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On the Populations of *Ablepharus kitaibelii* (Bibron and Bory, 1833) (Sauria: Scincidae) from South-Western Anatolia

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Abstract: A total of 52 specimens (22 males, 23 females and 7 juv.) belonging to *Ablepharus kitaibelii* species collected from the South-Western Anatolia were examined in this study. Along with pholidosis, coloration-pattern and body measurements information about the specimens, the study contains some ecological and biological observations concerning the localities. In this study, some of the characters of the specimens around Elmali, which was collected from higher localities over 1500 m, was found significantly different (Number of dorsal scales around mid-body, supralabials, subdigital lamellae and evident of ear opening) from the Antalya population.

Key words: *Ablepharus*, South-Western Anatolia, taxonomy

INTRODUCTION

Ablepharus kitaibelii was defined by Bibron and Bory in 1833 for the first time. In the following years, this species was accepted as three subspecies (*A.k. kitaibelii*, *A.k. fabichi* and *A.k. fitzingeri*) by Mertens and Müller^[1], Mertens and Wermuth^[2]. Darevsky^[3] described a new species, *A. chernovi*. Two comprehensive taxonomic analyses of this species were made by Fuhn^[4,5] who divided *A. kitaibelii* into five subspecies (*A.k. kitaibelii*, *A.k. chernovi*, *A.k. fitzingeri*, *A.k. stepaneki* and *A. k. fabichi*) in view of the specimens he examined from Turkey, the Aegean Islands, Greece, Bulgaria, Romania, the Czech Republic, Slovakia, Hungary, South-Western Caucasia, Cyprus, Syria, Israel, Jordan, Iraq and the Sinai Peninsula. Thus, *chernovi* was defined as a species by Darevsky^[3] was accepted as a subspecies of *kitaibelii*. Yozgat (Turkey) specimens were regarded as *A.k. chernovi* subspecies by Eiselt^[6]. *A.k. chernovi* had been stated in Erzurum (Turkey) by Fuhn^[5]. Later, Eiselt determined *A. kitaibelii* in Yozgat, which is located more than 600 km west of Erzurum; for that reason, it was declared that the existence of *A. kitaibelii* is dependent on suitable biotopes^[6].

Baran^[7] and Kumlutas^[8] pointed out that there were merely two subspecies (*kitaibelii* and *chernovi*) in Turkey and the known area of distribution for *chernovi* subspecies was extended by them. Eremčenko and Ščerbak^[9] also accepted *chernovi* as a species which was previously regarded by Darevsky^[3].

Recent years, Göçmen *et al.*^[10] defined a new subspecies (*A. k. budaki*) from Northern Cyprus and also compared them with the materials examined from Turkey. These researchers doubted the existence of *chernovi* form. They also declared that the pholidosis features of the specimens of southern Turkey were similar to the ones of the new subspecies.

Schmidtler^[11] in his study, accepted 3 species (*A. kitaibelii*, *A. budaki* and *A. chernovi*) examined from Turkey and classified them many subspecies. The researchers also declared that there is *A. budaki* and *A. chernovi* species in addition to *A. kitaibelii* in South-Western of Turkey.

The main objective of this study was to examine comprehensively *A. kitaibelii* populations collected from South-Western Anatolia between the years 1994 and 1998 and find out taxonomic status by presenting the variations between populations.

MATERIALS AND METHODS

A total of 52 specimens (22 males, 23 females and 7 juv.) was collected from South-Western Anatolia (Western Taurus Range), fixed and preserved using traditional processes. The specimens, given ZDEU (Department of Zoology Ege University) collection codes, are kept in the Ege University. The specimens were examined with respect to pholidosis, body measurements and color-pattern features. Body measurements were taken using a dial caliper with an accuracy of 0.02 mm. The

color and pattern features of newly collected specimens were recorded and slide pictures of them were taken after field excursions.

The materials were divided into two groups as Antalya and Elmali populations since the specimens caught in the area which was higher than 1500 m altitude are different from the others in view of the morphological characteristics; hence, the specimens collected at elevation of 1500 m and higher were included in Elmali population. The localities, where the specimens obtained are presented in the map (Fig. 1) according to their corresponding numbers in the material list. Coefficient of Difference (CD) of the metric data^[12] and Kolmogorov Smirnov Two-samples Test (KS) values of the meristic characters (Alpha level, 0.05) were calculated to compare similarities and differences of the populations.

Antalya population: The specimens collected from the altitudes between the sea level and 1450 m belong to this population. 1) 189/1994. 1♂, Kisalar village-Manavgat, 05.02.1994, Leg. M. Öz; 2) 190/1994. 1 juv., Bereket village-Manavgat, 20.03.1994, Leg. M. Öz; 3) 160/1995. 1♀, Beldibi, 15.02.1995, Leg. M. Öz; 4) 161/1995. 1♂, Manavgat, 12.06.1995, Leg. M. Öz, Y. Kumlutas, R. Tunç, H. Durmus; 5) 367/1996. 1♂, Dagbag village-Kas, 15.06.1996, Leg. M. Öz, Y. Kumlutas, R. Tunç, H. Durmus; 6) 368/1996. 1 juv., Sariçbasi-Kalkan, 16.06.1996, Leg. M. Öz, Y. Kumlutas, R. Tunç, H. Durmus; 7) 369/1996. 1♂, Saribelen-Kalkan, 16.06.1996, Leg. M. Öz, Y. Kumlutas, R. Tunç, H. Durmus; 8) 370/1996. 1-2♀♀, Sütlegen-Elmali, 16.06.1996, Leg. M. Öz, Y. Kumlutas, R. Tunç, H. Durmus; 9) 373/1996. 1 juv., Mahmutlar-Alanya, 24.08.1996, Leg. Y. Kumlutas, R. Tunç; 10) 266/1997. 1♀, Küçük Çaltıcak-Antalya, 09.03.1997, Leg. R. Tunç; 11) 267/1997. 1♂, Termessos, 29.03.1997, Leg. R. Tunç; 12) 268/1997. 1♂, 2♀, Beskonak village-Bucak, 24.05.1997, Leg. Y. Kumlutas, R. Tunç; 13) 271/1997. 1♂, 2♀, Sinekçibeli-Elmali, 27.05.1997, Leg. Y. Kumlutas, S. Düsen; 14) 272/1997. 1♀, Büyük Caltıcak-Antalya, 30.10.1997, Leg. M. Öz; 15) 121/1998. 1 juv., Büyük Caltıcak-Antalya, 30.03.1998, Leg. M. Öz; 16) 122/1998. 1♀, Hurma village-Antalya, 30.03.1998. Leg. M. Öz.

Elmali population: 17) 371/1996. 1-12♂♂, 13-25♀♀, Çiglikara-Elmali, 1950 m, 16.06.1996, Leg. M. Öz, Y. Kumlutas, R. Tunç, H. Durmus; 18) 372/1996. 1♀, Bozhöyük-Elmali, 1800 m, 18.06.1996, Leg. M. Öz, Y. Kumlutas, R. Tunç, H. Durmus; 19) 269/1997. 1-3♂♂, 4♀, 5-6 juv., Sögüt-Korkuteli, 1600 m, 25.05.1997, Leg. Y. Kumlutas, O. Türkozan, R. Tunç, S. Düsen; 20) 270/1997. 1 juv., Yuva-Seki, Elmali, 1525 m, 26.05.1997, Leg. Y. Kumlutas, S. Düsen.

RESULTS

Antalya population: The number of loreals is 3; supraciliaries 2; supralabials in front of the subocular mostly 4 (84%) and 3 in three specimens (16%). Prefrontal plates are rarely in contact (2 specimens, 11%), occasionally not in contact (17 specimens, 89%). The ear opening is distinctly visible in 18 specimens (95%) and not visible in one specimen (5%). The vertical rows of scales between the ear opening and masseteric is mostly 3 (79%), rarely 2 (21%). Dorsal scales around mid-body is 20 (90%), 19 in one specimen (5%) and 18 in one specimen (5%). The maximum total body length is 116.76 mm and minimum is 69.64 mm in undamaged or unregenerate adult specimens. Other pholidosis, body measurements and indices related to Antalya population are given in Table 1.

The ground coloration of the dorsum varied from brown to its tones. 4 longitudinal spotted lines over the ground coloration of the dorsum is not visible (21%), distinctly visible (32%) and indistinct (47%). Dirty white supratemporal band, which extends up to ear opening, is not visible (31.5%), indistinct (37%) and visible (31.5%). Venter is usually light gray or blue. In males, this colour turns to light or dark orange in mating season.

The specimens were captured generally under stones, sometimes between the trees which fall its leaves in various localities. They were usually observed in the morning (9:00-11:00) and in the evening (17:00-20:00) at temperatures varying between 25 and 35°C. The biotopes of the specimens include plant species such as *Pinus brutia*, *Pinus nigra*, *Quercus* sp., *Juniperus* sp., *Myrtus communis*, *Pistacia* sp. and *Astragalus* sp. The specimens were seen in the same habitats with amphibians, *Mertensiella luschani*, *Rana ridibunda*, *Bufo viridis* and with reptiles, *Testudo graeca*, *Blanus strauchii*, *Mabuya vittata*, *Hemidactylus turcicus*, *Laudakia stellio*, *Ophisops elegans*, *Lacerta trilineata*, *Eirenis modestus*, *Typhlops vermicularis*, *Coluber jugularis*, *Coluber nummifer*, *Malpolon monspessulanus* and *Telescopus fallax*.

Elmali population: The number of loreals (preocularia) is mostly 3 (91%), 2 in two specimens (6%) on both sides of head and 2 on the left side and 3 on the right side in one specimen (3%). In all the specimens, the number of supraciliaries, supralabials in front of subocular, vertical rows of scales between the ear opening and masseteric and dorsal scales around mid-body are always 2, 3, 3 and 18, respectively. The ear opening, which is not visible, is covered by a scale in 33 specimens. Prefrontal plates are

Table 1: The statistical values of some body measurements, indeces and pholidosis features [1. Snout-vent length, 2. Tail length, 3. Total body length, 4. Head length, 5. Head width, 6. Fore limb length, 7. Hind limb length, 8. Length of fourth toe of hind limb, 9. (Head length/Head width)x 100, 10. (Tail length/Total body length)x 100, 11. (Fore limb length/Snout-vent length)x100, 12. Number of dorsal scales around mid-body, 13. Subdigital lamellae, 14. Scales between the ear opening and masseteric, 15. Number of supralabials in front of the subocular, CD: Coefficient of Difference, KS: Two-samples Kolmogorov Smirnov test]

	Elmalı population (♂♂+♀♀)					Antalya population (♂♂+♀♀)					CD
	n	Range	Mean	SD	SE	n	Range	Mean	SD	SE	
1	30	30.28-48.98	42.91	4.65	0.85	15	31.26-45.76	36.66	3.75	0.97	0.74
2	16	35-64	50	9.51	2.38	7	35-71	49.43	12.55	4.75	0.03
3	16	75.28-111.04	92.56	12.84	3.21	7	69.64-116.76	86.08	15.98	6.04	0.22
4	30	5.46-7.46	6.65	0.46	0.08	15	5.10-6.78	6.21	0.47	0.12	0.47
5	30	2.78-4.24	3.74	0.31	0.06	15	2.92-3.78	3.42	0.21	0.05	0.62
6	30	5.88-8.44	7.42	0.63	0.12	15	5.32-7.72	6.37	0.63	0.16	0.83
7	30	8.06-12.36	10.91	0.91	0.17	15	7.76-11.90	9.48	1.02	0.26	0.74
8	30	3.38-4.34	3.78	0.27	0.05	15	3.08-3.98	3.45	0.33	0.09	0.55
9	30	49.83-65.42	56.36	3.86	0.70	15	51.03-59.65	55.26	2.53	0.65	0.17
10	16	46.02-59.78	53.73	4.05	1.01	7	49.28-60.81	56.83	4.98	1.88	0.34
11	30	13.93-20.46	17.44	1.86	0.34	15	14.99-20.36	17.45	1.69	0.44	0.003
12	33	18	18	-	-	19	18-20	19.84	0.50	0.12	p<0.05
13	33	10-15	12.85	1.20	0.21	19	12-16	14.53	0.91	0.21	p<0.05
14	33	3	3	-	-	19	2-3	2.79	0.42	0.10	p>0.05
15	33	3	3	-	-	19	3-4	3.84	0.37	0.09	p<0.05

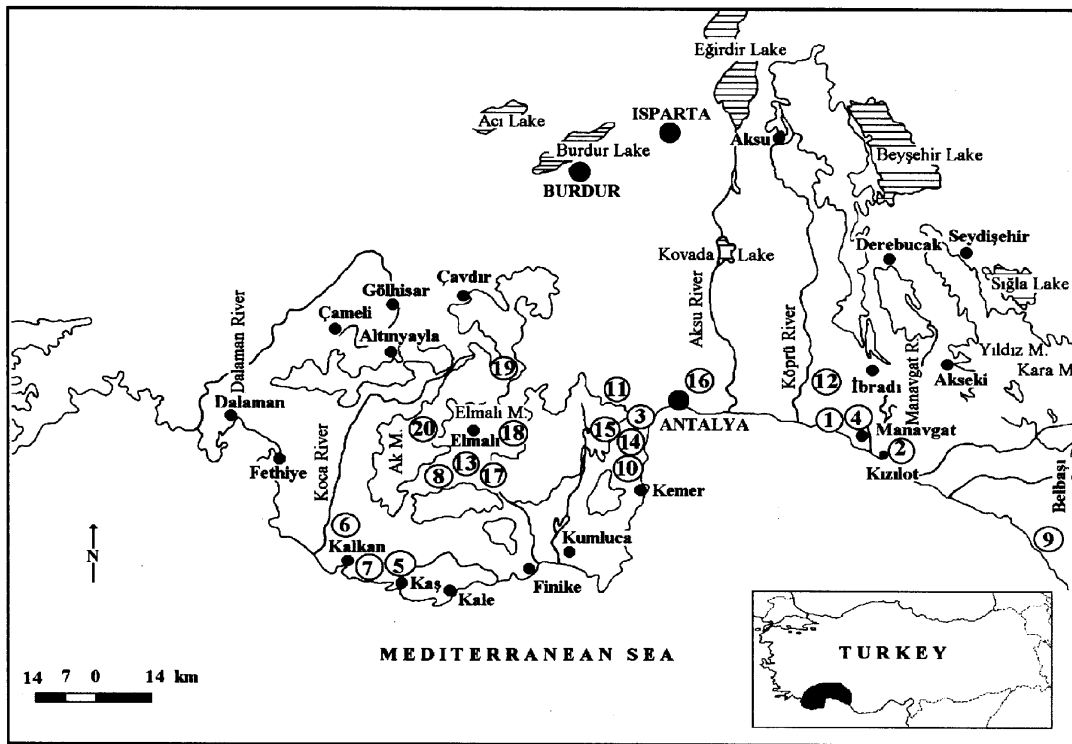


Fig. 1: The stations in which specimens were collected

generally in contact (26 specimens, 79%) and rarely not in contact (7 specimens, 21%) with each other. The maximum total body length is 111.04 mm and minimum is 75.28 mm in undamaged or unregenerate adult specimens. Other pholidosis, body measurements and indices related to Elmalı population are given in Table 1.

The colour of the dorsum is brown or light brown. There are 4 longitudinal spotted lines over the ground

coloration of the dorsum. Dark brown temporal bands extend to lateral parts of body. In all specimens dirty white coloured subtemporal band reach the fore limbs by the body exceeding ear opening. The venter is light gray or grayish blue colour.

The great number of Elmalı population is included from the specimens of Çıglikara. In the evening time (19:00-20:30) at 25°C, the specimens were captured under

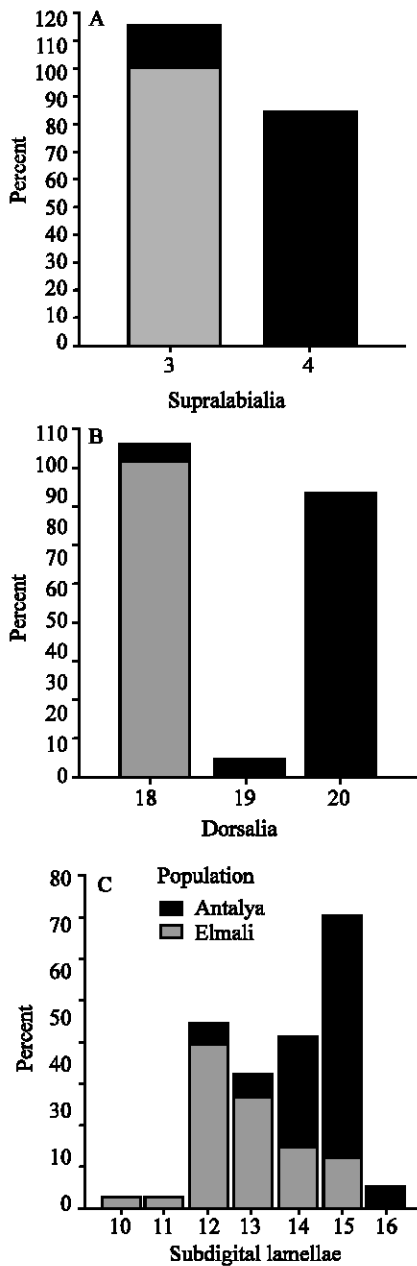


Fig. 2: Comparison of two populations from the viewpoint of the percentage of supralabials (A), dorsals (B) and subdigital lamellae (C)

stones in grassy vegetation. The biotopes of the specimens include plant species such as *Cedrus libani*, *Abies cilicica*, *Quercus coccifera*, *Juniperus oxycedrus*, *Pinus nigra*, *Verbascum* sp., *Cirsium* sp., *Madicago* sp., *Lathyrus* sp. and *Euphorbia* sp. The specimens were seen in the same habitats with amphibians, *Rana ridibunda*, *Bufo viridis*, *Testudo graeca* and with reptiles, *Lacerta*

danfordi, *Lacerta trilineata*, *Laudakia stellio*, *Ophisops elegans*, *Cyrtopodion kotschyi*, *Elaphe quatuorlineata*, *Eirenis modestus*, *Typhlops vermicularis* and *Coluber najadum*.

DISCUSSION

The specimens collected from the higher altitude than 1500 m (Elmali population) in the field of research have shown some significant differences from the ones collected from the lower altitudes (Antalya population). The number of supralabials in front of the subocular is mostly 4 (84%) in Antalya population whereas it is 3 in all of the specimens in Elmali population (KS= 2.924 p= 0.000). Ear opening is covered by a scale in all of 33 specimens forming Elmali population, on the other hand it can be distinctly visible in 18 specimens forming 95% of Antalya population. While the number of dorsal scales around mid-body is 18 in the whole of the specimens belonging to Elmali population, it is 20 in 17 specimens forming 90% of Antalya population (KS= 3.290, p=0.000). In addition, the two population have been found to be different in view of the number of subdigital lamellae (KS= 2.160 p= 0.000) (Table 1). Results regarding the number of dorsalia, supralabialia and subdigital lamellae belonging to the two populations are shown in Fig. 2.

The specimens collected in Turkey have been examined as the comparing material in the study of Göçmen *et al.*^[10] given as the new subspecies of *A.k. budaki* from Cyprus. As a result of their study, the researchers pointed out that the population of Mediterranean Region of Turkey has similarity to *A.k. budaki* with the respect of pholidosis features. For instance, the pholidosis values of Antalya population in our study have supported this view. Schmidtler^[11] caught a specimen in the region of Elmali population and than he reported that it could be a new subspecies of *A. chernovi* ssp. In this study, it could be possibly said that Elmali population is closer to *A. chernovi* whereas Antalya population is partly similar to Cyprus population with the respect of pholidosis but the taxonomic status of *A. kitaibelii* can only be solved by examining in Turkey and investigating all of the populations with morphological and biochemical techniques.

One of the important conclusion of our study is that there are differences related to some pholidosis features between Elmali population distributed higher than 1500 m altitude and Antalya population distributed lower than 1500 m altitude.

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