

**New Locality Record of the Red-Bellied Lizard, *Darevskia parvula* (Lantz & Cyrén, 1913) s.l.,
from eastern Anatolia, Turkey**

Kamil CANDAN^{1,*}, Serkan GÜL², Yusuf KUMLUTAŞ^{1,3}, Elif YILDIRIM CAYNAK^{1,3}, Çetin
ILGAZ^{1,3}

ABSTRACT: *Darevskia parvula* is a rock lizard that is endemic for Anatolia. The known distribution range of the species is limited on eastern and northeastern Anatolia. Although many morphological studies have been carried out on the species, there are also molecular studies to construct its taxonomy in recent years. Four adult lizard specimens were collected from eastern Anatolia in 2016 during a herpetological field survey. We present a summary of a morphological features, and report new locality which is the westernmost record (Çayırlı Village, Erzincan) for *D. parvula sensu lato* in Turkey. Our finding largely extends the known distribution of the species.

Key Words: *Darevskia parvula*, biodiversity, morphology, distribution, turkey

¹ Kamil CANDAN (Orcid ID: 0000-0002-6934-3971), Yusuf KUMLUTAŞ (Orcid ID: 0000-0003-1154-6757), Elif YILDIRIM CAYNAK (Orcid ID: 0000-0001-9614-5754), Çetin ILGAZ (Orcid ID: 0000-0001-7862-9106), Dokuz Eylül University, Faculty of Science, Department of Biology, Buca-İzmir, Turkey.

² Serkan GÜL (Orcid ID: 0000-0002-0372-7462), Recep Tayyip Erdoğan University, Faculty of Science and Arts, Department of Biology, Rize, Turkey.

³ Yusuf KUMLUTAŞ (Orcid ID: 0000-0003-1154-6757), Elif YILDIRIM CAYNAK (Orcid ID: 0000-0001-9614-5754), Çetin ILGAZ (Orcid ID: 0000-0001-7862-9106), Dokuz Eylül University, Research and Application Center for Fauna Flora, Buca-İzmir, Turkey.

*Sorumlu Yazar/Corresponding Author: Kamil CANDAN, e-mail: kamil.candan@deu.edu.tr

INTRODUCTION

Darevskia parvula (Lantz & Cyren, 1913), the Red-Bellied Lizard, is a medium sized lizard species including into the genus *Darevskia* (Arribas, 1997). It was described as *Lacerta saxicola parvula nov. var.* (Lantz & Cyrén 1913). Based on the morphological characters, Darevsky and Eiselt (1980) described a new subspecies as *D. parvula adjarica*. After description of this taxon, some studies including distribution, morphology, taxonomy, ecology and phylogeny of the species were performed (Franzen, 2000; Kutrup, 2001; Baran et al., 2004; Ilgaz, 2009; Bülbül et al., 2016; Arribas et al., 2018; Yıldırım et al., 2019; Kurnaz et al., 2019). It was stated that *D. adjarica* is a differentiated from *D. parvula* as a distinct species based on the study covering information on morphology, osteology and the genetic markers (Arribas et al., 2018). A recent study was published on phylogeography, the red-bellied lizards group have three species groups; *D. parvula*, *D. adjarica* and unnamed *Darevskia sp.* (candidate species for genus *Darevskia*) (Kurnaz et al., 2019).

In this study, the meristic pholidolial and metric characters of the *D. parvula sensu lato* specimens collected from the new locality were given in detail.

MATERIALS AND METHODS

Materials: ZDEU. 97/2016, 2 ♂♂ 2 ♀♀, Yedigöller Plateau, Çayırılı Village, Erzincan, eastern Anatolia, Turkey, 17.08.2016, K. Candan and S. Gül.

Four adult lizard specimens were collected from eastern Anatolia in 2016 during a herpetological field survey. The exact locality of the collected specimens was determined using a Garmin eTrex® 30 Handheld GPS and was shown in Figure 1. The specimens were euthanized using tricaine methanesulfonate (MS222) and stored in 95% ethanol in the Zoology Lab of the Department of Biology at Science Faculty, Dokuz Eylül University. The metric measurements were taken using a digital caliper with sensitivity of 0.01 mm, and pholidosis characters were counted under a stereo microscope. All mensural and meristic data were recorded according to Ilgaz (2009) and Arribas et al. (2018) (Tables 1-2).

The following metric dimensions were taken: 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 Length (TOL): Tip of snout to tip of tail. Furthermore, morphometric indexes were calculated: Pileus index (PI) [(PW / PL) X 100], head index (HI) [(HW / HL) X 100].

Meristic pholidolial characters considered here consisted of the following counts: Supraciliar granules (right-left) (SCGR-SCGL), supraciliar plates (right -left) (SCPR-SCPL), supralabial plates (right-left) (SLPR-SLPL), sublabial plates (right-left) (SULBR- SULBL), transverse series of gular scales between inframaxillary symphysis and collar (MG), Collare (CO), supratemporal plates (right -left) (STMR -STML), temporal scales 1 (transverse rows of temporal scales between masseteric and tympanic) (right-left) (TS1a-TS1b), temporal scales 2 (longitudinal rows of temporal scales between tympanic and parietal) (right-left) (TS2a-TS2b), temporal scales 3 (longitudinal rows of temporal scales between supratemporal and masseteric) (right-left) (TS3a-TS3b), posttemporal plates (right -left) (PTR-PTL), ventral plates (transverse and longitudinal) (TVP and LVP), preanals 1 (number of preanals located anterior of anals) (PA1), preanals 2 (number of preanals surrounding anals) (PA2), femoral pores (right-left) (FPR-FPL), longitudinal rows of scales on ventral surface of thigh between the femoral pores and the outer row of enlarged scales (right-left) (SFOR-SFOL), subdigital lamellae in the 4th toe (right-left) (SDLR- SDLL), tibial scales (scales lying on dorsal surface of ankle between the large scales (TIB)

and transversal series of dorsal scales at the midtrunk (DL). In addition, the status of the following characters was evaluated: Contact between rostral and internasal (CRI), Contact between postorbital and parietal (CPP), Type of submaxillary (SMX).

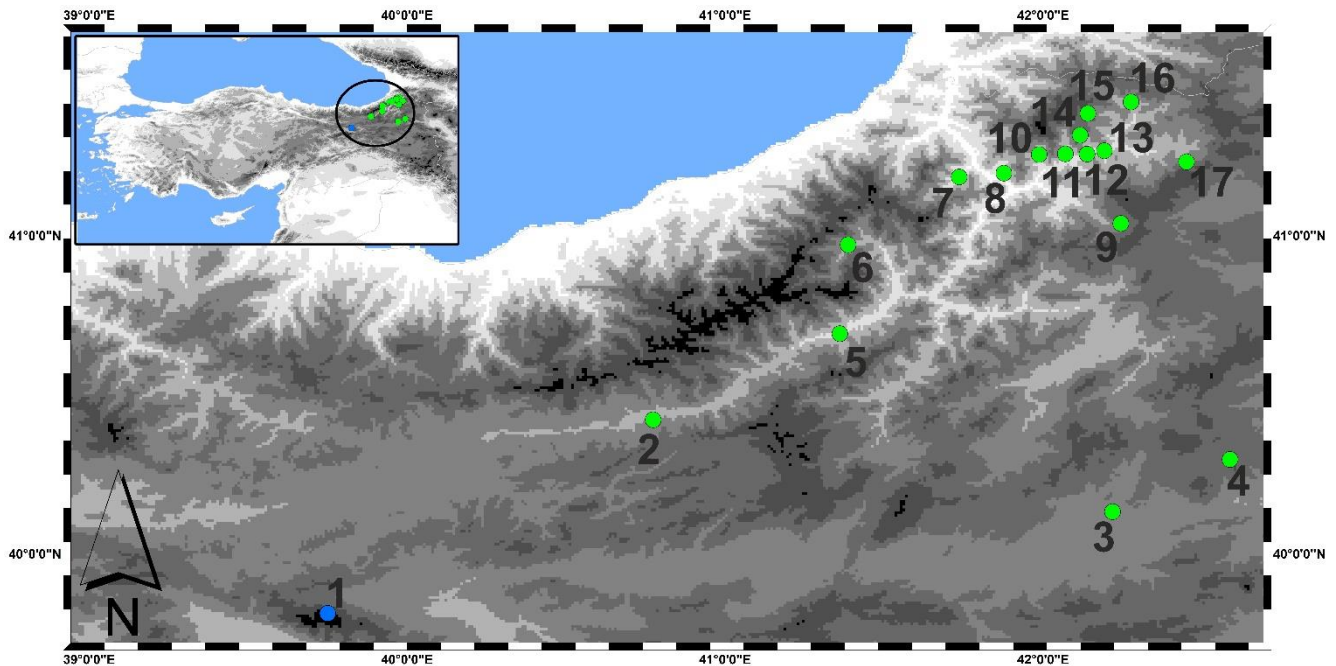


Figure 1. The distribution of *D. parvula s.l.* in Turkey based on literature (Arribas et al., 2018; Kurnaz et al., 2019). Blue circle represents the new one, while green circles are known localities. 1- Yediğöller, Çayırılı, 2- Pazaryolu, 3- Horasan, 4- Sarıkamış, 5- 30 km SW of Yusufeli, 6- Barhal Valley, 7- Hatila Valley, 8- Salkımlı, 9- Geçitli, 10- Ortaköy, 11- Pırnallı, 12- Soğuksu, 13- 15 km W of Şavşat, 14- Yanıklı, 15- Maden, 16- Erikli, 17- Sahara National Park.

RESULTS AND DISCUSSION

The maximum TOL was 143.88 mm for females. The maximum SVL was 53.55 mm for males (Table 1). The rostral usually was separated from the internasal (75%). The postorbital was usually in contact to parietal at least one side (75%). SCG was generally complete (85%). SLP were usually 4-4 (50%) or rarely 5-5 (25%) or 4-5 (25%). SULB were usually 6-6 (75%) or rarely 7-7 (25%). A large and visible masseteric plate was in the temporal area in all specimens. The large supratemporal plate ended sharply like a nail in all specimens. Submaxillar plates were always 6; first 3 pairs in complete contact, last 3 pairs completely separated. Sulcus gularis was visible. Collar was more or less smooth. There is only one PA1 were usually present (75%). The dorsal scales were small and smooth. The configuration of the 6th submaxillary plate: 50% of type D, 25% of type A and 25% of type B. The 6th submaxillary plate was usually (50%) swollen and triangular (see Ilgaz, 2009). Descriptive statistics of meristic pholidolial characteristics of our specimens are given in Table 2.

The ground color of both the dorsum and the head is greenish brown with various-sized black spots (Figure 2A-2B). These spots are lighter and fewer on the head than the dorsum. Similar dark spotting which is from posterior side of the eye to tail is present on both side of the body with whitish ocelli. The ground color of the fore and hind limbs is yellowish brown with small black points. Supraciliar stripes consisting of intermittent white dots are not very evident. The lower side of the head, the body, and the tail are whitish.

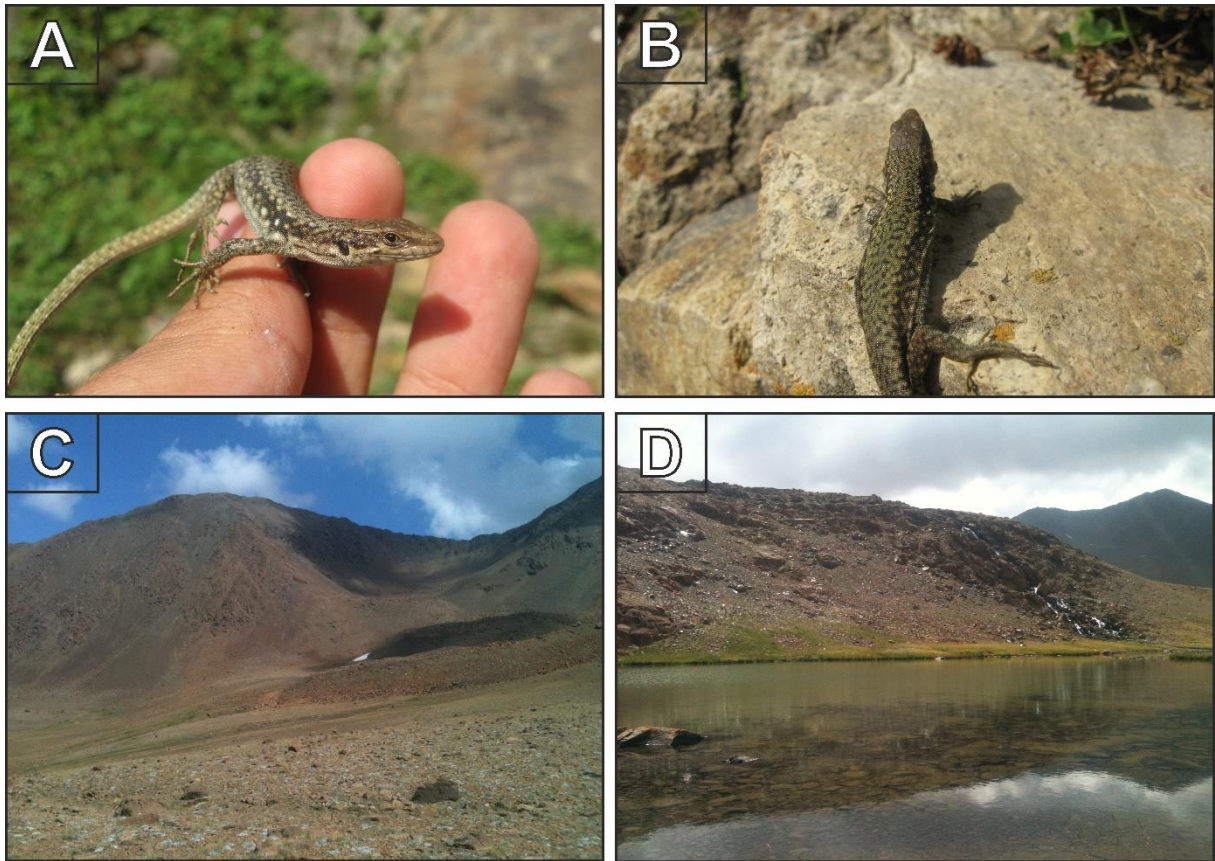


Figure 2. General view of a male/female *Darevskia parvula s.l.* (A-B) and its habitat (C-D).

Table 1. Descriptive statistics of metric dimensions obtained from *Darevskia parvula s.l.* specimens. For abbreviations see text (N: Number of specimens).

Characters	N	Minimum	Maximum	Mean	Std. Error of Mean	Std. Deviation
PW	4	5.18	5.72	5.45	0.14	0.28
PL	4	10.53	12.64	11.27	0.47	0.94
HW	4	6.24	7.26	6.60	0.23	0.46
HL	4	10.91	13.09	11.6	0.50	0.99
SVL	4	46.76	53.55	49.12	1.54	3.08
TL	3	76.80	95.04	86.39	5.29	9.16
TOL	3	123.56	143.88	134.03	5.87	10.17
PI	4	45.25	51.31	48.48	1.32	2.64
HI	4	55.46	57.54	56.64	0.46	0.93

Yedigöller that has unique natural beauties is the highest parts of Keşiş Mountains (3000-3549 m) within the boundaries of Çayırılı district in Erzincan, eastern Anatolia (Korkmaz et al., 2013). The average temperature in the area is about 6.8 °C, the average in winter is about -3.7 °C and the average in summer is 23.9 °C. Average precipitation is 535 mm (Kandemir and Türkmen, 2008). The specimens were found in the late afternoon around 16.00 being active in a grassy open field on that Plateau (Figure 2C-2D). We also observed another sympatric herptile species, *Darevskia valentini* (Boettger, 1892), living in syntopy in the same habitat and *Rana macrocnemis* (Boulenger, 1885) which lives in ponds around that area.

Darevskia parvula which has been in a polytypic taxon until recently, first was evaluated a monotypic one (Arribas et al., 2018) and finally a candidate species belonging to the group was determined (Kurnaz et al., 2019). Morphological characters including meristic pholidolial features and metric dimensions of our specimens in Çayırılı Village, Erzincan were found similar to specimens of *D.*

parvula s.l. mentioned in the previous studies (Darevsky, 1967; Darevsky and Eiselt, 1980; Ilgaz, 2009; Arribas et al., 2018).

Table 2. Descriptive statistics of meristic pholidolial characteristics obtained from *Darevskia parvula s.l.* specimens. For abbreviations see text (N: Number of specimens).

Characters	N	Minimum	Maximum	Mean	Std. Error of Mean	Std. Deviation
SCGR	4	7	13	10.50	1.32	2.65
SCGL	4	7	11	10.00	1.00	2.00
SCPR	4	6	7	6.25	0.25	0.50
SCPL	4	6	7	6.25	0.25	0.50
SLPR	4	4	5	4.25	0.25	0.50
SLPL	4	4	5	4.50	0.29	0.58
SULBR	4	6	7	6.25	0.25	0.50
SULBL	4	6	7	6.25	0.25	0.50
MG	4	22	26	24.50	0.96	1.92
CO	4	8	10	9.00	0.58	1.16
STMR	4	1	1	1.00	0.00	0.00
STML	4	1	1	1.00	0.00	0.00
TS2a	4	2	2	2.00	0.00	0.00
TS2b	4	2	2	2.00	0.00	0.00
TS1a	4	3	4	3.50	0.29	0.58
TS1b	4	2	4	3.00	0.41	0.82
TS3a	4	2	3	2.50	0.29	0.58
TS3b	4	2	3	2.50	0.29	0.58
PTR	4	4	5	4.50	0.29	0.58
PTL	4	3	4	3.75	0.25	0.50
TVP	4	25	26	25.50	0.29	0.58
LVP	4	6	6	6.00	0.00	0.00
PA1	4	1	2	1.25	0.25	0.50
PA2	4	7	8	7.75	0.25	0.50
FPR	4	16	21	18.75	1.11	2.22
FPL	4	16	21	18.75	1.11	2.22
SFOR	4	4	4	4.00	0.00	0.00
SFOL	4	4	4	4.00	0.00	0.00
SDLR	4	24	26	25.25	0.48	0.96
SDLL	4	23	26	24.50	0.65	1.29
TIB	4	14	15	14.75	0.25	0.50
DL	4	50	55	52.75	1.03	2.06

CONCLUSION

The new locality record presented in this study extends the known range of the *D. parvula s.l.* about 110 km to the northwest as measured from the Pazaryolu (Erzurum). Further land survey around the new locality sides from other direction may reveal the new localities in the region for *D. parvula s.l.* Additionally, this new locality may be shown difference in phylogeographic pattern of *D. parvula* complex. Therefore, next studies need to reconstruct phylogeny of the complex in detail.

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