

Distributional records for some herpetofaunal species in the islands of SW Turkey, with notes on the diet of *Laudakia stellio*

PIETRO LO CASCIO¹ and MARCO MASSETI²

¹ Associazione 'Nesos', Corso Vittorio Emanuele, 24. 98055 Lipari (ME), Italy.

E-mail: plocascio@nesosonline.org [author for correspondence]

² Dipartimento di Biologia Animale e Genetica 'Leo Pardi, Laboratori di Antropologia, Università di Firenze, Via del Proconsolo, 12. 50122 Firenze, Italy.

THE herpetofauna of the coastal islands of SW Turkey was the subject of a detailed study by Baran (1990), who explored more than 150 of the islands situated between Marmaris and İskenderun. In May 2003 we had the opportunity to visit some of these islands and to collect new data, the presentation of which is the aim of this paper. Among the islands visited, only Kizkumu Islet was not previously explored by Baran (1990); therefore no data on its herpetofauna are available in the literature (cf. Baran & Atatür, 1998; Sindaco et al., 2000, and references therein).

STUDY AREA

Most of the islands visited are situated in the Göcek-Fethiye Bay: Göcek (36°43'64"N 28°56'40"E), Yassica (36°42'23"N 28°56'01"E), Tersane (36°40'22"N 28°55'21"E), Domuz (36°39'69"N 28°54'06"E), and Delikli (36°40'04"N 29°02'12"E), the easternmost of a small group of islets with the same name, often indicated in maps as 'Deliklitas Adalari'. Kameriye (36°43'74"N-28°03'35"E) is located off the N coast of the Bozborun peninsula. Finally, Kizkumu (36°45'71"N 28°07'48"E) lies in the inlet of Keçibükü, at the end of the Orhaniye Bay, approximately 100 m off the coast. Geographical coordinates of the areas studied were determined using 'Cmapecs Electronic Chart System' software (version 4).

Land surface areas of the islands comprise between 0.044 (Kizkumu) and 4.87 km² (Tersane), and maximum altitudes are generally within 100 m a.s.l. The islands of Göcek-Fethiye Bay have a volcanic origin, while those of Bozborun peninsula, representing the top of submarine promontories, are characterised by massive

Mesozoic limestone deposits. All of them are included in the isobath of -50 m and were connected with the mainland during the Pleistocene sea regressions. The climate is mediterranean, with an average annual temperature of 18.6°C and a total annual rainfall of circa 1,000 mm (recorded in Marmaris). Variation in annual rainfall, however, is considerable, and prolonged droughts are not uncommon. The relative humidity is low throughout the summer months (50–60%), and somewhat higher in winter (70–75%) (Carlström, 1987 and references therein). Superficial hydrography consists of two perennial streams in Göcek, a few wells, cisterns and small troughs in Tersane and Kameriye, and one salt-marsh coastal lagoon in Yassica. Vegetation is comprised mainly of scrub forest with *Quercus coccifera*, *Olea europaea* var. *sylvestris*, *Pistacia terebinthus*, *Ceratonia siliqua* on Domuz, Tersane, and Kameriye. Pine-woods with *Pinus brutia*, and low maquis with *Cistus* sp. and *Erica* sp. form a dense covering on Göcek and Yassica. A dense thorn forest vegetation with *Genista acanthoclada*, *Sarcopoterium spinosum*, *Pistacia lentiscus* and *Erica* sp. covers Delikli. Finally, a phrygana dominated by *Phlomis fruticosa*, with sparse *Olea europaea* var. *sylvestris*, is present in Kizkumu. In some islands (Tersane, Domuz, Kameriye, Kizkumu), grazing by goats has led to significant change in the vegetation. Moreover, Tersane is currently inhabited by few people; a large part of Domuz is private property, used as a summer residence. On Kizkumu, ruins of a Byzantine fortress occur. The remaining islands are uninhabited, but commonly visited during summer by tourists.

SPECIES ACCOUNTS

Amphibians

Family Bufonidae

Bufo viridis (Laurenti, 1768)

One male found in Kameriye, in the vicinity of an old cistern located within about 150 m of the church ruins. This is the first evidence of the occurrence of *Bufo viridis* on the island.

Table 1. Dietary composition of *Laudakia stellio* by numbers of items (*N*), percentage of total (*N%*), and numbers (*n*) and percentage (*n%*) of pellets containing that prey type.

PREY TYPE	<i>N</i>	<i>N%</i>	<i>n</i>	<i>n%</i>
unidentified Arthropoda	9	3.22	8	33.33
Arachnida	(5)	(1.79)		
Araneae	5	1.79	2	8.33
Orthoptera	(26)	(9.31)		
Acrididae	7	2.50	6	25.00
Tettigoniidae	19	6.81	17	70.83
Heteroptera	(37)	(13.25)		
Lygaeidae	3	1.07	3	12.50
Pentatomidae	18	6.45	12	50.00
other Heteroptera	16	5.73	8	33.33
Homoptera	23	8.24	9	37.50
Coleoptera	(58)	(20.76)		
Melolonthidae	4	1.43	1	4.16
Cetoniidae	21	7.52	7	29.16
Buprestidae	2	0.71	1	4.16
Curculionidae	13	4.65	7	29.16
other Coleoptera	18	6.45	12	50.00
Lepidoptera	(3)	(1.07)		
adults	1	0.35	1	4.16
larvae	2	0.71	2	8.33
Diptera	9	3.22	5	20.83
Hymenoptera	(109)	(39.06)		
Apoidea	25	8.96	14	58.33
Formicidae	74	26.52	15	62.50
other Hymenoptera	10	3.58	9	37.50

Reptiles

Family Gekkonidae

Cyrtopodion kotschy (Steindachner, 1870)

Two specimens found in Yassica, in the ruins of a building located about 100 m from the landing stage; several specimens found in Kizkumu, in rocky crevices and on the fortress walls. The species is new for both islands.

Family Agamidae

Laudakia stellio (Linnaeus, 1758)

This species is widely distributed in W and S Anatolia (Baran & Öz, 1985; Sindaco et al., 2000),

on the Aegean islands of the Dodecanese, as well as on the coastal Turkish islands (see Baran, 1990). However, in these latter islands it does not seem to be common: only one and three specimens were observed in Yassica and Tersane, respectively, where this species was previously recorded by Baran (1990). In contrast, a large population of *Laudakia stellio* occurs on Kizkumu living in the rocky cliffs and on the walls of the fortress ruins. On this islet, mean density was about 2–6 individuals per 10 m², but in some areas it reaches up to 10 or 12 individuals. During the transect surveys, we collected faecal pellets ($n = 24$) that could be attributed undoubtedly to this species, because of their characteristic shape and size. Pellets were examined in the laboratory under a dissecting microscope, and remains of 279 preys were identified to family level (mean = 11.6 identifiable food items per pellet). Although the sample size was inadequately small for statistical analysis, the data permit at least some general comments on diet in this population (summarised in Table 1). Prey items consisted mainly of insects, with Coleoptera and Hymenoptera representing circa 60% of the entire sample. Among these, ants seem to constitute the major prey group and occur in 62% of the pellets examined. Although lower in terms of percentage composition, katydids are also frequently eaten by the lizards, having been identified from 70% of the pellets. Katydid thus seem to comprise an important prey source in the population studied, and most of the remains could be furthermore referred to perhaps a single species, the size range of which was above average (about 25–27 mm in length). Most of the other prey items identified measured between 6 and 12 mm. An unidentified species of Tettigoniidae characterised by this particular size range was observed quite commonly on the islet, where it shows a surprising high population density. Prey availability on Kizkumu thus seems to correspond well to the dietary composition of *Laudakia stellio* in this environment. Furthermore, the wide range of different prey species (see Table 1) suggests that *L. stellio* is an opportunist, as indicated in other studies on trophic ecology in this species (Düşen & Öz, 2001; Lo Cascio et al., 2001). In addition to

invertebrate prey, analysis of the pellet material also revealed a small but significant level of plant consumption (plant matter found in 16% of examined pellets, $n = 4$), which does not seem to be an important component of the diet when compared to populations from other insular environments (cf. Lo Cascio et al., 2001).

Family Scincidae

Ablepharus kitaibelii Bibron & Bory St. Vincent, 1833

Several specimens found in Delikli, where the species was previously unrecorded. Most were observed in leaf litter and low vegetation on a small beach of the NW coast. This species is well represented in the islands of coastal southwestern Turkey (Baran, 1990), as well as in W Anatolia; it is considered a polytypic species by Schmidtler (1997), even though this author did not discuss the subspecies that occurred in Anatolia.

Family Typhlopidae

Typhlops vermicularis Merrem, 1820

One dead specimen, probably trampled accidentally by goats, was collected in Domuz, along a path on the northeastern coast. Two others were observed respectively in Tersane and Kizkumu, while they were trying to hide under stones. The species is reported here as new for each of these islands. Its distribution covers almost the whole of Anatolia (Sindaco et al., 2000); however it does not seem to be frequent on the coastal Turkish islands (see Baran, 1990).

Family Colubridae

Hierophis jugularis Linnaeus, 1758

One adult found in Göcek, near the eastern stream, and the remains of one juvenile were also collected near the landing-stage. The species is new for this island. Widely distributed in S Anatolia, it does not seem to be common on the coastal Turkish islands (see Baran, 1990, as *Coluber jugularis*). In accordance with Schätti (1988), we refer this species to the genus *Hierophis* Fitzinger, 1843, recognized by this author as distinct from *Coluber* Linnaeus, 1758.

Eirenis modestus (Martin, 1838)

One specimen found in Kameriye, hidden under stones situated within a few metres from the sea. The species is new for the island. Within the genus *Eirenis* Jan, 1863, this is the only species with a distribution extending to SW Anatolia (Schmidtler, 1993). It seems to be relatively common on the coastal Turkish islands (see Baran, 1990).

SUMMARY

One amphibian and six reptile species are reported for the first time from the following islands of SW Turkey: Domuz (*Typhlops vermicularis*), Tersane (*Typhlops vermicularis*), Yassica (*Cyrtopodion kotschyi*), Göcek (*Hierophis jugularis*), and Delikli (*Ablepharus kitaibelii*), in the Göcek-Fethiye Bay; Kameriye (*Bufo viridis* and *Eirenis modestus*), located off the northern coast of Bozborum peninsula; and Kizkumu (*Cyrtopodion kotschyi*, *Laudakia stellio* and *Typhlops vermicularis*), in the Orhaniye Bay. Data concerning the diet of *Laudakia stellio* on the latter island are also discussed.

ACKNOWLEDGEMENTS

We wish to thank Dr Oguz Turkozan for his suggestions towards the improvement of this paper. It is a pleasure to also thank Dr Simona Barresi for his advice and support in the use of 'Cmapecs' application software.

REFERENCES

Baran, I. (1990). Marmaris ve İskenderun arasındaki adalarimizin herpetofaunasi. *Doğa, Turk. J. Zool.* 14, 113–126.

Baran, I. & Atatür, M.K. (1998). *Türkiye Herpetofaunasi*. Ankara: T.C. Çevre Bakanlığı Yayinlari.

Baran, I. & Öz, M. (1985). Anadolu *Agama stellio* (Lacertilia, Agamidae) populusyonlarinin taksonomik olarak arastirilmasi. *Doğa, Turk. J. Zool.* 9, 161–169.

Carlström, A. (1987). *A survey of the flora and phytogeography of Rhodos, Simi, Tilos and the*

Marmaris peninsula (SE Greece, SW Turkey). Lund: Dept. System. Bot., University of Lund.

Düşen, S. & Öz, M. (2001). A study on the feeding biology of *Laudakia (=Agama) stellio* (L. 1758) (Lacertilia: Agamidae) populations in the Antalya Region. *Turk. J. Zool.* 25, 177–181.

Lo Cascio, P., Corti, C. & Luiselli, L. (2001). Seasonal variations of the diet *Laudakia stellio* (Agamidae) from Nisyros Island, Dodecanese (Greece). *Herpetol. J.* 11, 33–35.

Schätti, B. (1988). *Systematik und Evolution der Schlangengattung Hierophis Fitzinger, 1843 (Reptilia, Serpentes)*. Ph. D. Thesis, Univ. Zürich.

Schmidtler, J.F. (1993). Zur Systematik und Phylogenie des *Eirenis modestus*-Komplexes in Süd-Anatolien (Serpentes, Colubridae). *Spixiana* 16, 79–96.

Schmidtler, J.F. (1997). Die *Ablepharus kitaibelii*-Gruppe in Süd-Anatolien und benachbarten Gebieten (Squamata: Sauria: Scincidae). *Herpetozoa* 10, 35–63.

Sindaco, R., Venchi, A., Carpaneto, G.M. & Bologna, M.A. (2000). The reptiles of Anatolia: a checklist and zoogeographical analysis. *Biogeographia* 21, 441–554.