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Mapping of Amphibian and Reptile species living in Bozcaada (Tenedos) Island, Türkiye, according to habitat and environmental changes

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ABSTRACT Bozcaada (Tenedos) Island, Türkiye, is a naturalistic biotope very important in terms of biological diversity as it has an isolated ecosystem. A total of 14 amphibian and reptile species were identified in previous studies in Bozcaada. In this study, two amphibians (*Lissotriton schmidtleri, Bufotes sitibundus*) and 10 reptiles (*Mauremys rivulata, Testudo graeca, Hemidactylus turcicus, Mediodactylus kotschyi, Ophisops elegans, Ablepharus kitaibelii, Dolichophis caspius, Malpolon insignitus, Natrix natrix, Xerotyphlops vermicularis*) species were observed. Distribution maps of amphibian and reptile species in Bozcaada were created using ArcGIS 10.8 package program according to seven different habitat types (agricultural habitat, shrubby area, settlements area, stony-hilly area, wetland habitat, dune habitat, woodland habitat). Consequently, with previous studies and current field surveys, distribution maps of amphibian and reptile species in Bozcaada according to environmental variables such as habitat, density, temperature, and elevation were created for the first time and the distribution of herpetofauna were compared between ten years ago and present. According to the data, it was determined that the distribution of amphibian and reptile species was limited in certain areas and the species preferred to live especially in the high elevation areas of the island. The dryness of seasonal puddles due to higher temperatures and climate change in Bozcaada, poses a threat especially to aquatic amphibians and reptile species on the island.

KEY WORDS Amphibian; Bozcaada; GIS; mapping; reptiles; Türkiye.

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INTRODUCTION

The use of Geographic Information Systems (GIS) while expressing distribution of species is important in making ecological analyzes, determining the distribution areas of many species and subspecies in the future, and revealing the ecological demands of taxonomic groups. Exact knowledge of the spatial distribution of taxonomic groups and species in a particular region and the factors affecting their distribution and habitat characteristics are crucial for the decision-making process in both biodiversity management and conservation (Margules & Pressey, 2000; Yaşar, 2018). In addition, species distribution maps play an important key role for various fields of study such as biogeography, ecology, and evolu-

tionary biology (Sillero et al., 2005; Beşir, 2018). Mapping species distributions and determining the presence-absence data of species contribute to filling the gaps in the geographical distribution of biological diversity (Mazerolle et al., 2007).

Biodiversity is strongly threatened by the human factor. In recent years, animal habitats, populations and species numbers were decreasing rapidly due to anthropogenic effects and negative environmental factors. Negative effects on land structures by humans, habitat loss and fragmentation, climate change and environmental pollution are the most important of these factors (Gibbons & Stangel, 1999; Gibbons et al., 2000; Driscoll, 2004). It is extremely important to know the changes in habitat and ecological preferences of amphibia and reptile species due to the adverse environmental conditions that have occurred in recent years.

Türkiye, located in the Western Palearctic region, creates a rich habitat for animal species due to its geographical structure, variable climate, vegetation, geomorphological features, and by having quite a lot of wetlands, and height differences ranging from 0–5000 meters. Furthermore, it forms an important fauna area with more than 80.000 animal species and has a lot of species and subspecies diversity, especially depending on its topographic structure (Özcan, 2012). Bozcaada shows a heterogeneous area feature in terms of geological, vegetation, topographical features and habitat diversity. In addition, it has an isolated ecosystem and is also very important in terms of biological diversity (Erginal, 2008; Karabacak et al., 2008; Tosunoğlu et al., 2009; Gül & Tosunoğlu, 2013). Herpetofaunal richness of Bozcaada consists of two amphibia and 12 reptile species (Tosunoğlu et al., 2009; Gül & Tosunoğlu, 2013).

The aim of this study was to create distribution maps of amphibian and reptile species in Bozcaada according to environmental variables such as habitat, species density, temperature and elevation. In addition, it is aimed to update the current information and to determine their future distribution by comparing ten years ago and today.

Figure 1. Study area: Bozcaada Island, Türkiye.

MATERIAL AND METHODS

Study area

Bozcaada Island is located on the northeast of the Aegean Sea and southwest of the Dardanelles (Fig. 1). It lies between 39°47'30''- 39°50'90'' N latitudes and 25° 57' 80''- 26° 05' 00'' E longitudes, approximately 6 km from the Aegean exit of the Dardanelles. It is the third largest island of Türkiye after Gökçeada and Marmara Islands with a surface area of 36.03 km^2. Göztepe (194 m) and Yenikale (115 m) Hills form the highest points of the island, which has a population of approximately 3.098 native people. In addition, the island has an intense tourism potential in the summer months and agricultural areas cover one third of it. There is no natural water source and seasonal temporary streams are formed in spring.

Previous studies (Erginal, 2008; Karabacak et al., 2008; Tosunoğlu et al., 2009; Gül & Tosunoğlu, 2013) conducted in Bozcaada, documented seven different habitat types; agricultural habitat, shrubby area, settlements area, stony-hilly area, wetland habitat, dune habitat, woodland habitat (Figs. 2–7).

Figures 2–7. Bozcaada Island, Türkiye, habitat types. Fig. 2: agricultural habitat. Fig. 3: settlements area. Fig. 4: stony-hilly area. Fig. 5: wetland habitat. Fig. 6: dune habitat. Fig. 7: woodland habitat.

Field surveys

We surveyed the study area (all of Bozcaada) over 15 days between February and October of 2021-2022. We performed visual encounter surveys during daytime or/and at nighttime in all habitat types within the study area. We performed the surveys along line transects in random routes and actively searched for animals by exploring refugia, for example by turning over stones, tree trunks or

other objects and extensively searching in the vegetation. We took photographs of all detected species, recorded habitat information and potential threats. For these procedures, the necessary permissions were obtained by the 2021/01–04 numbered decision of the local Ethics Committee of Animal Experiments of Çanakkale Onsekiz Mart University.

Mapping

We used GPS records from previous studies and the presence data of amphibian and reptile species determined by field surveys in Bozcaada for the distribution maps of the species. Based on the polygon map containing the boundaries of Bozcaada, we created the grid maps for the species using the ArcGIS version 10.8 package program (http://www.esri.com). We used Universal Transverse Mercator (UTM) grids of 1 x 1 km size and projected the databases to the same coordinate system (WGS84). We created a species density map using Kernel Density Analysis in ArcGIS 10.8. We created the temperature map using IDW analysis and data obtained from the General Directorate of Meteorology (2022). We also produced the elevation map using SRTM (Shuttle Radar Topographic Mission) data provided by the USGS (United States Geological Survey). All maps were adjusted in accordance with the World Geodetic System (WGS84) coordinate system.

RESULTS

As a result of previous studies (Tosunoğlu et al., 2009; Gül & Tosunoğlu, 2013) and present study in Bozcaada, a total of 14 species, including two amphibians and 12 reptiles were recorded. The species that we did not find during our surveys were *Pseudopus apodus* and *Eryx jaculus.*

We collected a total of 446 presence records of 14 species during field surveys in the study area (Fig. 8). Presence data from both our field surveys and literature covers 41 grid cells of a total of 56 (73.21%). The highest number of species recorded within a single cell was nine (Fig. 9). In most grid cells (50%) 4–6 species were observed, while 7–9 species were recorded in 7.14% of the studied grid cells. Photographs of 14 Amphibian and Reptile species distributed in Bozcaada are given in Figs. 10–23.

Classis AMPHIBIA
Familia SALAMANDRIDAE Goldfuss, 1820
Ordo URODELA Duméril, 1806
Genus *Lissotriton* Bell, 1839

Lissotriton schmidtleri (Raxworthy, 1988) (Fig. 10) - Schmidtler's Smooth Newt

The Schmidtler's Smooth Newt is a rare species in the study area, with eight records (1.79% of the total data) in six grid cells (10.71% of the entire grid). It is distributed in seasonal puddles and wetlands in agricultural habitat and settlements area.

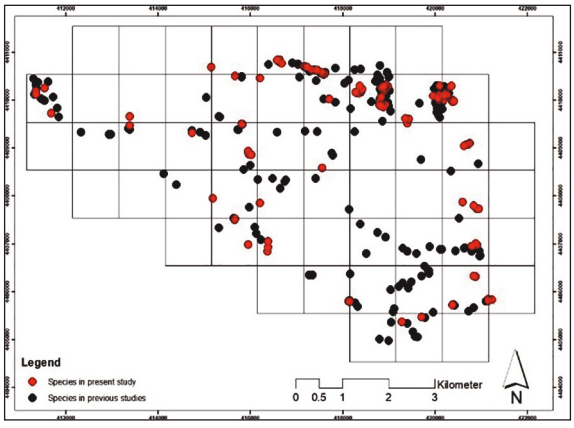


Figure 8. Amphibian and reptile records collected from the field (red dots) and literature records (black dots) in Bozcaada.

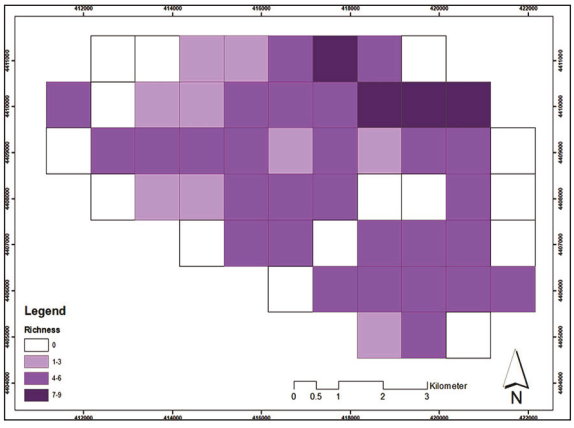


Figure 9. Amphibian and reptile species richness map of Bozcaada. The legend depicts the classes of species richness.

The distribution of this species was limited to elevations of 0–30 m (Fig. 24). Seasonal puddles in Bozcaada are very rare and formed by seasonal precipitation. It is thought that the future distribution of the species will be limited due to the early drying of these aquatic habitats and climatic changes.

Ordo ANURA Duméril, 1806
Familia BUFONIDAE Gray, 1825
Genus *Bufotes* Rafinesque, 1815

Bufotes sitibundus (Pallas, 1771) (Fig. 11) - Green Toad

The Green Toad is relatively common species in the study area, with 20 records (4.48%) from 11 different grid cells (19.64%). It was observed in agricultural habitat, shrubby area, settlements area, stony-hilly area, wetland habitat and woodland habitat. The range of this species is from 0–70 m (Fig. 25). The small number of seasonal puddles in Bozcaada and drying of them due to increasing air temperatures considerably reduces the biotopes suitable for reproduction of the species.

Classis REPTILIA
Ordo TESTUDINES Linnaeus, 1758
Familia GEOEMYDIDAE Theobald, 1868
Genus *Mauremys* Gray, 1869

Mauremys rivulata (Valenciennes, 1833) (Fig. 12) - Western Caspian Turtle

The Western Caspian Turtle is a relatively rare species in the study area, with two records (0.44%) in two grid cells (3.57%). It was detected in the seasonal puddle in the agricultural area and wetland habitat. The elevational range of this species is from 0–10 m (Fig. 26). Since Azmak Creek is the only permanent wetland on the island, distribution of the species in Bozcaada is quite limited. As a result of losing the wetland feature of Azmak Creek, it is expected that it will pose a threat to the *M. rivulata* population in Bozcaada.

Familia TESTUDINIDAE Batsch, 1788
Genus *Testudo*

Testudo graeca (Linnaeus, 1758) (Fig. 13) - Mediterranean Spur-Thighed Tortoise

The Mediterranean Spur-Thighed Tortoise is a common species in the study area with 45 records (10.08%) in 16 different grid cells (28.57%). This species is distributed in all habitat types determined and it generally prefers to live at elevations of 5–155 m (Fig. 27). In addition, *T. graeca* species is in the 'Vulnerable' category according to the IUCN Red List (2021). For this reason, it is extremely important for the future distribution of the species that the habitat in Bozcaada Island remains intact, away from human pressure and settlement areas.

Ordo SQUAMATA Oppel, 1811
Familia ANGUIDAE Gray, 1825
Genus *Pseudopus* Merrem, 1820

Pseudopus apodus (Pallas, 1775) (Fig. 14) - European Glass Lizard

According to the literature, the European Glass Lizard is one of the rarest species in the study area, with two records (0.44%) in only two grid cells (3.57%). In previous studies (Tosunoğlu et al., 2009; Gül & Tosunoğlu, 2013), the species was observed in a stony-hilly area and its elevation is 10 m (Fig. 28). We have not found the species in our field surveys. This indicates that the population of the species in Bozcaada has decreased or may have become extinct. Increasing tourism pressure, increase in settlements areas and human interventions in Bozcaada may cause the decrease/extinction of the population by destroying the habitat of the species.

Familia GEKKONIDAE Gray, 1825
Genus *Hemidactylus* Oken, 1817

Hemidactylus turcicus (Linnaeus, 1758) (Fig. 15) - Mediterranean House Gecko

Mediterranean House Gecko is one of the relatively common species in the study area, with 39 records (8.74%) from 17 grid cells (30.35%). It is distributed in agricultural habitat, shrubby area, settlements area, stony-hilly area, and woodland habitat. The range of this species is from 20 m to 160 m (Fig. 29). Failure to protect the habitats of the species in Bozcaada may lead to a decrease in population in the future.

Figures 10–14. Amphibian and Reptile species living in Bozcaada (Tenedos) Island, Türkiye, in their habitat. Fig. 10: *Lissotriton schmidtleri*. Fig. 11: *Bufotes sitibundus*. Fig. 12: *Mauremys rivulata*. Fig. 13: *Testudo graeca*. Fig. 14: *Pseudopus apodus*.

Figures 15–19. Amphibian and Reptile species living in Bozcaada (Tenedos) Island, Türkiye, in their habitat. Fig. 15: *Hemidactylus turcicus*. Fig. 16: *Mediodactylus kotschyi*. Fig. 17: *Ophisops elegans*. Fig. 18: *Ablepharus kitaibelii*. Fig. 19: *Eryx jaculus*.

Figures 20–23. Amphibian and Reptile species living in Bozcaada (Tenedos) Island, Türkiye, in their habitat. Fig. 20: *Malpolon insignitus.* Fig. 21: *Dolichophis caspius*. Fig. 22: *Natrix natrix*. Fig. 23: *Xerotyphlops vermicularis*.

Familia GEKKONIDAE Gray, 1825
Genus *Mediodactylus* Szczerbak et Golubev, 1977

Mediodactylus kotschyi (Steindachner, 1870) (Fig. 16) - Kotschy's Gecko,

Kotschy's Gecko is a relatively common species in the study area with 20 records (3.48%) in a total of six grid cells (10.71%). It is distributed in stony-hilly area and shrubby area, and it generally prefers to live at elevations of 5–160 m (Fig. 30). It is thought that the limited distribution of the species in Bozcaada may cause a decrease in its population in the future.

Familia LACERTIDAE Oppel, 1811
Genus *Ophisops* Ménétries, 1832

Ophisops elegans (Ménétries, 1832) (Fig. 17) - Snake-Eyed Lizard

Snake-Eyed Lizard is the most common species in the study area with 224 records (50.22%) from 38 different grid cells (67.85%). It is distributed in all habitat types determined and it generally prefers to live at elevations of 0–170 m (Fig. 31). It was observed that there is no threat yet for *O. elegans* in Bozcaada. However, in the future, there may be a decrease in the population of the species on island due to the destruction of its habitat.

Familia SCINCIDAE Gray, 1825
Genus *Ablepharus* Lichtenstein, 1823

Ablepharus kitaibelii (Bibron et Bory de Saint-Vincent, 1833) (Fig. 18) - Snake-Eyed Skink

Snake-Eyed Skink is one of the most common species in the study area with 38 records (8.52%) in 18 different grid cells (32.14%). It is distributed

in agricultural habitat, shrubby area, settlements area, stony-hilly area, dune habitat and woodland habitat. The elevational range of this species is from 0–120 m (Fig. 32). With the increasing tourism in Bozcaada, the conversion of shrubby area into settlement areas and the destruction of woodland habitat limit the distribution of the species. Such damage to the habitat of *A. kitaibelii* may result in a decrease in the distribution status of species on island in the future.

Familia BOIDAE Gray, 1825
Genus *Eryx* Daudin, 1803

Eryx jaculus (Linnaeus, 1758) (Fig. 19) - Sand Boa

The Sand Boa is one of the rarest species in the study area with one record (0.22%) in only one grid cell (1.78%). In previous studies (Tosunoğlu et al., 2009; Gül & Tosunoğlu, 2013), the species was observed in a stony-hilly area and its elevation is 37 m (Fig. 33). We have not found the species in our field surveys. This indicates that the population of the species in Bozcaada has decreased or may have become extinct. Tourism pressure in Bozcaada, increase in settlements areas and human interventions may have caused the population decline or extinction by destroying the habitat of the species.

Familia PSAMMOPHIIDAE Bourgeois, 1968
Genus *Malpolon* Fitzinger, 1826

Malpolon insignitus (Geoffroy Saint-Hilaire, 1827) (Fig. 20) - Eastern Montpellier Snake

The Eastern Montpellier Snake is one of the rare species in the study area with five records (1.12%) in three grid cells (5.35%). It is distributed in agricultural habitat, shrubby area, and stony-hilly area and it generally prefers to live at elevations of 15–70 m (Fig. 35). The increase of tourism activities on the island during the summer months leads to road deaths of this species. At the same time, it is thought that factors such as the destruction of the species' habitats and climatic changes may cause the decline of the species' population in Bozcaada in the future.

Familia COLUBRIDAE Oppel, 1811
Genus *Dolichophis* Gistel, 1868

Dolichophis caspius (Gmelin, 1789) (Fig. 21) - Caspian Whipsnake

Caspian Whipsnake is a relatively common species in the study area with 19 records (4.26%) in 13 different grid cells (23.21%). It is distributed in agricultural habitat, shrubby area, settlements area, stony-hilly area, dune habitat and woodland habitat. The elevational range of this species is from 0 m to 100 m (Fig. 34). The increase in tourism activities on the island during summer months and destruction of the habitat of species are important reasons for the limitation of its distribution. It is thought that problems such as climate change may cause a decrease in population of the species in Bozcaada in coming years.

Genus *Natrix* Laurenti, 1768
Natrix natrix (Linnaeus, 1758) (Fig. 22) - Grass Snake

The Grass Snake is one of the rarest species in the study area with three records (0.67%) in three grid cells (5.53%). It is distributed in seasonal puddles located in agricultural habitats and settlement areas, and wetland habitat. The range of this species is from 0 m to 25 m (Fig. 36). The increase in tourism activities on the island during the summer months leads to road deaths of this species. At the same time, the early drying of seasonal puddles in Bozcaada due to climatic changes and global warming is thought to pose a threat to the future status of the species.

Familia TYPHLOPIDAE Merrem, 1820
Genus *Xerotyphlops* Hedges, Marion, Lipp, Marin et Vidal, 2014

Xerotyphlops vermicularis (Merrem, 1820) (Fig. 23) - Blind Snake

The Blind Snake is a relatively common species with 20 records (4.48%) in eight different grid cells (14.28%). It is distributed in shrubby area, settlements area, and stony-hilly area and it generally prefers to live at elevations of 15–170 m (Fig. 37). It is thought that negative effects such as tourism activities and increase in residential areas may cause a decrease in the population of the species in Bozcaada in the future.

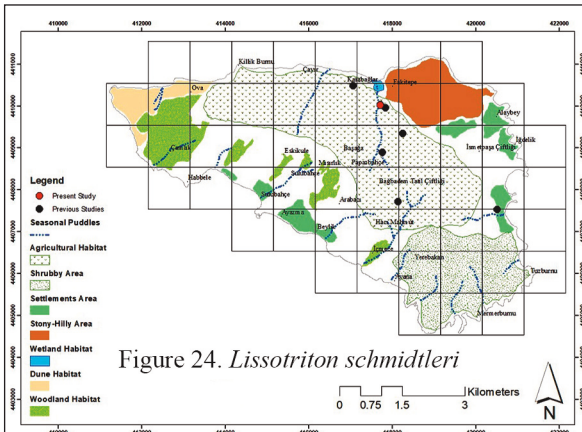


Figure 24. *Lissotriton schmidtleri*

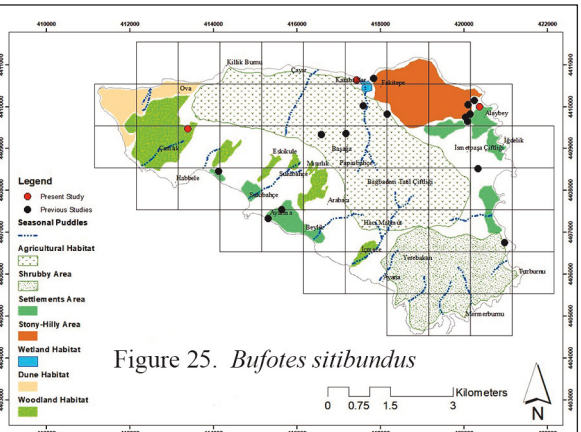


Figure 25. *Bufotes sitibundus*

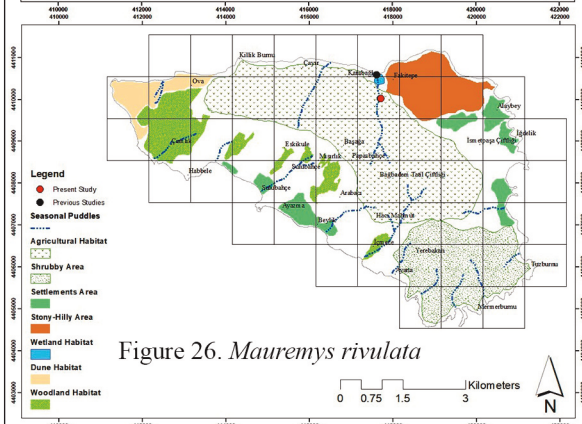


Figure 26. *Mauremys rivulata*

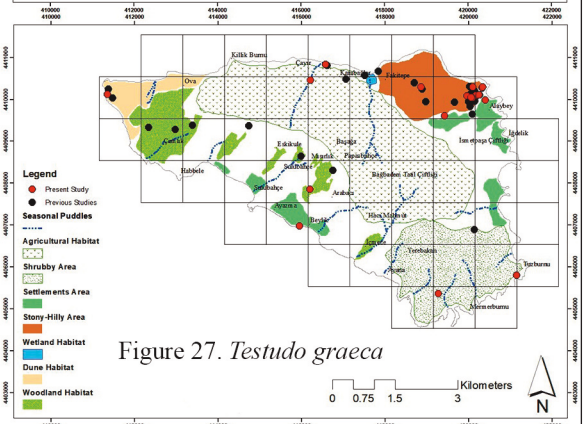


Figure 27. *Testudo graeca*

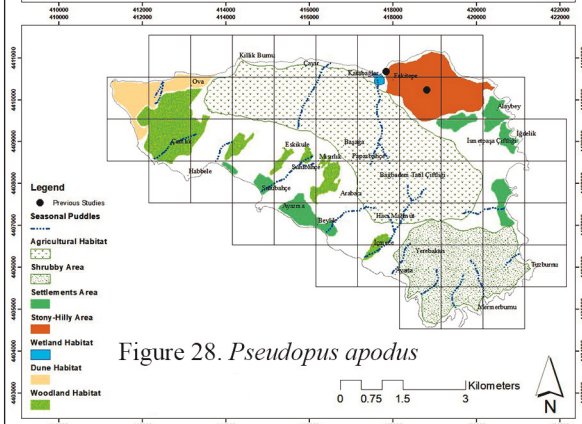


Figure 28. *Pseudopus apodus*

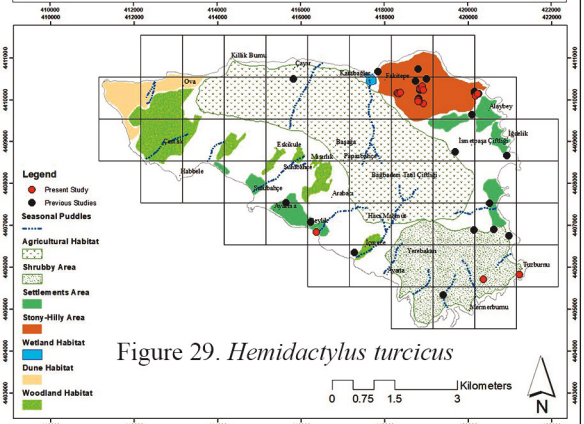


Figure 29. *Hemidactylus turcicus*

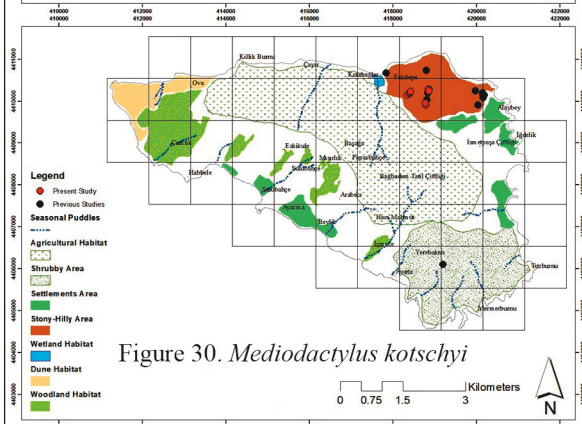


Figure 30. *Mediodactylus kotschyi*

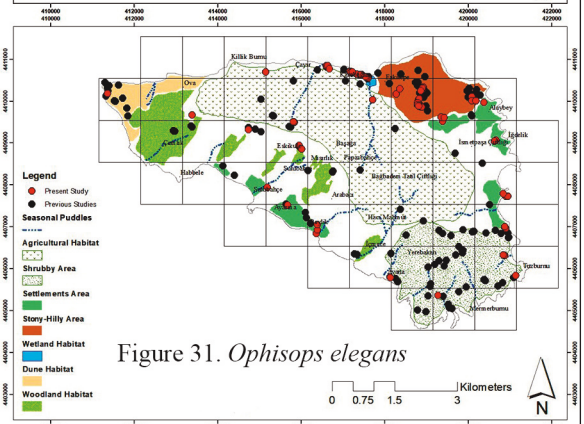
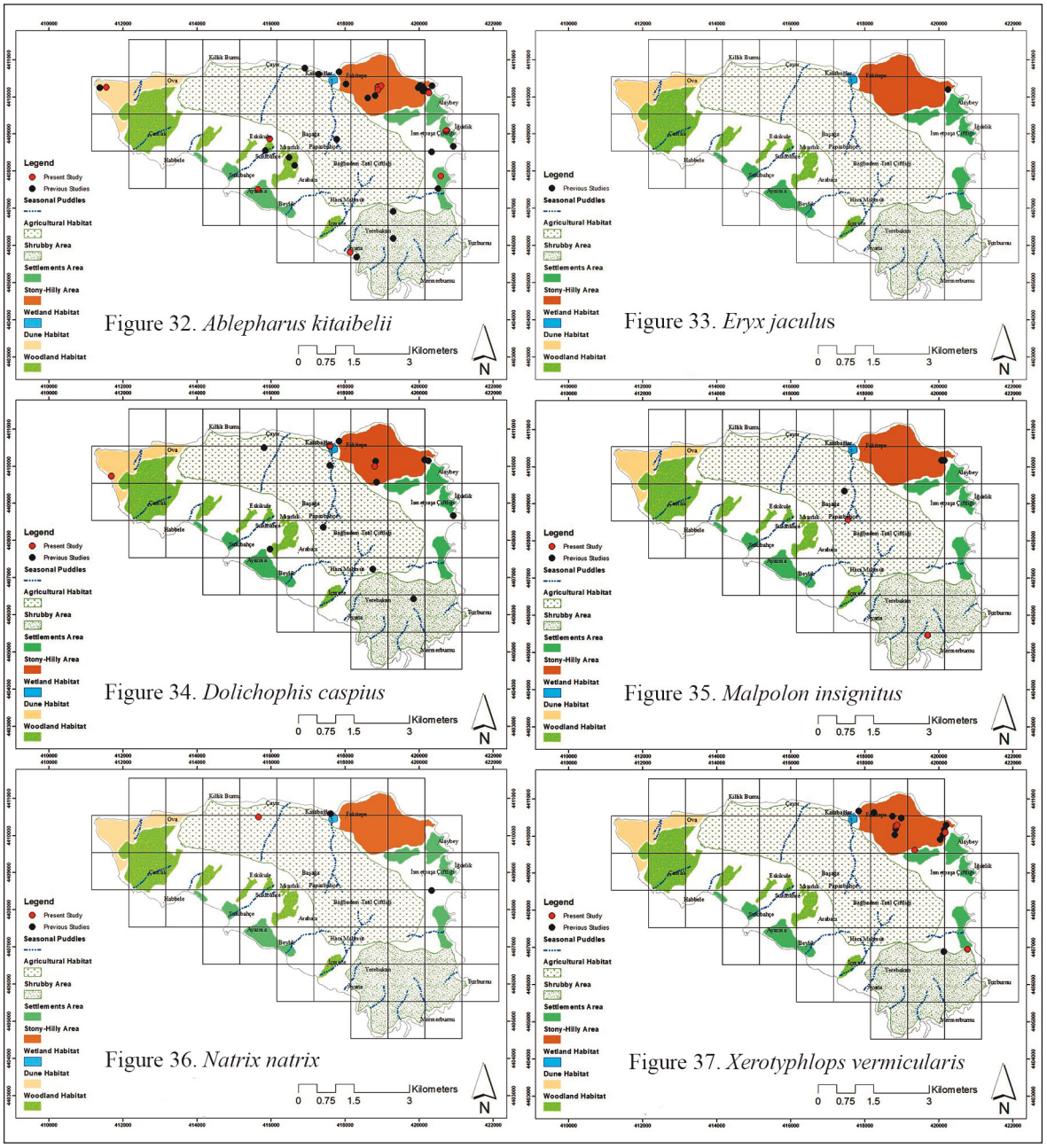


Figure 31. *Ophisops elegans*



Figures 24–37. Distribution of Amphibian and Reptile species living in Bozcaada (Tenedos) Island, Türkiye.

DISCUSSION

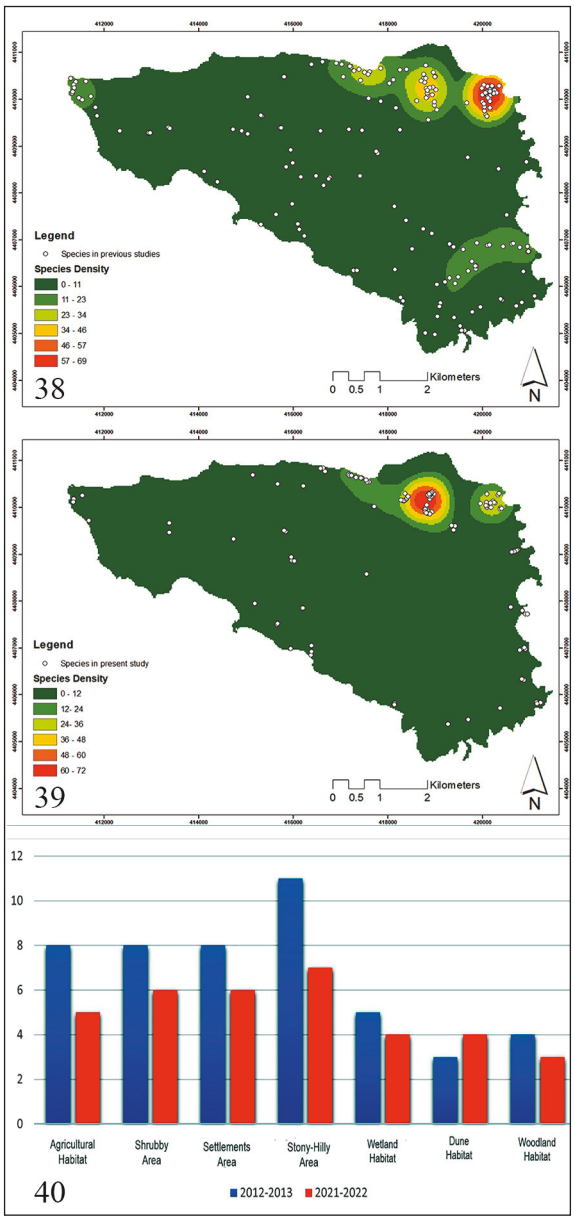
There are a total of 174 herpetofaunal varieties in Türkiye, including 34 amphibian and 140 reptile species (Baran et al., 2021). A total of nine amphibian species and 36 reptile species are distributed within the borders of Çanakkale Province (Tosunoğlu et al., 2017). Although Bozcaada is a small and isolated area, it has an important herpetofaunal diversity with two amphibia and 12 reptile species. *Pseudopus apodus* and *Eryx jaculus* species were not observed in the field surveys. For this reason, an updated herpetofaunal checklist and distributions were presented, containing a total of 12 species, two amphibian and 10 reptiles, from Bozcaada. The most frequently observed species

were *Ophisops elegans* with 224 records, *Testudo graeca* with 45 records, *Hemidactylus turcicus* with 39 records, and *Ablepharus kitaibelii* with 38 records, respectively.

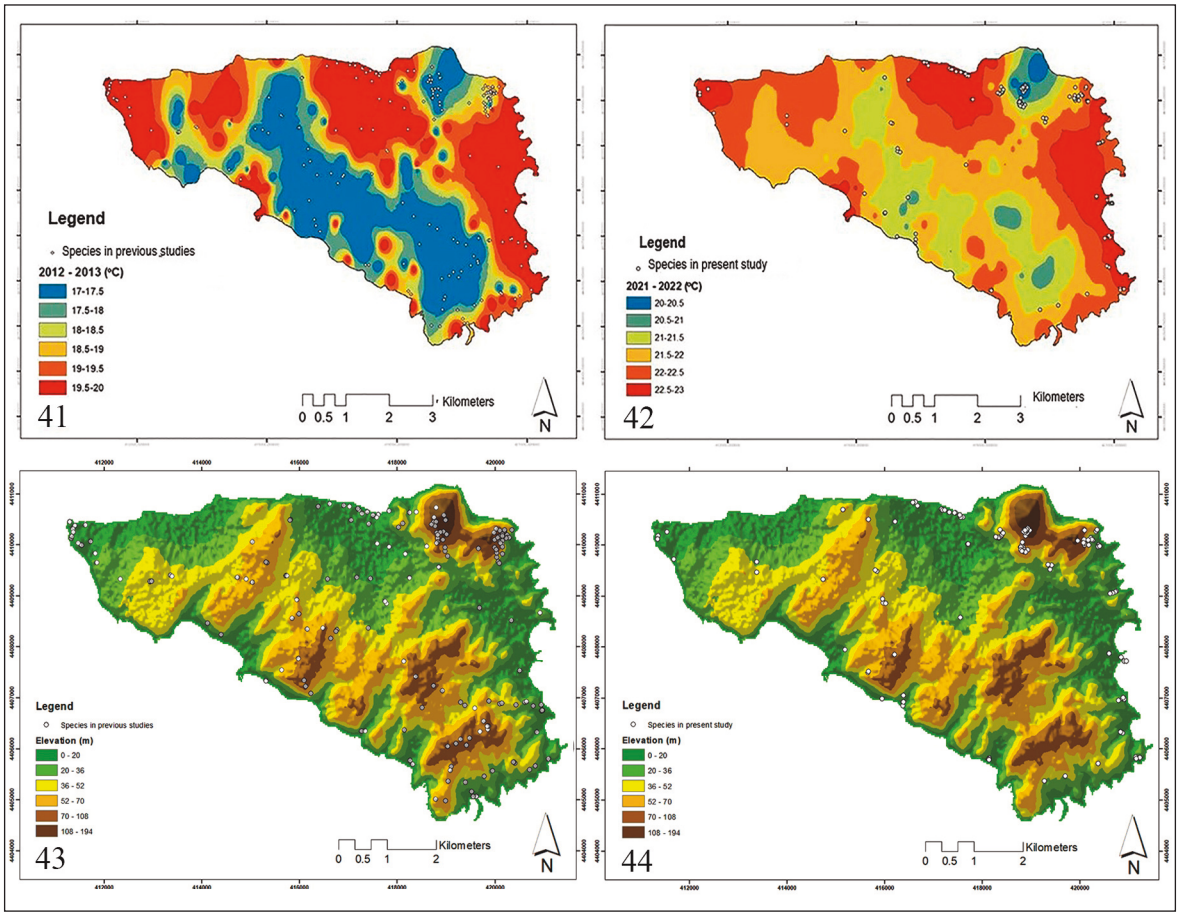
In previous studies (Tosunoğlu et al., 2009; Gül & Tosunoğlu, 2013), it was determined that all amphibian and reptile species distributed on the island are mostly found in the stony-hilly area. Apart from this, the species were also observed intensively in the wetland habitat, shrubby area and dune habitat, respectively (Fig. 38). In this study, it was determined that the species decreased considerably in the dune area and shrubby area, where the species density was found to be high in the past. In addition, in previous studies, it was determined that the species found in the stony-hilly area were concentrated in the Yenikale region, which is closer to the settlement area. In this study, it was determined that these species were more densely on Göztepe, the highest peak of the island (Fig. 39). It is observed that the distribution of amphibian and reptile species in Bozcaada was limited in a ten years period. It was determined that the distribution of amphibia and reptile species living on the island has been limited within ten years due to effects such as increased tourism activities and the destruction of their habitats, the fact that the island is mostly agricultural and the settlement areas have increased considerably. In addition, in the species' distribution of habitat types by years, it was determined that the number of species observed in all habitat types except the dune habitat decreased in 2021–2022 compared to previous years (Fig. 40).

The temperature maps of different years in Bozcaada were compared and it was seen that the average temperature of the island increased by about 2 ºC over the ten-year period (Figs. 41, 42). It was determined that the temperature difference in the island was at most 1-2 ºC, since the surface area of the island was small and the difference in elevation was not very large. It was observed that the species preferred higher elevations in Bozcaada due to the increasing temperatures. Future distributions of amphibia and reptile species are thought to be under threat, as temperatures rise, and the island has a closed ecosystem.

When the distribution of amphibian and reptile species in Bozcaada was compared for a ten-year period depending on the elevation, it was determined that they were concentrated in Göztepe and Yenikale regions, which are the highest hills of the island. In connection with the increase in temperature, it was determined that amphibian and reptile species on the island preferred higher altitudes regions (Figs. 43, 44). However, due to the low elevation difference of Bozcaada, it is predicted that amphibian and reptile species may decrease in high



Figures 38, 39. Species density in previous studies (Fig. 38) and species density in present study (Fig. 39). Figure 40. Distribution of amphibian and reptile species according to years in habitat types in Bozcaada Island.



Figures 41, 42. Temperature maps of Bozcaada Island. Fig. 41: 2012–2013. Fig. 42: 2021–2022.
Figures 43, 44. Elevation map of Bozcaada Island and distribution of species. Fig. 43: 2012–2013. Fig. 44: 2021–2022.

regions with increasing temperatures in the following years.

The current distributions and ecologies of amphibian and reptile species are closely related to environmental variable patterns such as temperature and precipitation. In addition, climate change is very important on amphibian and reptile biodiversity (Bickford et al., 2010). In contrast, all important parameters (air and sea surface temperature, solar radiation, UV, humidity, cloud cover, precipitation, and sea level rise) related to climate change have effects on biodiversity (Bickford et al., 2010).

Already reduced to small population sizes by isolation and habitat loss in islands, increased temperatures and decreased precipitation could drive populations and species extinction. Isolation makes amphibian and reptile species vulnerable to climate change because animals living on islands do not have the ability to migrate to colder latitudes (Bickford et al., 2010). The winter activity of some amphibian and reptile species (*Lissotriton schmidtleri*, *Mauremys rivulata*, *Testudo graeca*, *Hemidactylus turcicus*, *Mediodactylus kotschyi*, *Ophisops elegans*) in Bozcaada due to increasing temperatures were determined and the effects of climate change on these species were evaluated (Özgül et al., 2022).

Due to the estimated temperature increase of up to 6 °C by the end of the next century, it is possible that a large migration will occur depending on latitude or elevation (Bickford et al., 2010). Temperature increases are also likely to lead to a change in the distribution of amphibians and reptiles. The species may move to colder micro habitats (Bickford, 2005) or to lower temperatures at higher altitudes (Bickford et al., 2010). Some amphibian species have shifted towards higher habitats at a

TAXON	Tosunoğlu et al., 2009	Gül & Tosunoğlu, 2013	Present Study	Number of Records	Grid cells	IUCN
AMPHIBIA						
SALAMANDRIDAE						
Lissotriton schmidtleri	-	+	+	**8**	**6**	-
BUFONIDAE						
Bufotes sitibundus	+	+	+	**20**	**11**	**LC**
REPTILIA						
GEOEMYDIDAE						
Mauremys rivulata	+	+	+	**2**	**2**	-
TESTUDINIDAE						
Testudo graeca	+	+	+	**45**	**16**	**VU**
ANGUIDAE						
Pseudopus apodus	+	+	-	**2**	**2**	**LC**
GEKKONIDAE						
Hemidactylus turcicus	+	+	+	**39**	**17**	**LC**
Mediodactylus kotschyi	+	+	+	**20**	**6**	**LC**
LACERTIDAE						
Ophisops elegans	+	+	+	**224**	**38**	**LC**
SCINCIDAE						
Ablepharus kitaibelii	+	+	+	**38**	**18**	**LC**
BOIDAE						
Eryx jaculus	+	-	-	**1**	**1**	**LC**
COLUBRIDAE						
Dolichophis caspius	+	+	+	**19**	**13**	**LC**
PSAMMOPHIIDAE						
Malpolon insignitus	+	+	+	**5**	**3**	**LC**
NATRICIDAE						
Natrix natrix	-	+	+	**3**	**3**	**LC**
TYPHLOPIDAE						
Xerotyphlops vermicularis	+	+	+	**20**	**8**	**LC**

Table 1. Checklist of amphibians and reptiles recorded in Bozcaada during field surveys, along with literature mentions (Tosunoğlu et al., 2009; Gül & Tosunoğlu, 2013). The number of records and grid cells (from field surveys and literature) are provided, along with the IUCN Categories corresponding to each species.

large rate in the last 30 years (Raxworthy et al., 2008; Bickford et al., 2010).

The density of amphibian and reptile species living in Bozcaada, which is a heterogeneous area in terms of habitat diversity, geological, vegetation and topographic features, the distribution status on the island with increasing temperatures, were mapped and examined for the first time with this study. When compared over a ten-year period, amphibia and reptile species have moved to the highest points of the island with increased anthropogenic effects and temperatures. This study we have carried out is very important for the sustainability of biodiversity. In addition, it will make important contributions to the planning process of future studies on amphibia and reptile species, and to the creation of conservation studies and activities.

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