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SHORT COMMUNICATION **Open Access**

A contribution to the distribution of the endemic lizard species, *Lacerta pamphylica*

Endemik kertenkele türü, *Lacerta pamphylica*'nın dağılışına bir katkı

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ABSTRACT

In the present study, we contributed to the knowledge of the distribution of the endemic lizard species, Pamphylian green lizard in Türkiye and pointed out the northernmost localities of the species. Until recently, the occurrence of the species was only known from the Antalya and Mersin provinces of Türkiye. According to the most recent records, it has been reported from some localities (Aşağı Kırıntı, Yukarı Kırıntı, Kasımlar, and Belence) in the Sütçüler district of the Isparta province. In our study, we also found individuals of the species in the Yakaafşar village of Aksu district, Isparta. In addition, we revealed the occurrence of the species from two localities in Ayvalıpınar village, one locality in Güldallı village, and one locality in Kesme village of Sütçüler district.

ÖZ

Bu çalışmada, Pamfilya kertenkelesinin Türkiye'deki dağılış bilgisine katkıda bulunduk ve türün bilinen en kuzey lokalitesini belirtmiş olduk. Yakın zamana kadar türün varlığı sadece Türkiye'nin Antalya ve Mersin illerinden biliniyordu. En güncel kayıtlara göre, tür Isparta ilinin Sütçüler ilçesindeki bazı lokalitelerden de (Aşağı Kırıntı, Yukarı Kırıntı, Kasımlar ve Belence) rapor edilmiştir. Çalışmamızda, Isparta ilinin Aksu ilçesinin Yakaafşar köyünde de türe ait bireylere rastladık. Ayrıca, Sütçüler ilçesine bağlı Ayvalıpınar köyünde iki, Güldallı köyünde bir ve Kesme köyünde bir lokaliteden de türün varlığını tespit ettik.

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1. INTRODUCTION

The Pamphylian green lizard, *Lacerta pamphylica* is an endemic lizard species of Turkey. It is a large-sized lizard among the Lacertidae family. The habitat of the species consists of heavily vegetated stony places in forest areas, banks of streams, fields and gardens (Baran et al., 2021; Bülbül et al., 2022). *L. pamphylica* is distributed from the sea level to about 1300 m elevations, including suitable habitats for the populations (Baran et al., 2021) and it is only known from the Mediterranean region of Turkey in the provinces of Antalya, Mersin, and Isparta from Kumluca (Antalya) in the west, north to Belence (Isparta), and east to Göksu Delta (Mersin) (Schmidtler, 1986a; Winden and Boagerts, 1992; Geniez et al., 2004; Bülbül et al., 2022).

Distribution of the species in the province of Antalya are recorded by Schmidtler (1975) (Alanya, type locality of specimens, Cevizli, Irmasan, and Taşağıl), Schmidtler (1986a) (Beşkonak, Alanya, Irmasan, Cevizli, and Taşağıl), Schmidtler (1986b) (Irmasan and Taşağıl), Mulder (1995) (Taşağıl), Geniez et al. (2004) (Olympos), Kumlutaş et al. (2004) (Taşavur-Gündoğmuş, Alıcı-Alanya), Üçüncü et al. (2004) (Beşkonak and Cevizli), Peek (2013) (Side and Manavgat) and Kucharzewski (2015) (Hamaxia ancient city in Alanya and between Karakaya and Alara).

The locality records of the species in the province of Mersin was limited to findings of Schmidtler (1975; 1986a; 1986b) (20 km N of Anamur and 14 km E of Azıtepe), Winden and Boagerts (1992) and Winden et al. (1997) (Göksu Delta), and Arıkan and Çiçek (2010) (Mut).

Recently, Bülbül et al. (2022) reported the new locality records (Aşağı Kırıntı, Yukarı Kırıntı, Kasımlar, and Belence) from the Sütçüler District of Isparta province. In the present study, we provided the new localities of the species in the Aksu and Sütçüler districts of Isparta province and pholidolial and morphometric characters and color-pattern features of the *L. pamphylica* specimens.

2. MATERIALS AND METHODS

During our field surveys in the summer of 2020, the individuals (4 ♂♂, 2 ♀♀) of *L. pamphylica* were collected from five localities; Yakaafşar, Aksu-Isparta (on 19 September 2020, N: 37° 44' 11'' and E: 31° 10' 28'', 1228 m a.s.l.), Ayvalıpınar, Sütçüler-Isparta (on 21 August 2020, N: 37° 40' 02'' and E: 31° 03' 00'', 1091 m a.s.l.), Ayvalıpınar, Sütçüler-Isparta (on 21 August 2020, N: 37° 39' 31'' and E: 31° 03' 59'', 1084 m a.s.l.), Güldallı, Sütçüler-Isparta (on 10 June 2020, N: 37° 34' 27'' and E: 31° 13' 14'', 1177 m a.s.l.), and Kesme, Sütçüler-Isparta (on 03 June 2020, N: 37° 27' 33'' and E: 31° 13' 32'', 1016 m a.s.l.). The localities are shown in Figure 1. The lizards were caught in forests and small wooded areas along the creeks or in the thorns. All specimens were anesthetized with MS-222 solution, fixed with a 10% formaldehyde injection, and deposited in 70% ethanol. They were deposited in the Zoology Research Laboratory of Karadeniz Technical University (Collection number: KZL-377 for Kesme, KZL-378 for Güldallı, KZL-379 and KZL-380 for Ayvalıpınar, and KZL-381 for Yakaafşar) of the Department of Biology at the Faculty of Science, Karadeniz Technical University.

According to our observations, other reptiles shared their living areas with *Lacerta pamphylica* are *Anatololacerta ibrahimi* (Eiselt and Schmidtler, 1986), *Laudakia stellio* (L., 1758), *Dolichophis caspius* (Gmelin, 1789), and *Testudo graeca* (L., 1758) in Yakaafşar while *A. ibrahimi*, *L. stellio*, *Telescopus fallax* (Fleischmann, 1831), *T. graeca*, and *Zamenis hohenackeri* (Strauch, 1873) were seen in Ayvalıpınar, Güldallı, and Kesme.

Figure 1. Map showing the locality of *L. pamphylica* in Turkey. **1.** Alanya, Antalya; **2.** Cevizli, Antalya; **3.** Irmasan, Antalya; **4**. Taşağıl, Antalya; **5.** Beşkonak, Antalya; **6.** Olympos, Antalya; **7.** Taşavur-Gündoğmuş, Antalya; **8.** Alıcı, Antalya; **9.** Side, Antalya; **10.** Manavgat, Antalya;**11.** Hamaxia ancient city; **12.** between Karakaya and Alara; **13.** Anamur, Mersin; **14.** Azıtepe, Mersin; **15.** Göksu Delta, Mersin; **16.** Mut, Mersin; **17.** Kasımlar, Isparta; **18.** Belence, Isparta; **19.** Aşağı Kırıntı, Isparta; **20.** Yukarı Kırıntı, Isparta. The turqouse colored stars show the new localities: **21.** Yakaafşar, Isparta; **22.** Ayvalıpınar, Isparta; **23.** Güldallı, Isparta; **24.** Kesme, Isparta.

Mensural and meristic data were compared to the data of Schmidtler (1986a), Kumlutaş et al. (2004) and Bülbül et al. (2022). All pholidolial characters were examined under the stereo microscope and all specimens' morphometric features are measured to the nearest 0.01 mm using a digital caliper. The following pholidolial characteristics were evaluated: supralabial plates (right–left, SRLa–SRLb, number of labials both anterior and posterior to the center of eye), supraciliar plates (right–left, SCPa–SCPb), supratemporal plates (right–left, STa–STb), supraciliar granules (right–left, SCGa–SCGb), temporal plates (right-left, Ta-Tb), sublabial plates (right–left, SLa-SLb), preocular plates (right-left, POa-POb), postnasal plates (right-left, PNa-PNb), postventralia (right-left, PVa-PVb), transversal series of gular scales between inframaxillar symphysis and collar (MG), transversal series of dorsal scales at the midbody (DS), collaria (C), longitudinal ventral plates (LVP), femoral pores (right–left, FPa–FPb), subdigital lamellae in the 4th toe (right–left, SDLa-SDLb), number of preanal scales surrounding anals (PA1) and all plates surrounding anals (PA2).

The morphometric measurements in this study following: snout-vent length (SVL), the tip of snout to anal cleft; tail length (TL), anal cleft to the tip of tail; pileus width (PW), at the widest point between parietal plates; pileus length (PL), the tip of snout to the posterior margins of parietals; head width (HW), at the widest point of the head; head length (HL), the tip of snout to posterior margin of the ear opening.

Material: KZL-377/2020, 1 ♂ 06.03.2020, Kesme, Sütçüler-Isparta leg. H. ÖZKAN; KZL-378/2020, 1 ♂ 06.10.2020, Güldallı, Sütçüler-Isparta leg. H. ÖZKAN; KZL-379-380/2020, 1 ♂, 1 ♀, 08.21.2020 Ayvalıpınar, Sütçüler-Isparta leg. U. BÜLBÜL; KZL-381/2020, 1 ♂♂, 1 ♀♀, 09.19.2020, Yakaafşar, Aksu-Isparta leg. H. ÖZKAN.

3. RESULTS AND DISCUSSIONS

3.1. Morphological data

3.1.1. Pholidolial characteristics

The numbers of preocular and supratemporal plates were 2-2 (right-left) in all specimens. There were 2-2 (right-left) postnasal plates in all specimens. The numbers of supraciliar plates were 6-6 (right-left) in all specimens except one specimen from Ayvalıpınar. The mean numbers of dorsal scales, median gulars and longitudinal ventral plates were 60.66, 22.50, and 30.66, respectively. The number of collaria was 8 in three specimens and 9 in the other specimens. The number of SRLPa and SRLPb was 7 in all specimens. The numbers of subdigital lamellae under the 4th toe were 32 in two specimens and 31 in the other specimens.

3.1.2. Morphometric measurements

Maximum SVLs for male and female specimens were 115.68 mm and 116.41mm, respectively. The maximum TLs for males and females were 246.23 mm and 230.12 mm, respectively. The mean HLs for males and females were 24.06 mm and 22.47 mm, respectively. The means of HW were respectively 16.83 mm in males and 15.03 mm in females.

Pholidolial characteristics and morphometric measurements of specimens are given in Table 1.

3.2. Color-pattern features

Color pattern features of the specimens used in the present study was found similar to the findings of Bülbül et al. (2022). The color of the back side was usually green. The green color ends at the level of the hind limbs in the females, while it continues to the beginning of the tail in the males. The females had larger black spots which form patterns on the dorsal, while the males had numerous black and brown small spots on the dorsal part of the body. The dorsal part of the head was green and there were black spots on the brown background in all specimens. The lateral of the head was whitish brown and the laterals of the body were brown in the females, while the lateral of the was blue and the lateral of the body was green and brown in the males. In the females, there were very obvious longitudinal whitish lines on the sides of the body while they were thin and discontinuous in the males. In females, the sides of the neck were green and turquoise, while they were blue clearly greenish blue in the males. In all specimens, the ventral of the body was yellow. The ventral part of the head was white in the females, while it was blue in the males. There were dark brown spots on the tails of all specimens. These spots were bigger in the females (Figure 2).

Table 1. Comparison of some pholidolial characteristics and morphometric measurements of our specimens with those given by Kumlutaş et al. (2004), Schmidtler (1986a) and Bülbül et al. (2022). For abbreviations, see text.

This study							**Kumlutaş et al. (2004)**		**Schmidtler (1986a)**	**Bülbül et al. (2022)**
Yakaafşar			Ayvalıpınar		Güldallı	Kesme				
Character	1 ♂	1 ♀	1 ♂	1 ♀	1 ♂	1 ♂	1 ♂	1 Juvenile	Mean values of 11 adult specimens	Mean values of 5 adult specimens
SRLa-SRLb	7-7	7-7	7-7	7-7	7-7	7-7	-	-	-	7-7
SLPa-SLPb	6-6	6-6	6-6	6-6	6-6	6-6	-	-	-	6-6
SCPa-SCPb	6-6	6-6	5-6	6-6	6-6	6-6	-	-	6.2	6-6
SCGa-SCGb	10-10	10-10	10-10	10-10	10-10	10-10	7-7	11-11	8.7	10-10
STa-STb	2-2	2-2	2-2	2-2	2-2	2-2	2-2	2-2	-	2-2
Ta-Tb	33-32	30-29	30-29	28-28	34-34	33-32	37-37	32-32	28	36-36
POa-POb	2-2	2-2	2-2	2-2	2-2	2-2	2-2	2-2	1.9	2-2
PNa-PNb	2-2	2-2	2-2	2-2	2-2	3-2	2-2	2-2	-	2-2
FPa-FPb	19-18	17-17	18-17	17-17	19-18	19-17	18-18	18-18	17.5	18-19
LVP	32	29	31	30	31	31	28	28	-	30.6
PA1	1	1	1	1	1	1	-	-	-	1
PA2	6	6	6	6	6	6	-	-	8.7	6
MG	23	22	23	22	22	23	24	21	19.8	22.2
DS	61	60	61	59	62	61	57	57	60.4	61.2
C	9	8	8	8	9	9	-	-	8.4	8.8
SDLa-SDLb	32-32	31-31	32-32	31-31	31-31	31-31	33-33	30-30	32.9	32-32
SVL	111.38	114.32	115.68	116.41	115.29	110.49	89.50	-	-	112.19
TL	244.57	244.18	246.23	230.12	246.08	196.13	236.44	-	-	195.89
HL	24.02	22.38	24.17	22.56	24.13	23.94	-	-	-	23.82
HW	16.67	14.94	17.13	15.12	17.04	16.48	-	-	-	16.35
PL	25.89	23.79	26.06	24.01	26.03	25.81	21.50	-	-	25.62
PW	13.48	12.07	13.74	12.18	13.70	13.39	10.04	-	-	12.99

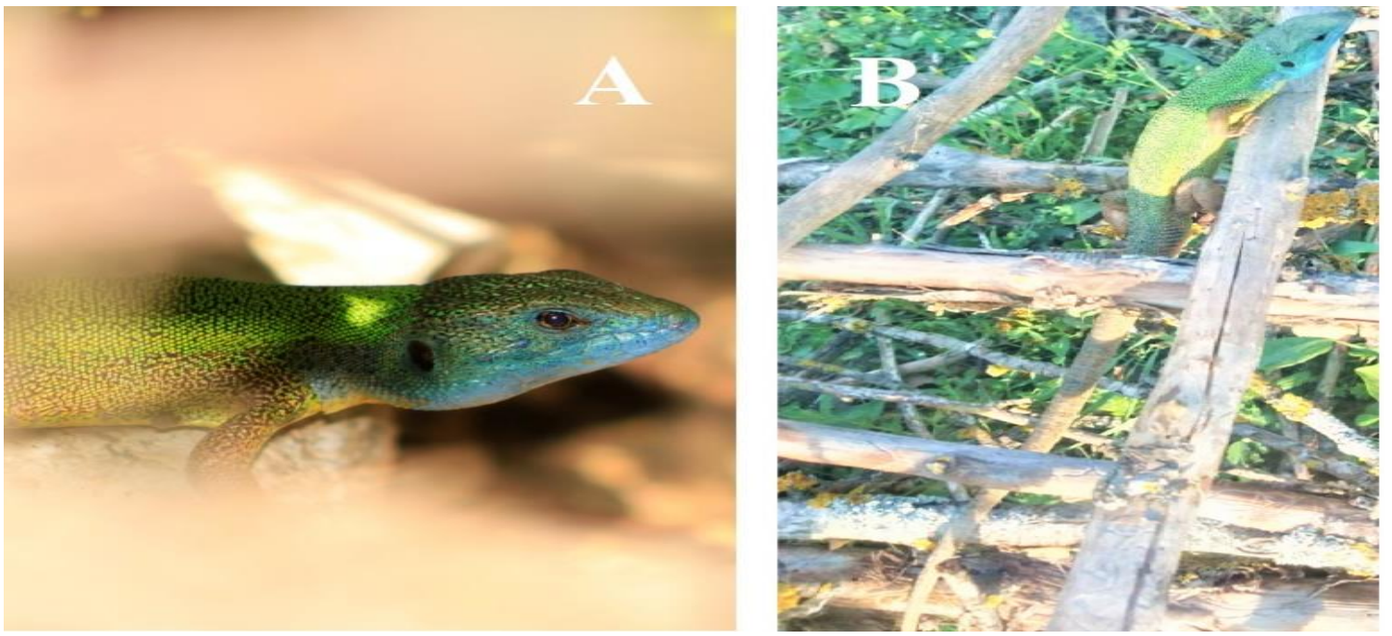

Figure 2. A general view of two individuals of *Lacerta pamphylica*. A. The male individual from Yakaafşar population, B. The male individual from Güldallı population.

Distribution of the endemic lizard species, *L. pamphylica* was only known from Antalya and Mersin provinces of Turkey, until recently. Bülbül et al. (2022) recorded new localities (Aşağı Kırıntı, Yukarı Kırıntı, Kasımlar, and Belence) in Sütçüler district of Isparta province. In the present study, we found individuals of the species in the Aksu district of Isparta province. In addition, we recorded the species from two localities in Ayvalıpınar village, one locality in Güldallı village, and one locality in Kesme village of Sütçüler district. The morphological characteristics (pholidolial, color-pattern and morphometric) of the specimens in these new populations were generally found to be similar to the specimens used in the studies in the literature (Schmidtler, 1986a; Kumlutaş et al., 2004; Bülbül et al., 2022). Although our results were similar to the records given in the literature in terms of many morphological characteristics, the number of specimens in our study was very low. More specimens should be investigated to evaluate the similarity of the populations of *L. pamphylica*.

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