

Additions to the distribution of *Vipera eriwanensis* (Serpentes: Viperidae) in Transcaucasia, with comments on the identity of vipers in northeastern Azerbaijan

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The range of the Armenian Steppe Viper, *Vipera eriwanensis* (Reuss, 1933) encompasses the greater part of the Armenian Plateau in Armenia, northeastern Turkey and western Azerbaijan, including the Karabakh Plateau and Nakhichevan (Alekperov, 1978; Aliev and Ganiev, 1985; Orlov and Tuniyev, 1990; Nilson et al., 1995; Nilson and Andr n, 2001; Baran et al., 2005; Tuniyev et al., 2009; Tuniyev et al., 2011; Arakelyan et al., 2011; Vedmederja, unpubl. data). While the presence of *V. eriwanensis* in southern Georgia was indicated in a single paper (Vedmederja, Orlov and Tuniyev, 1986), the record has been neglected in all subsequent publications.

During recent external morphological analyses of vipers located in the herpetological collection of the Museum of Nature at Kharkiv National University (further MNKhNU) and Institute of Zoology of the Azerbaijan National Academy of Sciences (further IZ), several specimens of *V. eriwanensis* were discovered which considerably extend the distribution of this species. A standard list of morphological characters (Nilson, Andr n, 2001) was used to measure and identify specimens.

A ruler and digital caliper were used to perform measurements. We herein present the new records in combination with natural history remarks, and comment on morphology and distribution of *V. eriwanensis*.

Firstly, seventeen *Vipera* specimens collected in 1976-1977 near the villages of Khartsakhi (41.240 N, 43.271 E, 10 specimens) and Khaveti (41.282 N, 43.232 E, seven specimens), Akhalkalaki district, Georgia (Fig. 1) (inventory numbers MNKhNU G-149 and G-1329; Vedmederja et al., 2007) were assigned to *V. eriwanensis*

(Fig. 2). As indicated on the original labels, two females (MNKhNU G-1329) gave birth to a total of 7 juveniles on respectively the 9th and 27th of October 1977. The juveniles are characterized by an average body length of 107.7 (range 100-113) mm and an average tail length of 14.3 (range 11.5-16.5) mm. Additionally, a female stored as MNKhNU G-149 gave birth to 6 newborns on the 9th of October, 1976. An further specimen originating from Madatapa Mountain near the village of Yefremovka, Ninotsminda (former Bogdanovka) district, Georgia (41.20 N, 43.78 E, MNKhNU 29044) was also attributed to *V. eriwanensis*. The specimen was collected on 3.07.1975 by V. I. Vedmederja, and initially identified as *Vipera darevskii* (Vedmederja, Orlov and Tunijev, 1986; Vedmederja et al., 2007). Earlier, individuals from the aforementioned localities and the vicinity of Dzeveli in the district of Aspindza and Borzhomi (Georgia) were attributed to *Vipera ursinii renardi* (Bakradze and Vedmederja, 1979) as at the time of publication *V. eriwanensis* was considered to be a synonym of the former. As the herein described localities of *V. eriwanensis* in the Georgian Akhalkalaki and Ninotsminda districts are bordering with the known range of the species, and both are situated on the Armenian Plateau, the presence of *V. eriwanensis* in Georgia could be expected and is not remarkable.

Secondly, we encountered twelve vipers of the *V. ursinii-renardi* complex (Fig. 3) collected in 1937-1976 in north-eastern Azerbaijan i) in the vicinity of town of  amaxi (40.633 N, 48.640 E; Fig. 1) and ii) near Demirchi village (1500 m a. s. l), located twenty kilometers to the north of  amaxi, which due to broad morphological congruence were tentatively assigned to *V. cf. eriwanensis*. Their inventory numbers are MNKhNU 27070 (leg. A. P. Boguslavskiy), MNKhNU G-148 (leg. A. Broido, V. I. Vedmederja, and I. Vlasyuk) and IZ 92, 94, 102, 103, 106-111.  amaxi is completely isolated from the range of *V. eriwanensis* which corresponds to the Armenian Plateau, and from the distribution of *V. (e.) ebneri* in the Talysh Mountains

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Table 1. Morphological description of *Vipera erivanensis* (Reuss, 1933) from Georgia and Azerbaijan

	Akhalkalaki district, Georgia				Madağara Mts, Georgia		Şamaxı, Azerbaijan (* original labels contains in addition Demirci village as collection point)											
	Fem.	Fem.	Fem.	Fem.	Male		Fem.	Fem.	Fem.	Fem.	Fem.	Fem.	Fem.	Fem.	Fem.	Fem.	Male	Male
Sex																		
Inventory number	G-1329	G-1329	G-1329	G-1329	G-29044		27070	G-148	92	94	102	103	106	107	108	109	110	111
Length, L., mm	360	380	380	390	302		345	320	274	280	303	310	315	307	227	185	290	145
Tail length, L.cd., mm	39	37	19	46	36		37	35	31	35	35	36	37	35	26	28	36	22
Number of Preventrals	2	1	1	2	3		1	3	2	2	1	1	1	2	2	3	2	2
Number of Ventrals	139	137	141	140	133		129	132	135	133	139	134	137	133	136	133	141	135
Number of subcaudals, S.cd.	27	23	25	29	28		25	24	28	26	26	27	27	26	25	32	29	34
Number of midbody dorsal scale rows, Sq	21	21	21	21	21		21	21	21	21	21	21	21	21	21	21	21	21
Number of Supralabials, Lab.	9/9	9/9	9/9	9/8	9/9		9/9	9/9	9/9	9/9	9/9	9/9	9/9	9/9	9/9	9/9	9/9	9/9
Number of Sublabials, S. lab.	10/10	9/10	10/10	10/10	10/11		10/10	11/12	9/11	11/11	11/11	11/12	10/10	10/10	10/10	10/10	10/10	10/10
Number of scales in circumocular ring, C. oc.	9/9	8/8	10/9	10/10	10/11		9/9	10/10	10/10	9/10	11/11	10/10	8/10	9/8	9/10	9/10	9/8	7/9
Number of Loreals, Lor.	3/4	3/4	4/5	3/4	5/5		5/5	6/7	5/4	5/5	5/5	6/6	3/5	3/3	7/6	5/5	5/5	4/4
Upper Preocular in contact with nasals	yes/ye	no/no	no/no	no/no	no/yes		no/no	yes/yes	yes/yes	no/no	no/no	no/no	yes/no	yes/yes	no/no	yes/yes	no/no	no/no
Number of apical plates	1	1	1	1	1		0	1	1	1	1	1	1	1	1	1	1	1
Sum of intercanthals and intrasupraoculars	8	12	15	11	13		6	15	14	14	14	15	15	10	14	14	13	11
Number of windings in dorsal zigzag band	67	57	70	64	67		57	55	46	51	56	61	53	50	57	53	62	-

in southeastern Azerbaijan and the Elburs Mountains in northern Iran (Aliev and Ganiev, 1985; Nilson and Andr n, 2001; Arakelyan et al., 2011; Fig. 1) by the vast semi deserts comprising the Kura-Araksian Lowland and the Shirvan Steppe. Additionally, the locality is separated from steppe vipers located at the

northern macroslope of the Greater Caucasus (*Vipera lotievi*, *V. renardi*) by a large area along the easternmost spurs which seems to be devoid of *Vipera* spp. (Aliev and Ganiev, 1985; Alekperov, 1978; Fig. 1). Certain absence of *Vipera* ssp. from this region however cannot be concluded due to a general lack of distribution data.



Figure 1. Distribution of vipers of the *Vipera ursinii-renardi* complex in the Caucasus. ● – known localities; □ – new localities of *V. eriwanensis*: 1 – Khartsakhi and Khaveti, 2 – Madatapa Mt., 3 – Şamaxı.

Therefore, a contact zone between these taxa might exist. Habitats of *V. cf. eriwanensis* near Şamaxı consist of pastures bordered by dry steppe slopes interspersed by shrubs and stony outcrops on low slopes north-west of the town, between 800 and 1000 m a. s. l. (Fig. 4).

The color pattern of the studied individuals is similar to that of *V. eriwanensis*, *V. (e.) ebneri* and eastern

populations of *V. lotievi*: dorsal surface yellow-greyish or yellow-brown; underside usually light colored and supralabials without black sutures; two external light rows of dorsal scales; wide light strips between the eye and edge of the mouth (Fig. 3). In some of formalin fixed specimens from the IZ an ocellated frontal spot (characteristic for *V. lotievi*) is visible, which is also present in the MNKhNU G-148 specimen. The specimens from Şamaxı differ from typical *V. eriwanensis* by a lower number of zigzag windings (54.6 ± 1.4 , $n=11$),



Figure 2. *Vipera eriwanensis* from the vicinity of Khaveti (MNKhNU G-1339).



Figure 3. *Vipera cf. eriwanensis* from the vicinity of Şamaxı (MNKhNU 27070).



Figure 4. Ruins of the Gyz-Galasy fortress near Şamaxı, indicated as collecting site of *Vipera cf. eriwanensis*.

ventral + preventral (females: 136.6 ± 1.4 , $n=10$) and subcaudal plates (females: 26.3 ± 0.47 , $n=10$). The individuals from Şamaxı further differ from *V. lotievi* (Tuniyev, Tuniyev and Mazanaeva, 2011) including the geographically closest populations from Daghestan by the a low number of zigzag windings, generally different color pattern on the head, the lower number of ventral scales and the absence of contact between the upper preocular and the nasal scales in 58.3 % of specimens (Table 1). However, until elaborate morphological and genetic comparisons with populations of *V. lotievi*, *V. eriwanensis* and *V. (e.) ebneri* have been performed we tentatively attribute the Şamaxı population to *V. cf. eriwanensis* in contrast to Alekperov (1978) and Nilson and Andrén (2001) who considered the population to belong to *V. renardi*. We emphasize that this taxonomic status will likely change in the future.

Faunistic exchange between the Cis- and Transcaucasia has been suggested to have occurred during the xerothermal epoch of the Holocene. During this period, several steppe faunistic elements of southeastern European origin (according to some authors including *V. renardi*) entered eastern Transcaucasia and reached northern Azerbaijan from the north, probably by means of dispersal along the shore of the Caspian Sea (Tuniyev,

1995; Nilson and Andrén, 2001). Despite this potential migration scenario, the current analysis of basic diagnostic characters showed *V. cf. eriwanensis* from Şamaxı to bear high resemblance to *V. eriwanensis* and *V. lotievi*. Likely, this represents either shared ancestry and/or contact during the Pleistocene between these entities.

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