








## RESEARCH ARTICLE

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## New locality record of *Lacerta agilis* (Squamata: Lacertidae) in Turkey

### *Lacerta agilis* (Squamata: Lacertidae)'in Türkiye'deki yeni lokalite kaydı

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#### ABSTRACT

In this study, it was given the locality record of the sand lizard (*Lacerta agilis*) from Yeşilköy Village, Pazar District of Rize Province of Turkey. This new record revealed the second locality for *L. agilis* from the eastern Black Sea coast of Anatolia. The metric and meristic features of the adult, subadult and juvenile specimens were compared to the features of the specimens of the species, *L. agilis* in the literature.

#### ÖZ

Bu çalışmada, Kars kertenkelesi (*Lacerta agilis*)'in Türkiye'de Rize ilinin Pazar ilçesinin Yeşilköy köyünden lokalite kaydı verilmiştir. Bu yeni kayıt *L. agilis* türünün Anadolu'nun Doğu Karadeniz kısmındaki ikinci lokalite kaydını oluşturmaktadır. Ergin, yarı ergin ve juvenile bireylerin metric ve meristic özellikleri literatürde *L. agilis* türünün bireylerinin özellikleriyle karşılaştırılmıştır.

#### Keywords:

Sand lizard, *pholidosis*, *morphometric*, Pazar, Rize.

#### Anahtar kelimeler:

Kars kertenkelesi, *folidosis*, *morfometrik*, Pazar, Rize.

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## 1. INTRODUCTION

The Sand lizard, *Lacerta agilis* shows extensive distribution including 45 countries in the world. It is distributed in Europe, Moldova, Latvia, Estonia, Lithuania, Belarus, Russia, Ukrain, Georgia, Turkey, Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, China and Mongolia (Agasyan et al., 2010; Uetz et al., 2013).

Although *L. agilis* is found in a great range of habitats, and is still abundant in many countries, it has suffered massive population declines along the northwestern edge of its world range (Edgar & Bird, 2005). The IUCN Red List of Threatened Species classifies this lizard at LC (Least Concern) category since 2009.

*L. agilis* has ten subspecies. Only two of them (*L. a. brevicaudata* and *L. a. grusinica*) have distribution areas in Turkey.

*L. a. brevicaudata* was recorded around Erzurum, Ardahan and Kars Provinces (Mertens, 1952; Clark & Clark, 1973; Başoğlu & Baran, 1977; Mulder, 1995; Baran et al., 2012). In Turkey, *L. a. grusinica* was only recorded from Hopa district of Artvin Province (Mulder, 1995). Although two specimens of *L. agilis* from Khost (Coşandere) locality in Trabzon Province were evaluated belonged to the subspecies of *L. a. grusinica* by Peters (1962), this publication was refuted by Schmidtler (1986). The recommendations of Başoğlu and Baran (1977) and Kalyabina-Hauf and Ananjeva (2004) pointing out that this subspecies could spread from Trabzon to the eastern parts of Black Sea in Turkey, are need to be verified. It is still unclear some points of distribution of *L. a. grusinica* on the Black Sea coast (Tuniyev & Tuniyev, 2008).

The present study provides a new locality record of *L. agilis* in Rize Province of Turkey. Some metric and meristic

characteristics of the *L. agilis* specimens captured from this locality were presented.

## 2. MATERIAL AND METHOD

During two field studies on 14<sup>th</sup> and 27<sup>th</sup> April 2019, 1 adult ♂♂, 2 subadult ♀♀ and 5 juvenile individuals of *Lacerta agilis grusinica* were recorded from Yeşilköy Village, Pazar District of Rize Province (41°09'900"N, 40°50'477"E, 182 m a.s.l.). A map indicating the new locality is given in Figure 1. We photographed the individuals in their natural habitat and the lizards were anesthetized by MS 222. After we injected a 10% formaldehyde solution, the lizards were stored in 70% ethanol. The collection numbers (KZL-343 and KZL-348 for Yeşilköy) were given to the specimens and they were stored at the Karadeniz Technical University, Department of Biology, Zoology Research Laboratory.



**Figure 1.** Map showing the locality of *L. a. grusinica* in Turkey. 1. Hopa, Artvin; 2. Yeşilköy, Pazar-Rize (The red colored diamond shows the new locality).

We obtained the pholidolial and morphometric data modifying the data of Peters (1960), Peters (1962) and Schmidtler (1986). For morphological observations, a stereomicroscope was used. To measure the morphometric features to the nearest to 0.01 mm, a digital caliper was used. We compared our results with the data obtained from the researches of Peters (1960), Peters (1962) and Schmidtler (1986). The assessed pholidolial features were: supraciliar granules (right–left, SCGa–SCGb), supraciliar plates (right–left, SCPa–SCPb), supralabials (right–left, SRLa–SRLb, number of labials both anterior and posterior to center of eye), sublabials (right–left, SLPa–SLPb), collar (C), ventral plates (transversal and longitudinal, TVP and LVP), femoral pores (right–left, FPa–FPb), transversal series of dorsal scales at the midbody (DS), number of preanal scales surrounding anals (PA1) and all plates surrounding anals

(PA2), formula for postnasal + frenal plates (P+F), preocular plates (PreO), the number of subdigital lamellae under the 4<sup>th</sup> toe (SDL), the number of plates between tympanium and supratemporal (T-S), temporalia (T), and gularia (G).

The metric characteristics used in the present study are: snout–vent length (SVL), tail length (TL), pileus width (PW), pileus length (PL), head width (HW), head length (HL), total body length (TBL), and hind limb length (HLL).

## 3. RESULTS

The vegetation of the habitat of the specimens from Rize, Yeşilköy generally comprises tea plants (Figure 2). *Darevskia derjugini* (Nikolsky, 1898) *Darevskia rudis* (Bedriaga, 1886) and *Anguis fragilis* (L., 1758) live in sympatry in the study area. We performed the sampling in two day excursions between 12.00-14.30 hours on 14<sup>th</sup> April 2019 and 11.00-17.00 hours on 27<sup>th</sup> April 2019. The air temperatures were 19 and 16 °C, respectively.



**Figure 2.** Habitat of *L. a. grusinica* from Yeşilköy, Pazar-Rize.

### 3.1. Examined Specimens

***Lacerta agilis*:** Turkey, Rize, Pazar, Yeşilköy, KZL-343/2019, 2 juveniles 04.14.2019; KZL-348/2019 1 adult ♂♂, 1 subadult ♂♂, 1 subadult ♀♀ and 3 juveniles 04.27.2019, leg. U. BÜLBÜL, H. ÖZKAN, and İ. ÖZTÜRK, KTU, TRABZON

### 3.2. Pholidolial characteristics

Rostrals and internasals were separated in all specimens. SCPa and SCPb were 5 in all observed lizards. SRLa and SRLb was found 7 in all specimens. SLPa was 6 (12.5%) in 1 specimen and 7 (87.5%) in 7 specimens while 6 SLPb was

found in all specimens. DS of the specimens was small and smooth. PA1 was 2 in all specimens while PA2 was 6 in most of the specimens (75%) and it was rarely 7 (25%).

### 3.3. Morphometric measurements

TBL was 235.9 mm in the adult male specimen, 151.67 mm in the subadult male specimen and 143.03 mm in the subadult female specimen. The maximum TBL was 126.83 mm for juveniles. SVL was 91.9 in the adult male, 60.12 mm in the subadult male and 56.81 mm in the subadult female. The maximum SVL was 51.94 mm for juveniles. Some of the metric and meristic features of the specimens caught from Yeşilköy, Rize are given in Table 1.

### 3.4. Color pattern

In the adult male specimen, the head was dark green-brownish. The sides of the head were light green. There were black spots on the supralabial and sublabial plates. Middle of the dorsum and limbs were light green. There were small black spots on the lateral of the dorsum and on the limbs. The tail had a brown color on green back -

ground. The ventral was greenish and there were dark spots on the ventral plates (Figure 3).



**Figure 3.** The male specimen of *L. a. grusinica* from Yeşilköy population.

**Table 1.** Some metric and meristic features of *Lacerta agilis grusinica* specimens collected from Yeşilköy population. For abbreviations see text.

Characters	Peters (1960)		Peters (1962)		Schmidtler (1986)	This study							
	19 ♀♀	18 ♂♂	1 ♀♀	1 ♂♂	7 Adults (Mean)	1 adult ♂♂	1 subadult ♀♀	1 subadult ♂♂	1. Juv.	2. Juv.	3. Juv.	4. Juv.	5. Juv.
SCP <sub>a</sub> - SCP <sub>b</sub>	-	-	-	-	5.2-5.2	5-5	5-5	5-5	5-5	5-5	5-5	5-5	5-5
SRL <sub>a</sub> - SRL <sub>b</sub>	-	-	-	-	-	7-7	7-7	7-7	7-7	7-7	7-7	7-7	7-7
SLP <sub>a</sub> - SLP <sub>b</sub>	-	-	5	5	-	7-6	6-6	6-6	6-6	6-6	6-6	6-6	6-6
C	-	-	-	-	12.1	11	11	10	10	11	10	11	11
TVP	27-30	24-28	27	26	-	27	29	31	33	29	29	28	29
LVP	-	-	6	6	-	6	6	6	6	6	6	6	6
FP <sub>a</sub> - FP <sub>b</sub>	12-18	12-18	17-17	17-17	15.4-15.4	14-14	15-13	15-13	15-13	16-15	15-15	15-16	15-14
DS	44-53	44-54	48-50-52	49	48.9	58	48	52	55	53	53	52	42
PA1	-	-	1.66	1.82	-	2	2	2	2	2	2	2	2
PA2	-	-	-	-	5.7	7	6	6	6	6	7	6	6
P+F	-	-	2+0:2+1	2+1:2+1	-	2+1:2+1	1+1:1+1	2+1:2+1	2+1:2+1	2+1:2+1	1+1:2+1	2+1:2+1	2+1:2+1
PreO	-	-	-	-	1.9	2-2	2-2	2-2	2-2	2-2	2-2	2-2	2-2
SDL	-	-	25	24	22.9	24	24	24	24	28	24	28	24
T-S	-	-	-	-	15.3	16-14	14-16	14-16	17-18	15-16	14-15	14-14	14-14
T	-	-	-	-	21.4	21	21	21	23	22	23	23	23
G	-	-	-	-	21.3	17	19	19	19	19	19	19	19
SVL	90.0	85.5	105.0	82.5	-	91.92	56.81	60.12	51.94	51.12	46.40	36.65	34.31
TL	-	-	17	-	-	143.98	86.20	91.55	74.89	74.33	74.31	88.13	79.65
PW	-	-	-	-	-	12.09	7.35	7.05	6.76	6.92	7.49	6.97	5.04
PL	-	-	2.13	2.10	-	2.13	1.32	1.38	1.22	1.17	1.17	1.13	0.80
HW	-	-	-	-	-	18.58	9.68	9.84	8.03	7.80	7.71	8.06	7.61
HL	-	-	-	-	-	32.68	19.13	19.52	16.80	16.75	16.70	13.25	10.96
TBL	23.3	23.4	-	-	-	23.59	14.30	15.16	12.68	12.54	12.07	12.47	11.4
HLL	-	-	4.70	4.45	-	4.09	2.78	2.84	2.65	2.58	2.53	2.54	2.46
PL x 100 SVL	21.48	24.07	-	-	-	23.26	23.28	23.08	23.62	22.96	25.40	30.94	23.08

The subadult specimens had brown dorsum except the head and neck. Dorsal and lateral parts of the body had black spots. These spots were bigger on the mid-dorsal. There were three green lines on the dorsal. The lateral part of the body had white spots in three rows. These spots continued from the front of the tympanium to the tail in the upper row, while they ended at the hind limb in the second and third rows. The ventral of the head was

green while ventral of other parts of the body were cream colored (Figure 4).

The juveniles had brown dorsum. As in subadults, dorsal and lateral parts of the body had black spots. These spots were also bigger on the mid-dorsal of juveniles. The three lines on the dorsal were light brown. The characteristics of the white spots on the lateral side were similar to those of the subadults. The ventral was completely cream colored (Figure 4).



**Figure 4.** A general view of the subadult and juvenile specimens of *L. a. grusinica* in the studied population. A. subadult ♀♀, B. subadult ♂♂, C. first juvenile, D. second juvenile and E. third juvenile individuals.

#### 4. DISCUSSION

Morphological features and metric characteristics of our specimens in the Yeşilköy population were found similar to individuals of *L. a. grusinica* used in the researches of Peters (1960), Peters (1962), and Schmidtler (1986), except slightly lower number of gularia in specimens of the present study. Overlapping postnasal plate number (2/0) in our specimens was found similar to those of specimens in the study of Bischoff (1988).

According to the comparison of data given in the literature to our data, we evaluated that the individuals in the Yeşilköy population belong to subspecies of *L. a.*

*grusinica*. We reported the first locality record of *L. a. grusinica* for Rize province. The occurrence of the subspecies from Artvin province (in Hopa district) was reported by Mulder (1995). The findings of the present study indicate that the individuals of the subspecies can be found in other suitable habitats in Turkey.

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