

The Morphology, Taxonomy, and Distribution of Specimens of *Darevskia clarkorum* (Sauria: Lacertidae: *Darevskia*) Collected from Turkey's Eastern Black Sea Region*

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Abstract: In all, 103 specimens of Clark's lizard, *Darevskia clarkorum* (Darevsky and Vedmederja, 1977), from 6 localities in the eastern Black Sea region of Turkey were examined in terms of pholidosis characteristics, morphometric measurements, and color and pattern features. Kolmogorov-Smirnov testing across all populations verified sexual dimorphism in the Ortacalar and Hemşin populations, regarding transversal series of ventral plates ($P < 0.05$). According to the Mann-Whitney U test, 16 pholidosis characteristics showed differences among the populations ($P < 0.05$). For comparison of morphometric measurements, 4 morphometric indices and ratios were developed. According to the results of independent t-testing, no differences were found between males and females among the populations. One-way variance analyses based on 4 morphometric indices and ratios confirmed that head index, snout-vent length/tail length, and tail length/total body length showed differences among the populations ($P < 0.05$). Regarding pholidosis characteristics (except rates of the presence of a masseteric plate and contact between the rostral and internasal plate), morphometric measurements, and color and pattern features, the specimens collected from 6 different localities were similar to *D. clarkorum* specimens mentioned in the literature. Furthermore, the known range of the species in Turkey has been extended.

Key Words: Reptilia, *Darevskia clarkorum*, Black Sea region, morphology, distribution

Türkiye'de Doğu Karadeniz Bölgesinden Toplanan *Darevskia clarkorum* (Sauria: Lacertidae: *Darevskia*) Örneklerinin Morfolojisi, Taksonomisi ve Dağılışı

Özet: Doğu Karadeniz Bölgesi'ndeki altı farklı lokaliteden toplanan yüz üç *Darevskia clarkorum* (Darevsky and Vedmederja, 1977) örneği, pholidosis karakterleri, morfometrik ölçümler ve renk-desen özellikleri bakımından incelenmiştir. Tüm populasyonlara uygulanan Kolmogorov-Smirnov testi, Ortacalar ve Hemşin populasyonlarında ventralia enine karakteri bakımından eşeysel dimorfizm olduğunu göstermektedir ($P < 0,05$). Mann-Whitney U testi sonuçlarına göre, on altı pholidosis karakteri bakımından populasyonlar arasında farklılık söz konusudur ($P < 0,05$). Morfometrik ölçümlerin karşılaştırılması için, dört tane morfometrik indeks ve oran geliştirilmiştir. Independent t-testi sonuçlarına göre, erkek ve dişiler arasında morfometrik indeks ve oran değerleri bakımından bir farklılık yoktur. Dört morfometrik indeks ve orana dayanan tek-yönlü varyans analizi (ANOVA) testi populasyonlar arasında baş indeksi, baş-gövde uzunluğu / kuyruk uzunluğu ve kuyruk uzunluğu / total uzunluk karakterleri bakımından farklılık olduğunu göstermektedir ($P < 0,05$). Altı farklı lokaliteden toplanan örnekler, pholidosis karakterleri (masseterik plağın bulunma ve rostral-internasal plağın temas etme yüzdelerinin yüksekliği dışında), morfometrik ölçümler ve renk-desen özellikleri bakımından literatürde *Darevskia clarkorum* için belirtilen söz konusu özelliklerle benzerlik göstermektedir. Ayrıca türün Türkiye'deki dağılış sahası genişletilmiştir.

Anahtar Sözcükler: Reptilia, *Darevskia clarkorum*, Doğu Karadeniz bölgesi, morfoloji, dağılış

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Introduction

Darevskia clarkorum was first described as *Lacerta clarkorum* by Darevsky and Vedmederja (1977). Three rock lizard specimens collected 20 km west of Borçka, Artvin, Turkey, were evaluated as *Lacerta saxicola* by Clark and Clark (1973). Subsequently, Darevsky and Vedmederja (1977) examined Clark and Clark's specimens and 4 other specimens caught from the neighboring territory of Adzharistan, Georgia, finally describing them as a new rock lizard species, *L. clarkorum*. Now it is known from the Black Sea coast of southwest Georgia (Adzharia) and northeast Turkey (Darevsky and Vedmederja, 1977; Engelmann et al., 1993; Darevsky and Tuniyev, 1997; Baran and Atatür, 1998; Sindaco et al., 2000). The distribution range of *D. clarkorum* in Turkey includes the provinces Artvin and Giresun (Baran and Atatür, 1998; Sindaco et al., 2000). Darevsky and Tuniyev (1997) described a new rock lizard species from Adzharistan, western Georgia, as *Lacerta dryada*. They stated that *L. dryada* differs from the closely related taxon *L. clarkorum*, in particular, by the scutellation of the head temporal area. Arribas (1999) stated that rock lizard species were different from other species of the genus *Lacerta* with respect to some morphological (pholidosis characters and color-pattern

features), osteological, karyological, and behavioral features. He therefore assigned rock lizard species to a newly erected genus: *Darevskia*.

A phylogeny of Caucasian rock lizard (genus *Darevskia*) was constructed using mitochondrial DNA sequences and allozyme data (Murphy et al., 2000). Murphy et al. (2000) placed all 15 bisexual rock lizard species into 3 major clades: *caucasica*, *saxicola*, and *rudis*. According to the results of that study, *D. clarkorum* was included into the *caucasica* clade. Panner (2001) conducted a study on the breeding biology of *D. clarkorum* kept in a terrarium. A female specimen produced a total of 5 eggs in 2 years, 3 of which produced hatchlings.

This study provides information on the distribution, morphology, and taxonomy of *Darevskia clarkorum* specimens collected from new Turkish Black Sea coastal areas.

Materials and Methods

Specimens were collected from different localities in the Black Sea coast region of Turkey (Figure 1) in 2001 and 2002. Color slides of the specimens were taken, then

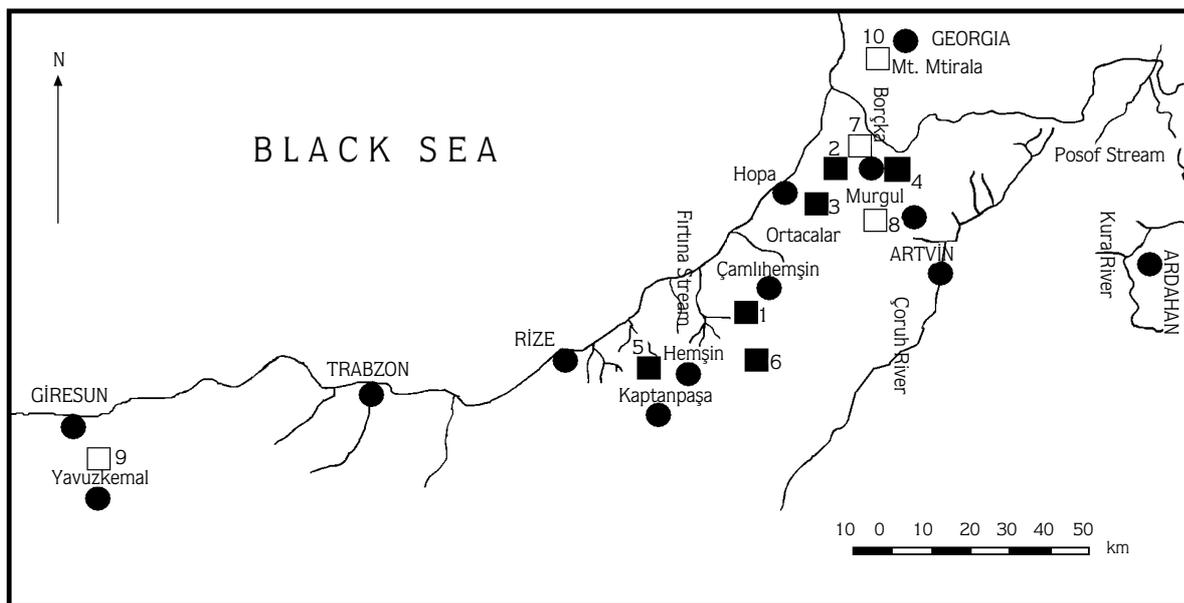


Figure 1. Distribution of *Darevskia clarkorum* according to the literature (Darevsky and Vedmederja, 1977; Darevsky and Tuniyev, 1997) and newly reported localities (a solid square marks new localities). 1. Ayder Plateau, ÇamlıHemşin, Rize; 2. 8 km east of Borçka, Artvin; 3. 16 km northeast of Ortacalar, Artvin; 4. Karagöl, Borçka, Artvin; 5. Çataldere Village, Kaptanpaşa, Rize; 6. 11 km southwest of Hemşin, Rize; 7. 20 km northwest of Borçka (type locality); 8. Vicinity of Murgul; 9. Yavuzkema, Giresun; 10. Mt. Mtriala (Georgia).

the specimens were fixed with 5% formaldehyde in 70% ethanol, and finally they were preserved in 70% ethanol, as described by Baçoğlu and Baran (1977). The specimens were incorporated into the collection of ZDEU (Zoology Department of Ege University) and are kept in the Zoology Lab of the Department of Biology at Buca Education Faculty.

Material Lists (n = 103)

ZDEU. 164/2001. 1-6 ♂♂, 7-12 ♀♀, Ayder Plateau, Çamlıhemşin, Rize, 08.07.2001, leg. Y. Kumlutaş, K. Olgun, Ç. Ilgaz, A. Avcı, F. İret.

ZDEU. 121/2002. 1-2 ♂♂, 8 km east of Borçka, Artvin, 12.07.2002, leg. İ. Baran, Y. Kumlutaş, Ç. Ilgaz, A. Özdemir.

ZDEU. 126/2002. 1-8 ♂♂, 9-21 ♀♀, 22 juv., 16 km northeast of Ortacalar, Artvin, 13.07.2002, leg. İ. Baran, Y. Kumlutaş, Ç. Ilgaz, A. Özdemir.

ZDEU. 135/2002. 1-6 ♂♂, 7-10 ♀♀, 11-15 juv., Karagöl, Borçka, Artvin, 04.09.2002, leg. İ. Baran, Y. Kumlutaş, Ç. Ilgaz, A. Avcı.

ZDEU. 139/2002. 1-12 ♂♂, 13-20 ♀♀, Çataldere Village, Kaptanpaşa, Rize, 05.09.2002, leg. İ. Baran, Y. Kumlutaş, Ç. Ilgaz, A. Avcı.

ZDEU. 148/2002. 1-16 ♂♂, 17-30 ♀♀, 31-32 juv., 11 km southwest of Hemşin, Rize, 07.09.2002, leg. İ. Baran, Y. Kumlutaş, Ç. Ilgaz, A. Avcı.

The following morphometric measurements were taken using dial calipers with an accuracy of 0.02 mm:

Snout-vent length (SVL): Tip of the snout to the anal cleft;

Tail length (TL): Anal cleft to the tip of the tail;

Pileus width (PW): At the widest point between the parietal plates;

Pileus length (PL): Tip of the snout to the posterior margins of the parietals;

Head width (HW): At the widest point of the head;

Head length (HL): Tip of snout to the posterior margin of the ear opening;

Total body length (TBL): Tip of the snout to the tip of the tail.

Furthermore, some morphometric indexes and ratios were calculated:

Pileus index (PI) $[(PW/PL) \times 100]$;

Head index (HI) $[(HW/HL) \times 100]$;

SVL/TL;

TL/TBL.

Pholidosis characteristics considered here consisted of the following counts: Supraciliar granules (left-right) (SCGa-SCGb), supraciliar plates (left-right) (SCPa-SCPb), supralabial plates (left-right) (SRLa-SRLb), sublabial plates (left-right) (SLa-SLb), transversal series of gular scales between the inframaxillary symphysis and collar (MG), collar plates (C), supratemporal plates (without the first supratemporal) (left-right) (STPa-STPb), ventral plates (transversal and longitudinal) (TVP and LVP), preanals 1 (number of preanals located anterior of the anals) (PA1), preanals 2 (number of preanals surrounding anals) (PA2), femoral pores (left-right) (FPa-FPb), longitudinal rows of scales on the ventral surface of the thigh between the femoral pores and the outer row of enlarged scales (left-right) (LSa-LSb), subdigital lamellae in the fourth toe (left-right) (SDLa-SDLb), tibial scales (scales lying on the dorsal surface of the ankle between the large scales (TS), and transversal series of dorsal scales at mid-trunk (DS).

In order to compare similarities and differences between sexes, an independent t-test was applied to the morphometric measurements of the 6 populations. For statistical analyses, morphometric indices and ratios [(PI), (HI), SVL/TL, and TL/TBL] were used to test for similarities and differences. Indices and ratios were used due to an uncertainty regarding age groups and because it was not known whether growth was isometric or not. Data were examined for conformation to assumption of normality (the Kolmogorov-Smirnov test) and homogeneity (Fmax). The morphometric indices and ratios that showed differences between sexes were excluded from further analysis. Later on, one-way ANOVA was applied to the morphometrics of the 6 populations according to morphometric indices and ratios that did not show sexual dimorphism between sexes.

According to pholidosis characteristics, the existence of sexual dimorphism between males and females was tested by the Kolmogorov-Smirnov test, and pholidosis characters showing sexual dimorphism were excluded from further analysis. Mann-Whitney U tests were used for comparing the populations according to pholidosis characteristics that did not show sexual dimorphism.

Regarding all statistical tests, the level significance was set at 0.05. Statistical analyses were carried out using SPSS v.11.0 (SPSS Inc., 1989-2001) and STATISTICA 6.0 (StatSoft Inc., 2001).

Results

Pholidosis characteristics

The rostral was separated from the internasal in 52 specimens (50.5%), whereas they were in contact in 51 specimens (49.5%) as a suture or point. The postorbital was separated from the parietal (59.2%) or was in contact (40.8%). A parietal foreman always exists on the

interparietal. SRL were usually 4-4 (79.6%) and rarely 3-4 (7.8%), 4-3 (3.9%), 4-5 (3.9%), 5-5 (2.9%), 5-4 (1.0%), and 3-3 (1.0%). SL were usually 6-6 (67.0%) and rarely 6-7 (9.7%), 7-7 (6.8%), 5-6 (5.8%), 7-6 (4.9%), 5-5 (3.9%), and 8-7 (1.9%). The first supratemporal is long and broad in front, and posteriorly the post-temporals are poorly developed. The masseteric was moderately sized and indistinct in 71 specimens (68.9%), but was absent in 4 (3.9%) specimens on the right side and in 2 (1.9%) specimens on the left side. In 26 (25.2%) specimens, the masseteric was absent on both the right and left side. Other pholidosis features of the specimens are given in Table 1.

Table 1. Pholidosis characteristics of *Darevskia clarkorum* specimens collected from northeastern part of Turkey. For abbreviations, see text (n: number of specimens; range: extreme values; SD: standard deviation; SE: standard error of the mean).

Characters	♂ + ♀♀					♂					♀♀				
	n	Mean	Range	SD	SE	n	Mean	Range	SD	SE	n	Mean	Range	SD	SE
SCGa	103	6.65	2.0-11.0	1.89	0.19	49	6.41	2.0-9.0	1.87	0.27	45	7.07	2.0-11.0	1.91	0.28
SCGb	103	6.86	2.0-12.0	1.80	0.18	49	6.70	3.0-10.0	1.80	0.26	45	6.93	2.0-12.0	1.78	0.26
SCPa	103	6.22	4.0-8.0	0.77	0.07	49	6.36	4.0-8.0	0.78	0.11	45	6.07	4.0-8.0	0.81	0.12
SCPb	103	6.36	5.0-8.0	0.67	0.07	49	6.49	5.0-8.0	0.71	0.10	45	6.22	5.0-8.0	0.64	0.09
MG	103	22.19	17.0-26.0	1.57	0.15	49	22.33	17.0-25.0	1.69	0.24	45	21.89	19.0-26.0	1.42	0.21
C	103	8.38	5.0-11.0	0.97	0.10	49	8.41	5.0-10.0	0.93	0.13	45	8.36	6.0-11.0	1.03	0.15
STPa	103	2.40	1.0-4.0	0.55	0.05	49	2.33	1.0-3.0	0.52	0.07	45	2.44	2.0-4.0	0.59	0.09
STPb	103	2.40	1.0-4.0	0.55	0.05	49	2.20	1.0-3.0	0.50	0.07	45	2.58	2.0-4.0	0.54	0.08
LVP	103	23.88	21.0-28.0	1.55	0.15	49	23.06	21.0-26.0	1.27	0.18	45	24.93	22.0-28.0	1.30	0.19
TVP	103	29.86	22.0-37.0	2.81	0.28	49	29.80	22.0-37.0	2.81	0.40	45	29.87	25.0-35.0	2.69	0.40
PA1	103	2.57	2.0-4.0	0.53	0.05	49	2.49	2.0-4.0	0.54	0.08	45	2.71	2.0-4.0	0.51	0.08
PA2	103	8.46	6.0-11.0	1.19	0.11	49	8.57	6.0-11.0	1.34	0.19	45	8.38	6.0-10.0	1.07	0.16
FPa	103	17.80	14.0-21.0	1.40	0.14	49	17.90	14.0-21.0	1.57	0.22	45	17.64	15.0-20.0	1.28	0.19
FPb	103	17.69	15.0-22.0	1.52	0.15	49	17.96	15.0-22.0	1.50	0.21	45	17.40	15.0-21.0	1.57	0.23
LSa	103	4.94	4.0-6.0	0.50	0.05	49	5.08	4.0-6.0	0.49	0.07	45	4.84	4.0-6.0	0.47	0.07
LSb	103	4.94	4.0-6.0	0.50	0.05	49	5.08	4.0-6.0	0.49	0.07	45	4.84	4.0-6.0	0.47	0.07
SDLa	103	27.38	24.0-31.0	1.50	0.15	49	27.47	24.0-30.0	1.49	0.21	45	27.33	24.0-31.0	1.52	0.23
SDLb	103	27.33	23.0-30.0	1.48	0.15	49	27.48	24.0-30.0	1.51	0.22	45	27.16	23.0-30.0	1.45	0.22
TS	103	17.31	15.0-21.0	1.16	0.11	49	17.63	15.0-21.0	1.09	0.16	45	16.96	15.0-19.0	0.98	0.15
DS	103	48.17	44.0-55.0	2.51	0.24	49	48.71	44.0-55.0	2.53	0.36	45	47.40	44.0-52.0	2.20	0.33

According to the Kolmogorov-Smirnov test, there was a difference in only TVP between males and females in the populations from Ortacalar and Hemşin. Thus, this character (TVP) was excluded from further analysis.

The results of the Mann-Whitney U test based on pholidosis characteristics without TVP are given in Table 2. The box and whisker plots of SCGa, SCGb, SCPb, SRLa, SLa, SLb, MG, C, TMP1a, FPb, SDLa, SDLb, TMP2a, TMP2b, TS, and DS of the populations are given in Figure 2. According to these plots, the highest mean value of SCGb, SRLa, MG, TMP1a, FPb, and DS was determined in the population from Ortacalar, the highest mean value of SLa, SLb, SDLa, and SDLb was found in the Ayder population, the highest mean value of TMP2a, TMP2b, SCGa, and TS was measured in the Çataldere population, the Karagöl population had the highest SCPb value, and the Hemşin population had the highest C value (Figure 2).

Morphometric measurements

Maximum TBL for a male specimen was 187.26 mm. The mean HI was 56.87 (range: 52.19-64.26). The descriptive statistics for the morphometric measurements are given in Table 3.

According to independent t-tests there were no significant differences between males and females of each population; thus, 4 morphometric characteristics (PI, HI, SVL/TL, and TL/TBL) were used for further statistical analysis. Results from one-way ANOVA suggested statistically significant differences among the populations in HI, SVL/TL, and TL/TBL (Table 4). The box and whisker plots of HI, SVL/TL, and TL/TBL of each population are given in Figure 3. According to these plots, the highest mean values of HI and SVL/TL were found in the Ayder population, while the highest mean value of TL/TBL was in the Çataldere population (Figure 3).

Table 2. Statistically significant differences (★) among the populations according to Mann-Whitney U tests (A: Ayder; B: Ortacalar; C: Karagöl; D: Çataldere; E: Hemşin; P < 0.05).

Population	SCGa	SCGb	SCPa	SCPb	SRLa	SRLb	SLa	SLb	MG	C	TMP1a	TMP1b	STPa	STPb
A – B		★		★					★					
A – C														
A – D	★	★								★				
A – E										★				
B – C		★		★	★		★	★				★		
B – D				★						★				
B – E				★				★						
C – D		★			★			★	★	★	★			
C – E					★									
D – E								★	★	★				

Population	TVP	PA1	PA2	FPa	FPb	LSa	LSb	SDLa	SDLb	TMP2a	TMP2b	TS	DS
A – B								★	★				★
A – C									★				
A – D													★
A – E								★	★				
B – C													
B – D					★			★	★				
B – E													★
C – D								★					
C – E													
D – E					★			★	★	★	★	★	★

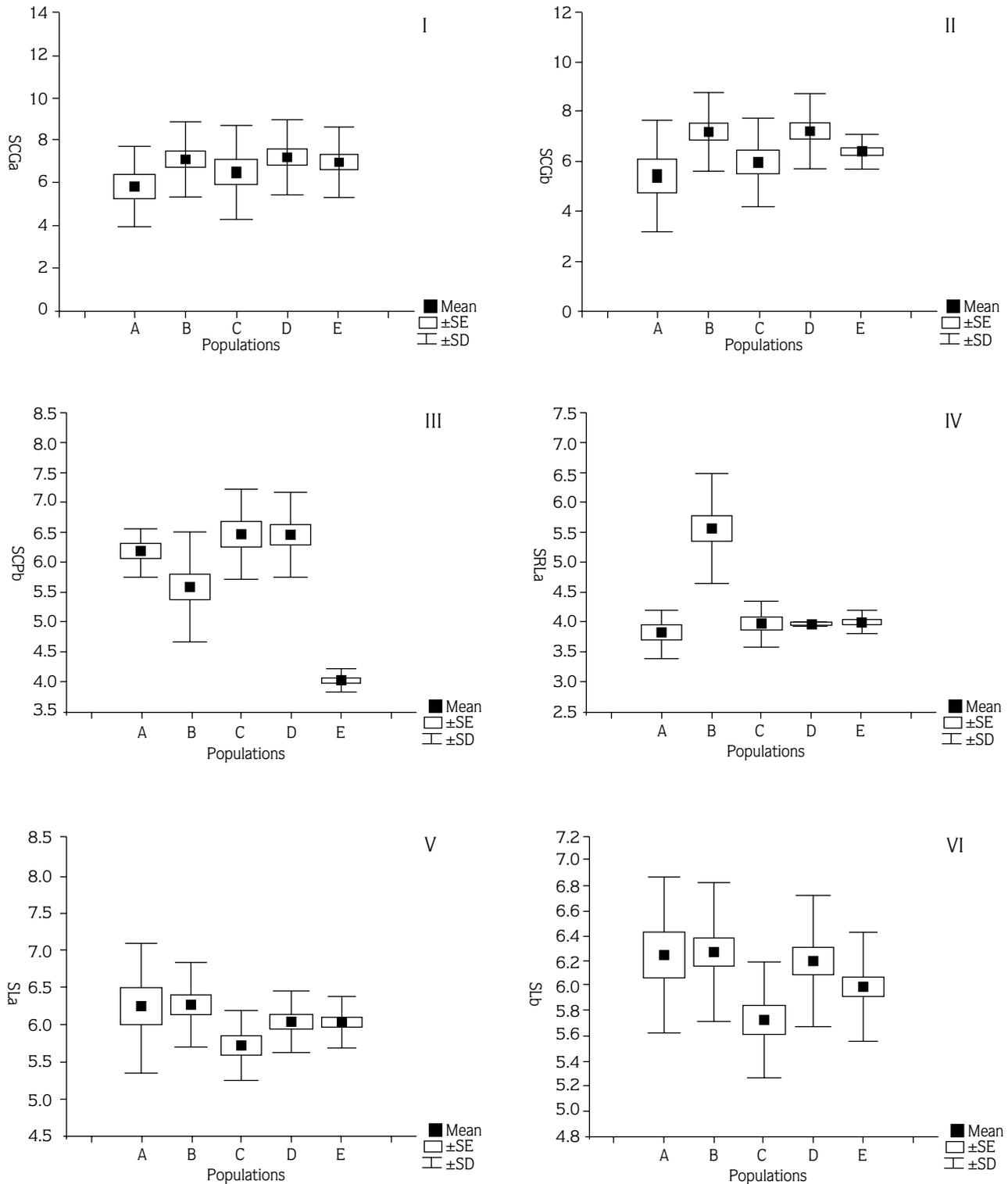


Figure 2. Box and whisker plots of the pholidosis characteristics show significant differences among the populations according to the Mann-Whitney U test.

A: Ayder; B: Ortacalar; C: Karagöl; D: Çataldere; E: Hemşin

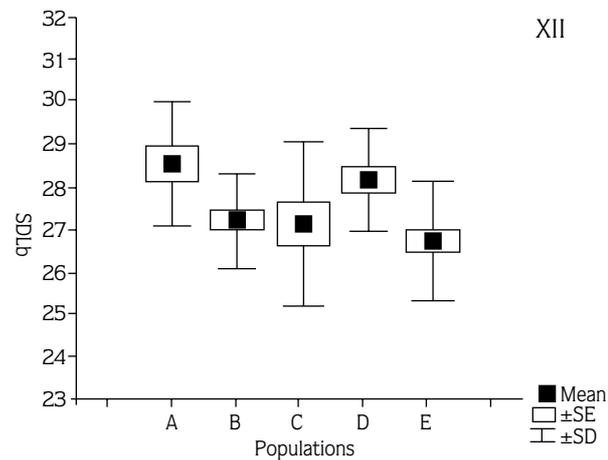
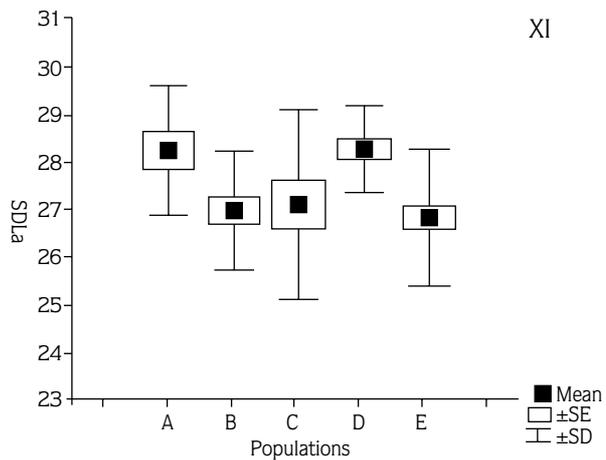
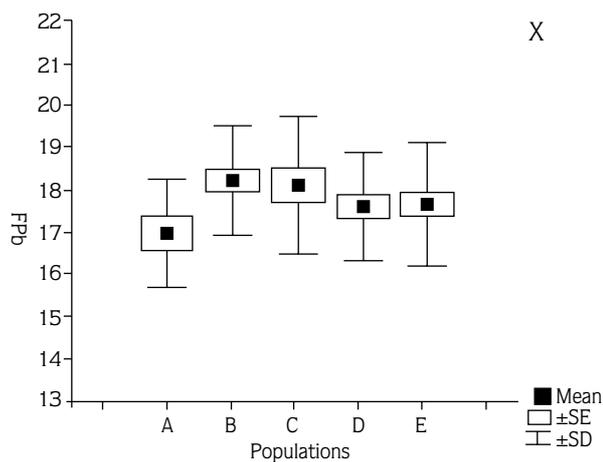
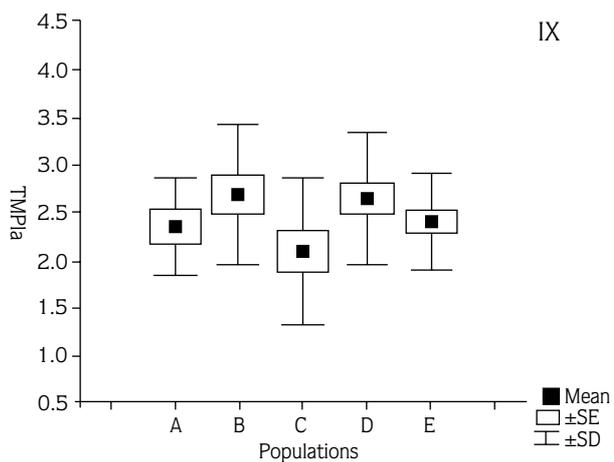
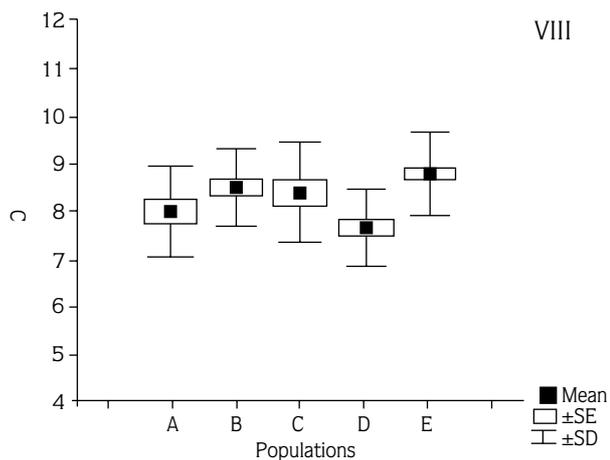
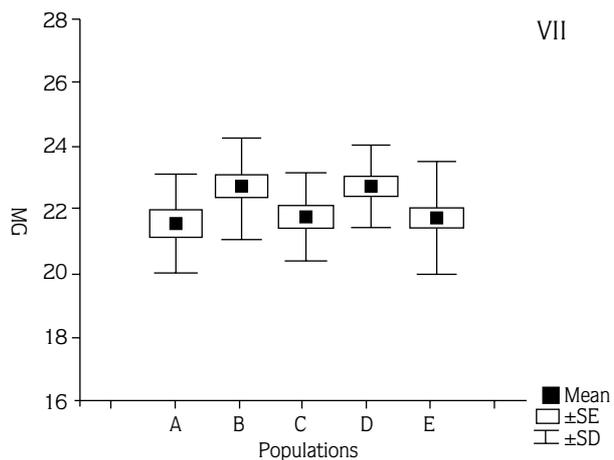


Figure 2. (Continued).

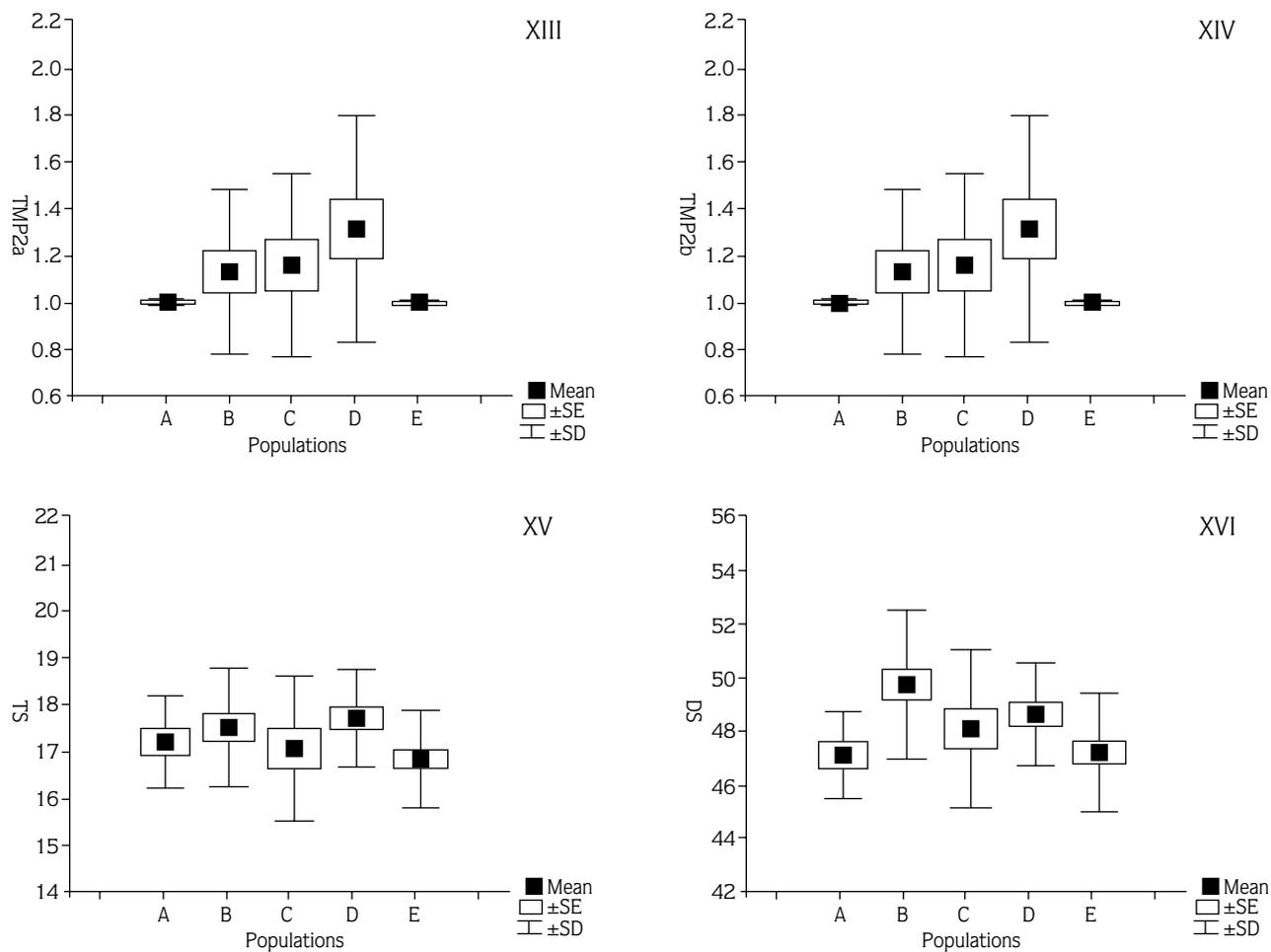


Figure 2. (Continued).

Table 3. Morphometric measurements of *Darevskia clarkorum* specimens collected from northeastern part of Turkey (n: number of specimens; range: extreme values; SD: standard deviation; SE: standard error of the mean; for other abbreviations see text).

Characters	♂♂ + ♀♀					♂♂					♀♀				
	n	Mean	Range	SD	SE	n	Mean	Range	SD	SE	n	Mean	Range	SD	SE
PL	95	13.58	11.18-16.32	1.23	0.13	49	14.11	11.18-16.32	1.26	0.18	45	12.98	11.50-15.42	0.88	0.13
PW	95	7.25	5.60-8.76	0.77	0.08	49	7.55	5.60-8.86	0.81	0.12	45	6.90	6.00-8.66	0.55	0.08
HL	95	8.24	6.74-9.94	0.84	0.08	49	8.61	6.74-9.94	0.85	0.12	45	7.81	6.90-9.58	0.56	0.08
HW	95	14.48	11.92-17.66	1.32	0.14	49	15.12	11.92-17.66	1.32	0.19	45	13.75	12.30-16.14	0.87	0.13
SVL	95	58.80	44.40-67.00	4.45	0.46	49	59.33	44.40-67.00	4.60	0.66	45	58.21	47.00-65.68	4.29	0.64
TL	25	106.20	84.00-128.00	9.10	1.81	15	106.20	84.00-128.00	10.33	2.67	10	106.20	100.00-122.00	7.38	2.33
TBL	25	165.50	131.94-187.26	11.68	2.33	15	165.16	131.94-187.26	13.13	3.39	10	166.02	151.53-183.48	9.75	3.08
PI	95	53.31	47.11-61.04	2.50	0.26	49	53.50	47.11-59.73	2.52	0.36	45	53.12	48.96-61.04	2.51	0.37
HI	95	56.87	52.19-64.26	2.42	0.25	49	56.94	52.19-61.92	2.52	0.36	45	56.70	52.72-64.26	2.29	0.34
SVL / TL	25	0.56	0.46-0.64	0.04	0.01	15	0.56	0.46-0.61	0.04	0.01	10	0.56	0.50-0.64	0.04	0.01
TL / TBL	25	0.64	0.61-0.68	0.02	0.01	15	0.64	0.62-0.68	0.02	0.01	10	0.64	0.61-0.66	0.01	0.01

Table 4. Statistically significant differences (★) among the populations according to one-way ANOVA (A: Ayder; B: Ortacalar; C: Karagöl; D: Çataldere; E: Hemşin; $P < 0.05$).

Population	PI	HI	SVL / TL	TL / TBL
A – B		★		
A – C		★		
A – D		★	★	★
A – E			★	★
B – C				
B – D				
B – E		★		
C – D				
C – E		★		
D – E		★		

Color and pattern

The ground color of the head is brown or greenish brown, with small spots that are especially dense on the parietal plates. This ground color extends to the sublabial plates at the sides of the head. The lower side of the head is bright yellow, without maculation. The ground color of the dorsum is ivy green, light green, brown, or grayish brown, with small black dots extending from the parietal plates to the first third of the tail. These small dots sometimes form 2 transversal lines. Supraciliar stripes consisting of interrupted white points are indistinct at the base of the tail, extending from the posterior of the head to the first third of the tail. The broad temporal stripe is black or dark brown and has 3 or 4 ocelli with white centers, while one is bluish at the level of the forelimbs. The ground color of the fore and hind limbs is dark brown with big black dots. The lower side of the fore and hind limbs, and venter are bright yellow, without maculation. The outer ventral plates are blue with small black spots. The lower side of the tail is light yellow or lemon-yellow.

Ecological and biological observations

The Ayder Plateau specimens were collected between 0830 and 1000 hours from under stones along a small river. The altitude where the sampling was carried out was 1350 m a.s.l. and the temperature was 20 °C. The specimens were collected when the weather was cloudy and rainy. The collection area had mainly fir (*Abies nordmanniana*), spruce (*Picea orientalis*), alder (*Alnus glutinosa*), cypress (*Cupressus sempervirens*), and beech (*Fagus orientalis*) trees.

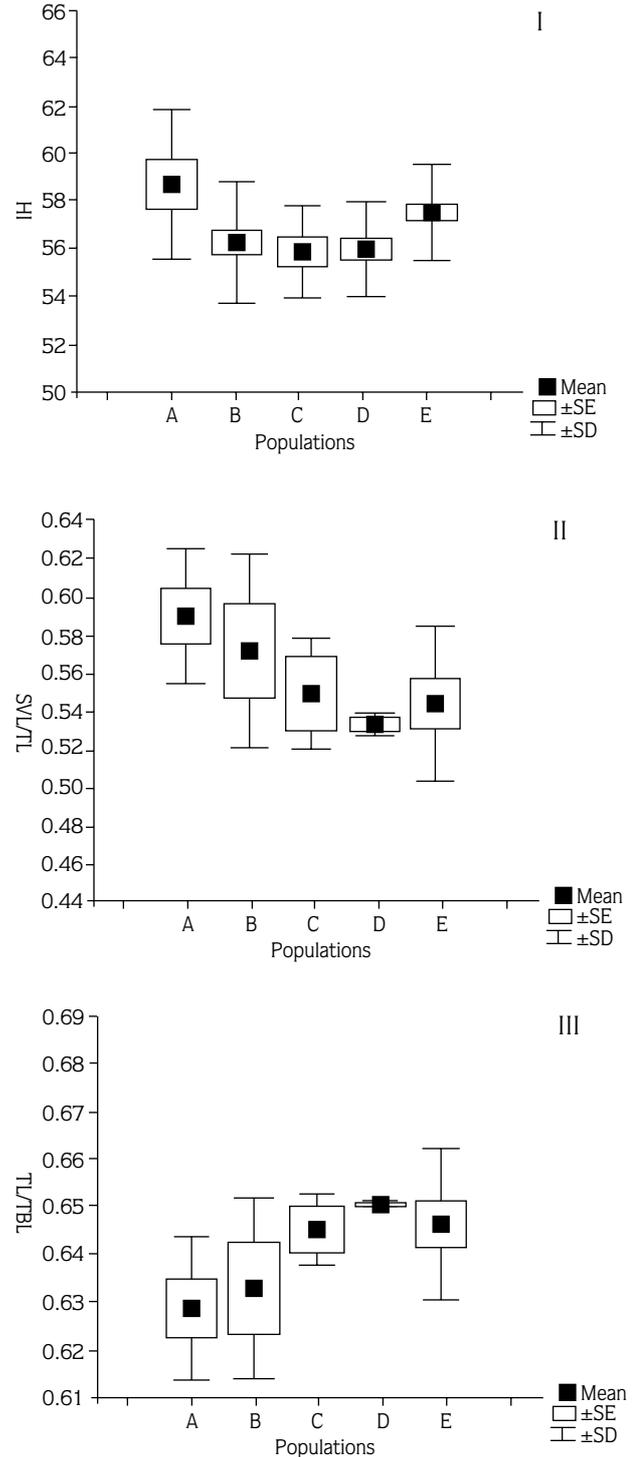


Figure 3. Box and whisker plots of HI show significant differences among the populations according to one-way ANOVA.

A: Ayder; B: Ortacalar; C: Karagöl; D: Çataldere; E: Hemşin

Borçka specimens were collected from under stones along a rapidly flowing stream at an elevation of 550 m a.s.l. The biotope where the specimens were captured had dense vegetation consisting of grass. The sampling was carried out between 1730 and 1830 hours, when it was raining and the temperature was 25 °C. The sympatric reptile and amphibian species in the specimen collection area were *Darevskia rudis* (Bedriaga, 1886), *Anguis fragilis* Linnaeus, 1758, and *Bufo viridis* (Laurenti, 1768).

Ortacalar specimens were collected from the walls of buildings used as tea stores and from under stones situated around the buildings between 0930 and 1530 hours. The altitude of the collection area was 750 m a.s.l. The air temperature ranged from 23 to 31 °C at the time of collection. There were mainly alder (*Alnus glutinosa*), beech (*Fagus orientalis*), chestnut (*Castanea sativa*), hornbeam (*Carpinus orientalis*), hazelnut (*Corylus maxima*), and tea (*Camelia sinensis*) trees in the area. The sympatric reptile species were *Darevskia rudis* (Bedriaga, 1886), *Darevskia parvula* (Lantz-Cyrén, 1913), *Darevskia derjugini* (Nikolskij, 1898), and *Anguis fragilis* Linnaeus, 1758.

Karagöl specimens were collected from among small weeds, especially *Urtica* sp., and from under small stones surrounding the lake. The weather was cloudy and rainy, and the temperature was 24 °C when specimens were collected. The altitude of the collection area was 850 m a.s.l. The area included mainly alder (*Alnus glutinosa*), beech (*Fagus orientalis*), chestnut (*Castanea sativa*), and hornbeam (*Carpinus orientalis*) trees. The sympatric amphibian and reptile species were *Bufo bufo* (Linnaeus, 1758), *Rana ridibunda* Pallas, 1771, *Rana macrocnemis* Boulenger, 1885, and *Natrix natrix* (Linnaeus, 1758).

Çataldere specimens were collected from the walls of buildings near beehives and from among weeds and annual grasses. The collection area included mainly alder (*Alnus glutinosa*), beech (*Fagus orientalis*), chestnut (*Castanea sativa*), hornbeam (*Carpinus orientalis*), and fir (*Abies nordmanniana*) trees. Specimens were collected between 1000 and 1400 hours when the temperature was 21 °C. The altitude of the locality was 800 m. a.s.l. The only sympatric reptile species in the area was *Darevskia parvula* (Lantz-Cyrén, 1913).

Discussion

Darevskia clarkorum is known from the Black Sea coast in southwest Georgia (Adzharia) and northeast Turkey (in a few localities) (Darevsky and Vedmederja, 1977; Darevsky and Tuniyev, 1999; Engelmann et al., 1993; Baran and Atatür, 1998; Sindaco et al., 2000; Szczerbak, 2003). *D. clarkorum* is listed by IUCN as endangered; the results of the present study indicated that *D. clarkorum* is more widely distributed than previously thought.

Darevsky and Vedmederja (1977) reported that a masseteric plate was present in 25.0% of the specimens collected 10 km west of Borçka (terra typica) and Adzharistan (Georgia) (n = 8). In the present study, the majority of the specimens (68.9%) collected from 6 different localities along the Black Sea region of Turkey had a masseteric plate on both sides (n = 103). In comparison, the number of masseteric plates found in this study was much higher than that reported by Darevsky and Vedmederja (1977). Darevsky and Vedmederja (1977) stated that the rostral is always in contact with the internasal, whereas in 50.5% of our specimens the rostral was separated from the internasal and the rest were in contact (49.5%) as a suture or point.

Comparative assessments of the other pholidosis characteristics observed in the present study with those reported by Darevsky and Vedmederja (1977), and Darevsky and Tuniyev (1997) are given in Table 5.

According to DS counts, our specimens had much lower values than those given by Darevsky and Vedmederja (1977), and Darevsky and Tuniyev (1997). Baran and Atatür (1998) reported that the DS number at mid-trunk ranged from 47 to 55 for *Darevskia clarkorum*. Our TS counts were similar to those given in previous studies for both sexes (Table 5).

FP counts in the present study were lower than those reported by Darevsky and Vedmederja (1977), but higher than those given by Darevsky and Tuniyev (1997). According to Baran and Atatür (1998), FP counts ranged from 16 to 21 for *D. clarkorum*. The *Darevskia clarkorum* specimens examined in this study had lower TVL counts than reported by Darevsky and Vedmederja (1977), and Darevsky and Tuniyev (1997). Our PA1 value was similar with that given by Darevsky and Tuniyev (1997) (Table 5).

Table 5. A comparison of pholidosis characteristics and morphometric measurements of the specimens examined in this study (C) and those given by Darevsky and Vedmederja (1977) (A), and Darevsky and Tuniyev (1997) (B). (n: number of specimens).

		A	B	C
SVL	♂♂	62.0-(65.40)-69	54.7-(58.90)-63.4	44.4-(59.33)-67.0
	♀♀	58.0-(62.70)-66	46.7-(58.50)-66.0	47.0-(58.21)-65.68
TL	♂♂	120.0-(124.00)-126.0	101.0-(107.10)-120.0	84.0-(106.20)-128.0
	♀♀	86.0-(96.00)-106.0	68.0-(89.4)-106.0	100.0-(106.20)-120.0
PA1	♂♂	-----	7.0-(9.10)-11.0	6.0-(8.60)-11.0
	♀♀	-----	6.0-(8.00)-10.0	6.0-(8.40)-10.0
PA2	♂♂	-----	2.0-(2.60)-3.0	2.0-(2.50)-4.0
	♀♀	-----	2.0-(2.80)-4.0	2.0-(2.70)-4.0
FP	♂♂	16.0-(18.60)-20.0	16.0-(17.30)-19.0	14.0-(17.90)-21.0
	♀♀	17.0-(18.80)-21.0	15.0-(16.20)-18.0	15.0-(17.60)-20.0
MG	♂♂	23.0-(24.00)-26.0	21.0-(22.40)-24.0	17.0-(22.30)-25.0
	♀♀	23.0-(24.00)-25.0	21.0-(22.80)-25.0	19.0-(21.90)-26.0
TS	♂♂	16.0-(17.50)-21.0	16.0-(17.50)-21.0	5.0-(17.60)-21.0
	♀♀	14.0-(16.70)-20.0	14.0-(16.70)-20.0	115.0-(17.00)-19.0
SCG	♂♂	5.0-(6.60)-10.0	5.0-(6.10)-8.0	2.0-(6.40)-9.0
	♀♀	5.0-(6.30)-7.0	4.0-(6.60)-10.0	2.0-(7.10)-11
DS	♂♂	49.0-(51.00)-55.0	47.0-(52.00)-57.0	44.0-(48.70)-55.0
	♀♀	47.0-(49.30)-51.0	47.0-(50.80)-56.0	44.0-(47.40)-52
LVP	♂♂	22.0-(23.00)-25.0	22.0-(24.50)-26.0	21.0-(23.60)-26.0
	♀♀	25.0-(25.30)-26.0	25.0-(26.80)-28.0	22.0-(24.90)-28.0

Regarding SVL, the specimens examined in the present study were slightly shorter than specimens previously measured by Darevsky and Vedmederja (1977), but were similar to those measured by Darevsky and Tuniyev (1997). TL value for male specimens in the present study was similar to that measured by Darevsky and Tuniyev (1997), but lower than that measured by Darevsky and Vedmederja (1977). In the present study TL for females was slightly longer than for previously measured specimens (Table 5).

D. clarkorum was sympatric with *Darevskia rudis* in Borçka and Ortacalar. Darevsky and Vedmederja (1977) suggested a possible hybridization between *D. clarkorum* and *D. rudis*. Darevsky and Tuniyev (1997) stated that *D. clarkorum* lives at altitudes ranging from 900 to 1700 m

a.s.l. Vertical distribution of specimens examined in this study ranged from 550 to 1350 m a.s.l. They were usually collected during cloudy and rainy conditions between 0830 and 1830 hours. The biotopes of the collection areas had dense vegetation. Darevsky and Tuniyev (1997) mentioned that *D. clarkorum* is active in cloudy and foggy weather, and even during rain. They also stated that *D. clarkorum* is a typical petrobiont, which occurs on heaps of stones, rocky outcrops, and stony talus slopes.

Statistical analyses performed on the pholidosis characteristics and morphometric measurements verified statistically significant differences in at least 2 characters among the populations (Tables 2 and 4). According to Darevsky (1967), the variation of the number of

transverse rows of pectoral and ventral scales in rock lizard species is generally at its maximum in specimens from populations at maximum altitudes. By studying other populations it can be determined whether the morphological differences observed in the present study change according to altitude, and whether they correspond to a change of habitat or other ecological conditions. I think that more specimens should be examined from the known distribution range of *D. clarkorum* for molecular and morphological studies, in order to clarify the taxonomic status of this species.

In conclusion, regarding pholidosis characteristics, morphometric measurements, and color-pattern features, specimens collected from 6 different localities along the eastern Black Sea of Turkey coast were found to be similar to *D. clarkorum*, except for an increased presence of masseteric plates. Additionally, the rate of contact between the rostral and internasal was higher in the present study than in previous studies (Darevsky and Vedmederja, 1977; Darevsky and Tuniyev, 1997).

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