

## On the Distribution and Morphology of the Steppe Viper, *Vipera eriwanensis* (REUSS, 1933), from Gavur Mountain (Gümüşhane)

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**Abstract:** *Vipera eriwanensis* (Reuss, 1933), known only from the localities of the eastern Aras River in Turkey, was morphologically examined and compared with the related species on the basis of one additional specimen from Gavur mountain (province Gümüşhane), situated outside the known localities. This information changed our knowledge of the total distribution of *V. eriwanensis*, clearly showing that this taxon has expanded its range at least 210 km to the west in eastern Turkey. Furthermore it differs from *V. eriwanensis* reported from Turkey, Armenia and Azerbaijan in having a lower number of mid-body scales and loreals, and a higher number of crown scales.

**Key Words:** *Vipera eriwanensis*, distribution, morphology, northeastern Turkey

### Gavur Dağından (Gümüşhane) Yakalanan Bozkır Engereğinin, *Vipera eriwanensis* (REUSS, 1933), Dağılımı ve Morfolojisi Üzerine

**Özet:** Türkiye'de *Vipera eriwanensis*'in bilinen lokaliteleri yalnızca Aras nehrinin doğusunda yer almaktadır. Bu lokalitelerden oldukça uzakta, Gavur Dağından (Gümüşhane) yakalanan yeni bir *V. eriwanensis* örneği morfolojik olarak incelenmiş ve benzer türlerle karşılaştırılmıştır. Bu bilgi bozkır engereği (*V. eriwanensis*)'nin Türkiye'deki total dağılımının bilinen lokalitelerden yaklaşık 210 km batıya doğru genişlediğini göstermektedir. Ayrıca, yakalanan bu yeni örnek daha önce Azerbaycan, Ermenistan ve Türkiye'den rapor edilen örneklerden dorsal pullarının ve yanak bölgesindeki plakların sayısının düşük olması, ve crownscalenin daha yüksek olması ile farklılık göstermektedir.

**Anahtar Sözcükler:** *Vipera eriwanensis*, yayılış sahası, morfoloji, Kuzey Doğu Anadolu

### Introduction

*Vipera eriwanensis* (Reuss, 1933) was first described from the vicinity of Erivan (at 2000 m altitude) as *Renardi eriwanensis* (Reuss, 1935). The description was based on one specimen. Although different individuals were later reported by Reuss (1935) they are now lost, and the description is short and not exclusive for the Ursini complex.

This taxon had also been formerly referred to as *Vipera ursini renardi* (Kramer, 1961) and *V. ursini ebneri* (Saint Girons, 1977), but Joger (1984) pointed out that there is no doubt about Reuss' identification although his steppe specimens are lost. He also said that no similar viper inhabits the Erivan area. Finally, Höggren et al. (1993) recognized the difference in marking from the

above-named species and they regarded *V. eriwanensis* as a distinct species.

The steppe viper, *Vipera eriwanensis*, is widely distributed in most mountain areas of Azerbaijan (Aliev and Ganiev, 1985), but several specimens were reported in Armenia at the mountain border with Azerbaijan (Chernov, 1939; Nilson et al., 1994), on the Karabakh plateau (2000-3000 m altitude) and near the Kanligel Nakhitshevan lakes (2500 m altitude) (Alekerov, 1982). Its distribution was expanded to eastern Turkey (Kars) (Baran, 1976; Başoğlu and Baran, 1980; Joger, 1984; Tenyie, 1987; Nilson et al., 1995; Baran and Atatür, 1998; Nilson et al., 1999). Nilson and Andren (2001) have recently compiled locality records, which indicate that the northern limit of this viper's range runs to the

Aras River in Turkey. Furthermore, the single specimen from Palandöken mountain (south of Erzurum) (Eiselt, 1976) shows that this viper is extending its range north of the Aras River. However, this locality is not clearly agreed upon because the specimen is damaged.

The new specimen belonging to *Vipera eriwanensis* from Gavur mountain (2600 m altitude) extends the known range of this species north of the Aras River, and this paper aims to have a broad perspective including morphological characters and distribution. The locality is far from the known localities of *V. eriwanensis* (210 km from the nearest locality, Palandöken, and 320 km from other locality, Sarıkamış) and located very near the southwest border of Trabzon and Gümüşhane.



Figure 1. Habitat of *V. eriwanensis*, Gavur mountain, NE Turkey.

### Materials and Methods

A male, total length 286 mm, tail length 43 mm, was collected on Gavur mountain (30° 10' N, 40° 22' S) situated in northeastern Turkey, province Gümüşhane, on 22 September 2003. This habitat, mostly at 2600 m altitude, was similar to areas inhabited by the Armenia and Kars *eriwanensis* and can be characterized as alpine steppe (Figure 1). In most places, it was sympatric with *Coronella austrica* and *Rana macrocnemis*. This specimen was preserved in the Department of Zoology at Karadeniz Technical University.

The new material was compared with *Vipera eriwanensis*, which was reported from Armenia, Azerbaijan plateau and eastern Turkey (Kars), but not with the specimen from Palandöken due to insufficient data in the literature. We also compared our specimens with related taxa (*V. renardi* and *V. anatolica*) (Table).

### Results and Discussion

This viper is remarkable in being similar in head shape, scalation and color pattern to *Vipera eriwanensis*, but it differs in having fewer mid-body dorsal scales (19 (20) instead of 21–22 in *V. eriwanensis*) and more crown

Table. Scalation characters of the Gavur mountain viper specimen and of the other related males of the taxa (from Nilson and Andren, 2001).

Characters	Gavur	<i>V. eriwanensis</i>	<i>V. renardi</i>	<i>V. anatolica</i>
Ventrals	129	133-143	141	114-124
Subcaudals	34	32-39	28-38	19-23
Crown scales	18	9-16	7-18	11-17
Loreals*	5 (2-3)	5-18	4-12	6-12
Apicals	1	1.26	1	1
Supralabials*	16 (8-8)	17-20	14-18	14-18
Circumocular*	18 (9-9)	17-25	16-21	16-20
Dorsal scale rows				
Neck:	21	21-22	21	17-21
Mid body:	19 (20) 21-22	19-21	19	
Posterior:	17	16-18 17	16-17	
Rostral index	1.14	0.79-1.67	0.91-1.32	0.87-1.50
Zig-zag bands	70	54-78	50-72	34-42

(\*) Counted as sum of both sides

scales (18 instead of 9-16). It also has lower loreal counts (2-5 instead of 5-18 in *V. eriwanensis*) (Table ), (Figures 2, 3).

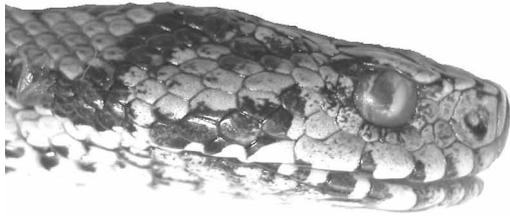


Figure 2. Lateral view of the head of *Vipera eriwanensis*.

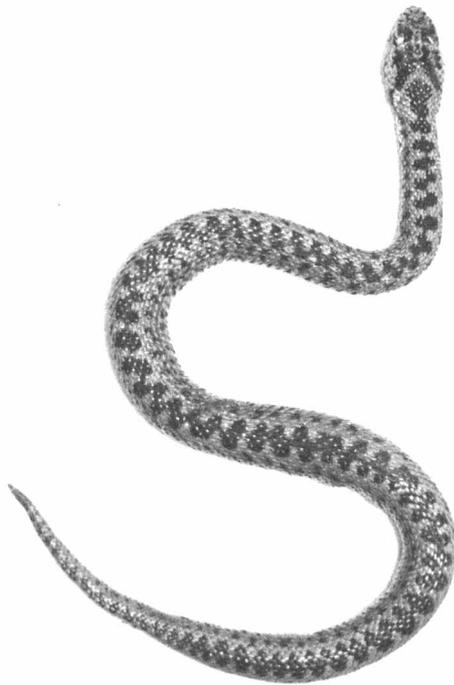


Figure 3. Dorsal view of *Vipera eriwanensis*

This sample has in early reduction of 21 to 19 dorsal scale rows at the level of ventral 9, and it is similar to *Vipera anatolica* (Nilson and Andren, 1997) in this respect, while *V. eriwanensis* has a scale reduction from 21 to 19 at ventral 97 (Nilson et al., 1999). Interestingly we observed 20 scale rows between ventrals 40-48 and 50-52, and this indicates increasing of the dorsal scale rows between these ventrals except for the 49th ventral (19). In contrast, 19 or 20 scale rows were not reported at the mid-body of *V. eriwanensis* (21-22). On the other

hand, the reduction from 19 to 17 dorsal scale rows on the posterior part of the body begins at ventral 101, and this reduction is similar to that in highland populations of *V. renardi* and *V. eriwanensis*. This result indicates that the reductions of dorsal scale rows show high variance and no overlap among the *V. eriwanensis* population as with other highland taxa, and this character is not purely phenotypic adaptation due to environmental conditions as stated earlier by Nilson and Andren (2001).

The number of intercanthals and intersupraoculars found 18 and shows a higher degree of fragmentation as in the eastern *Vipera renardi* (Höggren et al., 1993; Nilson et al., 1995). We observed one large frontal on the top of the head as in *V. eriwanensis* but the parietal was well fragmented and consisted of a small inter parietal plate, as in *V. renardi* (Figure 4). In contrast, *V. eriwanensis* has an unfragmented parietal (Nilson et al., 1999). It also differs from *V. eriwanensis* in having 3 equal plates, which separate the frontals from the supraoculars.



Figure 4. Dorsal view of the head of *Vipera eriwanensis*.

Furthermore, it differs from some Turkish *eriwanensis* populations such as Kanlıgel and Asbua in having one large apical. It was stated that in the total Turkish sub-sample 36.4% have 2 apicals (Tenyie, 1987; Nilson et al., 1995, 1999), and the Armenia populations at Ara-Iler and Yereva-Sevan also have fragmentation of specimens with 2 apicals (25%) (Alekerov, 1982). As stated by Nilson and Andren (2001), this character shows a certain geographic variation in *V. eriwanensis* populations.

It was stated that the external morphology in the *Vipera eriwanensis* populations was rather constant and symmetrical, indicating a high level of heterozygosity because of a high population density (Nilson and Andren, 2001). They also reported that a certain variation among *V. eriwanensis* populations could be seen in the shape of the rostral plate.

The addition of one new specimen from Gavur mountain shows that the external characters among *Vipera eriwanensis* populations vary not only in the rostral plate shape but also in the shape of parietals, dorsal scale rows reduction, and number of loreals and apicals. Our sample is similar to the eastern population of *V. renardi* in having a high number of crown scales (18), whereas the ventral counts of this specimen do not fall within the range of *V. renardi* (129 instead of 141 in *V. renardi*). The similarity and possible relation between *V. eriwanensis* and *V. renardi* was also discussed by Joger et al. (1992), Nilson et al. (1994) and Nilson and Andren (2001). Their analyses, based on immunological, biochemical and cladistic studies show genetic similarities between *V. eriwanensis* and the high land population of *V. renardi*. Our results are in line with these results.

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Although our sample was largely similar to *Vipera eriwanensis* from Ara-Iler, Armenia (Nilson et al., 1999) in terms of the color pattern, there was a minor difference in the dorsal pattern, in which 2 dark elongate bands in the parietal region were in contact with the lateral stripes not with the dorsal bands on both sides (Figure 2).

Previous studies (e.g., Baran, 1976; Başoğlu and Baran, 1980; Aliev and Ganiev, 1985; Tenyie, 1987; Baran and Atatür, 1998; Nilson and Andren, 2001) showed that the range of this taxon is restricted to the Armenian plateau, western Azerbaijan and eastern Turkey (Kars and Erzurum provinces). The additional material from Gavur mountain indicates that this viper is expanding its range at least 210 km to the west in northeastern Turkey, and this locality is very close to some localities of *Vipera barani* inhabiting the subalpine mountain belts situated at the southern border of Trabzon and Gümüşhane provinces (Kutrup, 2003).

It is of great importance to perform more studies focusing on the steppe viper, *Vipera eriwanensis*, to obtain detailed information about the morphological variation and distribution in Turkey. It is also necessary to focus on the protection of this viper in this locality because of the conflict with agriculture, especially cattle raising.

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