New locality record of *Podarcis tauricus tauricus* (Pallas, 1814) (Squamata: Lacertidae) from Western Black Sea Region of Turkey

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Abstract

The Lacertid lizard, *Podarcis tauricus tauricus* is recorded from Yörükköy, Düzce Province in the western Black Sea region. With the record of the present study, the known distribution area of the subspecies has been extended to about 90 km eastward. The pholidolial and morphometric characters and color-pattern features of the specimens were compared with the specimens from a known Turkish locality with regard to the literature. We observed that the specimens of the Yörükköy population were similar to *P. t. tauricus* specimens reported in the literature.

Key words: Balkan wall lizard, distribution range, Düzce, Turkey

The Balkan wall lizard, *Podarcis tauricus* has three subspecies; *P. t. tauricus* (Pallas, 1814), *P. t. ionicus* (Lehrs, 1902) and *P. t. thasopulae* (Kattinger, 1942). *P. t. ionicus* is different from *P. t. tauricus* with: 1-large SVL, 2-more pointed head, 3-the tail length is nearly twice length of head and body, 4-no constricted for thickness of neck, 5-frontal shield as long as frontoparietal, 6-occipital shield as long as or a little larger than the inter parietal shield, 7-feebly keeled dorsum scales, 8-less pointed caudal scales (Lehrs, 1902). *P. t. tasopulae* is different from *P. t. tauricus* with: 1-more yellowish and mustard ventral region, 2-brownish and bronze color middle of dorsum.

Podarcis tauricus is distributed through southwestern Ukraine, Crime Peninsula, eastern and southern Romania, southeastern Hungary, Macedonia, Bulgaria, Greece (Epirus, Peloponnese, Ionian and Thasopoulos Islands), western Turkey (Thrace and northwest Anatolia), Albania and southern Moldova (Gasc et al., 1997; http://reptile-database.org/).

The first records from European part of Turkey belong to this species were from İstanbul (Schreiber, 1912; Cyren, 1924; Andren and Nilson, 1976). The first Anatolian record was done by Bird (1936) from Beykoz, İstanbul. Later, Bodenheimer (1944) and Mertens (1952) added new locality (Polenezköy) to its distribution in Anatolian part of İstanbul. Furthermore, Mertens (1952) recognized that all examined samples in the literature from European and Anatolian parts of Turkey were belonged to *P. t. tauricus*. Besides Anatolian part of İstanbul, Clark and Clark (1973) collected samples belong to the subspecies near Ipsala, Keşan (Edirne) and Selimpaşa (European part of İstanbul) from part of Thrace. Further, Başoğlu and Baran (1977) stated that *P. t. tauricus* was also existed Thrace region of Turkey as a continuation of its distribution in the Balkans. The first record of the subspecies from eastward of the İstanbul was reported in Karamürsel (Altınova) and Adapazarı (Baran, 1977). Nilson et al. (1988) and Bergman and Norström (1990) also found the specimens of the subspecies in Sapanca (between Karamürsel and Adapazarı) and 10 km northward of

Adapazarı, respectively. Related to distribution of the subspecies in Turkey, Franzen (1990) mentioned that *P. t. tauricus* was found frequently in part of Europe and it was only occurred between İstanbul and Sapanca Lake in parts of Asia. In addition to this, Teynie (1991) stated that *P. t. tauricus* was found in İstanbul (Şile and Teke) and İzmit (Çubuklu and İrşadiye). The first record from east of Sapanca Lake was given by Baran et al. (1992) in Denizköy (Karasu, Sakarya). Mulder (1995) added new localities to Anatolian distribution of the subspecies in Kocaeli Peninsula (Akçaova, Kandıra, Dalca and Gebze). Later, Çevik (1999) presented data on the morphological characteristics of *P. t. tauricus* specimens from Thrace. Sindaco et.al (2000) enhanced distribution of the subspecies to Kocaeli Peninsula. Finally, Tok and Çiçek (2014) reported the presence of the subspecies from the Gelibolu Peninsula, Çanakkale and extended its distribution through southwest of Turkey.

The present study includes some pholidolial and morphometric characters and color-pattern features of *P. t. tauricus* specimens captured from a locality about 90 km east of known distribution areas of the subspecies in Turkey.

During the field studies, the specimens (2 ♂♂, 2 ♀♀, 3 subadults ♀♀) were collected from a locality; Yörükköy, Düzce (on 21 August 2014, GPS data, N: 40° 54' 120'' and E: 31° 11' 057'', 185 m. altitudes asl.). The locality is shown in Figure 1. All specimens were anesthetized with ether, fixed with a 10% formaldehyde injection, and deposited in 70% ethanol. They were deposited in the Zoology Lab. (Collection number: KZL-126 for Yörükköy) of the Department of Biology at the Faculty of Science, Karadeniz Technical University.

Mensural, meristic and qualitative data were recorded following the systems of Baran (1977) and Çevik (1999). All pholidolial characters were examined under the stereomicroscope and all specimens' morphometric features are measured using a digital caliper with an accuracy of 0.01 mm. All measured data were compared with studies of

Baran (1977) and Çevik (1999). The following pholidolial characteristics were evaluated: supraciliar granules (right–left, SCGa–SCGb), loreal plates back of postnasal plates and front of preocular plates (right-left, LOa-LOb), supraciliar plates (right–left, SCPa–SCPb), supralabial plates (right–left, SRLa–SRLb, number of labials both anterior and posterior to center of eye), sublabial plates (right–left, SLPa-SLPb), inframaxillar plates (right–left, IMa-IMb), transversal series of gular scales between inframaxillar symphysis and collar (MG), collar (C), supratemporals (right–left, STa–STb), ventral plates (transversal and longitudinal, TVP and LVP), femoral pores (right–left, FPa–FPb), subdigital lamellae in the 4th toe (right–left, SDLa-SDLb), transversal series of dorsal scales at the midbody (DS), and number of preanal scales surrounding anals (PA1) and all plates surrounding anals (PA2).

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

The habitat of the specimens from Düzce, Yörükköy consists of sparsely vegetated, rocky and sandy open ground. Vegetation of habitat was comprised generally with thorny plants which would be able to hide of these animals (Figure 2). *P. t. tauricus* and *Lacerta viridis* (Laurenti, 1768) live in sympatry at the locality of Yörükköy. The specimens were found during a day excursion between 10:30 and 13:30. The temperature was about 27 and 31°C.

Material: KZL-126/2014, 2 ♂♂, 2 ♀♀, 3 subadult, 20.08.2014, Yörükköy, Düzce leg. U. BÜLBÜL, M. KURNAZ and A.İ. EROĞLU

Pholidolial characteristics: Rostral and internasal plates were clearly separated in seven specimens. The occipital plate was in contact with interparietal plate in all specimens. The postnasal plate was single on each side in seven specimens. The supranasal plate was

separated from anterior loreal plates above nostrils in all specimens. The postnasal plate was single on each side in all specimens. The masseteric plate was reduced in all specimens. The row of supraciliar granules was always complete. SCPa was 4 in two specimens, 6 (28.6%) in two specimens and 5 (42.9%) in three specimens. SCPb was 4 in one specimen, 6 (14.3%) in one specimens and 5 (71.4%) in five specimens. LOs were always 2 on both sides of the head in all specimens. In all specimens, a large and clear tympanicum was present on both sides of the head. Four supraocular plates were present on both sides of head in all specimens. SRLPs were 7 (100%) in the left and right sides of head of the all specimens. SLPa was 6 (42.9%) in three specimens and 7 (57.1%) in four specimens. SLPb was 6 (28.6%) in two specimens, 7 (57.1%) in four specimens and 8 (14.3%) in one specimen. STs were large and narrow; first one was longest in all specimens. STa was 1 (14.3%) in one specimen, 2 (14.3%) in one specimen, 3 (14.3%) in one specimen, 4 (42.9%) in three specimens and 5 (14.3%) in one specimen. STb was 2 (28.6%) in two specimens, 3 (42.9%) in three specimens and 4 (28.6%) in two specimens. IMs were always 5-5 (100%), and the first 3 of them were in contact in all specimens. Collars were always smooth-edged in all specimens (100%). Dorsal body scales were small and smooth. Subdigital lamellae in 4^{th} toe were smooth. Anal plate was single in all specimens. While PA2 was usually 5 and 7 (42.9%), it was rarely 6 (14.3%).

Morphometric measurements: While maximum TBL for female specimens was 181.93 mm, maximum SVL for male and female were respectively 63.03 mm and 67.35 mm. The means of PL, PW, HL and HW were respectively 12.29 mm (range: 11.00-13.58), 6.13 mm (range: 5.57-6.96), 13.39 mm (range: 12.23-14.83) and 8.03 mm (range: 7.37-8.91) in all specimens.

Descriptive statistic of pholidolial characteristics and morphometric measurements of specimens collected from Yörükköy, Düzce are shown in Table 1.

Color-Pattern: All specimens collected from Yörükköy, Düzce have similar color-pattern features, when compared with the literature (Baran, 1977; Çevik, 1999). The top of head was brownish and usually spotless, but sometimes stained. The lateral sides of the head, especially temporal and supraciliary bands were light brown. The color of the supralabial plates was changed from creamy to yellowish. The color of middle of dorsum was generally green and it was light brown in both sides of dorsum. The rest of the body, the tail, and the hind limbs were in brownish shades. There were black spots along both sides of dorsum. Generally a brown lateral band (usually black spotted) continued in both sides of the lateral region and there were two whitish lines at the both sides of the lateral bands. The upper whitish line begins from end of the supratemporal plates and it reaches to tail while the lower one begins from end of the ear opening and it reaches to hind limb in all specimens. Two sides of body were generally light brown and sometimes grayish. While ventral region was generally reddish and yellowish color in males, it was generally whitish in subadult females and females (Figure 3).

Pholidolial characteristics and morphometric measurements of our specimens were found similar to the specimens used in the study of Baran, (1977) and Çevik (1999). The comparison is given in Table 2.

In the literature, the studies related to Turkish populations of *P. t. tauricus* are mainly based on morphological investigations (Mertens, 1952; Baran, 1977; Çevik, 1999). We compared our results from Yörükköy population to records of Baran (1977) and Çevik (1999) related to the subspecies, *P. t. tauricus* from Thrace and we evaluated that although there was a slight difference based on SCG, DS and TVP (for males) values with the study of Baran (1977) and C, DS, TVP (for females) and SDL values with the study of Çevik (1999), pholidosis characters of Yörükköy population were in agreement with the values given in the studies of Baran (1977) and Çevik (1999). Although our results were found similar to records

of Baran (1977) and Çevik (1999), the number of the specimens in our study was very low. More specimens should be investigated to evaluate similarity of Yörükköy population with Thrace and Anatolian populations. Based on our findings, original descriptions of the three subspecies and data of the studies of Baran (1977) and Çevik (1999), we conclude that our specimens are belonged to *P. t. tauricus* subspecies. But our conclusion is not dependent on molecular data.

Based on their molecular data, Poulakakis et al. (2005) stated that the specimens of Balkan wall lizard were subdivided in two different groups: The first one includes the specimens from northeastern Greece (*P. t. tauricus* and *P. t. thasopulae*) and, the other group includes the specimens from the rest of continental Greece (*P. t. tauricus*) and Ionian Islands (*P. t. ionicus*). Phylogenetic relationships among Turkish populations of *P. t. tauricus* have not been investigated. Comparison of morphological (in the literature and this study) and molecular (future studies) data on Turkish specimens is necessary to evaluate taxonomic status of the species in Turkey.

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Table 1. Descriptive statistics of some pholidolial characteristics and morphometric measurements of *Podarcis tauricus tauricus* collected from Yörükköy, Düzce. For abbreviations, see text (n: number of samples; Min: minimum value; Max: maximum value; SD: standart deviation and SE: standart error).

Characters	n	Mean	Min	Max	SD	SE	Characters	n	Mean	Min	Max	SD	SE
SCGa	7	8.14	7.00	9.00	0.90	0.34	STb	7	8.71	7.00	10.00	0.95	0.36
SCGb	7	8.43	8.00	9.00	0.79	0.30	TVP	7	31.29	30.00	33.00	1.38	0.05
SCPa	7	5.00	4.00	6.00	0.82	0.31	LVP	7	6.00	6.00	6.00	0.00	0.00
SCPb	7	5.00	4.00	6.00	0.58	0.22	FPa	7	17.57	17.00	18.00	0.53	0.20
SRPa	7	7.00	7.00	7.00	0.00	0.00	FPb	7	17.57	16.00	19.00	1.13	0.43
SRPb	7	7.00	7.00	7.00	0.00	0.00	DS	7	54.29	52.00	57.00	1.60	0.61
SLPa	7	6.57	6.00	7.00	0.53	0.20	PA1	7	1.14	1.00	2.00	0.38	0.14
SLPb	7	6.86	6.00	8.00	0.69	0.26	PA2	7	6.00	5.00	7.00	1.00	0.38
SDLa	7	23.57	22,00	26,00	1,51	0,57	SVL	7	56.71	47.41	67.35	7.81	2.96
SDLb	7	23.14	22.00	25.00	0.90	0.34	TL	2	103.17	91.75	114.58	16.14	11.42
IMa	7	5.00	5.00	5.00	0.00	0.00	PW	7	6.13	5.57	6.96	0.65	0.25
IMb	7	5.00	5.00	5.00	0.00	0.00	PL	7	12.29	11.00	13.58	0.98	0.37
MG	7	21.42	19.00	24.00	1.62	0.61	HW	7	8.03	7.37	8.91	0.63	0.24
C	7	3.00	2.00	4.00	0.82	0.31	HL	7	13.39	12.23	14.83	1.11	0.42
STa	7	3.29	1.00	5.00	1.38	0.52	TBL	2	152.88	181.9	167.4	20.54	14.53

Table 2. Comparison of some pholidolial characteristics and morphometric measurements of our specimens with those given by Baran (1977) and Çevik (1999). For abbreviations, see text (n: number of specimens; Range: Extreme values, * the values are used for left side of the body.

		Baran (1977)			Çevik (1999)			This study		
Characters		n	Mean	Range	n	Mean	Range	n	Mean	Range
SCG		21	7.38	5-8	241	7.53	3-12	7	8.43	8-9*
MG		-	-	-	241	21.88	18-27	7	21.42	19-24
C		-	-	-	241	10.03	7-12	7	8.71	7-10
DS		21	52.52	47-61	241	52.00	42-62	7	54.29	52-57
TVP	(♀)	11	29.91	29-31	121	28.20	25-31	2	30.00	30-30
	(♂)	10	26.8	26-28	96	31.22	29-34	2	31.50	31-32
FP		21	17.39	16-20	239	17.45	13-21	7	17.57	16-19*
SDL		21	24.00	22-26	241	24.48	18-29	7	23.14	22-25*
PW/PL		-	-	-	241	0.50	0.46-0.55	7	0.50	0.47-0.53
PL/SVL	(♀)	-	-	-	119	0.24	0.23-0.27	2	0.21	0.21-0.21
	(♂)	-	-	-	93	0.21	0.19-0.23	2	0.19	0.19-0.20
TL/SVL	(♀)	-	-	-	53	1.93	1.71-2.17	-	-	-
	(♂)	-	-	-	19	1.69	1.62-1.80	2	1.60	1.50-1.70
TL/TBL	(♀)	-	-	-	53	0.66	0.63-0.68	-	-	-
	(♂)	-	-	-	19	0.63	0.62-0.64	2	0.62	0.60-064

Figure 1. Map showing the distribution area of *Podarcis tauricus tauricus* in Turkey. Red cross square represents the known distribution according to the literature and blue star shows the new locality. **1**-İpsala; **2**-Keşan; **3**-Gelibolu; **4**-Selimpaşa; **5**-Halkalı; **6**-Belgrad Forests; **7**-Büyükdere; **8**-Beykoz; **9**-Polenezköy; **10**-Şile; **11**-Teke; **12**-Gebze; **13**-Karamürsel; **14**-İrşadiye; **15**-Akçaova; **16**-Kandıra; **17**-Dalca; **18**-Çubuklu; **19**-Sapanca; **20**-Adapazarı; **21**-Denizköy-Karasu; **22**-Yörükköy. Data from Schreiber, 1912; Cyren, 1924; Bird, 1936; Bodenheimer, 1944; Mertens, 1952; Clark and Clark, 1973; Andren and Nilson, 1976; Baran, 1977; Nilson et al., 1988; Franzen, 1990; Bergman and Norström, 1990; Teynie, 1991; Baran et al., 1992; Mulder, 1995; Tok and Çiçek, 2014.

Figure 2. New locality for *Podarcis tauricus tauricus* from Yörükköy, Düzce. **a-** The lower side of the road; **b-** The upper side of the road.

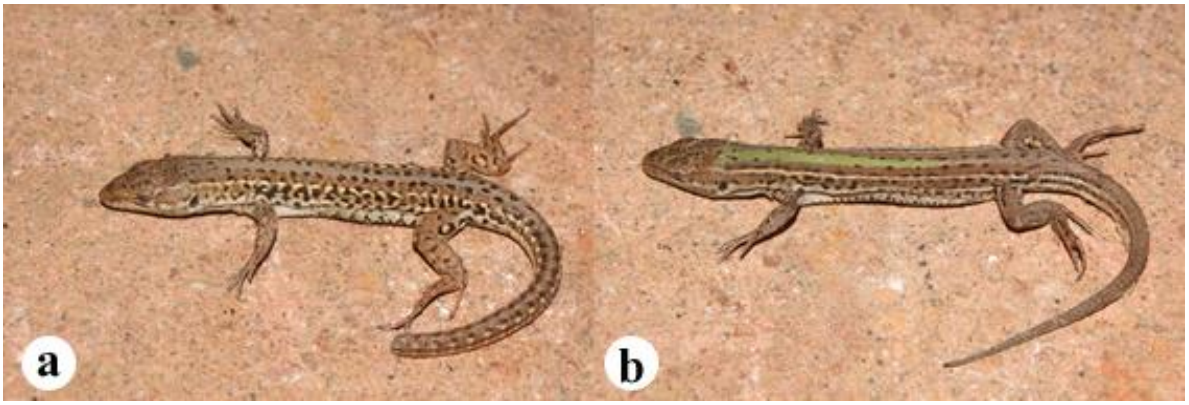

Figure 3. General view of a male and a subadult female specimens of *Podarcis tauricus tauricus* from Yörükköy, Düzce. **a-** Male specimen; **b-** Subadult (Female) specimen