Bonn. zool. Beitr.	Bd. 39	H. 2/3	S. 221—228	Bonn, August 1988

Morphological characterization of *Vipera wagneri* Nilson & Andrén, 1984 (Reptilia: Viperidae), with first description of the males

Ulrich Joger, Alexandre Teynié & Dieter Fuchs

Abstract. *Vipera wagneri* Nilson & Andrén, 1984, hitherto known only from one ♀ of uncertain locality, is morphologically characterized and compared to related species on the basis of one additional ♀ and five ♂ from north-eastern Turkey. The status of *V. wagneri* as a distinct species within the *V. xanthina* complex is confirmed. Sexual dimorphism and live colouration are described for the first time.

Key words. *Vipera wagneri*, Viperidae, Turkey, taxonomy.

Introduction

Vipera wagneri Nilson & Andrén, 1984, was described on the basis of a single ♀ of which the exact locality was not known. It had been collected in 1846 by Moritz Wagner during an expedition near the "Armenian-Persian border" of that time.

The specimen, now the holotype of *V. wagneri* (ZFMK 23495), had been formerly referred to *Vipera aspis ocellata* (Berthold, in Wagner 1850), *V. xanthina* (Strauch 1869) and *V. raddei* (Boulenger 1896, Nikolskij 1905 and later authors). Nilson & Andrén (1984) recognized its marked differences from the above named species. They regarded *V. wagneri* as a distinct species of the *V. xanthina* group within the *V. xanthina* complex (which is composed of the *V. xanthina* and *V. raddei* groups). Nilson & Andrén established the Terra typica of *V. wagneri* as the "vicinity of Lake Urmia, province Azarbaijan, N. W. Iran", according to the original catalogue of the Zoological Museum Goettingen, where the specimen had been sent to by Moritz Wagner. As nearly 140 years had passed without any finding of additional specimens, it was uncertain whether the species still existed.

Meanwhile, further specimens of *V. wagneri* could be collected — not in Iran, but in northeastern Turkey. Already in May 1983, a ♂ viper was found in the Aras Valley near Karakourt, by K. Warncke, R. Gerstmeier, W. Schacht and M. Kühbander, during an entomological expedition of the Zoologische Staatssammlung München, where the specimen has been kept alive since. This specimen was recognized as *V. wagneri* in 1987. Its blood proteins (especially serum albumin) revealed considerable differences from *V. xanthina* which most probably is its closest living relative (Herrmann et al., 1987).

Teynié (1987) collected another four ♂ and one ♀ near a tributary of Aras River, to the east of the first mentioned locality. All our specimens are still alive except one ♂ which is deposited in the Musée national d'Histoire naturelle, Paris.

Table 1: Diagnostic scale counts of the known specimens of *Vipera wagneri.* ♀ 1: type specimen, Bonn; ♂ 1: Munich specimen; all other specimens collected by Teynié (1987). Data for other species from Nilson & Andrén (1986) (1st row: range; 2nd row in brackets: mean value).

	Vipera wagneri							*V. xanthina*		*V. bulgardaghica*		*V. bornmuelleri*		*V. raddei*	
	♀ 1	♀ 2	♂ 1	♂ 2	♂ 3	♂ 4	♂ 5	♀ (n = 36)	♂ (n = 25)	♀ (n = 1)	♂ (n = 2)	♀ (n = 17)	♂ (n = 13)	♀ (n = 40)	♂ (n = 45)
Dorsal scale rows at midbody	23	23	23	23	23	23	23	21−25 (23.4)		23		21−23		21−25 (23.1)	
Ventral scales	161+3 (163)	165+2	168+2	167+2	166+2 (166)	/	163+2	147−169 (157.1)	151−169 (160.0)	145	150−154	142−153 (147.8)	144−152 (148.4)	163−179 (161.9)	167−181 (174.3)
Subcaudal Scales	23/24 (24.3)	25/26	30/31	30/31	29/30 (30.1)	29/30	30/31	27−36 (30.5)	30−38 (33.3)	16	29−33	23−26 (25.6)	28−31 (29.3)	28−32 (29.9)	29−35 (31.9)
1st circumocular row of scales without supraoculars	14/15	13/13	12/12	13/13 (12.9)	13/13	12/12	12/13	11−14 (12.2)		9−11		11−15 (12.3)		12−18 (14.5)	

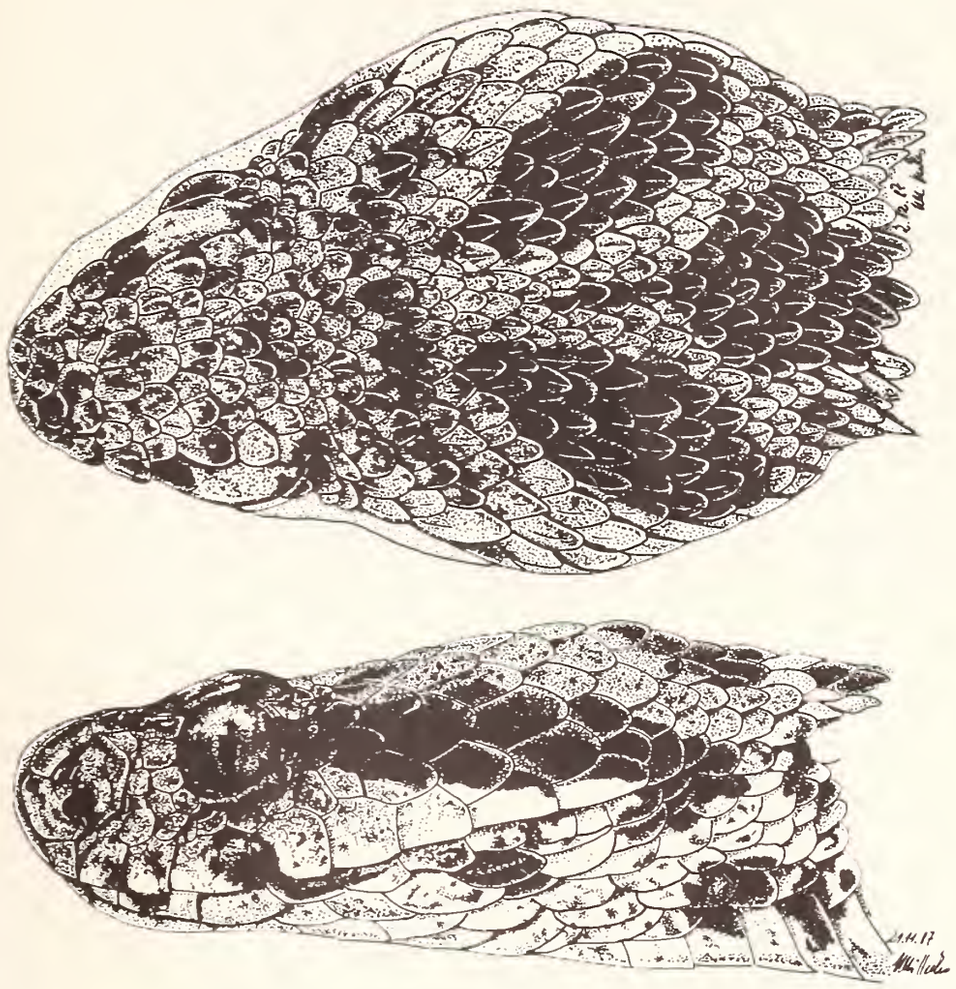

Fig. 1: Head of *Vipera wagneri*, ♂ 1 (Munich specimen). Drawing U. Heckes.

Diagnostic characters of *Vipera wagneri*

Pholidosis (see tab. 1). All specimens have 23 dorsal scale rows at midbody, a large supraocular plate and small, keeled head scales. This combination of characters, together with general habitus and body pattern (see below), is typical for members of the *Vipera xanthina* complex. None of the specimens has a complete circumocular ring of scales (derived character of the *raddei* group within the *V. xanthina* complex). The supraocular plates are in contact with the eyes. Thus, although ocurring within the geographical range of *V. raddei*, *V. wagneri* cannot be regarded as a close relative of *raddei*. Other differences from *raddei* are flat (non-erected) supraoculars, only one canthal (generally two in *raddei*), a generally lower number of ventral scales in ♂ *wagneri* and a lower number of subcaudal scales in ♀ *wagneri*.

Within the *xanthina* group, the mountain species *V. bulgardaghica* and *V. bornmuelleri* differ from both *V. xanthina* and *V. wagneri* in having a lower number of ventral scales, whereas the subcaudal counts of *V. wagneri* fall within the ranges of *V. bornmuelleri* and *V. bulgardaghica*. The autapomorphic characters of those mountain vipers (tendency towards reduction of dorsal scale rows and of dorsal pattern

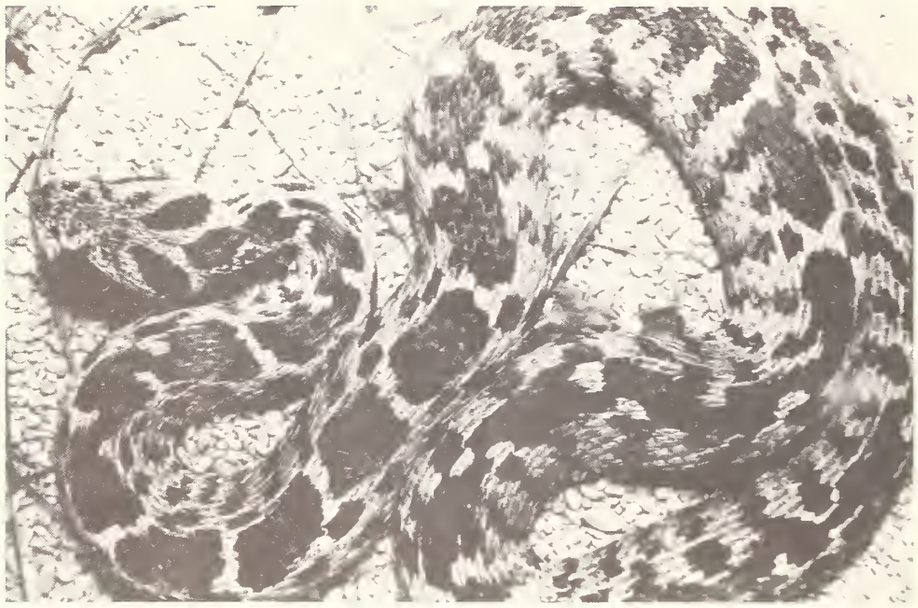

Fig. 2: *Vipera wagneri*, ♂ 1 from Karakourt area, NE Turkey. Photo Fuchs.

Fig. 3: *Vipera wagneri*, Portrait of a ♂ from Kagizman area, NE Turkey. Photo Teynié.

Fig. 4: *Vipera wagneri*, ♀ from Kagizman area, NE Turkey.
Photo Teynié.

in *V. bornmuelleri*, reduced number of subocular and circumocular scales in *V. bulgardaghica*) are not shared by *V. wagneri*.

No doubt *V. wagneri* is morphologically closest to *V. xanthina*. It differs from *V. xanthina* in having a higher average ventral count but markedly lower subcaudal counts in both sexes (more clearly different in ♀). Relative tail length (in percent of total length) is 8.2 in ♂ 1 and 7.2 in ♀ 1 — much less than in *xanthina* where it ranges between 9 and 10 (Nilson & Andrén 1986). Other differences are number of supralabials, which is 9 in the known specimens of *V. wagneri* and 10 in the majority of *V. xanthina*, and number of scales around the eye (1st circumoculars), which is slightly higher in *wagneri*.

The number of interocular scales (6 to 7 in a straight line between the supraoculars) is within the ranges of *xanthina* (5—8) and *raddei* (6—9). Details of the head scalation of a male *Vipera wagneri* can be seen in fig. 1.

Size. *V. wagneri* is intermediate in size between *V. xanthina* and *V. bornmuelleri*, the largest known specimen (a ♂) attaining about 70 cm.

Sexual dimorphism. ♂ have longer tails and a higher subcaudal count than ♀ (tab. 1). There is a slight difference in colour between sexes (see below).

Colour and pattern in life

The basic colour of ♂ is grey, of ♀ light brown. Both sexes share the same pattern of brown spots which are distinctly darker in ♂. Those spots are rather small and regularly arranged on the body side, forming transverse rows as in some ♀ *V. xanthina*. On both sides of the vertebral line, there are larger ochre or light orange-brown patches bordered by broad dark markings anteriorly and posteriorly, which gives the aspect of an "ocellated" pattern (figs. 2 to 4). Patches from both sides may melt with each other forming a pattern similar to ♀ *V. bornmuelleri* from Mt. Liban (Nilson & Andrén 1986, fig. 5D). Caudally, two light dorsolateral stripes appear bordering the area occupied by the large patches.

The head pattern is *xanthina*-like with two dark elongate patches in the parietal region which converge anteriorly and may be united posteriorly by a transverse bar. These patches are preceded by two small round dots (which may be absent). Indistinct dark spots are frequently present on the forehead (fig. 5). There is a dark brown stripe from the eye to behind the mouth angle.

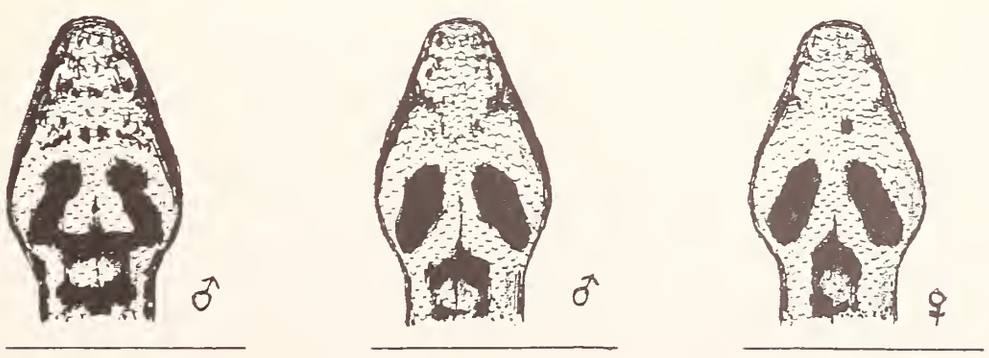

Fig. 5: Variations in head pattern of *Vipera wagneri*. Drawing Teynié.

Distribution and ecology

There are now two localities known to us in the Aras Valley and its tributaries in the Karakourt-Kagizman area of northeastern Turkey. We do not indicate the exact localities to protect this rare species from snake collectors. It remains uncertain whether the species actually occurs in northwestern Iran as stated by Nilson & Andrén (1984).

The habitat of *V. wagneri* consists of rocky slopes and pediments with scarce vegetation (grassy pastures nearby) at an altitude of 1,200 m to 2,000 m, not far from water (figs. 6 and 7). The accompanying herpetocoenosis contains *Coluber ravergieri*, *Natrix natrix*, *N. tessellata*, *Eirensis modestus* and *Lacerta media*.

Fig. 6: Habitat of *V. wagneri*, Aras valley E of Karakourt, NE Turkey. Photo Warncke.

Evolutionary position

V. wagneri is clearly a separate species as evidenced by its distinct morphology and by the considerable immunological distance of its serum albumin from that of *V. xanthina* (Herrmann et al. 1987). There is also a difference in venom composition (SDS electrophoresis) between *V. wagneri* and both *V. xanthina* and *V. raddei* (Teynié, unpublished). However, according to the immunological data, *V. wagneri* is the nearest living relative of *V. xanthina* (perhaps except *V. bulgardaghica*, which has not been studied).

Fig. 7: Habitat of *V. wagneri*, Kagizman area, NE Turkey. Photo Teynié.

Morphologically, *V. wagneri* appears to be somewhat intermediate between *V. xanthina* and *V. raddei* in number of circumoculars (although still lacking a complete circumocular ring) and in number of ventrals. It agrees with *V. bulgardaghica* and *V. bornmuelleri* in low subcaudal counts. This character may be regarded primitive (Nilson & Andrén, 1986).

If *xanthina* and *raddei* are the most apomorphic species within the *V. xanthina* complex, then *wagneri* may be a relict form morphologically still close to the origin of *xanthina*. This makes also sense biogeographically, as the region south of the Caucasus is likely to represent the evolutionary centre of this complex, from where the *xanthina* group spread to the west, whereas the *raddei* group radiated in eastward direction.

It is noteworthy that the Munich specimen (♂ 1) produced viable hybrids with a ♀ *V. raddei*, but successful hybridizations between *V. xanthina* and *V. raddei* are also known.

Acknowledgements

We thank R. Gerstmeier, M. Kühbander, W. Schacht and K. Warncke for providing photographs and locality data on the specimen they collected. Special thanks to U. Heckes for the drawing.

Zusammenfassung

Vipera wagneri Nilson & Andrén, 1984, bisher nur in einem ♀ unsicherer Provenienz bekannt, wird anhand eines weiteren ♀ und von 5 ♂ aus der Nordost-Türkei morphologisch charakterisiert. Erstmals können Sexualdimorphismus und Lebendfärbung beschrieben werden. Der Artstatus für *V. wagneri* kann bestätigt werden. Die Art könnte als Reliktform gedeutet werden, die der Wurzel von *V. xanthina* nahe steht.

Bibliography

Boulenger, G. A. (1896): Catalogue of the snakes in the British Museum (Nat. Hist.), Vol. III. — Trustees of the British Museum, London.

Herrmann, H.-W., U. Joger, G. Nilson & C. G. Sibley (1987): First steps towards a biochemically based reconstruction of the phylogeny of the genus *Vipera*. — Proc. 4th Ord. Gen. Meet. S. E. H., Nijmegen 1987.

Nikolskij, A. M. (1905): Herpetologia rossica. — Académie Impériale des Sciences, St.-Pétersbourg, 517 pp.

Nilson, G. & C. Andrén (1984): Systematics of the *Vipera xanthina* complex (Reptilia: Viperidae). II. An overlooked viper within the *xanthina* species-group in Iran. — Bonn. zool. Beitr. 35: 175—184.

— & — (1986): The mountain vipers of the middle east — The *Vipera xanthina* complex (Reptilia, Viperidae). — Bonn. zool. Monogr. 20, 90 pp.

Strauch, A. (1869): Synopsis der Viperiden, nebst Bemerkungen über die geographische Verbreitung dieser Giftschlangen-Familie. — Mém. Acad. imp. Sci. St.-Pétersbourg (7) 14: 1—144.

Teynié, A. (1987): Observations herpétologiques en Turquie, 1ère partie. — Bull. Soc. Herp. Fr. 43: 9—18.

Wagner, M. (1850): Reise nach Kolchis und nach den Colonien jenseits des Kaukasus. Mit Beiträgen zur Völkerkunde und Naturgeschichte Transkaukasiens. — Arnoldi, Leipzig.

Dr. Ulrich Joger, Zoologische Abteilung, Hessisches Landesmuseum, Friedensplatz 1, D-6100 Darmstadt, F. R. Germany.