

## HERPETOFAUNA OF BARTIN PROVINCE (NORTHWEST BLACKSEA REGION, TURKEY)

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**ABSTRACT.** *In this investigation, we aimed to determine the amphibian and reptile species distributed in Bartın province (Northwest Blacksea Region of Turkey). As a result of previously and current studies, we recorded two Urodela amphibian species (Ommatotriton ophryticus and Triturus ivanbureschi), six Anura amphibian species (Bufo bufo, Bufotes variabilis, Hyla orientalis, Pelophylax ridibundus, Rana macrocnemis and R. dalmatina), three turtle species (Emys orbicularis, Mauremys rivulata and Testudo graeca), four lizard species (Anguis fragilis, Darevskia rudis, Lacerta viridis and Podarcis muralis) and eight snake species (Coronella austriaca, Dolichophis caspius, Eirenis modestus, Natrix natrix, N. tessellata, N. megalcephala, Vipera transcaucasiana and Zamenis longissimus) in Bartın Province, which totally 23 species. There are no endemic species in our country among them. Natrix megalcephala is also a new record for Bartın province.*

**KEY WORDS:** *biodiversity, Amphibia, Reptilia, Turkey, Anatolia, new record.*

### INTRODUCTION

Turkey has a rich faunal biodiversity because of its different topographical, geological, and climatic characteristics (Cihan & Tok 2014). Turkey is a bridge for animals between Europe and Asia and it has some ecological barriers for animal species so that similar to the other animal group, Turkey has a rich herpetofaunal biodiversity, too. The herpetofauna of Turkey has been studied by many researchers until nowadays (Başoğlu & Baran 1977, 1980, Baran & Atatür 1986, Başoğlu et al. 1994, Baran et al. 2004). In

recent years, studies of regional herpetofauna have increased and these researches show that the herpetofauna of Anatolia is still not fully studied out. (Yıldız et al. 2007, Hür et al. 2008, Afsar & Tok 2011, Akman et al. 2013, Göçmen et al. 2007, 2009, 2013a, 2013b, 2014, Cihan & Tok 2014, Tok & Çiçek 2014, Özcan & Üzüm 2014, İğci et al. 2015, Yıldız & İğci 2015, Yıldız et al. 2015, Akman et al. 2016, Kumlutaş et al. 2017). Literature about Bartın herpetofauna is very limited. There are some herpetological studies about species distribution in Bartın province but these studies do not include all area research. In this study, we aimed to determine the herpetofaunal biodiversity of Bartın province.

## MATERIALS AND METHODS

This study was carried out within the scope of the Biodiversity Inventory and Monitoring Project of the Terrestrial and Inland Water Ecosystems of Bartın which was conducted by Ministry of Forestry and Water Affairs, Nature Conservation and National Parks. 26-days field survey was carried out within this project between March 2016 and September 2016. Excursions have been completed by performing at least two locality survey in each of the 1/25000 scaled 30 sheets, covering the whole of the Bartın province. Various habitats selected for field studies (eg. wetlands, forests, steppes, mountains and around agricultural areas). During herpetological trips, the localities in previously studies were controlled primarily and then areas were selected by evaluating the satellite images. A total of 54 different localities between 0 and 1649 m a.s.l were surveyed during this study. (Figure 1). Coordinates of localities were recorded with the Garmin Brand GPS device. Coordinates recorded while fieldwork was deposited in The Noah's Ark Biodiversity Database (The Republic of Turkey, Ministry of Forestry and Water Affairs, General Directorate of Nature Conservation and National Parks).

During the study, reptiles were identified by either visual encounter surveys (VES) or caught for detailed examination if needed. Amphibians were identified by visual encounter surveys and anuran calling surveys and caught. Photographs of reptiles and habitats observed during trips were taken using a digital camera (Nikon D80, Nikon D90) and lenses (90 mm Macro, 70-300 mm and 18-105 mm). After the examination and photographing, they were released where they had been captured. Previously literature was used to identify species (Başoğlu & Baran 1977, 1980, Leviton et al. 1992, Baran & Atatür 1998). The species were grouped into chorotype categories as proposed by Vigna Taglianti et al. (1999). In addition, the conservation status of the amphibians and reptiles was pointed out according to the International Union for Conservation of Nature and Natural Resources (IUCN), The Convention on International Trade in Endangered Species of Wild



Figure 1. The map showing the localities where the field studies were conducted during our field studies in Bartın province (locality names are given in Appendix).

Fauna and Flora (CITES) and The Convention on the Conservation of European Wildlife and Natural Habitats (BERN Convention).

## RESULTS

As a result of, two Urodela amphibian species (*Ommatotriton ophryticus* and *Triturus ivanbureschi*), six Anura amphibian species (*Bufo bufo*, *Bufo variabilis*, *Hyla orientalis*, *Pelophylax ridibundus*, *Rana macrocnemis* and *R. dalmatina*), three turtle species (*Emys orbicularis*, *Mauremys rivulata* and *Testudo graeca*), four lizard species (*Anguis fragilis*, *Darevskia rudis*, *Lacerta viridis* and *Podarcis muralis*) and eight snake species (*Coronella austriaca*, *Dolichophis caspius*, *Eirenis modestus*, *Natrix natrix*, *N. tessellata*, *N. megaloccephala*, *Vipera transcaucasiana* and



Figure 2. Selected amphibians and reptiles occurring in Bartın: A – *Ommatotriton ophryticus*, B – *Rana dalmatina*, C – *Vipera transcaucasiana*, D – *Podarcis muralis*, E – *Emys orbicularis*, F – *Darevskia rudis* (Photographs were taken by B. Akman and M. Çakmak).

*Zamenis longissimus*) were recorded in Bartın province. Shortly, 8 species of amphibians [Families: Salamandridae (2), Bufonidae (2), Hylidae (1) and Ranidae (3)], 3 species of chelonians [Families: Emydidae (1) Testudinidae (1) and Geomydidae (1)], 4 species of lizard [Families: Anguidae (1) and Lacertidae (3)] and 8 species of snake [Families: Natricidae (3), Colubridae (4), Viperidae (1)] were determined and showed Table 1. with their locality numbers, conservation status and related references.

The most common amphibian species in Bartın province is *Pelophylax ridibundus* based on observed the locality numbers. However, *Bufo bufo*,

Table 1. The list of the species of amphibians and reptiles distributed in Bartın province based on this study and bibliographic data with their localities, their status according to Bern Convention, CITES and IUCN and their chorotypes. Additionally, selected references reporting the occurrence in Bartın for each species are given. CR – Critically Endangered, EN – Endangered, NT – Near Threatened, VU – Vulnerable, LC – Least Concern, DD – Data Deficient, NE – Not Evaluated.

Family	Species/ Subspecies	Bern	IUCN	Cites	Chorotypes	Localities	Source
Salamandridae	<i>Ommatotriton ophryticus</i>	III	NT		E-Mediterranean	1,8,12,16,19,27,29,30,31,36,40,45,46,48,50	Baran and Yılmaz 1986; Baran et al. 1992; Bülbül and Kurtup 2013; Gümüş 2013; Litvinchuk 2003; Ünal 2012
Salamandridae	<i>Triturus ivanbureschi</i>	II	NE		European	27,29,48,49,50	Antzen et al. 1999; Antzen et al. 2007; Ünal, 2012; Wielstra 2012
Ranidae	<i>Pelophylax ridibundus</i>	III	LC		Turano-European-Mediterranean	1,2,3,4,7,8,12,13,14,15,17,18,19,20,21,22,23,24,25,26,28,29,30,31,32,33,34,35,36,37,39,40,42,43,44,45,46,47,48,51,52,53,54	Bülbül & Kutrup 2011; Mulder 1995; Ünal 2012
Ranidae	<i>Rana macrocnemis</i>	III	LC	-	SW-Asiatic	48,49	Ünal 2012
Ranidae	<i>Rana dalmatina</i>	II	LC	-	E-European	34,37,43,48,51	Ünal 2012
Bufonidae	<i>Bufo bufo</i>	III	LC		S-European	1,8,9,15,20,22,23,24,25,29,30,31,36,37,41,42,45,46,48,53	Baran et al. 1992; Ünal 2012

Table 1. (continued)

Family	Species/ Subspecies	Bern	IUCN	Cites	Chorotypes	Localities	Source
Bufo	<i>Bufo variabilis</i>	III	DD	-	Turano-European-Mediterranean	1,2,7,8,9,11,12,14,24,2 9,30,36,37,40,44,45,48 ,49,52,54	Baran et al. 1992; Bülbül & Kutrup 2007; Tosunoğlu 1999; Ünal 2012
Hyla	<i>Hyla orientalis</i>	III			European	12,13,14,17,18,20,22,2 3,25,26,29,30,36,40,46 ,48,51	Ünal, 2012
Testudinidae	<i>Testudo graeca</i>	II	VU	II	Turano-Mediterranean (Irano-Mediterranean)	4,7,9,11,12,13,14,15,1 7,20,24,27,29,30,32,33 ,34,35,36,37,39,40,41, 42,46,47,48,	Kiremit 2011; Mulder 1995; Sindaco et al. 2000
Geoemydidae	<i>Mauremys rivulata</i>	III			Turano-Mediterranean (Turano-Balkan)	40	Ayaz & Budak 2006
Emydidae	<i>Emys orbicularis</i>	II	NT		Centralasiatic	17,25,34,39	Baran et al. 1992; Fritz 1993; Sindaco et al. 2000
Anguillidae	<i>Anguilla fragilis</i>	III			S-European	1,11,14,17,19,20,22,23 ,24,25,28,29,30,31,34, 35,42,45,46,47	Baran et al. 1992; Sindaco et al. 2000
Lacertidae	<i>Darevskia kiarudis</i>	III	LC	-	SW-Asiatic (Pontocaucasian endemic)	2,4,5,7,8,9,15,16,19,20 ,21,22,23,26,28,31,32, 33,42,43,45,47,48,52,5 4	Arribas et al. 2013; Sindaco et al. 2000

Table 1. (continued)

Family	Species/ Subspecies	Bern IUCN	Cites	Chorotypes	Localities	Source
Lacertidae	<i>Lacerta viridis</i>	II	LC	-	Turanian	1,2,4,5,6,7,8,9,11,12,13,15, Baran et al. 1992; 17,18,19,20,21,22,23,24,25 Çevikve Kumlutaş 1999; .26,27,28,29,30,31,33,34,3 Kumlutaş 1996; Sindaco 5,36,37,38,39,40,41,42,43, et al. 2000 44,45,46,47,48,51,53,54
Lacertidae	<i>Podarcis muralis</i>	II	LC	-	E-European	9,16,22,25,27,33,37,42,43, Çakmak 2013 54
Colubridae	<i>Coronella austraca</i>	II	LC	-	European	24,43 Ünal 2012
Colubridae	<i>Dolichophis caspius</i>	III		-	Turano- Mediterranean	4,17,22,24,27,29,31,39,41, Sindaco et al. 2000 44,45,46,47,52
Colubridae	<i>Eirenis modestus</i>	III	LC	-	SW-Asiatic (Anatolo- Caucasian)	yok Ünal 2012
Colubridae	<i>Zamenis longissimus</i>	II	LC		E-European	8,22,24,30,31 Sindaco et al. 2000
Natricidae	<i>Natrix tessellata</i>	II	LC	-	Centralasiatic- European	12,15,17,32,45 Ünal 2012
Natricidae	<i>Natrix natrix</i>	III	LC	-	Turano- Mediterranean (Turano-Balkan)	12,14,17,23,25,30,31,39,40 Sindaco et al. 2000; Ünal ,45,48,54 2012
Natricidae	<i>Natrix megalcephala</i>	II	VU		SW-Asiatic (Ponto- Caucasian endemic)	22,44,46,47,51,53 New record
Viperidae	<i>Vipera transcaucasiana</i>	III	NT	-	SW-Asiatic (Ponto- Caucasian endemic)	7,20,22,24,25,31,45 Sindaco et al. 2000; Mulder 2017

*Bufo variabilis* and *Ommatotriton ophryticus* also occur many areas. *Lacerta viridis* was the most found reptile species in Bartın province and followed by *Testudo graeca*. There are no Anatolian endemic species distributed in Bartın province.

According to the IUCN Red List criteria ([www.iucnredlist.org](http://www.iucnredlist.org)) two species (*Emys orbicularis*, *Ommatotriton ophryticus*) are near threatened (NT), two species (*Testudo graeca* and *Natrix megaloccephala*) are classified as vulnerable (VU), twelve species are categorized Least Concern (LC) and the others were shown in Table 1. Ten of the species are under protection according to the BERN convention appendices II and rest of them appendices III ([www.coe.int/en/web/conventions/full-list/-/conventions/treaty/104](http://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/104)). However, only one species (*T. graeca*) is under protection according to the CITES appendix II ([www.cites.org](http://www.cites.org)).

The species of amphibians and reptiles in Bartın province can be grouped into 10 chorotype categories (Table 2). SW-Asiatic chorotype (21.73%) is the dominant category that represented by 5 species. Turano-Mediterranean, Centralasiatic, S- European and E- European categories (13.04%) are represented by 3 species each one. European chorotype (8.69%) has 2 species. Other categories are represented by 1 species (4.34%)

Habitat loss, the destruction and pollution is the most important factors threatening the herpetofaunal biodiversity in Bartın province. There are several causes of habitat loss such as transforming natural habitats to an agricultural field, constructions, and overgrazing.

## DISCUSSION

There is no detailed study on the herpetofauna of Bartın province until today except some specific survey (Baran & Yılmaz 1986, Fritz 1993, Tosunoğlu et al. 1999, Ayaz & Budak 2006, Bülbül & Kutrup 2011, Mulder 2017). Many researchers have shown the region where Bartın province is located in the distribution area of the species during the studies conducted throughout Turkey (Mulder 1995, Baran & Atatür 1998, Sindaco 2000, Baran et al. 2004). Such records do not contain location information (Budak & Göçmen 2014, Baran & Atatür 1998). Baran et al. (1992), reported 26 species from west and middle black sea region. As a result of old literature survey, it was determined 8 amphibian, 3 chelonian, 4 lizard and 7 snake



Table 2. The chorotype classification of the amphibian and reptile species in the Bartın province.

Chorotype	Amphibia	Reptilia	Percentage	Species
European	1	4	22.73%	<i>Rana dalmatina</i> , <i>Bufo bufo</i> , <i>Anguis fragilis</i> , <i>lacerta viridis</i> , <i>Coronella austriaca</i>
SW-Asiatic	1	3	18.18%	<i>Rana macrocnemis</i> , <i>Vipera transcaucasiana</i> , <i>Darevskia rudis</i> , <i>Natrix megalcephala</i>
Turano-European	3	1	18.18%	<i>Ommatotriton ophryticus</i> , <i>Triturus ivanbureschi</i> , <i>Hyla orientalis</i> <i>Zamenis longissimus</i>
Turano-Mediterranean	-	3	13.64%	<i>Testudo graeca</i> , <i>Mauremys rivulata</i> , <i>Dolichophis caspius</i> ,
Turano-Europe-Mediterranean	2	1	13.64%	<i>Pelophylax ridibundus</i> , <i>Bufo variabilis</i> , <i>Emys orbicularis</i>
S-European	-	1	4.55%	<i>Podarcis muralis</i>
Centralasiatic-European	-	1	4.55%	<i>Natrix tessellata</i>
Centralasiatic-European-Mediterranean	-	1	4.55%	<i>Natrix natrix</i>
Total	7	15	100%	

species previously recorded in Bartın province. Related references are given in Table 1 for each species. *Natrix megalcephala* was recorded in Bartın province for the first time thus herptile species number of Bartın province has raised from 22 to 23. According to the recent studies, totally 24 amphibians and reptile species were recorded in Karabük province (Kumlutaş et al. 2017) that neighbor province of Bartın. 18 herptile species of these provinces are the same. Kumlutaş et al. 2017, reported 6 different species (*Darevskia bithynica*, *Lacerta trilineata*, *Parvilacerta parva*, *Ophisops elegans*, *Ablepharus kitaibelii* and *Elaphe sauromates*) from Karabük province. Therefore, it is strongly possible that these 6 species are distributed in Bartın province, too. Because, most of them is common species is Northwest Black sea Region (Baran et al. 1992). It needs more detailed studies.

The major factor threatening the amphibian and reptile species in Bartın province is Habitat loss. So, authorities must ensure that the local people are informed about the conservation of the reptile and amphibian species. It is suggested that special studies and informative studies should be done for the species (*Emys orbicularis*) that are more susceptible to loss of habitat.

The present study recorded 23 amphibian and reptile species and revealed the richness of the herpetofauna of Bartın province. Our results contributed to the literature and will be useful for conservation and monitoring studies.

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**Appendix 1.** Detailed information about all localities that observations were carried out in Bartın province.

**1:**Kurucaşile/Komeç, 500 m, 11.03.2016; **2:**Kurucaşile/Yeniköy, 94 m, 15.04.2016; **3:**Kurucaşile/Ömerler, 16 m, 11.03.2016; **4:**Kurucaşile/Aydoğmuş, 198m, 15.04.2016; **5:**Kurucaşile/Curunlu, 238 m, 7.05.2016; **6:**Kurucaşile/Karaman, 19 m, 11.03.2016; **7:**Kurucaşile/Paşalılar, 287 m, 16.04.2016; **8:**Amasra/Yahyayazıcılar, 15 m, 12.03.2016; **9:**Amasra/İnpiri, 261 m, 16.04.2016; **10:**Amasra/Merkez, 0 m, 12.03.2016; **11:**Merkez/İnkumu, 138 m, 13.03.2016; **12:**Merkez/Karasu, 39 m, 13.03.2016; **13:**Merkez/Güzelcehisar, 358 m, 17.04.2016; **14:**Merkez/Topluca, 23 m, 15.03.2016; **15:**MerkezKaman, 250 m, 17.04.2016; **16:**Amasra/Bostanlar, 203 m, 12.03.2016; **17:**Merkez/Gürpınar, 15 m, 16.05.2016; **18:**Merkez/Sipahiler, 288 m, 14.03.2016; **19:**Amasra/Acarlar, 138 m, 12.03.2016; **20:**Merkez/Şahin, 256 m, 15.05.2016; **21:**Merkez/Karaköyşeyhler, 537 m, 15.05.2016; **22:**Merkez/Söğütlü, 602 m, 15.05.2016; **23:**Ulus/Kadıköy, 354 m, 14.05.2016; **24:**Ulus/Alıçlı, 444 m, 30.09.2016; **25:**Ulus/Yukarıdere, 499 m, 14.05.2016; **26:**Ulus/Elmacık, 560 m, 13.06.2016; **27:**Ulus/Güneyören, 555 m, 17.05.2016; **28:**Ulus/Güneyören, 564 m, 13.06.2016; **29:**Ulus/Güneyören, 832 m, 17.05.2016; **30:**Ulus/Güneyören, 473 m, 14.03.2016; **31:**Ulus/Çerde, 510 m, 15.05.2016; **32:**Ulus/Dere, 116 m, 14.03.2016; **33:**Merkez/Derbent, 75 m, 19.04.2016; **34:**Merkez/Tabanözü, 27 m, 19.04.2016; **35:**Merkez/Budakdüzü, 25 m, 13.05.2016; **36:**Merkez/Siremirçavuş, 18 m, 15.03.2016; **37:**Merkez/Karahüseynli, 136 m, 13.03.2016; **38:**Merkez/Ahatlar, 154 m, 16.05.2016; **39:**Merkez/Arönü, 188 m, 17.04.2016; **40:**Merkez/Sülek, 67 m, 29.09.2016; **41:**Merkez/Şarköy, 96 m, 13.05.2016; **42:**Merkez/Bakioğlu, 142 m, 18.04.2016; **43:**Ulus/Keçideresi, 172 m, 18.04.2016; **44:**Merkez/Aşağıdere, 224 m, 15.03.2016; **45:**Ulus/Kızıllar, 331 m, 18.04.2016; **46:**Ulus/Hisarköy, 479 m, 14.06.2016; **47:**Ulus/Anaç, 444 m, 12.06.2016; **48:**Ulus/Üçsaray, 1134 m, 12.06.2016; **49:**Ulus/Üçsaray, 1649 m, 12.06.2016; **50:**Ulus/Üçsaray, 1513 m, 12.06.2016; **51:**Merkez/Özbaşı, 553 m, 18.04.2016; **52:**Merkez/Eyüpoğlu, 545 m, 11.06.2016; **53:**Merkez/Hasankadı, 476 m, 18.04.2016; **54:**Merkez/Hanyeri, 533 m, 11.06.2016