

AN UPDATED OVERVIEW OF THE DISTRIBUTION OF THE MOLDAVIAN STEPPE VIPER (*Vipera ursinii moldavica* NILSON, ANDRÉN et JOGER, 1993)

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We give an overview of the current distribution of *Vipera ursinii moldavica*. Until 2000 just one small population was known to survive in the “Valea lui David” Natural Reserve, Iași District, Romania. We surveyed the habitats in the Iași District, in May and September 2000 and March 2001, where this snake was formerly reported: Tomești and the surroundings of Românești, Avântul, and Ursoaia. In the surroundings of Românești, Avântul and Ursoaia we found the viper in two sites, Ciritei and Holm, in the proximity of a small hill informally called “Dealul lui Dumnezeu,” where Vancea et al. had recorded the subspecies in 1985. *V. u. moldavica* has probably disappeared from Tomești (Iași District), Tecuci (Galați District), Horlăceni and Călărași (Botoșani District). The results of a short survey, from 1997, in the “Valea lui David” Natural Reserve are also presented. Based on a field survey (1998) in the Republic of Moldova, the survival of *V. u. moldavica* cannot be confirmed there. In this paper we describe the newly discovered habitats, and provide morphometric data for the captured specimens. An updated distribution map of the subspecies is provided.

Keywords: *Vipera ursinii moldavica*, Moldova – Romania, Republic of Moldova, habitat description, morphometrics, distribution.

INTRODUCTION

The Moldavian steppe viper (*Vipera ursinii moldavica* Nilson, Andrén et Joger, 1993) is one of the endangered subspecies of the *Acridophaga* complex (Nilson and Andrén, 2001). Its distribution range extended from the Carpathian Mountains to the Danube river at Galați and to the Ukrainian steppes; in Moldova (Romania) and the Republic of Moldova (Besarabia). From the former population only the one in the “Valea lui David” Natural Reserve has recently been known to have survived (Nilson et al., 1993; Korsós et al., 1997; Krecsák and Zamfirescu, 2001). According to earlier literature (Băcescu, 1933; 1937; 1941; Vancea and Ionescu, 1954; Fuhrn and Vancea, 1961; Fuhrn, 1969; Vancea et al., 1980; Dely and Stohl, 1984; Vancea et al., 1985), in Romania the viper was recorded from: “Valea lui David,” Tomești, from a place called “Dealul lui Dumnezeu” — the

surroundings of Românești, Avântul, and Ursoaia — (Iași District); Călărași, Horlăceni (Botoșani District), Tecuci (Galați District), and the Rarău Mountains (Suceava District).

Vipera ursinii was recorded in the Danube Delta (Romania) from: Letea, Caraorman (Băcescu, 1937), Sărături, Sf. Gheorghe (Băcescu, 1937; Kiss, 1985), Periprava (Băcescu, 1937), Perișor-Periteasca and Portița-Razelm (Vancea et al., 1985). The taxonomic status of these populations has never been clarified. Earlier they were considered as *V. u. ursinii* and/or *V. (u.) renardi* (Băcescu, 1937), or as intermediate forms (Vancea and Ionescu, 1954; Stugren, 1961; Vancea et al., 1985; Dely and Stohl, 1989). In some of the earlier works (Fuhrn and Vancea, 1961; Fuhrn, 1969; Vancea et al., 1980; Dely and Stohl, 1984; Kiss, 1985) and recent ones (Kotenko et al., 1993) they are considered as *V. (u.) renardi*.

Nilson et al. (1993), Nilson and Andrén (2001) included these populations in the *V. u. moldavica* taxon. They found that the vipers from the Danube Delta are morphologically similar to those from Romanian Moldova, and differ significantly only in the number of midbody scale rows (19.2 in the Moldavian populations and 19.9 in the Danube Delta). Vancea et al. (1985) observed the same thing, and emphasized the necessity for further investigations. Korsós

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et al. (1997) found significant differences in morphological characters (dorsal scale rows on neck and midbody, ventrals, subcaudals, supralabials and sublabials) between the specimens from the Danube Delta and those from Transylvania and Moldova. According to Nilson et al. (1993), Andrén and Nilson (1994), Kotenko et al. (1999), and Nilson and Andrén (2001) the distribution of *V. u. moldavica* includes the Danube Delta region, too.

Four *V. ursinii* specimens were reported in Bulgaria, two in the surroundings of Sumen (350 m elevation) and two west to Sofia, in Lyulin planina. One of the last two individuals was collected in the area of the village Verdikal (650–680 m elevation) and the other in the surroundings of the monastery Sveti Kral (950 m elevation) (Westerström, 2002). In the earlier literature (Beskov, 1973; Dely and Stohl, 1989) they were considered *V. u. rakosiensis*. Nilson and Andrén (2001) included them into *V. u. moldavica*.

We do not share this opinion, thus in the following we refer only to the populations from Romanian Moldova and Republic of Moldova as *V. u. moldavica*. The revision of the taxonomy of the vipers from the Danube Delta is the subject of another paper.

MATERIAL AND METHODS

During May and September 2000, and March 2001 several places were surveyed in Romanian Moldova where *V. u. moldavica* had previously been reported. In several cases just the name of the closest village or an informal name of a hill was given by the authors of relevant reports (Băcescu, 1933; 1941; Fuhn and Vancea, 1961; Fuhn, 1969; Vancea et al., 1980; Vancea et al., 1985). In these cases the entire area was investigated. We obtained preliminary data on the populations from Călărași, Horlăceni, and Tecuci from the Nature Protection Agencies of Botoșani and Galați.

In every case characteristics of the habitat were recorded. We measured body weight, total length, tail length, on the captured individuals and recorded the following meristic characters: number of ventral, subcaudal, supralabial, sublabial, rostral, apical, nasal, nasorostral, canthal, intercanthal, loreal, circumocular, preocular, subocular, postocular, frontal, parietal, supraocular, intersupraocular, mental, inframaxillary, and gular scales; number of dorsal scale rows on the neck, midbody and in front of the tail, and the quantitative description of the dorsal zigzag colour pattern.

The formerly enumerated body proportions and pholidotic characters were studied during the field surveys on five specimens: one male and one female in the “Valea lui David” Natural Reserve, two females in the location “Holm” and one male from “Ciriței,” all in Romanian Moldova.

The morphometric data of these specimens were compared to 66 *V. u. moldavica* specimens from different collections (MINJ, Natural History Museum of Iași; HNHM, Hungarian Natural History Museum) and those studied in the “Valea lui David” Natural Reserve in 1999 (for more details see Krecsák and Zamfirescu, 2001). The population size was estimated with a 95% confidence limit using the Chapman index from the following formulas:

$$N = (C + 1)(M + 1)/(R + 1) - 1,$$

$$SE = \sqrt{\frac{(M + 1)(C + 1)(M - R)(C - R)}{(R + 1)^2(R + 2)}},$$

$$N \pm (1.96)(SE);$$

where N is the total population size; M the number of marked individuals in the first sample (15 specimens — May 2000); C is the number of individuals marked in the second sample (12 individuals — September 2000); R is the number of recaptured specimens (1 individual); SE is standard error.

The distribution map was drawn with DMAP for Windows 7.0 software.

The research was carried out with the permission of the Romanian Academy of Sciences (Permission No. 664).

RESULTS AND DISCUSSION

1. “Valea lui David” Natural Reserve

The hayfields from the “Valea lui David” were designated as a protected area in 1969, by the District Council of Iași. This habitat is situated at 8 km from the city of Iași, in the valley of a secondary stream of the Bahlui river, in the hills of Coșeri; it has an area of 46.36 ha (Fig. 1). In the 1970s the Reserve and its buffer zone formed a complex hayfield of 80 ha (the whole valley is 180 ha). Its size has since decreased due to the extension of agricultural fields from the east and vineyards from the south. Its vegetation consists of different association types: mesohygrophilous, xerophilous, halophilous, nitrophilous associations, and steppe shrubs. The most common plants are *Stipa lessingiana*, *Stipa capillata*, and *Festuca valesiaca*. The fauna also contains specific steppe elements, like the giant sawfooted grasshopper *Saga*



Fig. 1. “Valea lui David” Natural Reserve.

pedo, the eastern subspecies of the sand lizard, *Lacerta agilis chersonensis*, or endemic and rare species like the moth *Evergestis dilutalis* or the orthopteran *Callimenus* (= *Bradyporus*) *macrogaster*.

The first survey interested in *V. u. moldavica* was made in 1951 – 1952 by Vancea and Ionescu (1954). Later, in 1988, Nilson et al. (1993) visited this population and revised its taxonomy, raising it to the subspecific status *V. u. moldavica*. In the following nine years no herpetological surveys were conducted in the area. In 1997 (August 25 – 26) one of the authors (ZK) together with Beáta Újvári visited here and captured two specimens. Their morphological data are summarized in Table 1. Subsequently the other two authors (LK, ȘZ) captured, measured, marked and released 45 specimens in the area, having 3 recaptures. The morphological characteristics of some of these snakes were discussed in Krecsák and Zamfirescu (2001). The population size was estimated to 103 ± 101 individuals. It should also be mentioned that in 2000 8 specimens were captured in the buffer zone of the Reserve, which indicates the necessity of the extension of the Reserve’s area. The reserve is manually mowed, but unfortunately at the end of August. Nonetheless, no dead specimens were found after the mowing. Possible threats for the vipers include: a) human disturbance — the Reserve was enclosed in the 1970s, but today just a few fence poles remain; b) grazing — although it is a Reserve the shepherds sometime bring sheep from the buffer zone into the Reserve; c) pollution — the Reserve lies 1 km from the large Iași Medicine Factory “Antibiotica”; d) expansion of the surrounding agricultural fields.



Fig. 2. Erroneous locality, “Dealul lui Dumnezeu,” at Larga Jijia.

2. Populations Rediscovered

The Moldavian steppe viper was recorded from the surroundings of Românești – Avântul – Ursoaia for the first time by Dely and Stohl (1984), based on a specimen received from Ștefan Vancea. The specimen was collected in a place called “Dealul lui Dumnezeu” in 1977, and is deposited in the collection of the HNHM (Coll. No. 2023/1). Later, Vancea et al. (1985) reported on 17 specimens from “Dealul lui Dumnezeu,” which were most probably collected between the years 1976 – 1977 and deposited in the MINJ. In Moldova there are many hills called “Dealul lui Dumnezeu” which means “The Hill of God,” reflecting the religious nature of the major part of the population, who believe that the areas between communal lands belong to God. It is difficult to identify exactly the hill where Vancea collected his vipers, because he could have been misled by the numerous toponyms that designate a hill, just as we were at the time of the field surveys.

In September 2000 we visited the habitats between the three villages (Românești – Avântul – Ursoaia). We could not find any hill with the name “Dealul lui Dumnezeu” on the topographic map. The single one with this name is in the vicinity of Larga Jijia at 12 km distance from Ursoaia. There is no doubt that this hill has been used as a vineyard for many years (Fig. 2) and could not have hosted a population of vipers in the last 30 – 40 years. A shepherd also showed us another place called “Dealul lui Dumnezeu” in the vicinity of Ursoaia, which was not named on the map. This was probably the hill where Vancea had collected his vipers (Fig. 3). Based on this shepherd’s story, on the 17th of September we found a dead specimen and two hours later, despite of



Fig. 3. Locality “Dealul lui Dumnezeu,” at Românești – Avântul – Ursoaia.



Fig. 4. Newly discovered locality, “Holm” or “Lanu Mare,” at Românești – Avântul – Ursoaia.

the windy and rainy weather, an additional living adult female was also found on a hill named “Holm,” or “Lanu Mare” on the map (Fig. 4). The distance between the two specimens was 890 m. The morphometric data of these specimens can be found in Table 1.

In March 2001 another field survey was carried out in the area of Românești – Avântul – Ursoaia. On the 15th of the month a mature male (Fig. 5) was found at 2 km distance from “Holm” in a valley called “Ciritei” (Fig. 6). Morphometric data from this specimen are presented in Table 1.

Both habitats were found at an elevation of 150 m. Although agricultural fields surround them, they lie in a few kilometers from each other. Sheep-grazing represents the only disturbance for the vipers.



Fig. 5. *V. u. moldavica* male from the locality “Ciritei,” at Românești – Avântul – Ursoaia.



Fig. 6. Newly discovered locality, “Ciritei,” at Românești – Avântul – Ursoaia.

In addition, they are manually mowed just like the “Valea lui David” Natural Reserve.

The principal vegetal associations are: *Stipaetum capillatae*, *Botriochloetum ischaemi*, *Taraxaco serotini* — *Festucetum valesiacaе*, *Pruno spinosae* — *Crataegetum*, *Festuca valesiacaе* — *Botriochloa*. The *Agrostetum stoloniferae*, *Puccineliatum limosae*, *Cynodontetum dactyloni*, and *Scirpo* — *Phragmitetum* associations from the valley are fragmented by sodic soils with *Cynodonto* — *Poaetum angustifoliae*, *Staticetum* — *Artemisietum monogynae*, *Juncetum gerardii* and *Agrostio* — *Caricetum distantis* associations.

Both habitats are larger than that at “Valea lui David” Natural Reserve, and hence could support a more viable viper population.

3. Morphological Data of Extant Populations

Table 1 summarizes the morphometric data of the studied specimens (one male and one female in the “Valea lui David” Natural Reserve, two females in the location “Holm” and one male from “Ciritei”)

TABLE 1. Morphological Characters of the Specimens Discussed in the Present Study and the Variation of These Characters in the “Valea lui David” Natural Reserve; Population Given as Mean ± S.E. and Range

Character	Specimen 1	Specimen 2	Specimen 3	Specimen 4	Specimen 5	<i>V. u. moldavica</i>	<i>V. u. moldavica</i>
	♀	♂	♀	♀	♂	♂ (N=32)	♀ (N=34)
Weight, g	15.5	68	—**	47	51	—	—
Total length, mm	288	505	390	405	510	—	—
Tail length, mm	30	75	40	56.5	65	—	—
Ventral (preventrals included)	136	136	141	146	143	137.9 ± 0.3 (122 – 146)	140.3 ± 0.3 (122 – 146)
Subcaudal	28	42	28	32	37	36.6 ± 0.0 (28 – 42)	28.0 ± 0.1 (24 – 39)
Supralabial*	16	16	—**	20	17	16.7 ± 0.0 (16 – 21)	16.4 ± 0.0 (15 – 20)
Sublabial*	19	21	—**	19	19	18.9 ± 0.0 (16 – 21)	18.8 ± 0.0 (16 – 21)
Loreal*	8	10	—**	7	8	8.3 ± 0.1 (4 – 13)	7.8 ± 0.1 (3 – 13)
Circumocular*	18	19	21	21	17	18.6 ± 0.0 (16 – 23)	18.2 ± 0.1 (13 – 23)
Preocular*	6	6	8	8	6	6.4 ± 0.0 (5 – 8)	6.6 ± 0.0 (5 – 9)
Subocular*	6	6	6	6	6	5.3 ± 0.0 (3 – 7)	5.5 ± 0.0 (4 – 8)
Postocular*	6	7	7	7	5	6.8 ± 0.0 (6 – 9)	6.1 ± 0.0 (2 – 8)
Nasal*	6	4	3	3	4	3.3 ± 0.0 (2 – 6)	3.7 ± 0.0 (2 – 7)
Apical	1	1	2	2	1	1.0 ± 0.0 (1 – 3)	1.0 ± 0.0 (1 – 2)
Intersupraocular + intercanthal	9	7	13	15	12	9.4 ± 0.1 (5 – 15)	10.4 ± 0.1 (6 – 17)
Gular	—	—	15	22	17	—	—
Dorsal neck	19	19	21	21	20	19.5 ± 0.6 (19 – 21)	19.7 ± 0.0 (18 – 22)
Dorsal midbody	19	19	19	21	19	19 ± 0.0 (16 – 21)	19.3 ± 0.0 (18 – 21)
Dorsal tail	17	17	17	17	18	16.8 ± 0.0 (15 – 18)	16.9 ± 0.0 (15 – 18)
Zig-zag windings	—	—	75	79	80	—	—

Note. *, both sides together; **, uncountable; Specimen 1, Valea lui David; Specimen 2, Valea lui David; Specimen 3, killed specimen, Holm; Specimen 4, Holm; Specimen 5, Ciritel.

and the variation of these characters at the males and the females of *V. u. moldavica*. It can be observed that the individuals do not differ from the males and the females of the subspecies. All the specimens possessed 2 nasorostral, 2 supraocular, 1 frontal, 2 parietal, 1 mental, 2 inframaxillar, and 4 canthal scales, which are characteristic both for the males and females of *V. u. moldavica* from the other localities.

4. Populations Most Probably Extinct

Băcescu (1941) refers to an adult male collected by M. Mălăescu in the flood plain of the river Bahlui at Tomești, on April 3, 1940. Previously, on May 18, 1932, I. Sava collected a female in this area (Băcescu, 1933). At that time Tomești was a small village, but today it is a suburb of Iași. On a part of the plain,

houses have been built and intensive grazing also changed the specific steppe vegetation, and now just a few spots of *Stipa* and *Festuca* meadows remain (Fig. 7). Vancea et al. (1980) considered the *V. u. moldavica* population of the area extinct. Based on the field survey from 2000 and 2001 there is no doubt that the snake has disappeared from this region.

A young specimen was collected on the 20th of July, 1940, in a plain close to the river Bârlad, before Tecuci, Galați District (Băcescu, 1941). Since then there was no record of *V. u. moldavica* from this location and based on the data obtained from the Nature Protection Agency of Galați, the snake has disappeared from here.



Fig. 7. Unsuitable habitat at Tomești.



Fig. 8. Unsuitable habitat between Ciucur Mingir and Bucean.

Vancea et al. (1985) discovered *V. u. moldavica* in Botoșani District, at Călărași and Horlăceni close to Șendriceni-Dorohoi. A single specimen collected at Călărași on April 21, 1971 remains in the collection of MINJ. The Nature Protection Agency of Botoșani informed us that the two habitats are unsuitable for a population of vipers and most probable they already disappeared from these localities.

Two specimens were collected from the Rarău Mountains, which were believed to be *V. u. moldavica* individuals (Vancea et al., 1985; Nilson et al., 1993; Nilson and Andrén, 2001), but their taxonomic position is still questionable. These specimens unfortunately were lost from the MINJ.

Only a few specimens were known from the Republic of Moldova (Brauner, 1903; 1907; Călinescu, 1931; Băcescu, 1937; Didusenko, 1966; Tofan, 1965; Bannikov et al., 1977; Yangolenko, 1977; Popa and Tofan, 1982; Țurcanu, 1993; Borkin et al., 1997) col-



Fig. 9. Locality Trebujeni, where *V. renardi* specimens have been introduced.

lected in different locations. Băcescu (1937) reports on *V. u. moldavica* from Chișinău and Tighina — based on the record of Brauner (1907). There are two specimens in the Zoological Museum of the State University from Chișinău, collected by N. Kononov and L. V. Chepurnova in 1964 near the village of Ciucur Mingir (Raion Chimișlia, Lăpușna District). The Moldavian steppe viper was also recorded from: Benderei (Brauner, 1903, 1907), Hănțești (Călinescu, 1931), Bălți, Ialoveni, Secăreni, Ocnița (Yangolenko, 1977), and Ikela (Țurcanu, 1993 — based on a report before 1920).

The viper was reported from a meadow between the villages Ciucur Mingir and Bucean (Țurcanu, personal communication). In the 1960–1970s the plain was broke up and agricultural field terraces were made on it. Now it is a protected area, as Natural Reserve, but there is no doubt that the viper had already disappeared from here (Fig. 8).

Another habitat, Trebujeni, was visited in 1998 in the Orhei District in the Rent river valley (Fig. 9). In 1993 some 40 individuals of *V. renardi* from Ukraine were released here by V. Țurcanu, a herpetologist in the Zoological Museum of the State University from Chișinău. Although this is a military field and could ensure a good protection for the vipers, there was no recapture here. Based on a field survey made in 1998 by one of the authors (ZK) together with Beáta Újvári and Vladimir Țurcanu, the survival of *V. renardi* in this location is questionable.

The overall distribution of *V. u. moldavica* based on the records presented above is shown in Fig. 10.

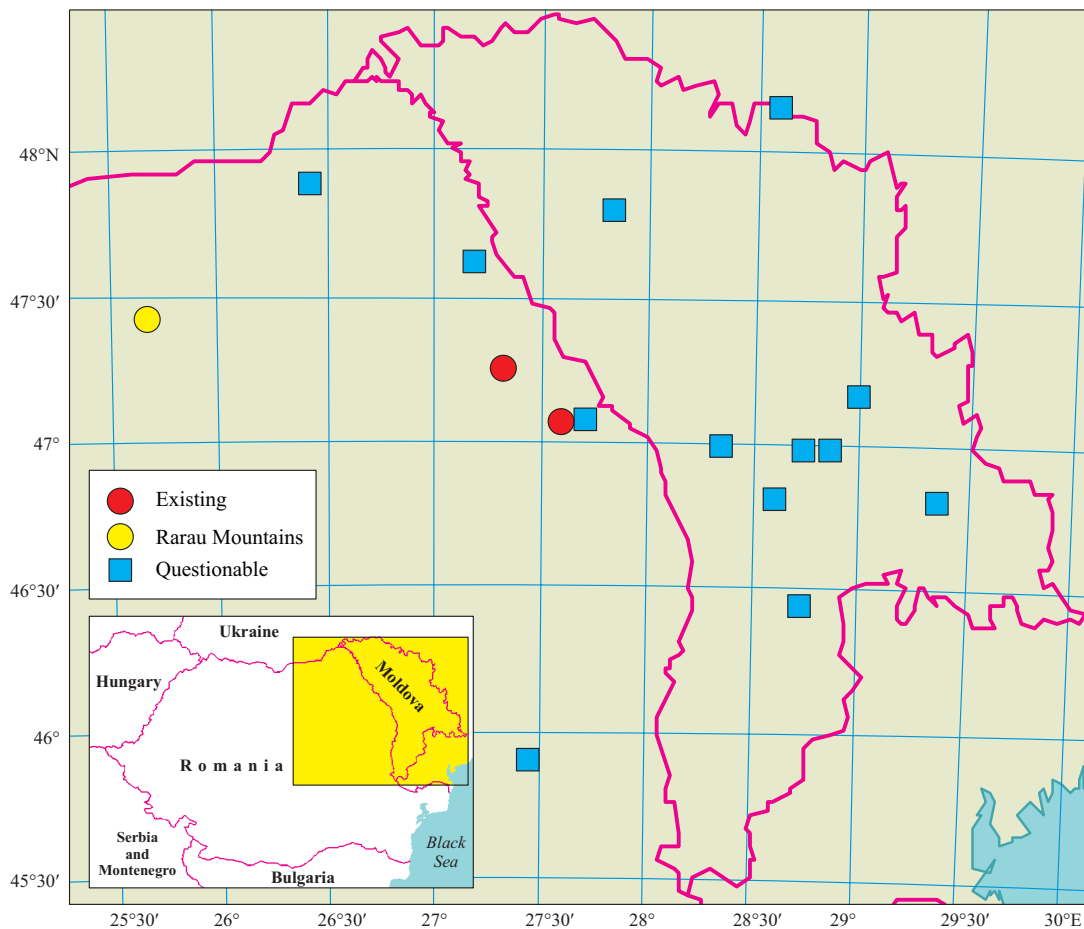


Fig. 10. Updated distribution of *V. u. moldavica*.

CONCLUSIONS

Of all the Romanian habitats the “Valea lui David” Natural Reserve is the only one where the vipers are in a protected area, all the other habitats are private properties of local people, thus, we can not instruct the owner to manage the field properly for the viper, we can only suggest him, how he should use it. Further investigations are needed throughout Romanian Moldova, as the last complete herpetological monitoring program was carried out in the 1960s. Many meadows had remained almost undisturbed until now, like the one in the “Valea lui David” Natural Reserve, and they might maintain populations of vipers. This monitoring should be carried out also in the Republic of Moldova. The dimensions of the newly discovered populations from “Holm” and “Ciritei” have to be estimated, for a better understanding

of the actual situation of the subspecies and the real needs for its survival. These two habitats should be designated as protected areas immediately.

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