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The Morphology of *Vipera ammodytes transcaucasiana* (Reptilia, Viperidae) Specimens Collected from Murgul (Artvin, Turkey)

Bilal KUTRUP
Karadeniz Technical University, Science Faculty, Biology Department, Trabzon–TURKEY

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Abstract: The morphological characteristics and distribution of *Vipera ammodytes transcaucasiana,* which is a member of the *Vipera kaznakovi* group, were studied. The transcaucasian horned viper specimens were captured from Murgul, Artvin, in Turkey.

This species differs from all other vipers in the Near and Middle East in respect of its pronounced horn. It is similar to *Vipera pontica* in the greenish–yellowish tip of the tail, but differs in having more apicals.

Key Words: Reptilia, Squamata, Viperidae, *Vipera ammodytes transcaucasiana,* Erenköy, Morphology.

Murgul (Artvin)'dan Yakalanan *Vipera ammodytes transcaucasiana* (Reptilia, Viperidae)'nın Morfolojisi

Özet: Bu çalışmada *Vipera kaznakovi* grubunun bir üyesi olan *Vipera ammodytes transcaucasiana*'nın morfolojik karakterleri ve yayılışı araştırılmıştır. Boynuzlu engerek olarak bilinen *Vipera ammodytes transcaucasiana* örnekleri Artvin iline bağlı Murgul ilçesinden yakalanmıştır.

Bu engerek oldukça belirgin boynuzu ile yakın ve orta doğudaki engerek türlerinden farklıdır. Kuyruk ucunun sarımsı yeşil olması ile *Vipera pontica*'ya benzer fakat apical sayısının daha fazla olması ile ondan ayrılır.

Anahtar Sözcükler: Reptilia, Squamata, Viperidae, *Vipera ammodytes transcaucasiana,* Erenköy, Morfoloji.

Introduction

The first study of zoogeographic and systematic characteristics in Turkish vipers was conducted by Başoğlu (1). Further studies have been carried out by Baran (2), Başoğlu & Baran (3), Tuncer (4), Böhme & Joger (5) and Tok & Kumlutaş (6).

The first report of *Vipera ammodytes transcaucasiana* in Turkey was from the vicinity of Borçka, in the provence of Artvin (7). Eiselt & Baran (8) described two viper specimens from Kösedağ, near Zara, in the province of Sivas, as *Vipera ammodytes transcaucasiana*. Nilson & Andren (9) reported this taxon from Ordu, Zonguldak, Adapazarı and Konya. Teynie (10) stated that a specimen caught in the İstanbul area resembled *Vipera ammodytes transcaucasiana.* Tok & Kumlutaş (6) described a specimen of *Vipera ammodytes transcaucasiana,* which was caught in Perşembe (central Black Sea region).

Recent studies of the systematics of vipers in the Caucacus region have shown that the taxonomy of these species is rather complex. It has been reported that there are two viper groups in this region, *Vipera kaznakovi,* and *Vipera ursini* (11, 12, 13). *Vipera ammodytes transcaucasiana* has been shown to be an important species in the *Vipera kaznakovi* group in north-eastern Turkey and the adjacent Transcaucasia region since 1990 (14).

To date there have been few *Vipera ammodytes transcaucasiana* specimens caught in the province of Artvin. The first specimen in the region was examined by Derjugin (7). Then, Nilson (9) reported that he saw one *Vipera ammodytes transcaucasiana* in Borçka in 1988.

It can be concluded that there has been little substantial research carried out on *Vipera ammodytes transcaucasiana* in the eastern Black Sea region, and only a few specimens have been caught in this region. The aim of this study was to define new locations and to capture more *Vipera ammodytes transcaucasiana* specimens.

Material and Method

This research was predominantly a study of external morphology. Field trips were conducted in different parts

of Artvin, Rize and Trabzon. A total of two *Vipera ammodytes transcaucasiana*, one male and one female, were collected in the period 1996-1997. The male was caught at midday in a hazelnut orchard in July 1996 and the female was caught in the same area close to the hazelnut orchard in June 1997. The hazelnut orchard is in Erenköy, near Murgul, a village 44 km away from Artvin (Turkey).

During the capture of the two vipers, the male was injured. Pattern and coloration characteristics were recorded while the animals were alive. In addition, colour and black and white slides were taken. Then, the specimens were anaesthetised and fixed with an injection containing a mixture of 50% ethanol and 10 % formalin. The male and female specimens were preserved in the Department of Zoology in Karadeniz Technical University (Trabzon). In terms of morphological measurements, the tail length and total length of the two specimens were measured. In addition, the number of ventrals, subcaudals, anterior and mid-body dorsal scale rows, apical scales, canthals, circumoculars, sublabials, crown scales (intercanthal+intersubraoculars), loreals and dorsal zig-zag bands were counted. The division of the parietal and frontals, and the colour of the dorsal and ventral sides were determined according to the method described by Nilson & Andren (9).

Diagnosis

The species *Vipera ammodytes transcaucasiana* belongs to the Caucasus species group and has a partial fragmentation of the frontal and parietal and has an upturned horn. In terms of these characteristics, it differs from all other vipers in the Near and Middle East. The adult male examined in the present study had a total length of 395 mm and a tail length of 45mm (11.4% of the total length), while the total length of the female was 548mm and the tail length was 55mm (10.0% of the total length). Both vipers were found to have two supraoculars and canthals. They also had 10 circumoculars on each side. The apicals were raised to form the pronounced horn. The rostral index was bordered by two supralabials, two prenasals and three apicals.

The specimens had 8-12 apicals in contact with the rostral, 44-49 intercanthals and intersupraoculars, 154-157 ventrals, 34-38 subcaudals, 9-12 subralabials, 9-10 sublabials, 6-7 loreals, 25-27 dorsal scales of the neck, 20-21 mid-body scales and 17 posterior scales.

As can be seen in Table 1, the female differed from the male in terms of having a longer tail (55mm instead of 45mm), and a smaller number of scales (34 instead of 38) and apicals (8 instead of 12). Furthermore, the female had a higher rostral index (1.56 instead of 1.33). The other characteristics were similar to each other.

The dorsal pattern was dark brown in the male and light brown in the female. The black bordered zig-zag band extended along the dorsum with a total of 50-51 turns in the male and 50-55 turns in the female (Figure 1, 2). The ventral colour of the female was light brown with a larger number of orange speckles. White spots extended along the chin and lateral area on each side of the body in the male.

As Figures 1 and 3 show, the male was identical to the female in having two dark brown lines in the shape of the letter 'M' on the head, a big beige earth-coloured stain on the neck and a greenish-yellowish tip on the tail with a black ventral colour.

Discussion

To date, *Vipera ammodytes transcaucasiana* has been known as the transcaucasian viper, and has been reported in different regions of Turkey. However, recent studies *of*

Table 1. Morphology in *Vipera ammodytes transcaucasiana*

Characters	Male	Female
Tail length (mm)	45	55
Total length (mm)	395	548
Ventrals	154	157
Subcaudals	38	34
Greenish–yellowish colour of tail	16	19
Dorsal scale row: neck	27	25
mid–body	21	20
posterior	17	17
Rostral index	1.33	1.56
Apicals	12	8
Canthals	2	2
Supralabials	12–12	9–10
Sublabials	9-9	10–10
Supraoculars	2–2	2–2
Circumoculars	10–10	10–10
Loreals	7–7	7–7
No. of turns in zig zag band (total)	50–51	50–55
No. of turns in zig zag band (body)	47	49
Intercanthals and intersupraoculars	44–48	49

Figure 1. Dorsal view of an adult male.

Vipera ammodytes transcaucasiana in Turkey have shown that specimens caught from Istanbul, Adapazarı, Bursa and Kuşadası did not belong to the species *Vipera ammodytes taranscaucasiana.* They were more similar to *Vipera ammodytes meridionalis* or *Vipera ammodytes montandani* (6).

Although this subspecies was reported by Nilson (9) in his study carried out in the central Black Sea area, Baran did not mention it in his study conducted in the same region. In recent years, Tok & Kumlutaş (6) captured a specimen of *Vipera ammodytes transcaucasiana* from Perşembe (central Black Sea region). Accordingly, we thought that *Vipera ammodytes transcaucasiana* could be found throughout the eastern Black Sea region. For this reason, the research area was extended towards the west of Çoruh Valley.

Within the area covered by the study, it was only Çoruh Valley (from the village of Murgul, Erenköy) where specimens of *Vipera ammodytes transcaucasiana* were found. The main shelter for this subspecies was hazelnut orchards which are common to all the regions along the Black Sea coast. However it was determined that the drier habitat of Erenköy is better suited to *Vipera ammodytes transcaucasiana* than the habitat in Trabzon and Rize, which have a more humid climate. *Vipera ammodytes transcaucasiana* does not like a humid climate, like *Vipera kaznakovi.*

Vipera ammodytes transcaucasiana has a pronounced horn on the snout, and this is a distinguishing characteristic for the different forms of *Vipera ammodytes*. Similar head morphology is also found in *Vipera pontica* and *Vipera darevskii,* but *Vipera*

Figure 2. Dorsal view of an adult female.

ammodytes transcaucasiana is identical in terms of its long horn. The snout shape seems to be an evolutionary trait that is more pronounced in this viper than is normally found in Caucasian viper populations. Table 2 shows that the Erenköy specimens had a pronounced horn similar to the Borçka specimen. There was no mention of the upturned snout in the Perşembe specimens, but the Sivas specimens hade 2 or 3 scales in front of the pronounced horn (2). The number of scales in the same area in the Erenköy specimens were: 2 in the female and 3 in the male, as in the Sivas specimens. The Perşembe specimens show similarities to the Erenköy specimens in terms of rostral index. However, The Perşembe and Sivas specimens had lower ventrals than

Table 2. Variation in scalitions characters in different isolated populations of *Vipera ammodytes transcaucasiana*.

Locality	Ventrals	Subcaudals	Crawnscales	Loreals	Apicals	Canthals	Rostral index	Sublabials
Borçka*	150–162	36–39	45–58	6–7	10–12	1–1.5	–	–
Erenköy	154–157	34–38	44–48	7–7	8–12	2–2	1.33-1.56	9-10
Perşembe	150–153	33–37	–	-	-	-	1.28	11–11
Sivas	150–154	37–39	-	-	-	-	1.30–1.50	11–11

(*) Billing et al. (14).

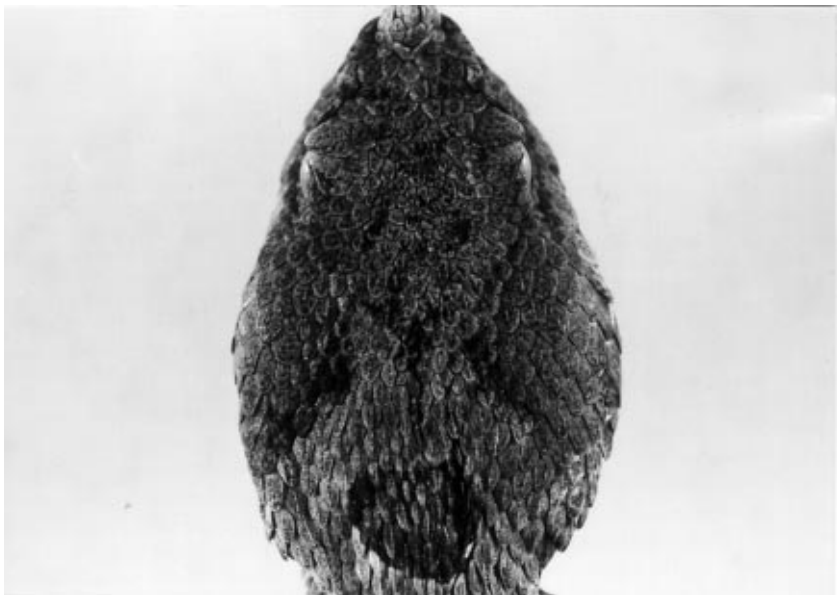

Figure 3. Dorsal view of the head of an adult male.

the Erenköy and Borçka specimens (Table 2). Thus, the Erenköy and Borçka specimens are quite alike in terms of these characteristics.

It is essential that more studies be carried out in order to determine the distribution of this viper in Turkey. Since there still are some questions left unanswered, we think it is necessary to continue work on this topic in order to obtain a more comprehensive picture of the issue discussed in this paper.

Unlike *Vipera kaznakovi, Vipera ammodytes transcaucasiana* is not under protection. As a result, it is in danger, because foreign tourists have started to come to the Çoruh Valley to collect specimens.

Finally, the vipers in the Çoruh valley, especially *Vipera ammodytes transcaucasiana,* should be studied in more detail and placed under protection like *Vipera kaznakovi.*

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