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Research Article

Additional records of *Suncus etruscus* (Savi, 1822) (Mammalia: Soricidae) from Southeastern Anatolia, Turkey

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Abstract

The Pygmy white-toothed shrew, *Suncus etruscus*, was reported from especially west and south of Anatolia. Owl pellets obtained from *Asio otus, Athene noctua, Bubo bubo* and *Tyto alba* were collected in different localities from south eastern Anatolia and were analysed. Results show that *Suncus etruscus* had been found at a rate of 1.03 % in mammal remains. In addition, a live sample was captured from Karacadağ near Diyarbakır. These findings are substantially new records for the south eastern part of Turkey.

Keywords: Soricomorpha, *Suncus etruscus,* Owl pellet, Southeastern Anatolia, Turkey.
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Güneydoğu Anadolu'dan *Suncus etruscus* (Savi, 1822) (Mammalia: Soricidae) Kayıtları

Özet

Etrüsk sivrifaresi, Suncus etruscus özellikle batı ve güney Anadolu bölgelerinde kaydedilmiştir. Güneydoğu Anadolu bölgesinin farklı lokalitelerinden toplanan, çeşitli baykuş A*sio otus, Athene noctua, Bubo bubo* ve *Tyto alba*'ya ait peletler incelenmiştir. Kalıntılar içerisinde % 1.03 oranında Suncus etruscus türüne rastlanmıştır. Ayrıca Diyarbakır yakınında Karacadağ'dan bir canlı örnek elde edilmiştir. Bu çalışmanın bulguları Güneydoğu Anadolu bölgesi için yeni kayıttır.

Anahtar Kelimeler: Soricomorpha, *Suncus etruscus,* Baykuş peleti, Güneydoğu Anadolu, Türkiye.

Introduction

The Pygmy white-toothed shrew, *Suncus etruscus* (Savi, 1822) is the smallest known mammal with an average adult mass of less than 2 grams. It is a south Palaearctic species that occurs in countries located around the Mediterranean Sea (Szpunar et al. 2008; Grimmberger et al. 2009; Esmaili et al. 2008). It is dispersed in most of Anatolia, especially in the west and south of Anatolia (Kuş Gölü, Kuşadası, Milet, Kemalpaşa, Bolu, NorşunTepe, Belen, and Adana) (Kock et al. 1972; Obuch 1994). There is only one report (Karadut- Adıyaman) (Kryštüfek and Vohralík 2001) from in the southeastern part of Turkey.

Owl pellet studies are a reliable instrument to investigate an area's small mammals, because it is cheap and shows many results, due to the big open hunting areas of the owls, which feed mostly on small mammals (Amr et al. 1997; Seçkin and Coşkun 2006). Such data is important for research and conservation aims, and is useful for determining the distribution of small mammals (Niethammer 1962).

The aim of this study is to present some new reports of *Suncus etruscus* from the southeastern part of Turkey which have not been given before.

Materials and methods

Owl pellets, which belonged to *Asio otus, Athene noctua, Bubo bubo* and *Tyto alba* were collected in different localities from southeast Anatolia. In total 6 specimens of (skull

and mandible) *Suncus etruscus* samples were found in owl pellets at 5 different localities and a live sample was from Mt. Karacadağ (Fig. 1), located in a dense grassy area under small stones, near a small spring (Yiğityolu Village, Diyarbakır, 37°51'44" N 39°52'25" E, Elevation 1017 m, 27.03.2010) 15 km southwest of Diyarbakır province.

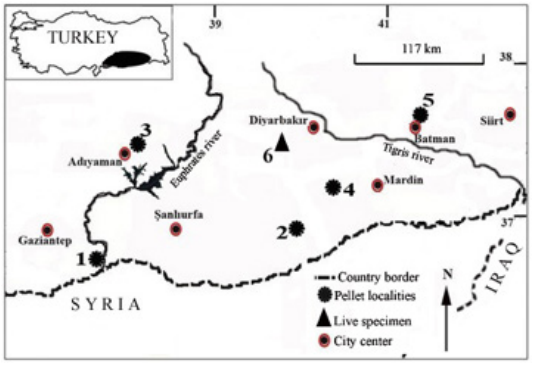

Figure 1. Collection localities (1-Gaziantep-Karkamış, 2-Şanlıurfa-Ceylanpınar-Beyazkule, 3-Adıyaman-Göletli, 4-Mardin-Derik, 5-Batman-Akçaköy, 6-Diyarbakır-Karacadağ).

Barn owl (*Tyto alba*) pellets were collected under the pine trees which were placed each side of Ceylanpınar-Viranşehir road in Şanlıurfa in 2007. The long-eared owl (*Asio otus*) pellets were collected from under the pine and cypress trees at Göletli location in Adıyaman in 2008. The Eagle owl (*Bubo bubo*) pellets were collected from a mosque's minaret in a village in Batman in 2007. The little owl (*Athene noctua*) pellets were collected from two different localities; the first district was in Derik (Mardin) and the samples were found under the pine trees in 2008, the second district was in Karkamış (Gaziantep) and the samples were found under the pine and cypress trees in 2008.

All localities were surrounded by agricultural fields. In total 230 pellets were analysed that belong to *Asio otus* were 24, *Athene noctua* 33, *Bubo bubo* 132 and *Tyto alba* 41 and the remains of *S. etruscus* one, two, one and two were found respectively (Table 1)

Table 1. The pellet numbers of each owl species and remains of *Suncus etruscus*.

Species	Pellet numbers	Remains of *S. etruscus*
Asio otus	24	1
Athene noctua	33	2
Bubo bubo	132	1
Tyto alba	41	2
Total	**230**	**6**

Analyses of the pellets were conducted according to standard procedures (Obuch 1994; 2001; Amr et al. 1997). Each pellet was soaked in water and then teased apart using a pair of forceps and a needle. The skeletal remains and skulls were placed in separate containers for analysis. The identification of the prey was performed using the keys by Yalden (1977), Kryštüfek and Vohralik (2001). The measurements were taken according to Alexander (1996). The measurements considered were; maxillar breadth, least interorbital breadth, upper tooth row length, length of mandible tooth row, height of coronoid process and length of mandible (Table 1). All remains were preserved at Dicle University Science Faculty Biology Department.

Results

Small mammals remains were mostly found in pellets. While rodents had the great majority of mammal remains insectivores constituted 6.93% of mammals' remains (in total 581 remains). *Suncus etruscus* had been found at a rate of 1.03% in mammal remains.

Suncus etruscus is easily recognized in the collection with its remarkable small size and presence of four unicuspid teeth on maxilla (Fig. 2 A and B).

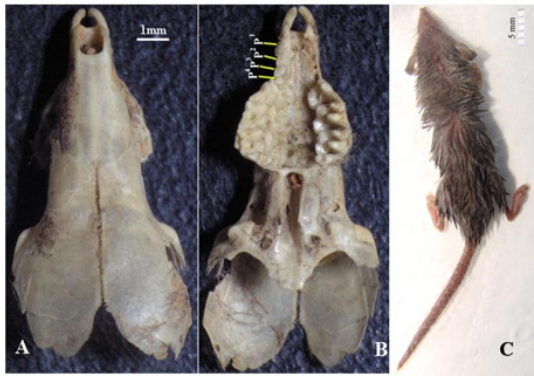

Figure 2. *Suncus etruscus* skulls were obtained from pellets and alive sample (A-Dorsal, B-Ventral view of skull, C- *Suncus etruscus* from Karacadağ-Diyarbakır province, p: premolars).

The numbers of *Suncus etruscus* remains taken from pellets were, Ceylanpınar (n=2), Akçaköy (n=1), Derik (n=1), Adıyaman (n=1) and Karkamış (n=1). In addition, a live sample was found in Diyarbakır (Karacadağ province) (Fig. 2C), therefore, our finding is the first record of a living specimen of this species for the southeastern part of Turkey. Some external and cranial measurements of specimens are given below (Table 2).

Table 2. The measurements of *Suncus etruscus* (n: Specimens, Min: Minimum, Max: Maximum, X: Mean, SD: Standard Deviation, *: Live sample body measurements).

Characters	n	Min-Max	X ± SD	Harison and Bates (1991)	Grimmberger et al. (2009)	Esmaili et al. (2008)	Spitzenberger (1970)	Contoli et al. (2000)	Kryštüfek and Vohralik (2001)
Total length	1*	63-63	63±0	69.7	57-85	71	67-70	---	75.1
Tail length	1*	24-24	24±0	26.0	21-31	30	25-26	---	26.1
Hind foot length	1*	6.8-6.8	6.8±0	7.4	5.7-83	8.5	8.05-8.3	---	7.9
Ear length	1*	4.35-4.35	4.35±0	5.0	4.0-6.2	---	---	---	---
Maxillar breadth	5	3.5-3.97	3.75±0.20	3.5	---	---	---	3.86-4.06	---
Least interorbital breadth	4	2.69-2.92	2.81±0.09	2.8	---	---	---	---	---
Width across I1-I1	3	1.17-1.29	1.21±0.07	---	---	---	---	---	---
Breadth of zygomatic plate	5	0.45-0.58	0.51±0.05	---	---	---	---	---	---
Breadth at M2-M2	5	3.56-3.96	3.75±0.14	---	---	---	---	---	---
Breadth at U4-U4	5	1.4-1.68	1.54±0.13	---	---	---	---	---	---
Breadth at U1-U1	5	1.1-1.41	1.28±0.13	---	---	---	---	---	---
Length of unicuspid tooth row	5	1.25-1.7	1.41±0.19	---	---	---	---	---	---
Length of P4-M3	5	2.68-3.1	2.84±0.16	---	---	---	---	---	---
Width of upper condylar facet	5	0.4-0.58	0.48±0.07	---	---	---	---	---	---
Width of lower condylar facet	5	0.7-0.97	0.88±0.11	---	---	---	---	---	---
Greatest condylar depth	5	1.25-1.35	1.28±0.04	---	---	---	---	---	---
Upper tooth row length	5	1.3-4.38	3.65±1.32	5.2	---	---	---	---	---
Length of mandiblar tooth row	6	2.9-3.2	3.08±0.14	4.8	---	---	---	---	---
Height of coronoid process	5	2.82-3.09	2.97±0.11	---	---	3.1	---	2.85-3.04	3.06
Coronoid process-condylar length	5	1.9-2.4	2.21±0.21	---	---	---	---		---
Length of mandible	5	5.75-6.2	6±0.19	7.5	---	---	---	6.31-6.80	---

Discussion

In pellet analysis, the assemblages were composed mostly of small mammals (Amr et al. 1997; Seçkin and Coşkun 2005; 2006). Pellet analysis showed that Insectivora species were taken by owls (Rifai et al. 1998; Bates and Harrison 1989; Shehab 2005) these findings have confirmed previous study in the region (Seçkin and Coşkun 2006). In the *Asio otus* pellets taken from Diyarbakır, insectivores were found at a ratio of 4.52%, but there were no *Suncus etruscus* remains (Seçkin and Coşkun 2006). But, *Suncus etruscus* remains were reported from Syria and Iraq by Nadachowski et al. (1990). Living samples of *Suncus* species have not been captured or monitored in this area by that time, but the study shows that the analysis of regurgitated pellets of Long-eared Owls is a vaulable tool for inventorying small mammals. We assume that the absence of the *Suncus etruscus*

records before in that area, because of the limited studies on this species, an insufficient number of pellet analysis and having pellets were belong to only one owl *(Asio otus)* species.

It was recorded that *Suncus etruscus* consisted 3.2% of pellet remains in Syria (Shehab and Al Charabi 2006). Cecere and Vicini (2000) reported the number of *Suncus etruscus* in pellet components was quite poor in Italy. While Niethammer (1989) found the rate of *Crocidura suaveolens* remains was 4.5 times higher than *Suncus etruscus* remains. The *Suncus etruscus* remains were found lower than in Syria given by Shehab and Al Charabi (2006). It may depend on the population density, the agricultural land involved and the different owl species in the study area.

The external measurements given by Harrison and Bates (1991), Grimmberger et al. (2009) and Kryštüfek and Vohralik (2001) are similar to our living sample of Diyarbakır (Table 2). However maxillary breadth, length of mandible and upper tooth row values is smaller than measurements given by Harrison and Bates (1991) and Contoli et al. (2000). Coronoid process height is similar to Esmaili et al. (2008), Contoli et al. (2000) and Kryštüfek and Vohralik (2001) that have reported previously.

In the study it was observed that the rate of insectivores was higher than Seçkin and Coşkun (2006) in pellets of *Asio otus*, but lower than Shehab and Al Charabi (2006) and *Suncus etruscus* remains were detected in *Tyto alba*`s pellets. It was seen that the ratio of these remains consisted 1.03% of small mammal remains.

In the south eastern Anatolian Region, in total 7 samples from 6 different localities were recorded for this species. The fact that these localities were dispersed in the region showed the common distribution of this species and that the frequency of its presence was higher than estimated. The situation of *Suncus etruscus* in the region should be further studied by using different methods and the density of population in other cities of the region should be investigated.

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