

NEW LOCALITY RECORDS FOR *Eumeces schneiderii* (Daudin, 1802) AND *Trapelus ruderatus* (Olivier, 1804) WITH THE MORPHOLOGICAL DATA FROM EASTERN ANATOLIA, TURKEY

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ABSTRACT. In this study, we report new locality records for *Eumeces schneiderii* and *Trapelus ruderatus* from Malatya, Eastern Anatolia. As the new locality is about 60 km north of the known distribution area for *E. schneiderii* from Malatya and *T. ruderatus* is the first record for this province. A summary of metric and meristic characteristics with color-pattern features was given for these specimens. Moreover, the explored locality's importance for the species biogeography via Anatolian diagonal was emphasized.

1. INTRODUCTION

New locality records provide valuable information for the management and conservation of biodiversity in order to contribute to an evaluation about habitat preferences and geographic distribution of wildlife animals, lizards in particular [1]. Turkey is a very important area in terms of the biodiversity and it, where it hosts more than 139 native reptile species, is also unique for including three of the world's 36 biodiversity hotspots [2-3]. The reptile species in Turkey are grouped in about 24 families. Some of them contain many (over thirty) species (e.g. Lacertidae, Colubridae), while others are represented by only 1 species (e.g. Chamaeleonidae, Phyllodactylidae, Eublepharidae, Elapidae) [4]. Two of these

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families are Scincidae and Agamidae, which are relatively less studied lizard groups compared to Lacertids in Turkey. However, with more than 1600 described species of skinks, they are the largest lizard family in the world [4]. On the other hand, approximately 300 species have been described for the Agamidae family [5].

The genus *Eumeces* (Wiegmann, 1834), is a subgroup of the Scincidae family, distributed among Holarctic Region as an Afro-Central Asian clade [6]. Anatolia hosts only *Eumeces schneiderii* (Daudin, 1802) with three subspecies from this genus in an altitudinal range between 300 to 1800 meters [7-15]. While *E. s. princeps* (Eichwald, 1839) is generally distributed among Central, Southeastern and Eastern Anatolia, *E. s. barani* Kumlutaş, Arıkan, Ilgaz & Kaska, 2007 is distributed in a limited area between Pamukkale (Denizli), Bozdağ (İzmir) and Buharkent (Aydın) in Western Anatolia [10, 16-17]. The remaining subspecies is *E. s. pavimentatus* (Geoffroy de St. Hilaire, 1827), which is only distributed in the Southern Anatolia (eastern Mediterranean) [18]. This species was studied in mostly herpetofaunistic surveys (mentioned above) and morphological traits in the Anatolian Peninsula [9, 14-15].

The genus *Trapelus* (Cuvier, 1816), is a genus of Middle Eastern based species under the Agamidae family. Anatolia hosts only one species of this genus: *Trapelus ruderatus*. Actually, there have been debates on the taxonomy of *Trapelus* populations in Anatolia, but we would like to introduce Anatolian *Trapelus* specimens as *T. ruderatus*. Because Ananjeva et al. 2013 examined the holotype of it with *T. ruderatus* and evaluated that it has significant features, that can be the neotype of *T. ruderatus* [19]. Like *E. schneiderii*, this species was evaluated in herpetofaunistic studies, but in addition to this, its ecological niche differentiations under genus *Trapelus* was also studied [18, 20-26].

Here, we would like to report the new locality of relevant species with their morphological characteristics, including the pholidosis features, measurements, and color-pattern characteristics, recorded from the localities outside the known distribution.

2. MATERIALS AND METHODS

During the field study, both *Eumeces* and *Trapelus* specimens were observed in Yazıhan, Malatya (Eastern Anatolia) in 16 August 2020. Locality was recorded by Garmin GPSMap 64s (38° 41' N – 38° 10' E, 950m a.s.l.). In order to avoid risk of color and pattern characteristics, both specimens were evaluated under these terms while they were alive. After that specimens were brought to Karamanoğlu Mehmetbey University Zoology Research Lab for determining morphometric

traits. While quantitative metric measurements were taken by a digital caliper, stereo microscope was used for examining the pholidosis characters [15,22]. Later, both specimens were preserved in 96% ethanol.

All mensural, meristic, and qualitative data were recorded for both species [15,22]. The following mensural and meristic characteristics were evaluated for *Eumeces schneiderii*: SVL (Snout to vent length), TL (Tail length), HL (Head length), WH (Width of head), HH (Height of head), LFL (Length of forelimb), LHL (Length of hindlimb), SL4T (Subdigital lamellae under the 4th toe), NSL (Number of supralabials), NIL (Number of infralabials), D (Number of scales in one complete row at midbody), V (Number of ventral scales), EYEL (Eye length), EED (Eye to ear length), NL (Neck length), EYED (Eye diameter), ED (Ear diameter), DHF (Distance between hindlimb and forelimb), SUC (Number of supraciliaries), SUO (Number of oculars).

The following mensural and meristic characteristics were evaluated for *Trapelus ruderatus*: SVL (Snout to vent length), TL (Tail length), HL (Head length) mm, WH (Width of head), HH (Height of head), LFL (Length of forelimb), LHL (Length of hindlimb), SL4T (Subdigital lamellae under the 4th toe), NSL (Number of supralabials), NIL (Number of infralabials), EYEL (Eye length), EEL (Eye to ear length), IN (Internasal nostril), TD (Tympanum diameter), NGS (Number of gular scales), RIHS (Reverse imbrication of head scale).

3. RESULTS

The expedition area is in Yazihan, Malatya Province, Eastern Anatolia, Turkey, 38° 41' N – 38° 10' E and about 950 m elevation. Agamid (*T. ruderatus*) and Scincid (*E. schneiderii*) lizards were found in morning (10.00) and afternoon (16.00) respectively by M.K. Şahin and M. Kurnaz. The air temperature fluctuated between 30-33°C. While *T. ruderatus* was in estivation under stones in a rocky area, *E. schneiderii* was seriously active in a sandy-grassy field. Three plant species were significantly dominating the expedition area: *Tamarix* sp., *Alhagi* sp. and *Xanthium strumarium* (Figure 1). *Ophisops elegans* Menetries, 1832, which was highly abundant, is the sympatric reptile species that shared its macrohabitat with studied ones.



FIGURE 1. General view of the new locality for *E. schneiderii* and *T. ruderatus*

3.1. *Eumeces schneiderii* (Daudin, 1802)

Material: 1 subadult (Figure 2). Here is the measurements of the specimen: SVL 72.18 mm, TL 109 mm, HL 15.34 mm, WH 9.03 mm, HH 7.11mm, LFL 19.14 mm, LHL 29.21 mm, SL4T 14/15 (left/right), NSL 8/7 (left/right), NIL 8/8 (left/right), D 26, V 67, EYEL 4.33 mm, EED 5.67 mm, NL 9.89 mm, EYED 2.71 mm, ED 2.75 mm, DHF 43.88 mm, SUC 4/4 (left/right), SUO 6/6 (left/right).



FIGURE 2. *Eumeces schneiderii* from Yazihan, Malatya

The dominant color of pileus is light brown and this pattern continues to the upper parts of supralabial plates. No dark spots detected on the pileus, but slight red tinges spread out towards the back of dorsalia. While dorsum is light brown, ventralia is spotless and brightly white. The orange band is typical *E. schneiderii* form as it starts from the subocular plates and ends in the back.

3.2. *Trapelus ruderatus* (Olivier, 1804)

Material: 1 juvenile (Figure 3). Here are the measurements of the specimen: SVL 21.75 mm, TL 24.19 mm, HL 8.13 mm, WH 7.44 mm, HH 4.87mm, LFL 12.56 mm, LHL 17.84 mm, SL4T 14/14 (left/right), NSL 11/12 (left/right), NIL 12/13 (left/right), EYEL 2.19 mm, EEL 2.91 mm, IN 4, TD 0.44 mm, NGS 27, RIHS 2.

The head is thick, short and bulging. While dorsalia is well-carinated, tail scales have not been arranged in a ring shaped. The coloration from the head plates to the entire dorsalia has a sandy gray brownish pattern. However, the gular region, where is spotted by gray or blue color in males and pink in females, has not been covered or spotted by any evident colors yet due to its juvenile status [27].



FIGURE 3. *Trapelus ruderatus* from Yazihan, Malatya

4. DISCUSSION

It is well known from the literature that *Eumeces schneiderii* (Daudin, 1802) has been distributed in Southern Anatolia (mostly Southeast, followed by Southwest, East and Central Anatolia). For instance, Bozdağ (İzmir), which hosts the type locality of *E. s. barani*, extend our knowledge about its distribution. The same perspective can be expressed for Eastern populations via Ayaz et al. 2011 study as declaring a new locality from Iğdır province [12]. Except these extreme locality records from this species, it is essential that filling the gaps throughout Anatolia will give us remarkable sights to understand its distribution. This type of information can be used not only to understand its current distribution but also predicting the future with different scenarios by applying ecological niche modelling analysis. The specimen caught in Yazihan, which displays the same morphological and coloration pattern with *E. s. princeps*, will provide a beneficial connection between southeastern and northeastern populations (Figure 4) [15].

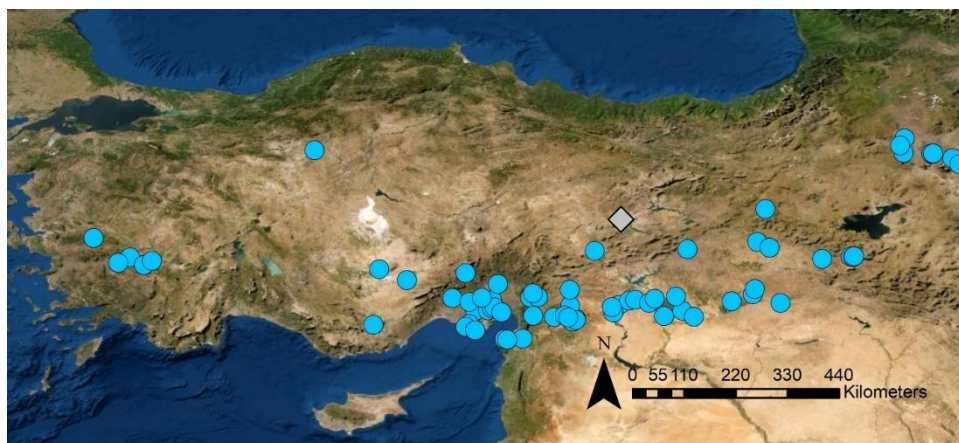


FIGURE 4. Distribution map of *E. schneiderii* in the Anatolian Peninsula (blue circle points are known localities [12,14-17, 20, 23, 26, 28-39]; grey quadrangle is the new one in Malatya)

On the other hand, *T. ruderatus* (Olivier, 1804), which has been distributed in Central and Southeastern Anatolia, has still lack of presence data in the Anatolian Peninsula. The new occurrence data, like our finding in Yazihan, will aid the researchers about to understand its distribution. Because it is such a critical locality between Central and Eastern Anatolian populations (Figure 5). Moreover, it will contribute to developing valuable hypotheses for its niche overlap or similarity with other agamid lizards.

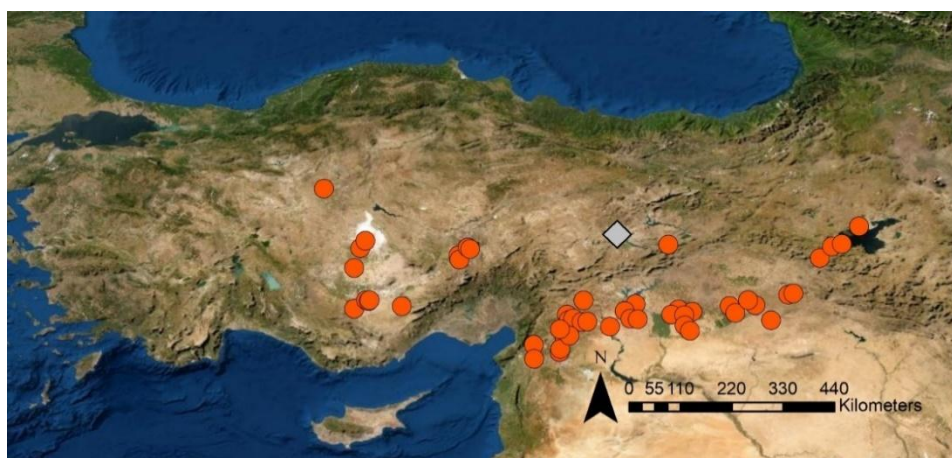


FIGURE 5. Distribution map of *T. ruderatus* in the Anatolian Peninsula (red circle points are known localities [20, 23-26, 28-29, 31-32, 34, 39-46]; grey quadrangle is the new one in Malatya)

Except this ecological niche approach, these novel records may also bring the researchers to a good point to study their phylogeographic history and biogeography of these species via providing an extra locality. Because this locality is in a strategic place on the Anatolian Diagonal [47].

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