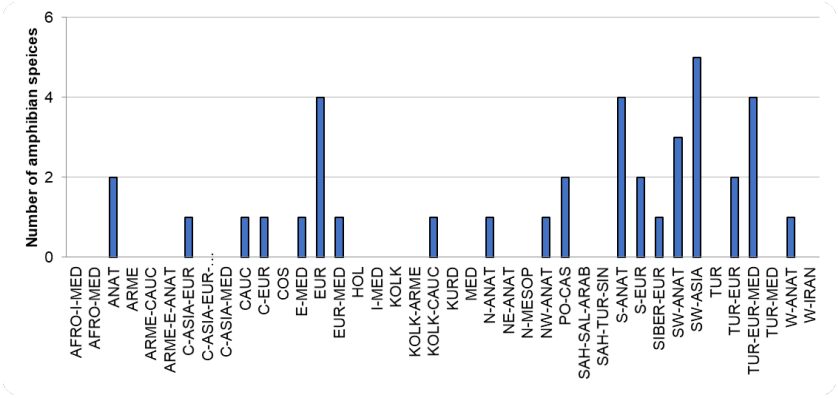

Figure 7a. Distribution of chorotypes of amphibians in Turkey.

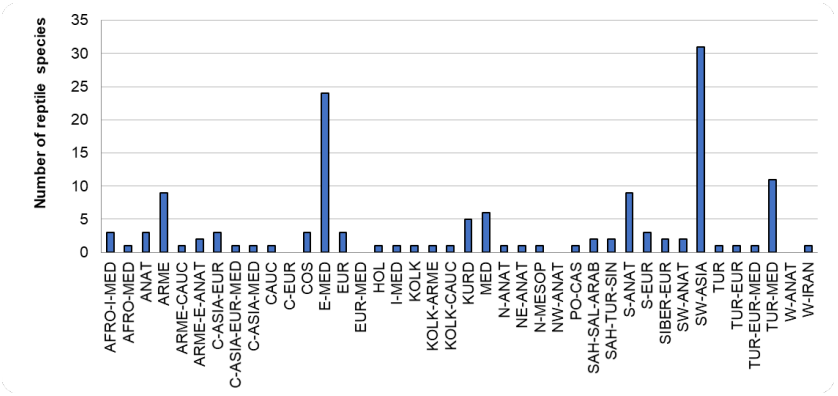

Figure 7b. Distribution of chorotypes of reptiles in Turkey.

separated *T. ivanbureschi* from the former and nowadays is the name for the Balkan populations, including Thrace and part of Northwest Anatolia. Subsequently, Wielstra & Arntzen (2016) found that *T. ivanbureschi* comprises two cryptic species and the North Anatolian population was given the name *T. anatolicus*.

The smaller-bodied species were given the name *Lissotriton* (and other genera not represented in Turkey). In Turkey three species occur*: L. kosswigi, L. schmidtleri and L. lantzi*. Dubois & Raffaëlli (2009) suggested, on the basis of the data of Babik et al. (2005), to elevate the subspecies *L. vulgaris kosswigi* and *lantzi* to species on their own. Raxworthy (1988) described the subspecies *Triturus vulgaris schmidtleri*, but two years later changed its name in *schmidtlerorum*, because this subspecies was named after two people (father and son): J. J. Schmidtler and J. F. Schmidtler and therefore the original subspecific name would be grammatically incorrect (Raxworthy 1990). As indicated by Dubois & Raffaëlli (2009) and referring to Dubois (2007), only the original genitive is valid. A separate subspecific status for this taxon has been refused by Olgun et al. (1999) on morphological research and also Dubois & Raffaëlli (2009) had their doubts. New research on genomic DNA by Pabijan et al. (2017) revealed its specific status. Speybroeck et al. (2020) though feel the need for more information on contact zones and consider *schmidtleri* and *lantzi* as subspecies of *L. vulgaris* for the time being.

Newts of the genus *Ommatotriton*, banded newts, are represented by three taxa. The genus name was proposed by Litvinchuk et al. (2005) splitting it off from *Triturus*. Originally *T. vittatus* was the only species, but now this name is restricted to the population of southern Anatolia and the Levant. Litvinchuk et al. (2005) split off the North-Anatolian and Caucasian *O. ophryticus* from *O. vittatus*. Litvinchuk et al. (2005) described the subspecies *O. o. nesterovi* for the western part of it. Its rank was raised to full species by Bülbül & Kutrup (2013) and recognized as full species "for convenience" by van Riemsdijk et al. (2017) and is excepted by the Taxonomic Commitee of the Societas Europaea Herpetologica (Speybroeck et al. 2020).

Species of the genus *Lyciasalamandra* were previously placed in the genus *Mertensiella,* nowadays only represented in Turkey by *M. caucasica*. The genus name *Lyciasalamandra*, given by Veith & Steinfartz (2004) has been called an unnecessarily long and unpalatable nomen by Dubois & Raffaëlli (2009) for which a better name 'would aptly have been coined'. Based on mitochondrial DNA, this genus has been proposed to fit under *Salamandra*, e.g. Weisrock et al (2001), but there is a lot of consensus in using the name of *Lyciasalamandra*. Six distinct species are currently identified: *S. anatalyana*, *S. atifi*, *S. billae*, *S. fazilae*, *S. flavimembris* and *S. luschani*. The last has been the traditional species name and the other five were subspecies elevated to full species by Veith & Steinfartz (2004), after Weisrock et al. (2001) already indicated that these six taxa probably represent distinct phylogenetic species.

Dubois & Raffaëlli (2009) elevated the subspecies *Salamandra salamandra inframmaculata* to species level.

Within Turkey the genus *Neurergus* has been traditionally represented by two species: *N. crocatus* and *N. strauchii*. The subspecies *N. strauchii barani*, separated by the Euphrates river from *N. s. strauchii* for an estimated 3 million years and showing deep divergence, has been given species status by Rancilhac et al. (2019).

Anura: Bombinatoridae

Bombina variegata has been added to the Turkish fauna list very recently (Bülbül et al. 2016).

Anura: Hylidae

Hyla arborea var. *orientalis* Bedriaga, 1890 with Terra typica Tulcea, Romania and Kharkov, Ukraine has long been seen as a synonym for *Hyla arborea arborea*, but has been elevated to species level. *Hyla orientalis* is now in use for populations around the Black Sea, including all Turkish tree frogs except *H. savignyi* (Stöck et al. 2008). The same authors split *H. savignyi*, but all Turkish populations maintain their species name.

Anura: Bufonidae

The classical genus *Bufo* Laurenti, 1768 has been split up and *Bufo* s. str. is represented only by the *Bufo bufo* species group in Turkey. *B. verrucosissimus* was assigned full species level by Orlova & Tuniyev (1989). Litvinchuk et al. (2008) assumed all Anatolian common toad populations to belong to *B. verrucosissimus*. According to Recuero et al. (2012) only the Anatolian population near Georgia is assigned to this species and most of Anatolia is inhabited by *B. bufo* s. str. We follow this last view.

Originally within *Bufo* s. l., the green toads were known as *B. viridis* group. The taxonomic history is confusing, although the study of Dufresnes et al. (2019a) gives good information. Hybridization and polyploidy played a role in speciation of some taxa. First issue is the relation to *B. calamita,* for which the monotypic genus *Epidalea* was erected by Frost et al. (2006). Traditionally seen as belonging to the same *B. viridis* group, they were split upon research of Graybeal (1997). Other researchers (Harris 2001) could not corroborate her conclusions and the split have been questioned by Speybroeck & Crochet (2007). For the *viridis* group (without *calamita*) Frost et al. (2006) chose the new genus name *Pseudepidalea*. Dubois & Bour (2010) regarded *Bufotes* Rafinesque, 1815, as the oldest available generic name for this group. They used it as a subgenus name, but shortly after it came into use as a replacement for Frost et al.'s *Pseudepidalea*. The old name *variabilis* (Pallas 1769), from which Stöck et al. (2001) commented 'junior subjective synonym of *Bufo viridis*' and 'doubtful name in regard to different Asian green toad taxa', came into use for some European as well as Anatolian green toads. The controversy regarding the identity of *B. variabilis* and the Anatolian green toads seems to be resolved by Dufresnes et al. (2019a) and they concluded that Anatolian green toads belong to *Bufotes sitibundus*. Thrace is inhabited by *B. viridis*.

Anura: Pelobatidae

Some research supports species status for the eastern clade of *Pelobates syriacus* (ssp. *transcaucasicus*), but the final conclusion must await further data (Veith et al. 2006).

Dufresnes et al. (2019b) elevated *Pelobates syriacus balcanicus* to full species. The species has been found up to the Greek-Turkish border river Evros and could occur in Turkish Thrace too. The species has not been adopted by us in the species list pending further research, especially molecular analyses.

Anura: Ranidae

The polyphyletic group of true frogs *Rana* Linnaeus, 1758 strongly needed a revision. The name *Pelophylax* was created by Fitzinger (1843) to discriminate between the Old World green (water) frogs and the brown frogs, but was ignored until Fei et al. (1991) would have reintroduced it in their 'Key to Chinese Amphibia' (Chinese text could not be checked). Dubois (1992) split *Rana* s.l. into 33 groups tentatively given rank of subgenera. For Turkey the subgenera *Rana* (s. str.) and *Pelophylax* are of interest.

The Marsh frog *Pelophylax ridibundus* once was thought to have a widespread distribution in Eurasia and to inhabit the whole of Turkish territory. Along the Aegaean coast and in West Anatolia (exact border not known) it is substituted by the sister species Levant frog *P. bedriagae*, described and shortly known as *Rana levantina* (Schneider & Sinch 1992). Dubois (1992) used *P. bedriagae* (from *R. esculenta* var. *bedriagae)* for this taxon. The species might have a considerably larger distribution and probably contains several taxa that deserve species status. One of them is described by Arıkan (1988) as *Rana ridibunda caralitana,* now *P. caralitanus,* an endemic of the area around the Lakes Beyşehir, Ereğli and Suğla. The situation is still very complex and Akın et al. (2010) recognised 7 evolutionary lineages. Because of the fact that the situation is not clear at the moment, we represent the species *caralitanus* and plot all other lineages provisionally under *Pelophylax ridibundus*-group.

From the brown frogs *Rana macrocnemis* has a wide distribution in Anatolia. For a long time there was confusion in whether *R. camerani* was a separate (sub)species. There is considerable agreement in the acceptance of a polymorphic species without taxonomic status for the morph *camerani*. *Rana tavasensis*, a rare brown frog species from Southwest Anatolia, was described by Baran & Atatür (1986) as a subspecies of *R. macrocnemis*, but given species rank by Veith et al. (2003). They concluded in the same paper that *Rana holtzi* should be considered a subspecies of *R. macrocnemis*. Using morphological features and electrophoresis Çevik et al. (2006) stated it a distinct species, which we provisionally follow here.

Reptilia

Chelonia: Emydidae

Originally described as *Testudo scripta* by Thunberg in Schoepf in 1792, the species has been placed under *Emys*, *Chrysemys*, *Pseudemys* and has been known under *Trachemys scripta* since Schwartz & Henderson (1991). Hatchling sliders of this species, mainly from the subspecies *elegans* were exported as pets from its native range in North-America all over the world. Subsequently some of those animals ended up in the wild. In areas with suitable conditions they will reproduce and can pose a threat for native turtle species. Reproduction in Turkey has been documented (Çiçek & Ayaz 2015).

Chelonia: Geoemydidae

Mauremys rivulata was elevated from subspecific status in *M. caspica* by Fritz & Wischuf (1997).

Chelonia: Trionychidae

From the two soft-shell turtles originally known as *Trionyx* one species (*T. triungius*) is still known under that name and the other (*T. euphraticus*) has been reassigned to the genus *Rafetus* Gray, 1864. Ernst & Barbour (1989) were the first to reintroduce Gray's name *Rafetus euphraticus*.

Chelonia: Testudinidae

The polyphyletic genus *Testudo* s.l. has undergone many splittings, but the European species stayed in *Testudo* s. str., until de Lapparent de Broin et al. (2006) introduced *Eurotestudo* for the *hermanni* group. Fritz & Bininda-Emonds (2007) proposed a continued usage of the generic name *Testudo* for all western Palaearctic tortoise species, considering it a monophyletic group after extensively investigating mitochondrial and nuclear DNA data. They also proved *Eurotestudo* to be an objective junior synonym of two other available names: *Chersine* Merrem, 1820 and *Medaestia* Wussow, 1916. Bour (2004) and Perälä (2004) advocated giving the three subspecies of *hermanni* species status: *hermanni*, *boettgeri* and *hercegovinensis*, which would render the Turkish population to be *T. boettgeri*. We provisionally follow the vision of Parham et al. (2006) and Fritz et al. (2007) in considering them to be one species. For the eastern distribution of *Testudo graeca* the subspecies *ibera* has sometimes been given species rank following Bour (1989). Next to that, several doubtful subspecies occurring in Turkey have been treated as full species, e.g. *anamurensis*, *antakyensis*, *perses*, *terrestris* (Perälä 1996, 2002a, b, Bonin et al. 2006). We refrain from this, thus using *T. graeca*, following Parham et al. (2006), Fritz et al. (2007), and Türkozan et al. (2010).

Amphisbaenia: Amphisbaenidae

The subspecies *aporus* of the worm lizard *Blanus strauchi* has been given species status by Sindaco et al. (2014). In the same publication a new species has been described: *B. alexandri*, increasing the number of species in Turkey to three.

Sauria: Agamidae

The names of the larger agamids changed considerably. The West-Asian species have been in the collective genus *Agama* for a long time. Some authors used *stellio* for a part of them, following the unpublished thesis of Moody (1980), although this name was made unavailable by Stejneger (1936). Baig (1992) reintroduced the old name *Laudakia* Gray, 1845, of which a part was divided in other genera by Baig et al. (2012). Since then, the hardun is known as *Stellagama stellio* and the Caucasian agama as *Paralaudakia caucasia.* The subdivision of *Laudakia* into several separate genera has been questioned though (Melville et al. 2009).

Moody (1982) reintroduced the name *Trapelus ruderatus* Anderson, 1872 for *Agama ruderata*. Rastegar-Pouyani (2000) detected that the type specimen in fact belonged to *Trapelus persicus* (Blanford, 1881) and that those animals earned to be called *T. ruderatus* (Olivier, 1804). As a result, the population formerly known as *T. ruderatus* should be called *T. lessonae*. Unfortunately, Rastegar-Pouyani overlooked the fact that *Agama ruderata* had been described on multiple specimens from different species. Ananjeva et al. (2013) resolved this confusing situation by designating a neotype for *T. ruderatus.* They choose the holotype of *T. lessonae* for it, thus repairing the old situation and resurrecting the name *Trapelus ruderatus* for at least the Turkish animals.

The taxonomic status of the toad-headed agama occurring near the Armenian border is not clear yet. Described as *Phrynocephalus helioscopus* var. *Horváthi* by Méhely (1894), it has sometimes been placed under *P. persicus*. The Reptile Database (Uetz et al. 2020) treats it as a subspecies of the latter (*P. p. horvathi*). On the basis of molecular data Melnikov et al. (2008) propose *P. persicus* De Filippi, 1863 and *Phynocephalus helioscopus horváthi* Méhely, 1894 as different species. The IUCN provisionally follows Melnikov et al. (2008) in considering *Phrynocephalus horvathi* to be distinct at species level, pending additional taxonomic studies (Ananjeva & Agasyan 2009).

Sauria: Eublepharidae

It was only 2001 that *Eublepharis angramainyu* Anderson & Leviton, 1966 was found in Turkey for the first time (Göçmen et al. 2002).

Sauria: Phyllodactylidae

Asaccus elisae has been mentioned as occurring in Turkey since Böhme (1973). Torki et al. (2011) described a new species, *Asaccus barani* on the basis of specimens from Harran. Yıldız et al. (2019) re-evaluated specimens from the other locations and concluded that there were no sound differences, thus the species present in Turkey was *A. barani*.

Sauria: Gekkonidae

Thin-toed geckos of the genus *Mediodactylus* were originally assigned to *Gymnodactylus.* Later, they were placed under *Cyrtodactylus* fide Underwood (1954) and *Tenuidactylus* fide Shcherbak & Golubev (1986: accessed through English translation 1996). In Turkey, two species were recognised: *M. kotschyi* and *M. heterocercus.* Kotsakiozi et al. (2018) extensively researched the DNA of specimens from almost all over *M. kotschyi*'s range, estimated the phylogenetic relationships and recognised five species within the species complex. Two of the new species occur in Turkey: *M. daniliewskii* and *M. orientalis*. *M. kotschyi* s. str. could probably be encountered on some Turkish islands of the Aegian Sea. For several eastern Anatolian populations, no research is available, and they are provisionally mapped under *M. kotschyi* s.l.

The rough bent-toed gecko has also been assigned several scientific names. Originally described as *Stenodactylus scaber* (Heyden, 1827), it was later consecutively placed in the genera *Gymnodactylus*, *Cyrtodactylus* and *Tenuidactylus* respectively. After Khan (1993) raised Shcherbak & Golubev's subgenera to full genera, thereby resurrecting *Cyrtopodion* Fitzinger 1843, it has been known as *Cyrtopodion scabrum.* The specific epithet, as an adjective, has been adapted to the neuter gender of the new genus. See e.g. Crother (2000). The species *Cyrtodactylus basoglui* described for Turkey by Baran & Gruber (1982) is a junior synonym of *Cyrtopodion scabrum* (Werner et al. 2010).

Sauria: Lacertidae

The species thought of as an endemic to Cyprus *Acanthodactylus schreiberi* was found in Turkey in 1997 (Franzen 1998). Relatively new to the Turkish herpetofauna is *Acanthodactylus harranensis* (Baran et al. 2005). It was described from Harran and thought of as endemic to Turkey, but John Mulder found the species in Syria just on the other side of the border near Harran in 1995 (Mulder 2021). From the province of Malatya a new species, *Acanthodactylus ilgazi*, apparently belonging to the *tristrami* species-group was discovered in 2020 and described in 2021 (Kurnaz & Şahin 2021).

The collective genus *Lacerta* has been split up to several genera. For Turkey the following genera are recognised: *Anatolalacerta*, *Apathya*, *Darevskia*, *Iranolacerta*, *Lacerta* s. str., *Parvilacerta*, *Phoenicolacerta* and *Timon* following e.g Mayer &

Bischoff (1996) on morphology and biochemistry, Arribas (1997) on morphology, osteology, karyology and electrophoresis and Arnold et al. (2007) using mtDNA and morphology.

The *danfordi* species complex was originally described as *Zootoca danfordi* and shortly the name *Podarcis danfordi* was used but has been known for a long time just under *Lacerta*. Sindaco et al. (2000) used the generic name *Archaeolacerta*. The taxa *anatolica* and *oertzeni* were described as species, but soon ended as subspecies of *Lacerta danfordi*. Also, *pelasgiana* was long treated as subspecies of either *oertzeni* or *danfordi*. Mayer & Lutz (1989) still concluded on the basis of albumin that the differences between *Lacerta danfordi*, *L. oertzeni* and *L. anatolica* were 'too small to confirm their taxonomic revalorisation'. Together with the creation of the genus *Anatolalacerta*, the former subspecies *anatolica* and *oertzeni* were given full species status (Arnold et al. 2007). Until recently, four species were recognised: *A. anatolica*, *budaki*, *danfordi* and *pelasgiana*, endemic to western and southern Anatolia and some neighbouring Aegean islands. Bellati et al. (2014) unraveled the phylogenetic relationships and the genetic diversity of this species complex. The name *Lacerta anatolica* Werner, 1900 was resurrected and combined to *Anatolalacerta anatolica*. The former subspecies *budaki* and *pelasgiana* got species status, next to *A. danfordi*. Eiselt & Schmidtler (1986) more or less used this taxonomic arrangement, but considerable shifts occurred in (sub) specific assignment of populations. Very recently a fifth cryptic lineage was differentiated by Karakasi et al. (2021). It was given the name *Anatolalacerta ibrahimi*. A further change in names was needed as specimens of the type-locality of *A. budaki* are assigned genetically to *A. pelasgiana*. By raising the former subspecies *A. b. finikensis* to species level the population meant by *A. budaki* is given the name *A. finikensis*. (Karakasi et al. 2021).

Arnold et al. (2007) resurrected the old name *Apathya cappadocica* Méhely, 1909 for the lizard formerly known as *Lacerta cappadocica*.

The '*Lacerta saxicola* group' is represented by a manifold of species in Turkey. Arribas (1997) presented a doctoral thesis in the late 1990s in which he, among other things, introduced the genus *Darevskia* for the '*L. saxicola* group'. The genus name has been accepted by many authors and the Reptile Database uses it. There has been discussion though about the official publication date and validity (Busack et al. 2016). The year 1997 has been connected with the thesis, but it was only in 1999 that a peer reviewed publication was published. In the meantime, Harris et al. (1998) published and proposed the genus *Caucasilacerta* for the same taxa. This name has been considered a nomen nudum by several authors, including Arribas (2016). Assigning 1999 as the publication date, this could render the name *Darevskia* Arribas, 1999 a junior invalid synonym of *Caucasilacerta* Harris, Arnold & Thomas, 1998. Publications on microfiche were valid according to the version of the Code prevailing at the time but not according to the current version. A case was submitted to the ICZN to validate the publication on microfiche (Arribas et al. 2018a). If a case is accepted for consideration, Art 82.1 of the Code protects the widespread used nomen, until the Commission reaches a verdict. Apart from this taxonomic dispute, two new species were described by Schmidtler et al. (1994): *D. sapphirina* and *D. bendimahiensis*. The subspecies *D. parvula adjarica* has been given species status by Arribas et al. (2018b). The full species status has been supported by research of Kurnaz et al. (2019). The species *Lacerta bithynica* Méhely, 1909 has been resurrected and is now known as *D. bithynica*. Species mentioned for Turkey before (Baran & Atatür 1998, Sindaco et al. 2000), but not in this list are *D. dryada*, *D. mixta* and *D. nairensis*. According to Gabelaia et al. (2015) *D. mixta* is a Georgian endemic species and the Turkish specimen from Giresun is probably misidentified. Schmidtler et al. (2002) concluded that *D. dryada* is a synonym of *D clarkorum*. About the status of *nairensis* there has been different views. Fu et al. (2000) considered it conspecific with *D. raddei*, while for instance Omelchenko et al. (2016) hinted towards the possibility to assign them to different species. Pending further research, we treat *nairensis* as a ssp. of *D. raddei*.

Arnold et al. (2007) described the new genus *Iranolacerta*, which created the new combination of *Iranolacerta brandtii* for the former *Lacerta brandtii*. The species was recently found within Turkey (Avcı et al. 2015a, Yıldız & İğci 2015).

After the split, the bigger green lizards remained in the genus *Lacerta* s.str. On the basis of mitochondrial DNA Kornilios et al. (2019) resurrected *Lacerta diplochondrodes* Wettstein, 1952 from its subspecific status *Lacerta trilineata diplochondrodes*.

The subgenus name *Parvilacerta*, was proposed, but not formally described, by Harris et al. (1998). The separate status of the genus *Parvilacerta* was confirmed by Arnold et al. (2007) and formally described by them.

Within the *Lacerta laevis* complex Schmidtler & Bischoff (1999) described a new species: *L. cyanisparsa*. The new genus *Phoenicolacerta* was described by Arnold et al. (2007) for the former *Lacerta laevis* and akin taxa.

Mayer & Bischoff (1996) resurrected the old name *Timon* Tschudi, 1836 for the *princeps* and *lepidus* groups within the former genus *Lacerta*. The subspecies *T. princeps kurdistanica* was given full species status by Ahmadzadeh et al. (2012) on the basis of nuclear and mitochondrial DNA sequences and corrected to its gender: *T. kurdistanicus*. Hoser (2015) described a new genus for the *princeps* group: *Duboislacerta*, a decision that we do not follow.

Kumlutaş et al. (2002) found *Mesalina brevirostris* as new for the Turkish herpetofauna, near the Syrian border. Šmíd et al. (2016) elevated the species status of *M. b. microlepis* (Angel 1936) based on genetic analysis for the species occurring in the Levant, including Turkey. Geniez (2013) used the name *M. microlepis* already. He considered the taxon as a species on its own on the base of genetic research of Kapli et al. (2008) and morphology.

Sauria: Scincidae

Göçmen et al. (1996) described the subspecies *Ablepharus kitaibelii budaki*, that was elevated to species rank by Schmidtler (1997) and described the subspecies *anatolicus*. Based on mtDNA and nuDNA genes Skourtanioti et al. (2016) indicated a possible cryptic species within the *Ablepharus kitaibelii* species complex from Kastelorizo and southwest Turkey and proposed the availability of the name *A. anatolicus*. Very recently Bozkurt & Olgun (2020) elevated *A. budaki anatolicus* to species level. We did not insert this new taxon in the current list, awaiting further research.

Bozkurt & Olgun (2020) concluded that *A. bivittatus* showed highly different genetic and morphological characteristics compared to its congeners and shares morphological characteristics with the genus *Asymblepharus*. For that reason, they placed *A. bivittatus* in the genus *Asymblepharus*. We did not apply this change in the current list yet, pending further research.

Kornilios et al. (2018) described a new species on the basis of DNA-research: *Ophiomorus kardesi.* This replaces the former name *O. punctatissimus* for the Turkish population.

The collective genus *Mabuya* has been split and Mausfeld et al. (2002) placed the Turkish species under the resurrected name *Euprepis* Wagler 1830. According to Bauer (2003) the name *Euprepis* is a synonym of *Mabuya* s.str. The name *Trachylepis* Fitzinger, 1843 is the oldest name attributable to the Afro-Malagasy clade. Moravec et al. (2006) tentatively associated the skinks known formerly as *Mabuya aurata* with this generic name *Trachylepis* and elevated *T. a. septemtaeniata* to species rank. To reflect monophyly Karin et al. (2016) placed the Middle-Eastern species into the resurrected name *Heremites* Gray 1845.

Sauria: Anguidae

The Turkish slow worms have been treated as *Anguis fragilis* for a long period, with the subspecific name nominate subspecies and *colchica* (or *colchicus*) (Başoğlu & Baran 1977). Mitochondrial and nuclear DNA led to the conclusion that *colchica* deserves full species status (Gvoždík et al. 2010) considering northeastern Anatolia populations. As this species also includes Baltic populations, the name *Anguis incerta* Krynicki, 1837 would prevail over *Otophis eryx* var. *colchica* Nordmann, 1840. Gvoždík et al. (2010) argued the question and proposed to treat *A. incerta* as nomen oblitum and, promoting nomenclatural stability, to consider the younger though prevailingly used name *A. colchica* valid as nomen protectum.

The European glass lizard was described as *Lacerta apoda* by Pallas in 1775, but Merrem (1820) forwarded *Pseudopus serpentinus* as a nomen substitutum. In the following years, it has been placed under several genera: *Bipes*, *Chalcida*, *Chamaesaura*, *Seps*, *Sheltopusik, Proctopus* and *Anguis*. Boulenger (1885) placed it under *Ophisaurus* Daudin, 1803 with species epithet *apus*. Mertens & Müller (1928) used the combination *Ophisaurus apodus*, under which name it has been known for a long time since then. *Ophisaurus* s.l. obviously was not a monophyletic group (Macey 1999). Since then the name *Pseudopus apodus* is used, e.g. Roitberg et al. (2002) and Jandzik et al. (2017).

Serpentes: Leptotyphlopidae

The long-nosed wormsnake has been assigned to the genus *Leptotyphlops* Fitzinger 1843 and beared the name *Leptotyphlops macrorhynchus* for a long time. Adalsteinsson et al. (2009) created the new genus *Myriopholis* and translocated this species under it. The name is now *M. macrorhyncha,* with the gender changed to accommodate the female gender.

Serpentes: Typhlopidae

The Eurasian blindsnake beared the name *Typhlops vermicularis* Merrem, 1820 since its description. Hedges et al. (2014) described a new genus *Xerotyphlops* and placed *vermicularis* in it. Kornilios (2017) treats it as a species complex, which could hide several distinct species.

Franzen (2000) found a typhlopid specimen, which he attributed to the genus *Rhinotyphlops*, a species and genus new for Turkey. Franzen & Wallach (2002) described the species as new and named it *Rhinotyphlops episcopus*. Hedges et al. (2014) put it under *Letheobia* Cope 1869, a genus name revalidated by Broadley & Wallach (2007a). Cope indicated the feminine gender of it by changing *Onychocephalus caecus* Duméril, 1856 into *L. caeca*. Also Broadley & Wallach (2007a,b) and Hedges et al. (2014) used the genus as feminine, thus the correct name should be *L. episcopa*.

Serpentes: Natricidae

In 1987 Orlov & Tuniyev described a new species *Natrix megalocephala* from the region east of the Black Sea (accessed through the English translation in 1992). The species status has been questioned and denied by several authors. On the basis of allozyme, mitochondrial and morphological data Kindler & Fritz (2014) concluded that the species status is not valid and should be considered conspecific with *N. natrix*.

Serpentes: Colubridae

Within Turkey, the family Colubridae has traditionally contained the genera *Coluber*, *Eirenis*, *Elaphe, Spalerosophis, Rhynchocalamus* and *Pseudocyclophis*.

Inger & Clark (1943), on the basis of morphology, divided the large genus *Coluber* s.l. in five genera (*Coluber* s. str. Linnaeus, *Masticophis* Baird and Girard, *Zamenis* Wagler, *Platyceps* Blyth and *Haemorrhois* Boie). These new names were denied by most authors, though Welch (1983) discussed them. For the Old World species he agreed with *Hemorrhois*. *Haemorrhois* Boie, 1827 is a later homonym and should be *Hemorrhois* Boie 1826. Welch also argued that *Zamenis* has to be seen as a synonym for *Elaphe* with type species *E. longissima* and that *Platyceps* is not available due to the earlier name *Eremiophis* Fitzinger 1843. A renewed interest in the *Coluber* taxonomy started with the work of Schätti and others (Schätti 1986, 1988, Schätti & McCarthy 2001, Nagy et al. 2004, etc.), first based on morphology, later on DNA research.

Both species *Coluber nummifer* and *C. ravergieri* were assigned to the genus *Hemorrhois* by Schätti (1988).

Within the collective and paraphyletic genus *Coluber* s.l. distinctiveness of the *C. caspis-jugularis-schmidtii* group was recognised by Schätti (1988) and he proposed, together with some more species (among which *viridiflavus* and *gemonensis*), the new genus name *Hierophis*. Nagy et al. (2004) proved this genus to be paraphyletic and proposed the use of the available name *Dolichophis* Gistel 1868 for the *jugularis* group.

Schätti & McCarthy (2001) discussed the possible sister group status of the genus *Platyceps* Blyth, 1860 (already in use for Saharo-Sindian species) to the *C.* (s.l.) *najadum* group, but preferred to await further morphological and molecular studies and refrained from referring these species to *Platyceps* or to describe a new genus for them. After further studies, the slender whip snake species were included in *Platyceps*, e.g. Nagy et al. (2004) and Schätti & Monsch (2004). The collared dwarf racer, known as *Coluber najadum rubriceps* since Mertens (1940), was elevated to full species by Baran (1976). It has been renamed to *Platyceps collaris* by Schätti et al. (2001) revalidating *Zamenis dahlii* var. *collaris* Müller, 1878. There has been a lot of confusion about species affiliation of

Middle-Eastern specimens to *P. karelini*, *P. rhodorachis* and *P. ventromaculatus*. The single find of *Platyceps ventromaculatus* (Baran, 1982) has been confirmed by Yıldız (2011) from four new specimens from a larger distribution near the Syrian border. Schätti et al. (2012) discussed the *karelini-rhodorachis-ventromaculatus* complex. For a part of *P. ventromaculatus*, concerning also the Turkish distribution, a separate species was revalidated using the oldest available name *Coluber chesneii* Martin, 1838 on the basis of hemipenis features and molecular data, which now is *P. chesneii*. *P. rhodorachis* (Jan, 1863) has recently been added to the Anatolian fauna by Yılmaz et al. (2020) in eastern Anatolia.

Starting from the former large genus *Coluber* s.l. the new *Coluber* s.str. is now restricted to the North American eastern racer *C. constrictor.*

Pseudocyclophis persicus, a name given by Boettger (1888), has been treated as member of the genus *Eirenis* for decades, but Dotsenko (1985) resurrected the old name on the basis of its dentition. The name *Pseudocyclophis* was used by many authors since then. The species was subject to molecular studies and was placed within the genus *Eirenis* under the subgenus *Pseudocyclophis* by Nagy et al. (2003). After comprehensive study of *E. persicus,* including morphology, ecological niche modelling and genetics, Rajabizadeh et al. (2016) renamed the animals living in Turkey into *Eirenis occidentalis*.

Four new species have been added to the genus *Eirenis* in the last decades: *Eirenis barani* by Schmidtler (1988), *Eirenis thospitis* by Schmidtler & Lanza (1990), *Eirenis hakkariensis* by Schmidtler & Eiselt (1991) and *Eirenis levantinus* by Schmidtler (1993).

Since the work of Mertens & Müller (1928) *Elaphe* s.l. contained a large amount of both Old and New World species. Lenk et al. (2001a) and Utiger et al. (2002), after initial work of Helfenberger (2001), finally came with a new phylogeny for this polyphyletic group. For Turkey this led to the recognition of the genera *Elaphe* s.str. and *Zamenis*.

The genus *Elaphe* s.str. has been restricted to the original type species *E. parreysii*, which has been identified as *sauromates* (ICZN 1957), and related species. Traditionally *Elaphe quatuorlineata* has been the species recognised for Turkey. For almost a century *sauromates* has been seen as a subspecies of *E. quatuorlineata* (Werner 1899). With the elevation of the local subspecies *sauromates* to full species level (Lenk et al. 2001a) it became *E. sauromates*. After analysing the genetic structure of *E. sauromates* Jablonski et al. (2019) detected a cryptic species and named it *E. urartica*. As this new species lives in East Anatolia, both *sauromates* and *urarctica* are members of the Turkish fauna. Garzoni & Geniez (2004) added a new *Elaphe* species to the Turkish fauna: *E. dione*, with findings near the Armenian border. The former *Elaphe situla*, *E. longissima* and *E. hohenackeri* have been allocated to the genus *Zamenis* fide Utiger et al. (2002).

The genus *Rhynchocolamus* in Turkey has been represented by *R. melanocephalus* (ssp. *satunini*) for a long time. The species *Rhynchocalamus satunini* namely, originally described as *Contia satunini* Nikolsky, 1899, has long been treated as a subspecies of *R. melanocephalus*, though Reed & Marx (1959) already considered them to be different species and Eiselt (1970) used the separate species names. Šmíd et al. (2015) finally elevated *satunini* to full species on the basis of morphology and mitochondrial and nuclear DNA. Next to *R. m. satunini* Franzen & Bischoff (1995) reported the first find of *R. m. melanocephalus* for Turkey and with this find added the 'real' *R. melanocephalus* to the Turkish fauna. A new species in the genus, *R. barani* was described by Olgun et al. (2007). For this species a separate genus, *Muhtarophis*, was erected by Avcı et al. (2015b).

Telescopus nigriceps has been added to the Anatolian fauna by Göçmen et al. (2007).

Serpentes: Lamprophiidae

The eastern Montpellier snake has been known as the subspecies *Malpolon monspessulanus insignitus* since Mertens & Müller (1928). Because of differences in dorsal colour pattern, skull structure and genetic divergence Carranza et al. (2006) recommended that it should be treated as a separate species.

Serpentes: Viperidae

All Turkish vipers have been arranged under the collective genus *Vipera* for a long time. Several attempts were made to divide this large genus. Reuss (1927) created the new genera *Acridophaga* for *ursinii* and *Macrovipera* for *lebetina* and *xanthina* and accepted *Pelias* Merrem, 1820 for *berus* (that originally included *ursinii*), while *ammodytes* stayed in *Vipera*. Except by Reuss himself these names were seldom used and after the work of Mertens & Müller (1940) most authors used *Vipera* for all solenoglyph species in Europe, Anatolia and the Caucasus, and Reuss' names were synonymised.

The larger species were separated from the rest by Obst (1983). He revalidated *Daboia* Gray, 1842 (type species *russelii*), including e.g. *lebetina*, *xanthina, raddei* and *palaestinae*. Later research indicated that this was a polyphyletic assemblage. It was by Herrmann et al. (1992) that the genus *Macrovipera* has been resurrected for *lebetina* and related species. Frétey (2019) indicated the correct use of the original epithet as in *Coluber Lebetinus* Linnaeus 1758, rendering the combination *Macrovipera lebetinus*. Capitalised epithets in the 18th century namely were viewed by their authors as nouns and according to the International Code of Zoological Nomenclature cannot be changed to accommodate gender. On the basis of genetic research Lenk et al. (2001b) restricted *Macrovipera* to *lebetina* (and *schweizeri*) and the former African representatives were placed in the genus *Daboia* with the species *palaestinae* and *russelii.* Only very recently *Daboia palaestinae* was added to the Turkish herpetofauna (Göçmen et al. 2018) on the base of only one specimen. The addition of the species to the Turkish fauna should be seen as pending further finds, because accidental translocation cannot be ruled out yet.

For the distinct group of mountain vipers Nilson et al. (1999) described a new subgenus *Montivipera*, including the Turkish taxa *xanthina*, *wagneri*, *albizona*, *bulgardaghica* and *raddei*. The subgenus was elevated to genus level by Joger (2005), already suggested by Garrigues et al. (2005). The species *Montivipera wagneri* and *M. albizona* have been found and described by Nilson & Andrén (1984) and Nilson et al. (1990) respectively. Nilson & Andrén (1984) described *Vipera* (now *Montivipera*) *bulgardaghica* on three old museum specimens. They had been among the types of *V. bornmuelleri* Werner, 1898. Schätti et al. (1991) rediscovered specimens of this taxon, but lumped *bornmuelleri*, *albizona* and

bulgardaghica under *xanthina*. Stümpel et al. (2016) recognised all described taxa within the *xanthina* complex, based on extensive nuclear and mitochondrial research, but placed *M. albizona* as a subspecies under *M. bulgardaghica*. Genetic research by Stümpel & Joger (2009) already showed that haplotypes of *bulgardaghica* were nested within *albizona* and rendered the validity of *M. albizona* uncertain.

Nose-horned vipers east of the Bosporus have been assigned full species status by some authors (Obst 1983, Nilson et al. 1999), but in research by Ursenbacher et al. (2007) the taxon groups well within the south-eastern clade of *ammodytes*.

Pelias Merrem, 1820 has been used a lot (see e.g. Wallach et al. 2014), especially as a subgenus, but lately has been used mainly by Russian and Turkish authors for shield-headed vipers like those from the *berus-kaznakovi-ursinii* group(s), e.g. Tuniyev et al. (2012) and Tuniyev et al. (2018).

Nilson et al. (1999) proposed to revalidate Reuss' *Acridophaga* as a subgenus for the *ursinii* complex, with uncertain affinities of the *kaznakovi* group. Others denied this and placed the *ursinii* group within the subgenus *Pelias*, e.g. Zinenko et al. (2016a). The taxonomy of this group still is not clear. Hybridization has been mentioned to play a role in speciation (Orlov & Tuniyev 1990, Zinenko et al. 2016b). From this *Pelias-Acridophaga* group, three taxa are long-known for Turkey: *Vipera kaznakovi*, *V. eriwanensis* and *V. anatolica*. The last two have been treated within *V. ursinii* for a long time. In the last decades several species were added to them. *Vipera barani* was described by Böhme & Joger (1983). Its species status had been doubted. Joger et al. (2007) indicated a subspecific status under *V. berus*. Also Freitas et al. (2020) declares it to be of doubtful validity as species and propose to consider it a subspecies of *V. berus*. A further 'species' has been described as *Vipera pontica* Billing et al. (1990). This has been put in synonymy with *V. barani* by some authors, creating confusion (e.g. Baran & Atatür 1998, Baran et al. 2001). Genetic research by Zinenko et al. (2013) made clear that '*V. pontica*' is a hybrid between *V. kaznakovi* and *V. ammodytes*, possibly the result of an erroneous mating of sympatric populations. We do not list it as a Turkish species.

V. darevskii, originally described from Armenia, was subsequently found in Turkey as well. Tuniyev et al. (2012) created a new species for the population near Posof, *V. olguni* (as *Pelias olguni*). This decision seems ill-substantiated. Tuniyev et al. (2018) in a further research of this complex commented 'In the light of the results obtained, *P. olguni* seems to be a subspecies of *P. darevskii*,' but yet they continued using *V. olguni* in the following part of the publication and key to identification. We decided not to list this population as a full species, but as a population within *V. darevskii,* a view supported by low genetic divergence (Freitas et al. 2020). In the same publication (Tuniyev et al. 2018) yet another population of this complex has been given species status: *Vipera sakoi* (as *Pelias sakoi*) from an isolated locality, far west of other populations. While molecular analysis on cytb did not provide significant differences, the authors still considered the viper a separate species on the basis of cluster and discriminant analyses of morphological features and ecology. The species seems to be rather ill-supported by convincing proof. Pending further research (see also Freitas et al. 2020) it is provisionally listed by us.

The species status of *V. eriwanensis* is given as doubtful by Freitas et al. (2020) and should be considered to be *V. renardii*.

Serpentes: Elapidae

Walterinnesia aegyptia was added recently to the Turkish fauna by Uğurtaş et al. (2001). Nilson & Rastegar-Pouyani (2007) re-established the name *W. morgani* (Mocquard, 1905) for the eastern populations, including Turkey.

Discussion

The herpetofauna of the Near East is very rich and diverse, due to the high habitat diversity and historical zoogeographic factors (Sindaco et al. 2000, 2008). The first basic contribution to the Turkish herpetofauna was presented by F.S. Bodenheimer (1944). His book contained 85 amphibian and reptile species from Turkey. The number of species increased enormously over the past 76 years and has doubled now. New species continue to be described at the very moment. Two new species have been described in 2018 (*O. kardesi* Kornilios et al. 2018, *V. sakoi* Tuniyev et al. 2018), one in 2019 (*E. urartica* Jablonski et al. 2019), and two in 2021 (Karakasi et al. 2021, Kurnaz & Şahin 2021). Taxonomy and phylogeography of many species complexes are still in need of further research and this probably will result in an even higher number of species.

GIS-based atlas studies in Europe began in 1997. Sillero et al. (2014) reported that the study conducted within the scope of the NA2RE project (http://na2re.ismai.pt/) will be useful in decision-making mechanisms, conservation studies and activities. Examples of nation-wide projects are Arntzen (2006), in which the current distribution of amphibians and reptiles in the Iberian Peninsula were mapped and modeled by using an ecological niche model and Cogălniceanu et al. (2013a,b) that established a national database for the determination of the distribution of the amphibians and reptiles of Romania. Recently, the diversity and distribution of the herpetofauna of Albania were also mapped with GIS-based tools (Mizsei et al. 2017, Szabolcs et al. 2017). Our study presents a database containing the largest amount of herpetofauna records from Turkey to date. By integrating our findings into the European atlas database, it will be possible to make better inferences and meta-analyzes on a large scale in terms of conservation strategies, biogeography, and taxonomical implications.

The maps presented in this study show the known distribution of the species, but many records were collected randomly without following any particular method. The mapping of amphibians and reptiles with GIS was only started with recently. Tok & Çiçek (2014) carried out a systematic study to determine the amphibians and reptiles of the province of Çanakkale and mapped them with the help of GIS. Recently, the herpetofauna of Gediz Delta was mapped in detail and is intended for use in the field and management plans (Arslan et al. 2018). Also, the coordination of TUBITAK and Nature Protection and National Parks General Directorate began the Noah's Ark Biodiversity Database project

(http://www.nuhungemisi.gov.tr) with the aim of conservation and sustainable biodiversity in 2006 and is a work in progress. The data generated in this study will contribute to this project. Until now in almost every province of Turkey biodiversity inventories have been carried out and the data has been transferred to the Noah's Ark Biodiversity Database. The results obtained in this study will provide the opportunity to be evaluated together with literature-based distributions. The availability of the historical and current distribution of species therefore constitutes an important component in conservation-based research (Sillero et al. 2014).

While species diversity increases from south to north and from east to west direction for amphibians, the reptile diversity increases towards the east, southeast, and north of Turkey. We used different sources of information to build a database on Turkish herpetofauna. However, a systematic survey most possibly will change the pattern of richness and endemism maps. The number of records is low in central and eastern Turkey, which is likely to affect species richness and endemism patterns. Herpetofaunal biodiversity hotspots were found where sampling effort was higher in either easily accessible regions or destinations known for rare species. For example, the number of records in central Anatolia is low, due to containing mainly common species. Similar results were reported for Albania (Mizsei et al. 2017, Szabolcs et al. 2017) and Romania (Cogălniceanu et al. 2013a,b). Future studies should focus on those regions to detect the possibility of the presence of rare species or confirmation of common species abundance. According to our results, NE, E, and SE Anatolia were not studied in detail up to now due to different causes and these parts deserve the attention of herpetologists in the future. Herpetologist should focus on these regions to elucidate the actual distribution of species or detect new species known from neighboring countries.

Amphibian endemism is at its highest values in southern, eastern, and northeastern Anatolia. The major of endemic species are Lycian salamanders for southern Anatolia and genus *Neurergus* for eastern Anatolia. For reptiles the highest values of endemism are reached in southeastern and eastern Anatolia. The narrow-distributed or rare species of rock and eremial lizards and mountain vipers especially contribute to endemism in Anatolia. Overall, northeastern, eastern, southern Anatolia are centers of endemism for Turkish herpetofauna.

Among 178 herpetofauna species of Turkey, 30% (11 species) of amphibians and 13% (18 species) of reptiles are included in threatened categories the IUCN Red List. Unfortunately, 24% of the herpetofauna is not listed or in data deficient categories. On the other hand, the status of amphibians and reptiles of Turkey has not been studied in detail and we urgently need a national red list for establishing national conservation priorities.

Aegean and Western Turkey sclerophyllous and mixed forests, Euxine-Colchic deciduous forests, Southern Anatolian montane conifer and deciduous forests, and Anatolian conifer and deciduous mixed forests ecoregions contain half of the amphibian species in Turkey. Likewise, almost half of the reptile species inhabit Eastern Mediterranean conifer-sclerophyllous-broadleaf forests, Southern Anatolian montane conifer and deciduous forests, Aegean and Western Turkey sclerophyllous and mixed forests, Eastern Anatolian montane steppe, and Euxine-Colchic deciduous forests.

For the herpetofauna of Turkey 40 chorotypes are recognized. SW-Asiatic, E-Mediterranean, S-Anatolian endemic, and Turano-Mediterranean elements together contain about 50% of all species.

Herpetofauna across the globe faces threats from both known and unknown sources (Blaustein & Wake 1990, Alford & Richards 1999, Houlahan et al. 2000, Gibbons et al. 2000, Böhm et al. 2013). Amphibians and reptiles are the most threatened vertebrates (Stuart et al. 2008, Hof et al. 2011). Habitat loss and disintegration, environmental pollution, diseases, land-use change, alien species, UV-B radiation, potential impacts of climate change and synergies between them are important threats that suppress both groups (Alford & Richards 1999, Gibbons et al. 2000, Cox & Temple 2009). Sustainable management plans, which will be used effectively to prevent the extinction of amphibians and reptiles, need to be implemented quickly by both public and private organizations worldwide.

The ecosystems of Anatolia have dramatically changed during the approximately ten-thousand years of human activities and moreover, the pressure of major threats on its biodiversity has increased since 1950 (Şekercioğlu et al., 2011). One of the major precautions is focusing on scientific research exploring a better understanding of biodiversity and creating associated conservation strategies. Potential causes of herpetofauna decline in Turkey are mainly human-induced and consist of habitat loss and destruction (e.g. urbanization, construction of roads and dams, intensive agricultural activities), pollution (e.g. agrochemicals, factory waste), over-harvesting (especially the export of amphibians, killing by cats, and dogs), direct persecution, illegal collecting, introduction of alien species (e.g. *Trachemys scripta*, exotic fish and invertebrates) and climate change (reviewed from IUCN Red List). Habitat loss and degradation is one of the greatest threats to amphibian and reptile populations and occurs from a variety of sources like the expansion of urban areas, land conversion for agriculture, the transformation of dry plains into irrigated agricultural fields, forests into tea and hazelnut plantations, reservoirs behind hydroelectric dams, quarrying. Central Anatolia is covered by semi-natural steppes and steppe forests. Unfortunately, steppe and steppe-forest vegetation has been almost halved due to diverse destructive activities (Ambarlı et al. 2016). The reduction and destruction of steppes areas likely have influenced especially reptile diversity in Anatolian landscapes. The pressure of major threats to the Turkish herpetofauna vary with the region. The species living in western and southern Turkey are mainly suffering from urbanization and agriculture activities. The species living in central and eastern Turkey are facing with overgrazing and agricultural area expansion in general. The species in northern Turkey suffer from urbanization and agriculture activities.

The ecological studies of the Turkish herpetofauna started in the 1980s and accelerated after the 2000s. Up to today, the ecology of some species have been studied with respect to population size/status. Long-term studies were

carried out on the ecology and population trend of some frogs and salamanders, however most other studies lasted one year or less. The conservation studies/actions on Turkish amphibians and reptiles are still not at the desired level and few scientists have been focused on conservation studies.

In summary, our study presents an assessment of the current taxonomic status of amphibians and reptiles of Turkey and its distribution patterns on a large scale. However, the mapping of species is a dynamic process and finer-scale data will be obtained in the future. This study will also provide an important contribution for new studies on amphibians and reptiles, in the decision-making process of the public, in the creation of their conservation efforts and activities.

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Appendix 1: The distribution and biogeography of amphibians and reptiles in Turkey

Appendix 2: Map of grid codes in Turkey