

## Chapter 44

# The Amphibians and Reptiles of Euphrates and Tigris Basin



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**Abstract** This chapter focused on Amphibians and Reptiles of Euphrates and Tigris River Basin that is confined to Iraq, Iran, Syria, and Turkey as a main part of Mesopotamia. The Mesopotamian terrestrial biome has an area of approximately 700,000 km<sup>2</sup>, divided into ten main ecoregions. Herpetofauna of the basin includes 10 species of amphibians in 8 genera and 4 families in two orders of Caudata and Anura, furthermore 134 species of reptiles in 64 genera and 21 families, 4 turtle species, 71 species of lizards, 57 species of snakes and 2 species of amphisbaenians. Predominant vegetation along the Euphrates and Tigris River and their tributaries provide food, refuge, and breeding ground for many semiaquatic and aquatic species. The main threats to the survival of amphibians and reptiles in this region are human overexploitation, dam construction, water pollution, illegal fishing methods, ongoing habitat loss and fragmentation, wars, and political conflicts.

### 44.1 Introduction

Historical records show that humans and animals, in this case, amphibians and reptiles, have been living together since antiquity. Archeological investigations have demonstrated these creatures played a significant role as cultural symbols in ancient times (Berthon et al. 2016). This has been investigated in various regions in the Mesopotamia in terms of drawings and carvings on the ceramic pots. Fig. 44.1a displays a tadpole was found in the Jarmoo Plain in the Kurdistan region of Iraq and

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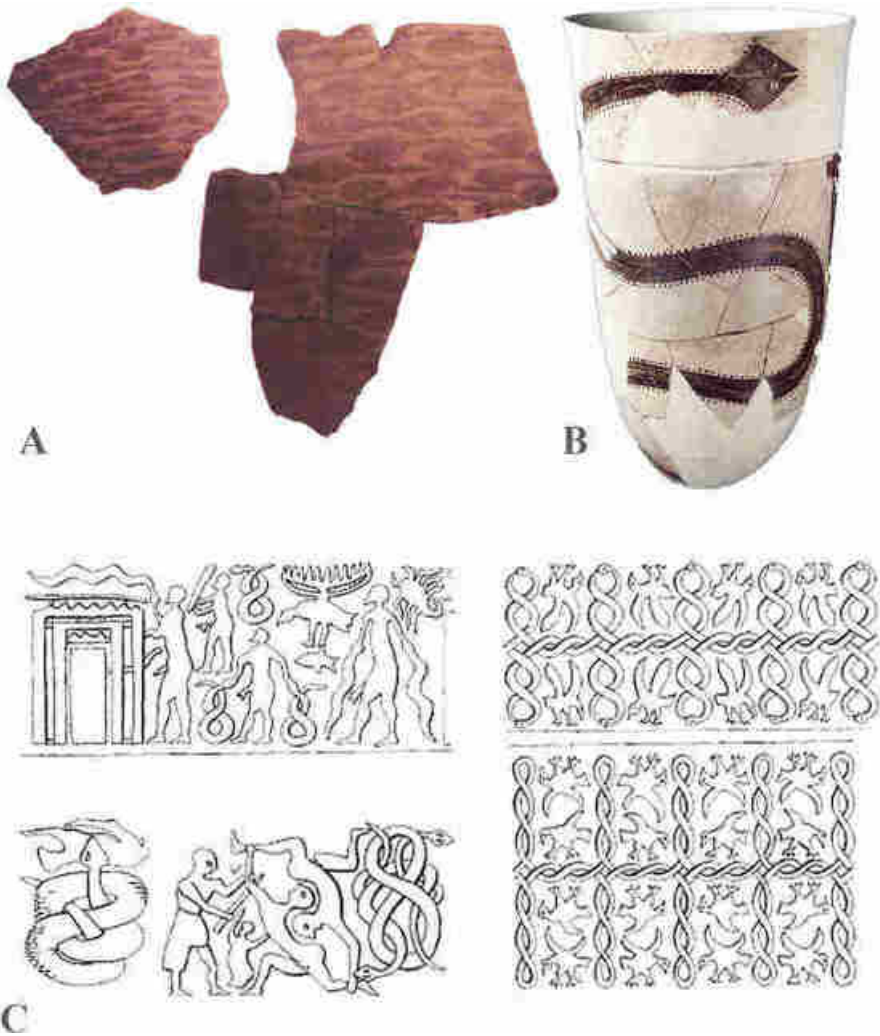
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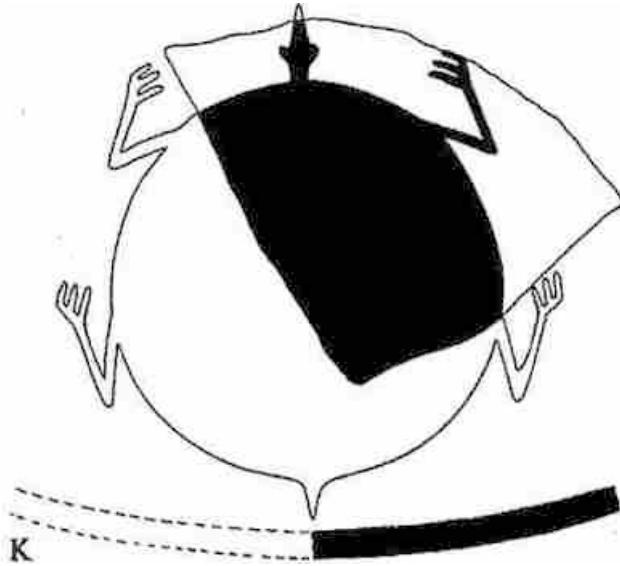
L. A. Jawad (ed.), *Tigris and Euphrates Rivers: Their Environment from Headwaters to Mouth*, Aquatic Ecology Series 11,  
[https://doi.org/10.1007/978-3-030-57570-0\\_44](https://doi.org/10.1007/978-3-030-57570-0_44)

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**Fig. 44.1** (a) Ancient pottery pieces from Mesopotamia showing toadpoles; (b) Snake vase from Susa (Harper et al. 1993: 35); (c) The snake vase and headless intertwined snakes designs: Middle Susiana (Delougaz and Kantor 1996a, b)

Tamarkan east of Baghdad (Braidwood and Howe 1960; Adams Mc 1983: 215–217; Oates 1968: 4) and other artifacts on snakes (individual or intertwined) (Fig. 44.1b, c) as well as turtles were discovered east of Mesopotamia in Choghamish of Khuzestan Province of Iran (Fig. 44.2) dating back to Middle ages of Susiana (Delougaz and Kantor 1996a, b), which reflects a background of at least 7000 years between humans and reptiles.



**Fig. 44.2** The three-clawed turtle on pottery from Choghamish, Late Middle Susiana (Delougaz and Kantor 1996a, b)

In Middle Susiana 3 (5700–4700 BC), snakes were favored designs compared to earlier ages (Kantor 1976). Furthermore, ceramic pots designed with three-clawed turtles and elongated snout, round and flat shell, have been found, which are very similar to the Euphrates softshell turtles. This species of turtle still lives along the Mesopotamian rivers, including Tigris, Euphrates, and their tributaries in Iran, Iraq, Syria, and Turkey (Fig. 44.2).

## 44.2 A Short History of Herpetology and Herpetological Publications in Mesopotamia

In terms of new reptiles description on the border of Iraq and Iran from 2015 to 2019, Böhme et al. (2015); Torki (2017); Safaei-Mahroo et al. (2017); Nazarov et al. (2018); and Ablonski et al. (2019) have shown that Mesopotamia is a part of the world that is still herpetologically unexplored.

The first naturalist who visited Mesopotamia was Guillaume-Antoine Olivier, who made extensive expeditions to Persia, Syria, and parts of Turkey from 1792 to 1799. Blanford (1874) described two new lizards from Mesopotamia and Southern Persia. Werner contributed significantly to the herpetology of Mesopotamia; in contributions to the knowledge of the fauna of Syria and Persia paper published in 1929, he described reptiles from Damascus to Baghdad and Basra, which Alford

Gabriel collected and gave him. Werner (1895) described *Phylodactylus elisae* and *Hemidactylus bornmulleri* from Iraq that were collected by Josef Bornmuller, who was a botanist.

Boulenger (1920a, b) published lists of snakes and lizards collected by members of the Mesopotamian Expeditionary Force from 1915 to 1919 and sent to the Museum of Bombay Natural History Society. Procter (1921) recorded the remaining list of reptiles from Mesopotamia.

Schmidt (1939) was a reptiles and amphibians curator in the Field Museum of Natural History; he reported herpetological specimens deposited in the Field Museum, collected by Henry Field from Iraq during the Marshall Field North Arabian Expedition in 1928 and other collectors from various surveys and investigations. A list of amphibians and reptiles collected by the 1950 and 1955 expeditions from Iran, Iraq, and Syria was published by Henry Field (Anderson 1999).

The specimens of the Austrian Expedition were deposited in the Vienna Natural History Museum were reported by Wettstein (1951), including reptiles and amphibians from Iran and Iraq (Anderson 1999). Bodenheimer and Theodor provided herpetological collections from Baghdad and Addaye; the account of these collections was published by Haas (1952). Hass and Werner (1969) published a report on a collection of reptiles collected by Henry Field from Syria, Iraq, Iran, Saudi Arabia, and Pakistan. The book *Reptiles of Iraq with Some Notes on the Amphibians* was published by Khalaf in 1959, and Nader and Jawdat (1976) published a taxonomic study of the geckos of the Iraq book. By far, the most comprehensive literature on the herpetofauna of the Middle East is Handbook to Middle East Amphibians and Reptiles (Leviton et al. 1992).

### 44.3 Mesopotamian Biogeography Relative to Reptiles and Amphibians Distribution

In this chapter, we focus on Euphrates and Tigris River Basin that are confined to Iraq, Iran, Syria, and Turkey as a main part of Mesopotamia shown in Fig. 44.3; the boundaries are based on the Euphrates and Tigris River Basin (UN-ESCWA and BGR 2013). The area has a surface of 700,000 km<sup>2</sup> and consists of a diverse range of habitats from complex mountain chains in the north and east to flat, low-lying plains in the center and south.

Mesopotamia is located in Palearctic Zoogeographic Region, the study area located in the western Palearctic (Sindaco et al. 2013). Olson et al. (2001) subdivides the terrestrial world into distinct ecoregions, the main Mesopotamian terrestrial ecoregions including: the Tigris-Euphrates alluvial salt marsh (24,571 km<sup>2</sup>, 3.5%), the Arabian Desert, and East Sahero-Arabian xeric shrublands (162,487 km<sup>2</sup>, 23.1%), the Eastern Anatolian deciduous forests (67,958 km<sup>2</sup> 9.7%), the Eastern Anatolian montane steppe (41,224 km<sup>2</sup> 5.9%), the Eastern Mediterranean conifer-sclerophyllous-broadleaf forests (56,334 km<sup>2</sup> 8%), the Mesopotamian shrub desert



**Fig. 44.3** Ecoregions of Euphrates and Tigris River Basin (based on UN-ESCWA and BGR 2013 and Olson et al. 2001)

(159,554 km<sup>2</sup> 22.7%), the Middle East steppe (947,71 km<sup>2</sup> 13.5%), the Northern Anatolian conifer and deciduous forests (5131 km<sup>2</sup>, 0.7%), the Southern Iran Nubio-Sindian desert and semi-desert (8779 km<sup>2</sup>, 1.3%), the Zagros Mountains forest steppe (81,047 km<sup>2</sup>, 11.5%).

These species are widely distributed throughout the region: *Bufo* *sitibundus*, *Hyla savignyi*, *Pelophylax bedriagae*, *Trapelus ruderatus*, *Uromastix aegyptia*, *Bunopus tuberculatus*, *Cyrtopodion scabrum*, *Hemidactylus persicus*, *Mediodactylus heterocercus*, *Asaccus elisae*, *Ophisops elegans*, *Acanthodactylus boskianus*, *Heremites septemtaeniatus*, *Varanus griseus*, *Dolichophis jugularis*, *Platycephalus chesneii*, *P. najadum*, *Malpolon insignitus*, *Natrix tessellata*, *Eryx jaculus*, *Myriopholis macrorhyncha*, *Macrovipera lebetinus*.

In the northern part of the Euphrates and Tigris River Basin, Common reptiles are found: *Lacerta media*, *Eumeces schneideri*, *Dolichophis schmidti*, *Eirenis (Pediophis) eiselti*, *E. (P.) punctatolineatus*, *Hemorrhhois nummifer*, *H. ravergieri*, *Xerophylops vermicularis*, *Natrix natrix*, *Testudo graeca*. Species confined to the southern of the Euphrates and Tigris River Basin include *Hemidactylus flaviviridis*, *Mesalina bernoullii*, *Eirenis (Pediophis) coronella*, *Spalerosophis diadema cliffordii*, *Walterinnesia aegyptia morgani*.

There are similarities between the upper and lower boundaries of the Euphrates and Tigris River Basin in this section and those described by Smith et al. 2014. We corroborate the idea of Smith et al. (2014), who suggested that there are endemic species, which are dependent on freshwater habitats and springs, especially Caudata such as *Salamandra infraimmaculata semenovi*, *Neurergus crocatus*, *N. derjugini* and *N. strauchii*, in the upper part of the basin that are not found in the lower part.

The factor of altitude plays a crucial role in the dispersal of amphibians and reptiles of Mesopotamia. The mountains of eastern and northeastern Turkey are the origins of the Tigris and Euphrates Rivers, which prolong from the highland to the low-lying regions of the southern Mesopotamian regions, and the elevation relatively and moderately decreases from the north to the south. This characteristic in controlling the amount of relative humidity, has been the cause of a regulated modification of vegetation throughout Mesopotamia such that the mountainous and forest areas in the north and east have been directly under the impact of Mediterranean rainfalls; and consequently, amphibian and reptile species, which are more dependent on the mountainous and forestry regions, namely, *Salamandra infraimmaculata semenovi*, *Neurergus crocatus*, *N. derjugini*, *N. strauchii*, *Hemidactylus kurdicus* and *Timon kurdistanica*, have been inhabited here.

The warm and dry climate and little precipitation of lowland and flat areas of the central and southern parts except for the rivers and marshlands shoreline are mainly caused by the climate of northern Arabia. These areas are suitable habitats for reptiles inhabit the north of the Arabian Desert to North Africa like *Acanthodactylus*, *Stenodactylus*, *Trigonodactylus*, *Cerastes*, *Echis*, *Platyceps*, and *Rhagerhis* genera.

Taurus-Zagros Mountain range is located between the mountainous area and the Mesopotamian lowlands extending from north to eastern parts of Mesopotamia (across Iran, northern Iraq, and Turkey). This ecotone between forests and grasslands plays an important role in herpetofaunal diversity and speciation. This humid temperate zone has enriched biodiversity of 14 endemic amphibians and reptiles that are as follows: *Neurergus crocatus*, *N. derjugini*, *Salamandra infraimmaculata semenovi*, *Hemidactylus kurdicus*, *Mediodactylus ilamensis*, *Microgecko helenae fasciatus*, *Eremias montana*, *Timon kurdistanica*, *Asaccus andersoni*, *A. kurdistanensis*, *A. saffinae*, *Varanus nesterovi*, *Lytorhynchus levitoni*, *Pseudocerastes urarachnoide*.

Biogeographical factor is the major driver of herpetofauna patterns in the Euphrates and Tigris River Basin. With 11 ecoregions, each has its own endemic species. Endemic species of amphibians and reptiles of Mesopotamian range in each biome and ecoregion are listed in Table 44.1.

The Zagros Mountain range in northern Iraq that extends to western and southern Iran creates a barrier and a corridor for amphibians and reptiles in Mesopotamia (Anderson 1999).

Tigris and Euphrates Rivers and their tributaries are other major elements of Mesopotamian species diversity. This freshwater ecosystem is titled as factors limiting the dispersion of terrestrials and for riverine reptiles, such as the pond turtle, watersnake, and likewise, for Anura, such as the tree frog and marsh frog, are like the main corridor for the transition and distribution of species.



**Table 44.1** Hepheto fauna of Mesopotamia in deferent ecoregions

Biome <i>Ecoregion</i>	Common Species	Endemic species to the Mesopotamia
<b>Desert and Xeric Shrublands</b>		6 Endemic species
<b>Arabian Desert and East Sahero-Arabian xeric shrublands</b>	<i>Uromastyx aegyptia</i> , <i>Hemidactylus flaviviridis</i> , <i>H. persicus</i> , <i>H. robustus</i> , <i>Stenodactylus affinis</i> , <i>S. slevini</i> , <i>Platyceps rogersi</i> , <i>Cerastes gasperetti</i> , <i>Echis carinatus</i>	<i>Diplometopon zarudnyi</i> , <i>Acanthodactylus grandis</i>
<b>Mesopotamian shrub desert</b>	<i>Uromastyx aegyptia</i> , <i>Trapelus pallidus</i> , <i>Stenodactylus grandiceps</i> , <i>Acanthodactylus scutellatus</i> , <i>A. trisrami</i> , <i>Lytorhynchus diademata</i> , <i>L. kennedyi</i> , <i>Platyceps rhodorachis</i> , <i>Telescopus nigriceps</i>	<i>Acanthodactylus nilsoni</i>
<b>South Iran Nubio-Sindian desert and semi-desert</b>	<i>Saara loricata</i> , <i>Stenodactylus affinis</i> , <i>Rhagerhis moitensis</i> , <i>Echis carinatus</i>	<i>Phrynocephalus abuvazicus</i> , <i>Xerotyphlops wilsoni</i> , <i>Trigonodactylus persicus</i>
<b>Flooded grasslands and savannas</b>		1 Endemic species
<b>Tigris-Euphrates alluvial salt marsh</b>	<i>Mauremys caspica</i> , <i>Natrix tessellata</i>	<i>Rafetus euphraticus</i>
<b>Mediterranean Forests, Woodlands, and Scrub</b>		6 Endemic species
<b>Eastern Anatolian deciduous forests</b>	<i>Salamandra infraimmaculata</i> , <i>Stellagama stellio</i> , <i>Elaphe dione</i> , <i>Zamenis hohemackeri</i> , <i>Macrovipera lebetinus</i>	<i>Neuregus strauchii</i> , <i>Elaphe urartica</i> , <i>Eirenis (Pseudocyclophis) thospitis</i>
<b>Eastern Mediterranean conifer-sclerophyllous-broadleaf forests</b>	<i>Bianus strauchi</i> , <i>Stellagama stellio</i> , <i>Macrovipera lebetinus</i>	<i>Acanthodactylus harranensis</i> , <i>Apalyha cappadocica schmidlerorum</i> , <i>Asaccus barani</i>
<b>Temperate broadleaf and mixed forest</b>		14 Endemic species
<b>Zagros Mountains forest steppe</b>	<i>Hyla savignyi</i> , <i>Pseudopus apodus</i> , <i>Eublepharis angramainyu</i> , <i>Laudakia nupta</i> , <i>Hemidactylus persicus</i> , <i>Mediodactylus kotschyi</i> , <i>M. heterocercus</i> , <i>M. heteropholis</i> , <i>Apalyha cappadocica</i> , <i>Asaccus granularis</i> , <i>Eirenis (Pediphis) collaris</i> , <i>E. (P.) nigrofasciatus</i> , <i>Elaphe saurornates</i> , <i>Hierophis andreaemus</i> , <i>Platyceps rhodorachis</i> , <i>Spaterosphis microlepis</i> , <i>Telescopus nigriceps</i> , <i>T. tessellatus</i> , <i>Psammophis schokari</i> , <i>Macrovipera lebetinus</i> , <i>Montivipera raddei</i>	<i>Callispora turistanica</i> , <i>Neuregus crocatus</i> , <i>N. derjugini</i> , <i>Salamandra infraimmaculata semenovi</i> , <i>Hemidactylus kurdicus</i> , <i>Mediodactylus lamensis</i> , <i>Microgecko heleneae fasciatus</i> , <i>Eremias montana</i> , <i>Timon kurdistanica</i> , <i>Asaccus andersoni</i> , <i>A. kurdistanensis</i> , <i>A. saffinae</i> , <i>Varamus nesterovi</i> , <i>Lytorhynchus levitoni</i> , <i>Pseudocercastes urarachnoides</i>
<b>Temperate Grasslands, Savannas, and Shrublands</b>		1 Endemic species
<b>Eastern Anatolian montane steppe</b>	<i>Salamandra infraimmaculata</i> , <i>Neuregus strauchii</i> , <i>Paralaudakia caucasia</i> , <i>Eremias suphanti</i> , <i>Zamenis hohemackeri</i> , <i>Z. longissimus</i> , <i>Montivipera raddei</i>	<i>Durewska sapphirina</i>
<b>Middle East steppe</b>	<i>Mediodactylus heterocercus</i>	
<b>Freshwater</b>		4 Endemic species
<b>Lakes and Rivers</b>	<i>Hyla savignyi</i> , <i>Pelophylax bebrugae</i> , <i>Mauremys caspica</i> , <i>Natrix tessellata</i>	<i>Neuregus crocatus</i> , <i>N. derjugini</i> , <i>N. strauchii</i> , <i>Rafetus euphraticus</i>
<b>Residential areas</b>	<i>Bufootes sibirundus</i> , <i>Cyrtopodion scabrum</i> , <i>Hemidactylus flaviviridis</i> , <i>H. persicus</i>	
<b>Other</b>		

**Terrestrial Biomes**

#### 44.4 Amphibians and Reptiles of Euphrates and Tigris River Basin

The Euphrates and the Tigris River Basin is located in a climate transition zone between the desert and humid continental climates; furthermore, high habitat diversity, including mountainous regions, flat and dry plains, marshland, and riverine habitats, has caused herpetofaunal species richness and diversity in this region. The reptiles of Euphrates and Tigris River Basin are 134 species in 64 genera and 21 families, 4 turtle species, 71 species of lizards, 57 species of snakes, and 2 species of amphisbaenians. The *Acanthodactylus* genera with 10 species and relative to the Lacertidae family and the *Asaccus* genus with 7 species from the Phyllodactylidae family are the most diverse groups. Among the snakes' family, Colubridae with 11 species, is the most diverse group. There are also 10 species of amphibians in 8 genera, and 4 families in two orders of Caudata and Anura have been reported in this area. By taking into consideration that half of this basin is dry, there are 3 species and one sub-species of the endemic Salamander, which is extremely significant (Table 44.2). The *Neurergus* genus with 3 species and 3 sub-species from the Salamandridae family, all are endemic to the mountainous area of this basin.

#### 44.5 Checklist of Amphibians in Mesopotamia

Class: Amphibia Gray, 1825

Order: Anura Fischer von Waldheim, 1813

Family: Bufonidae Gray, 1825

Genus: *Bufotes* Rafinesque, 1815

*Bufotes sitibundus* (Pallas, 1771)

Genus: *Calliopersa* Safaei-Mahroo & Ghaffari, 2020

*Calliopersa luristanica* (Schmidt, 1952)

Family: Hylidae Rafinesque, 1815

Subfamily: Hylinae Rafinesque, 1815

Genus: *Hyla* Laurenti, 1768

*Hyla savignyi* Audouin, 1827

Family: Ranidae Rafinesque, 1814

Genus: *Pelophylax* Fitzinger, 1843

*Pelophylax bedriagae* (Camerano, 1882)

Genus: *Rana* Linnaeus, 1758

*Rana macrocnemis* Boulenger, 1885

Order: Caudata Scopoli, 1777

Family: Salamandridae Goldfuss, 1820

Subfamily: Pleurodelinae Tschudi, 1838

Genus: *Neurergus* Cope, 1862

*Neurergus crocatus* Cope, 1862



**Table 44.2** Amphibians and reptiles of Euphrates and Tigris River

Class	Order	Suborder	Family	Subfamily: Genus	Total Number
<b>Amphibia</b>	<b>Anura</b>		Bufonidae	<i>Bufoies, Calliopera</i>	<b>2 orders, 4 families, 8 genera, 10 species</b>
			Hylidae	<i>Hyla</i>	3 families, 5 genera, 5 species
			Ranidae	<i>Pelophylax, Rana</i>	2 genera, 2 species
	<b>Caudata</b>		Salamandridae	Pleurodelinae: <i>Neuregus, Ommatourilon</i> Salamandrinae: <i>Salamandra</i>	1 family, 3 genera, 5 species 3 genera, 5 species
<b>Reptilia</b>	<b>Squamata</b>	<b>Amphisbaenia</b>	Trogonophiidae	<i>Bianus, Diplomatopon</i>	<b>2 orders, 21 families, 64 genera, 134 species</b>
		<b>Sauria</b>	Agamidae	Agaminae: <i>Laudakia, Paralaudakia, Phrynoscephalus, Stellagama, Tropidus</i> Uromastycinae: <i>Saura, Uromastyx</i> Anguinae: <i>Pseudopus</i> Eublepharidae Gekkonidae	1 family, 2 genera, 2 species 2 genera, 2 species <b>8 families, 32 genera, 71 species</b> 7 genera, 9 species 1 genus, 1 species 1 genus, 1 species
			Lacertidae	<i>Bunopus, Cyrtopodion, Hemidactylus, Microgecko, Stenodactylus, Trigonodactylus</i> <i>Acanthodactylus, Apathya, Darevskia, Eremias, Lacerta, Mesalina, Ophisops, Parvilacerta, Timon</i> <i>Asaccus, Pyrodactylus</i>	7 genera, 17 species 9 genera, 23 species
			Phyllodactylidae	<i>Eugongylus, Ablepharus</i>	2 genera, 9 species
			Scincidae	Mabuyinae: <i>Heremites</i> Scincinae: <i>Chalcides, Eumeces, Scincus</i> <i>Varanus</i>	5 genera, 9 species
			Varanidae		1 genus, 2 species
	<b>Serpentes</b>		Colubridae	Colubrinae: <i>Dolichophis, Eirenis, Elaphis, Hemorrhois, Hierophis, Lytorhynchus, Platyseps, Rhyhococalamus, Spalerosophis, Telescopus, Zamenis</i> Natricinae: <i>Natrix</i> Elapinae: <i>Walterinnesia</i> <i>Eryx</i>	<b>8 families, 25 genera, 57 species</b> 12 genera, 39 species
			Elapidae		1 genus, 1 species
			Erycidae		1 genus, 3 species
			Lamprophiidae	Malpophiinae: <i>Malpolon, Rhagerhis</i>	2 genera, 2 species
			Leptotyphlopidae	Myriophiinae: <i>Myriopholis</i>	1 genus, 1 species
			Psammodiidae	<i>Psammodphis</i>	1 genus, 1 species
			Typhlopidae	<i>Indotyphlops, Xerotyphlops</i>	2 genera, 3 species
			Viperidae	Viperinae: <i>Cerastes, Echis, Macrovipera, Montivipera, Pseudocerastes</i>	5 genera, 7 species
<b>Testudines</b>		<b>Cryptodira</b>	Emydidae	<i>Emys</i>	<b>4 families, 4 genera, 4 species</b>
			Geoemydidae	Geoemydinae: <i>Mauromys</i>	1 genus, 1 species
			Testudinidae	<i>Testudo</i>	1 genus, 1 species
			Trionychidae	Trionychinae: <i>Rafetus</i>	1 genus, 1 species

*Neurergus derjugini* (Nesterov, 1916)  
*Neurergus strauchii* (Steindachner, 1887)  
*N. s. barani* Öz, 1994  
*N. s. munzurensis* Olgun, Avci, Bozkurt, Üzüim, Olgun & Ilgaz, 2016  
*N. s. strauchii* (Steindachner, 1887)  
 Genus: **Ommatotriton** Gray, 1850  
**Ommatotriton vittatus** (Gray, 1835)  
 Subfamily: Salamandrinae Goldfuss, 1820  
 Genus: **Salamandra** Garsault, 1764  
**Salamandra inframaculata** (Martens, 1885)  
*S. i. semenovi* Nesterov, 1916

#### 44.6 Checklist of Reptilians in Mesopotamia

Class: Reptilia Laurenti, 1768  
 Order: Testudines Batsch, 1788  
 Suborder: Cryptodira Cope, 1868  
 Family: Emydidae Gray, 1825  
 Subfamily: Emydinae Rafinesque, 1815  
 Genus: **Emys** Duméril, 1806  
**Emys orbicularis** (Linnaeus, 1758)  
*E. o. colchica* Fritz, 1994  
 Family: Geoemydidae Theobald, 1868  
 Subfamily: Geoemydinae Theobald, 1868  
 Genus: **Mauremys** Gray, 1869  
**Mauremys caspica** (Gmelin, 1774)  
 Family: Testudinidae Batsch, 1788  
 Genus: **Testudo** Linnaeus, 1758  
**Testudo graeca** Linnaeus, 1758  
*T. g. boxtoni* Boulenger, 1921  
*T. g. armeniaca* Chkhikvadze & Bakradze, 1991  
*T. g. zarudnyi* Nikolsky, 1896  
 Family: Trionychidae Fitzinger, 1826  
 Subfamily: Trionychinae Gray, 1825  
 Genus: **Rafetus** Gray, 1864  
**Rafetus euphraticus** (Daudin, 1802)  
 Order: Squamata Opperl, 1811  
 Suborder: Amphisbaenia Gray, 1844  
 Family: Trogonophidae Gray, 1865  
 Genus: **Blanus** Wagler, 1830  
**Blanus strauchi** (Bedriaga, 1884)  
*B. s. bedriagae* Boulenger, 1884  
 Genus: **Diplometopon** Nikolsky, 1907

- Diplometopon zarudnyi* Nikolsky, 1907  
 Suborder: Sauria McCarthney, 1822  
 Family: Agamidae Spix, 1825  
 Subfamily: Agaminae Spix, 1825  
 Genus: *Laudakia* Gray, 1845  
*Laudakia nupta* (De Filippi, 1843)  
*L. n. nupta* (De Filippi, 1843)  
 Genus: *Paralaudakia* Baig, Wagner, Ananjeva & Böhme, 2012  
*Paralaudakia caucasia* (Eichwald, 1831)  
 Genus: *Phrynocephalus* Kaup, 1825  
*Phrynocephalus ahvazicus* Melnikov, Melnikova, Nazarov, Rajabizadeh, Al-Johany, Amr & Ananjeva, 2014  
 Genus: *Stellagama* Baig, Wagner, Ananjeva & Böhme, 2012  
*Stellagama stellio* (Linnaeus, 1758)  
 Genus: *Trapelus* Cuvier, 1816  
*Trapelus agilis* (Olivier, 1804)  
*T. a. khuzistanensis* Rastegar-Pouyani, 1999  
*Trapelus mutabilis* (Merrem, 1820)  
*T. m. pallidus* (Reuss, 1834)  
*Trapelus ruderatus* (Olivier, 1804)  
*T. r. ruderatus* (Olivier, 1804)  
 Subfamily: Uromastycinae Theobald, 1868  
 Genus: *Saara* Gray, 1845  
*Saara loricata* (Blanford, 1874)  
 Genus: *Uromastyx* Merrem, 1820  
*Uromastyx aegyptia* (Forskål, 1775)  
*U. a. microlepis* Blanford 1874  
 Family: Anguidae Gray, 1825  
 Subfamily: Anguinae Gray, 1825  
 Genus: *Pseudopus* Merrem, 1820  
*Pseudopus apodus* (Pallas, 1775)  
 Family: Eublepharidae Boulenger, 1883  
 Genus: *Eublepharis* Gray, 1827  
*Eublepharis angramainyu* Anderson & Leviton, 1966  
 Family: Gekkonidae Gray, 1825  
 Genus: *Bunopus* Blanford, 1874  
*Bunopus tuberculatus* Blanford, 1874  
 Genus: *Cyrtopodion* Fitzinger, 1843  
*Cyrtopodion scabrum* (Heyden, 1827)  
 Genus: *Hemidactylus* Oken, 1817  
*Hemidactylus flaviviridis* Rüppell, 1835  
*Hemidactylus kurdicus* Safaei-Mahroo, Ghaffari, Ghafoor & Amini, 2017  
*Hemidactylus persicus* Anderson, 1872  
*Hemidactylus robustus* Heyden, 1827  
*Hemidactylus turcicus* (Linnaeus, 1758)

Genus: *Mediodactylus* Szczerbak & Golubev, 1977

*Mediodactylus heterocercus* (Blanford, 1874)

*M. h. heterocercus* (Blanford, 1874)

*M. h. mardinensis* (Mertens, 1924)

*Mediodactylus heterophilis* (Minton, Anderson & Anderson, 1970)

*Mediodactylus kotschy* (Steindachner, 1870)

*M. k. syriacus* (Stepánek, 1937)

*Mediodactylus ilamensis* (Fathinia, Karamiani, Darvishnia, Heidari & Rastegar-Pouyani, 2011)

Genus: *Microgecko* Nikolsky, 1907

*Microgecko helenae* Nikolsky, 1907

*M. h. helenae* Nikolsky, 1907

*M. h. fasciatus* (Schmidtler & Schmidtler, 1972)

Genus: *Stenodactylus* Fitzinger, 1826

*Stenodactylus affinis* (Murray, 1884)

*Stenodactylus doriae* (Blanford, 1874)

*Stenodactylus grandiceps* Haas, 1952

*Stenodactylus slevini* Haas, 1957

Genus: *Trigonodactylus* Hass, 1957

*Trigonodactylus persicus* Nazarov, Melnikov, Radjabizadeh & Poyarkov, 2018

Family: Lacertidae Bonaparte, 1831

Genus: *Acanthodactylus* Fitzinger, 1834

*Acanthodactylus boskianus* (Daudin, 1802)

*A. b. euphraticus* Boulenger, 1919

*Acanthodactylus grandis* Boulenger, 1919

*Acanthodactylus harranensis* Baran, Kumlutas, Lanza, Sindaco, Avci & Crucitti, 2005

*Acanthodactylus nilsoni* Rastegar-Pouyani, 1998

*Acanthodactylus ophiodurus* Arnold, 1980

*Acanthodactylus orientalis* Angel, 1936

*Acanthodactylus robustus* Werner, 1929

*Acanthodactylus schmidti* Haas, 1957

*Acanthodactylus scutellatus* (Audouin, 1827)

*Acanthodactylus tristrami* (Günther, 1864)

Genus: *Apathya* Mehely, 1907

*Apathya cappadocica* (Werner, 1902)

*A. c. cappadocica* (Werner, 1902)

*A. c. muhtari* (Eiselt, 1979)

*A. c. schmidtlerorum* (Eiselt, 1979)

*A. c. urmiana* (Lantz & Suchow, 1934)

*A. c. wolteri* (Bird, 1936)

Genus: *Darevskia* Arribas, 1997

*Darevskia raddei* (Boettger, 1892)

*D. r. vanensis* (Eiselt, Schmidtler & Darevsky, 1993)

*Darevskia sapphirina* (Schmidtler, Eiselt & Darevsky, 1994)

- Darevskia valentini* (Boettger, 1892)  
 Genus: *Eremias* Fitzinger, 1834  
*Eremias montana* Rastegar-Pouyani & Rastegar-Pouyani, 2001  
*Eremias suphani* Başoğlu & Hellmich, 1968  
 Genus: *Lacerta* Linnaeus, 1758  
*Lacerta media* Lantz & Cyrén, 1920  
*L. m. media* Lantz & Cyrén, 1920  
 Genus: *Mesalina* Gray, 1838  
*Mesalina bernoullii* (Schenkel, 1901)  
*Mesalina guttulata* (Lichtenstein, 1823)  
*Mesalina microlepis* (Angel, 1936)  
 Genus: *Ophisops* Ménétries, 1832  
*Ophisops elegans* Ménétries, 1832  
*O. e. blanfordi* Schmidt, 1939  
*O. e. ehrenbergii* (Wiegmann, 1835)  
*O. e. elegans* Menetries, 1832  
*O. e. centralanatoliae* Bodenheimer, 1944  
 Genus: *Parvilacerta* Arnold, Arribas & Carranza, 2007  
*Parvilacerta parva* (Boulenger, 1887)  
 Genus: *Timon* Tschudi, 1836  
*Timon kurdistanica* Suchow, 1936  
 Family: Phyllodactylidae Gamble, Bauer, Greenbaum & Jackman, 2008  
 Genus: *Asaccus* Dixon & Anderson, 1973  
*Asaccus andersoni* Torki, Fathinia, Rostami, Gharzi & Nazari-Serenjeh, 2011  
*Asaccus barani* Torki, Ahmadzadeh, Ilgaz, Avci & Kumlutas, 2011  
*Asaccus elisae* (Werner, 1895)  
*Asaccus granularis* Torki, 2010  
*Asaccus griseonotus* Dixon & Anderson, 1973  
*Asaccus kurdistanensis* Rastegar-Pouyani, Nilson & Faizi, 2006  
*Asaccus saffinae* Afrasiab & Mohamad, 2009  
 Genus: *Ptyodactylus* Goldfuss, 1820  
*Ptyodactylus guttatus* Heyden, 1827  
*Ptyodactylus puiseuxi* Boutan, 1893  
 Family: Scincidae Opperl, 1811  
 Subfamily: Eugongylineae Welch, 1982  
 Genus: *Ablepharus* Fitzinger, 1823  
*Ablepharus chernovi* Darevsky, 1953  
*Ablepharus kitaibelii* (Bibron & Bory 1833)  
*Ablepharus pannonicus* Fitzinger, 1823  
 Subfamily: Mabuyinae Mittleman, 1952  
 Genus: *Heremites* Karin, Metallinou, Weinell, Jackman, & Bauer, 2016  
*Heremites auratus* (Linnaeus, 1758)  
*H. a. transcaucasica* (Chernov, 1926)  
*Heremites septemtaeniatus* (Reuss, 1834)  
*Heremites vittatus* (Olivier, 1804)

Subfamily: Scincinae Gray, 1825

Genus: *Chalcides* Laurenti, 1768

*Chalcides ocellatus* (Forskål, 1775)

*C. o. ocellatus* (Forskål, 1775)

Genus: *Eumeces* Wiegmann, 1834

*Eumeces schneideri* (Daudin, 1802)

*E. s. pavimentatus* (Geoffroy, 1827)

*E. s. princeps* (Eichwald, 1839)

Genus: *Scincus* Laurenti, 1768

*Scincus scincus* (Linnaeus, 1758)

*S. s. conirostris* Blanford, 1881

Family: Varanidae Gray, 1827

Genus: *Varanus* Merrem, 1820

*Varanus griseus* (Daudin, 1803)

*V. g. griseus* (Daudin, 1803)

*Varanus nesterovi* Böhme, Ehrlich, Milto, Orlov & Scholz, 2015

Suborder: Serpentes Linnaeus, 1758

Family: Colubridae Oppel, 1811

Subfamily: Colubrinae Oppel, 1811

Genus: *Dolichophis* Gistel, 1868

*Dolichophis caspius* (Gmelin, 1789)

*D. c. caspius* (Gmelin, 1789)

*Dolichophis jugularis* (Linnaeus, 1758)

*D. j. jugularis* (Linnaeus, 1758)

*Dolichophis schmidtii* (Nikolsky, 1909)

Genus: *Eirenis* Jan, 1863

Subgenus: *Eirenis* Jan, 1863

*Eirenis (Eirenis) modestus* (Martin, 1838)

*E. (E.) m. modestus* (Martin, 1838)

Subgenus: *Pediophis* Fitzinger, 1843

*Eirenis (Pediophis) collaris* (Ménétries, 1832)

*E. (P.) c. collaris* (Ménétries, 1832)

*Eirenis (Pediophis) coronella* (Schlegel, 1837)

*E. (P.) c. coronella* (Ménétries, 1832)

*Eirenis (Pediophis) coronelloides* (Jan, 1862)

*Eirenis (Pediophis) decemlineatus* (Duméril, Bibron & Duméril, 1854)

*Eirenis (Pediophis) eiselti* Schmidtler & Schmidtler, 1978

*Eirenis (Pediophis) hakkariensis* Schmidtler & Eiselt, 1991

*Eirenis (Pediophis) punctatolineatus* (Boettger, 1892)

*E. (P.) p. condoni* (Boulenger, 1920)

*E. (P.) p. punctatolineatus* (Boettger, 1892)

Subgenus: *Pseudocyclophis* Boettger, 1888

*Eirenis (Pseudocyclophis) nigrofasciatus* (Nikolsky, 1907)

*Eirenis (Pseudocyclophis) occidentalis* Rajabizadeh, Nagy, Adriaens, Avci, Masroor, Schmidtler, Nazarov, Esmaeili & Christiaens, 2015

*Eirenis (Pseudocyclophis) persicus* (Anderson, 1872)

*Eirenis (Pseudocyclophis) thospitis* Schmidtler & Lanza, 1990

*Eirenis (Pseudocyclophis) walteri* Boettger, 1888

Genus: *Elaphe* Fitzinger, 1833

*Elaphe dione* (Pallas, 1773)

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

Genus: *Hemorrhois* Boie, 1826

*Hemorrhois nummifer* (Reuss, 1834)

*Hemorrhois ravigieri* (Ménétries, 1832)

Genus: *Hierophis* Fitzinger, 1843

*Hierophis andreanus* (Werner, 1917)

Genus: *Lytorhynchus* Peters, 1862

*Lytorhynchus diadema* (Dumeril, Bibron & Dumeril, 1854)

*L. d. gaddi* (Nikolsky, 1907)

*Lytorhynchus kennedyi* Schmidt, 1939

*Lytorhynchus levitoni* Torki, 2017

*Lytorhynchus maynardi* Alcock & Finn, 1897

*Lytorhynchus ridgewayi* Boulenger, 1887

Genus: *Platyceps* Blyth, 1826

*Platyceps chesneii* (Martin, 1838)

*Platyceps collaris* (Müller, 1878)

*Platyceps najadum* (Eichwald, 1831)

*P. n. najadum* (Eichwald, 1831)

*P. n. schmidtleri* (Schätti & Mccarthy, 2001)

*Platyceps rhodorachis* (Jan, 1865)

*P. r. ladacensis* (Anderson, 1871)

*P. r. rhodorachis* (Jan, 1865)

*Platyceps rogersi* (Anderson, 1893)

Genus: *Rhynchocalamus* Günther, 1864

*Rhynchocalamus satunini* (Nikolsky, 1899)

Genus: *Spalerosophis* Jan, 1843

*Spalerosophis diadema* (Schlegel, 1837)

*S. d. cliffordii* (Schlegel, 1837)

*Spalerosophis microlepis* Jan, 1865

Genus: *Telescopus* Wagler, 1830

*Telescopus fallax* Fleischmann, 1831

*T. f. iberus* Eichwald, 1831

*Telescopus nigriceps* (Ahl, 1924)

*Telescopus tessellatus* (Wall, 1908)

*T. t. martini* (Schmidt, 1939)

*T. t. tessellatus* (Wall, 1908)

Genus: *Zamenis* Wagler, 1830

*Zamenis hohenackeri* (Strauch, 1873)

*Z. h. tauricus* (Werner, 1898)



- Zamenis longissimus*** (Laurenti, 1768)  
 Subfamily: Natricinae Bonaparte, 1838  
 Genus: ***Natrix*** Laurenti, 1768  
***Natrix natrix*** (Linnaeus, 1758)  
***Natrix tessellata*** (Laurenti, 1768)  
 Family: Elapidae Boie, 1827  
 Subfamily: Elapinae Boie, 1827  
 Genus: ***Walterinnesia*** Lataste, 1887  
***Walterinnesia aegyptia morgani*** (Mocquard, 1905)  
 Family: Erycidae Bonaparte, 1831  
 Genus: ***Eryx*** Daudin, 1803  
***Eryx elegans*** (Gray, 1849)  
***Eryx jaculus*** (Linnaeus, 1758)  
*E. j. jaculus* (Linnaeus, 1758)  
*E. j. turcicus* (Olivier, 1801)  
*E. j. familiaris* Eichwald, 1831  
***Eryx jayakari*** Boulenger, 1888  
 Family: Lamprophiidae Fitzinger, 1843  
 Subfamily: Lamprophiinae Fitzinger, 1843  
 Genus: ***Malpolon*** Fitzinger, 1826  
***Malpolon insignitus*** (Geoffroy de St-Hilaire, 1827)  
*M. i. fuscus* (Fleischmann, 1831)  
 Genus: ***Rhagerhis*** Peters, 1862  
***Rhagerhis moilensis*** (Reuss, 1834)  
 Family: Leptotyphlopidae Stejneger, 1892  
 Subfamily: Leptotyphlopinae Stejneger, 1892  
 Genus: ***Myriopholis*** Hedges, Adalsteinsson & Branch, 2009  
***Myriopholis macrorhyncha*** (Jan, 1860)  
 Family: Psammophiidae Bonaparte, 1845  
 Genus: ***Psammophis*** Fitzinger, 1826  
***Psammophis schokari*** (Forskål, 1775)  
 Family: Typhlopidae Merrem, 1820  
 Genus: ***Indotyphlops*** Hedges, Marion, Lipp, Marin & Viadal, 2014  
***Indotyphlops braminus*** (Daudin, 1803)  
 Genus: ***Xerotyphlops*** Hedges, Marion, Lipp, Marin & Viadal, 2014  
***Xerotyphlops vermicularis*** (Merrem, 1820)  
***Xerotyphlops wilsoni*** (Wall, 1908)  
 Family: Viperidae Laurenti, 1768  
 Subfamily: Viperinae Oppel, 1811  
 Genus: ***Cerastes*** Laurenti, 1768  
***Cerastes gasperettii*** Leviton & Anderson, 1967  
*C. g. gasperettii* Leviton & Anderson, 1967  
 Genus: ***Echis*** Merrem, 1820  
***Echis carinatus*** (Schneider, 1801)  
*E. c. sochureki* Stemmler, 1969

Genus: *Macrovipera* Reuss, 1927

*Macrovipera lebetinus* (Linnaeus, 1758)

*M. l. obtusa* (Dwigubsky, 1832)

Genus: *Montivipera* Nilson, Tuniyev, Andrén, Orlov, Joger & Herrmann, 1999

*Montivipera raddei* (Boettger, 1890)

*M. r. raddei* (Boettger, 1890)

*M. r. kurdestanica* (Nilson & Andrén, 1986)

Genus: *Pseudocerastes* Boulenger, 1896

*Pseudocerastes fieldi* Schmidt, 1930

*Pseudocerastes persicus* (Dumeril, Bibron & Dumeril, 1854)

*Pseudocerastes urarachnoides* Bostanchi, Anderson, Kami & Papenfuss, 2006

#### 44.7 Freshwater Amphibians and Reptiles in the Euphrates and Tigris River Drainages

There are four species of freshwater reptiles in the Euphrates and Tigris River Basin including *Rafetus euphraticus*, *Mauremys capsica*, *Emys orbicularis* and *Natrix tessellate*. Furthermore, ten freshwater amphibians inhabit rivers, lakes, marshlands, and springs of the region including *Bufo* *sitibundus*, *Calliopersa luristanica*, *Hyla savignyi*, *Pelophylax bedriagae*, *Rana macrocnemis*, *Neurergus crocatus*, *N. derjugini*, *N. strauchii*, *Ommatotriton vittatus*, and *Salamandra infraimmaculata*, 30% species of which are endemic to the Euphrates and Tigris River Basin.

##### Lorestan Melodious Toad

**Scientific name:** *Calliopersa luristanica*

**Subspecies:** -

**Etymology:** *luristanicus*: Persian, Lorestan Province of Iran (Fig. 44.4)

**Conservation status:** IUCN Red List: Least Concern

**Fig. 44.4** Lorestan Melodious Toad, *Calliopersa luristanica* (Schmidt 1939) Bina & Bijar Protected Area, Ilam Province, Iran. Photo by Barbod Safaei-Mahroo



**Fig. 44.5** Thirsty Toad, *Bufoetes sitibundus* (Pallas, 1771) (up female and down male): Qara-Dagh Mountain, SE Sulaymaniah. Photo by Barbod Safaei-Mahroo



**Morphology:**

It is a small-sized toad (SVL: 7-10 cm). Parotoid glands are almost quadrangular, short, as long as eye diameter, and extending to the beginning of supra-scapula. The dorsal tubercles are mostly same size and homogeneous. Toes of hind-limbs are weakly webbed. The dorsal color is light brown or reddish brown, with reddish to orange warts and scattered pale green spots, the ventral part without blotches or spots.

**Distribution in Mesopotamia:**

It has been reported from the western slopes of the Zagros region in southeastern Mesopotamia.

**Habitat and Ecology:**

This species is found in the seasonal rivers with a sandy bed, within hills and mountainous regions. It lays eggs in narrow strings.

**Thirsty Toad**

**Scientific name:** *Bufoetes sitibundus*

**Subspecies:** -

**Etymology:** *sitibundus*: Latin, thirsty (Fig. 44.5)

**Conservation status:** IUCN Red List: Data Deficient

**Morphology:**

It is a medium-sized toad (SVL: 7-10 cm). Parotoid glands are medium, elongated, bean-shaped, pass the supra-scapula, and approximately two times larger than eye diameter size. The dorsal skin is covered with heterogeneous tubercles. Toes of hind-limbs are one-third webbed. The dorsal color is cream to light brown with green or olive patches, ventral part is covered with scattered green blotches. Females are larger than males.

**Distribution in Mesopotamia:**

Throughout Mesopotamia, apart from the desert regions.

**Habitat and Ecology:**

**Fig. 44.6** Savigny's Tree Frog, *Hyla savignyi*  
Audouin, 1827 Kuna-Masi,  
Northern Sulaymaniah.  
Photo by Barbod Safaei-  
Mahroo



This species mostly inhabits in the vicinity of farms and residential regions, and found in marshlands, ponds, and small streams and can be seen numerous individuals on the roads surface at rainy nights. It lays eggs in wide strings.

**Savigny's Tree Frog**

**Scientific name:** *Hyla savignyi*

**Subspecies:** -

**Etymology:** *savignyi*: in honor of Marie Jules César Savigny (Fig. 44.6)

**Conservation status:** IUCN Red List: Least Concern

**Morphology:**

It is a small-sized tree frog, disc-like digital pads, dorsal surface bright green with a dark brown stripe at the sides with a lemon-colored line from nostril to groin laterally.

Some individuals of this species have gray spots on the dorsum. In the cold season, the dorsal part of the body changes color, ranging from cream to light brown. Males have a vocal sac in the front of the throat.

**Distribution in Mesopotamia:**

Known from the Euphrates and Tigris Rivers. It has a wide range from the northwest to the southeast and in parts of the central areas of this region.

**Habitat and Ecology:**

It inhabits marshlands and river shorelines with dense vegetated particularly *Carex*, *Phragmites*, and *Typha*. It depends intensely on humidity and the canopy cover.

**Bedriaga's Marsh Frog**

**Scientific name:** *Pelophylax bedriagae*

**Subspecies:** -

**Etymology:** *bedriagae*: in honor of Dr. Jacques Vladimir von Bedriaga (Fig. 44.7)

**Conservation status:** IUCN Red List: Least Concern

**Morphology:**

**Fig. 44.7** Bedriaga's Frog, *Pelophylax bedriagae* (Camerano, 1882) Ranya, Northern Dukan Lake dam. Photo by Barbod Safaei-Mahroo



Large species with smooth or slightly rough dorsal skin, in a variety of colors from cream to green with irregular brown blotches and some of the individuals have a long green vertebral line. Males have two vocal sacs on either side of their head.

**Distribution in Mesopotamia:**

Throughout northern and eastern parts of the basin, also the Euphrates and Tigris Rivers.

**Habitat and Ecology:**

This highly aquatic species mostly inhabits rivers, marshlands, lakes, and small streams. Its breeding season extends from the end of winter to mid-spring. In the mountainous regions, the frogs' calling can be heard at night, in the spring and autumn.

**Long-Legged Wood Frog**

**Scientific name:** *Rana macrocnemis*

**Subspecies:** -

**Etymology:** *macrocnemis*: Greek, *makrós* = long + Greek, *knēmē* = Shin or leg (Fig. 44.8)

**Conservation status:** IUCN Red List: Least Concern

**Morphology:**

Small species, dorsum is covered with round and small tubercles. Its body is cream or brown color with dark brown blotches. Dark brown triangular temporal marks present. Without external vocal sac opening.

**Distribution in Mesopotamia:**

Northern Mesopotamia, particularly, in the mountainous regions of the Zagros and Anatolia.

**Habitat and Ecology:**

Mostly in small lakes or small mountainous springs and slow-flowing streams. Laying eggs in clusters.

**Azerbaijan Mountain Newt**

**Scientific name:** *Neurergus crocatus*

**Subspecies:** -

**Fig. 44.8** Long-Legged Wood Frog, *Rana macrocnemis* Boulenger, 1885 Northwest Oshnaviyeh, West Azerbaijan Province, Iran. Photo by Barbod Safaei-Mahroo



**Fig. 44.9** Azerbaijan Mountain Newt, *Neurergus crocatus* Cope, 1862 Northwest Oshnaviyeh, West Azerbaijan Province, Iran. Photo by Barbod Safaei-Mahroo



**Conservation status:** IUCN Red List: Vulnerable

**Etymology:** *crocatus*: Latin, yellow or saffron-colored (Fig. 44.9)

**Morphology:**

The species has an elongated and narrow body, tail compressed at the side. The dorsum color ranges from dark brown to black and is covered with yellow spots. The ventral is orange or red.

**Distribution in Mesopotamia:**

Endemic to the northeast of the Tigris Basin, this species has been reported from the Zagros Mountains only.

**Habitat and Ecology:**

It prefers the streams and small springs in the mountainous regions with altitude of 1750–2000 meters. Laying eggs and mates in the spring season.

**Derjugin's Mountain Newt**

**Scientific name:** *Neurergus derjugini*



**Fig. 44.10** Derjugin's Mountain Newt, *Neurergus derjugini* (Nesterov, 1916) Garmab, Western Baneh, Kurdistan Province, Iran. Photo by Barbod Safaei-Mahroo



**Subspecies:** *N. d. derjugini*, *N. d. microspilotus*

**Conservation status:** IUCN Red List: Critically Endangered

**Etymology:** *derjugini*: in honor of Dr. Konstantin Michailovich Derjugin (Fig. 44.10)

**Morphology:**

Elongated and narrow body with a compressed tail. Dorsum color ranges from dark brown to black and is covered with yellow spots in a regular manner. Ventral color ranges from orange to red.

**Distribution in Mesopotamia:**

Endemic to the east of the Tigris Basin and within the limits of the Zagros Forests mountains.

**Habitat and Ecology:**

*Neurergus derjugini* inhabits slow-flowing water in springs and small streams in oak forests.

Normally, it mates at the beginning of spring; the female attaches eggs to the stems or roots of aquatic vegetation.

**Strauch's Mountain Newt**

**Scientific name:** *Neurergus strauchii*

**Subspecies:** *N. s. barani*, *N. s. munzurenensis*, *N. s. strauchii*

**Conservation status:** IUCN Red List: Vulnerable

**Etymology:** *strauchii*: in honor of Dr. Alexander Strauch

**Morphology:**

Body elongated and narrow, tail compressed. Dorsal surface dark brown or black, with yellowish heterogeneous and irregular small or large dots. In the subspecies, the size of the spots varies, such that in the *N. s. munzurenensis* has the smallest size of spots and *N.s. barani* has the largest to be seen.

**Distribution in Mesopotamia:**

Endemic to the north of Mesopotamia. Its three subspecies have isolated habitat patches that inhabit the northern regions of the Tigris and Euphrates Rivers in the eastern Anatolia deciduous forests and eastern Anatolian montane steppe ecoregions.



*N. s. strauchii* reported from the eastern part of the Euphrates River also from south to west of the Lake Van.

*N. s. barani* found in the western part of the Euphrates River.

*N. s. munzurensis* known from the northern part of the Euphrates River (Olgun et al. 2016).

**Habitat and Ecology:**

It occurs in the springs and small brooks and prefers the stony shoreline of the rivers.

**Banded Newt**

**Scientific name:** *Ommatotriton vittatus*

**Subspecies:** -

**Conservation status:** IUCN Red List: Least Concern

**Etymology:** *vittatus*; Greek, vitta = strip or band.

**Morphology:**

The dorsal surface milky with small dark gray or dark olive irregular spots, laterally highly compressed tail. The spots on the side of the body are in the form of two parallel lines, with a white-colored center, which runs from the forelimb to the end of the tail. In the breeding season, the males have deeply serrated mid-dorsal and caudal crest.

**Distribution in Mesopotamia:**

Reported from the northwestern Euphrates River Basin and its easternmost distribution is in Zagros mountains on the border of Turkey and Iraq (Riemsdijk et al. 2018).

**Habitat and Ecology:**

*Ommatotriton vittatus* is a highly aquatic species and found in ponds, lakes, ditches, and slow-flowing stream pools within forests (Olgun et al. 2009).

**Semenov's Salamander**

**Scientific name:** *Salamandra inframaculata*

**Subspecies:** *S. i. semenovi*

**Conservation status:** IUCN Red List: Near Threatened

**Etymology:** *inframaculata*; Latin, infra = below, Latin, im = not, Latin, maculate = spotted (Fig. 44.11)

**Morphology:**

Body robust, parotoid glands distinct and large extending from the posterior edge of the eyes to neck; the dorsum color is dark brown and/or gray, with irregular yellow spots and in adults mostly change into highly irregular. The ventral is brownish-grayish color along with small yellow spots.

**Distribution in Mesopotamia:**

*Salamandra inframaculata semenovi* subspecies is endemic to the eastern and northern parts of Mesopotamia in the western edge of Zagros Mountains Forest.

**Habitat and Ecology:**

This viviparous Salamander prefers mountain meadows and brooks; adults can be found under the stones in the vicinity of water.

**Euphrates Softshell Turtle**

**Scientific name:** *Rafetus euphraticus*

**Fig. 44.11** Semenov's Salamander, *Salamandra infraimmaculata semenovi* Nesterov, 1916 Naw village, Oraman (Hawrāmān) Mountain. Photo by Barbod Safaei-Mahroo



**Fig. 44.12** Euphrates Softshell Turtle, *Rafetus euphraticus* (Daudin, 1802) Rofayeh, Southern Bostan, Iran. Photo by Barbod Safaei-Mahroo



**Subspecies: -**

**Conservation status:** IUCN Red List: Endangered, CITES: Appendix II, as *Rafetus* spp.

**Etymology:** *euphraticus*; Greek: Euphrátēs = Euphrates River (Fig. 44.12)

**Morphology:**

The carapace is flattened, smooth and without tubercles. The carapace color is olive-green with scattered dark blotches and irregular creamy spots. The plastron color is yellowish or light pink with very weak callosities on the hyo- and hypoplastral (Taskavak et al. 2016; Turtle Taxonomy Working Group, 2017).

**Distribution:**

The distribution of *Rafetus euphraticus* is restricted to the Euphrates and Tigris River Basin and extends from southeastern Turkey to the southwestern Iran, throughout the Euphrates and Tigris Rivers and their tributaries, marshlands, and ponds in Syria, Turkey, Iraq, and Iran (Taskavak et al. 2016).

### **Habitat and Ecology:**

Euphrates softshell turtle is a medium-sized, exclusively riverine and cryptic trionychid turtle that inhabits various freshwater habitats. What we know about *R. euphraticus* home range size is based on Ghaffari et al. (2014) study that indicated that the mean linear home range size is 2.54 km, and the mean 95% kernel density estimator is 21.75 ha, with a core area of 5.74 ha and prefers vegetated shorelines over open deep water. Ghaffari et al. (2015) feeding ecology study in Iran indicated that the turtle diet predominantly included invertebrates mainly crabs and plants, but also scavenges (Taskavak and Atatür 1998). The reproductive and nesting behavior of *R. euphraticus* is still poorly understood (Biricik and Turğa 2011; Ghaffari et al. 2013; Taskavak et al. 2016). The nesting season in Iran reported from late April to early June and mating observed in March; emerging hatchlings from nest observed in early July (Ghaffari et al. 2013; Taskavak et al. 2016). Published studies (Taskavak and Atatür 1998; Baran and Atatur 1998; Biricik and Turğa 2011; Ghaffari et al. 2013; Taskavak et al. 2016) indicated that the average clutch sizes are 30–40 eggs.

### **Threats to Survival:**

The major threats to *Rafetus euphraticus* are anthropogenic fragmentation, alteration, and destruction of suitable habitat throughout its range; furthermore, drought especially the Mesopotamian Marshes in southeastern Iraq and southwestern Iran, dam construction, unsustainable fishing methods especially electro-fishing, and the use of poisons and explosive materials and pollution are the main concerns for *R. euphraticus* survival (Taskavak et al. 2016).

Besides, in recent years it has been reported that the Chinese soft shell *Pelodiscus sinensis* is imported into Iran illegally; this species has the potential to become a competitor for *R. euphraticus* (Ghaffari et al. 2014).

### **Caspian Pond Turtle**

**Scientific name:** *Mauremys caspica*

**Subspecies:** -

**Conservation status:** -

**Etymology:** *caspica*; Latin: Caspium = Caspian Sea (Fig. 44.13)

**Morphology:**

The color of carapace ranges from olive to light brown; the head is olive and has yellow stripes on each side of the head. The plastron is dark brown or black.

### **Distribution in Mesopotamia:**

This species occurs widely across the Middle East, ranges from Central Anatolia east, and extends southeastward Syria and the Caucasus Region to Iraq and Iran. In Mesopotamia, it occurs along Tigris and Euphrates Rivers (Vamberger et al. 2012).

### **Habitat and Ecology:**

*Mauremys caspica* is a medium-sized freshwater turtle that is found in ponds, creeks, streams, drainage ditches, canals, and marshlands.

### **European Pond Turtle**

**Scientific name:** *Emys orbicularis*

**Subspecies:** *E. o. colchica*

**Conservation status:** IUCN Red List: Near Threatened

**Etymology:** *orbicularis*; Latin: orbiculāris = circular

**Fig. 44.13** Caspian Pond Turtle, *Mauremys caspica* (Gmelin, 1774) Karkheh river. Photo by Barbod Safaei-Mahroo



**Morphology:**

The carapace color is light or dark olive and occasionally black with yellow radiating lines. The plastron color is yellow or light orange. Head and limb are dark green to black with scattered yellow spots.

**Distribution in Mesopotamia:**

Although *Emys orbicularis* has a wide distribution from northwestern Africa through Europe to western Asia (Bayrakci and Dinçer 2014); in Mesopotamia this species were reported only from Diyarbakir in southeastern Turkey (Fritz et al. 1998).

**Habitat and Ecology:**

*Emys orbicularis* is a semi-aquatic turtle that has variable habitats; it prefers freshwater or slightly brackish water. This turtle inhabits ponds, drainage ditches, canals, creeks, streams, and rivers.

**Tessellated Watersnake / Dise Snake**

**Scientific name:** *Natrix tessellata*

**Subspecies:** -

**Conservation status:** IUCN Red List: Near Threatened

**Etymology:** *tessellata*; Greek, tessera = tessellated (Fig. 44.14)

**Morphology:**

Its dorsal surface brownish to gray color, with dark and irregular blotches. Its ventral surface has a pattern similar to that of a mosaic design, of dark and light-colored squares. In adults this mosaic design can also be observed in an orange color.

**Distribution in Mesopotamia:**

Occurs extensively throughout the Euphrates and Tigris River Basin, including the entire rivers of this basin.

**Habitat and Ecology:**

Inhabits in the grasslands, along the rivers and marshlands. Diet includes amphibians, and especially frogs and fishes.

It utilizes two defense mechanisms: one is to emit a strong-smelling fluid, and the other is **thanatosis** (playing dead).

**Fig. 44.14** Dice Snake, *Natrix tessellata* (Laurenti, 1768) Hur Al-Azim Wetland. Photo by Barbod Safaei-Mahroo



#### **44.8 Threats to Freshwater Herpetofauna in the Euphrates and Tigris River Basin**

The drought of aquatic habitats, especially marshlands and the loss of marginal vegetation; particularly, in the Hoor-Al-Azim marshland in southeastern Mesopotamia, are the main threats to the survival of highly aquatic amphibians and reptiles throughout the Euphrates and Tigris River Basin. Predominant vegetation along the Euphrates and Tigris River and tributaries provide food, refuge, and breeding ground for many semiaquatic and aquatic species. An intense modification in the hydrological regime and the drying up of rivers due to the construction of dams throughout the basin are the main concerns for amphibians and reptiles, which are dependent on freshwater habitat. Furthermore, water pollution, illegal fishing methods, especially electrofishing, and ongoing habitat loss, and fragmentation are accounted as other threats for the survival of amphibians and reptiles in this region. The occurrence of wars and political conflicts in this part of the world has asserted a profound and negative impact on the habitats and wildlife, especially the amphibians and reptiles of Mesopotamia. Other serious threats are habitat alteration, overexploitation of mountainous terrain, and the anthropogenic conveyance of water from springs, which results in the absence of access for species to the most vital source, leading to the decline of the salamanders' population in Mesopotamia. In addition to the abovementioned, the intentional killing in particular of the snakes, Euphrates soft-shell Turtle (*Rafetus euphraticus*), and the Azerbaijan Mountain Newt (*Neurergus crocatus*) by the human is another factor of threat for these creatures in this region. In summer 2018, a wildfire burned the Iraqi part of the Hawr-al-Azim wetlands. An important concern is species that cannot escape from fire easily and move to another suitable habitat may be at risk of local extinction.

## 44.9 Conclusion

In the Euphrates and Tigris Basins, the Colubridae family has thirty-seven species as the largest reptile family, followed by Lacertidae and Gekkonidae, with twenty-three and seventeen species, respectively. The largest family of amphibians in this region is the Salamandridae, with five species. This basin has 10 species of amphibians and 134 species of reptiles, of which 25 species are endemic to the basin. Of the eleven ecoregions of the Tigris and Euphrates Basin, the Zagros Mountains forest steppe, which accounts for 11.5% of the area, has the most endemic species with 14 endemic amphibians and reptiles. The Zagros Mountains forest steppe ecoregion plays a key role in the speciation of amphibians and reptiles of the region. The speciation level in the Zagros Mountains forest steppe has been high; it has the highest regional endemism level in the Euphrates and Tigris Basins with over half of the endemic amphibians and reptiles of this basin.

Due to the strategic situation of the Euphrates and Tigris Basin and wars, including political conflicts, limited information is available on the wildlife, in particular the amphibians and the reptiles of this region. Therefore, there is no information in access in relevance to the population of amphibians and reptiles. Though, undoubtedly, the threat of dam constructions, habitat degradation and destruction, and increased pollution throughout the catchment area are serious threats to highly aquatic amphibians and reptiles, these threats are more austere in the southern parts, especially in the Mesopotamian Marshlands, extensive parts of which have drained and or else are confronted with salt accumulation.

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