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## ON THE TAXONOMIC STATUS OF THE COMMON ADDER OF THE PARTIALLY WOODED STEPPE OF THE OKA – DON PLAIN

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Morphological characters of the typical form of the common adder, *Vipera berus*, and its black form, so-called “*Vipera nikolskii*,” distributed in the partially wooded steppe of the Oka – Don plain, were investigated. Taxonomic status of black form is discussed.

**Keywords:** Serpentes, Viperidae, *Vipera berus*, morphological characters, taxonomy.

### INTRODUCTION

Until quite recently it was believed that the wooded and partially wooded zones within the limits of the former USSR are inhabited with only one species of vipers — common adder *Vipera berus* (Linnaeus, 1758) (Terentjev and Chernov, 1949; Bannikov et al., 1971, 1977; Shcherbak and Shcherban, 1980). The publication of Grubant et al. (1973) had broken out the stability of this idea and gave “reasons to put into discussion to resurrect for the black viper its specific name *Vipera prester* (L.)” Investigating the morphological characters of the black type of vipers from the Kharkov Oblast’ and the common adder from the north of the Sumy Oblast’, the investigators “revealed the significant differences” between these types of the vipers. The authors were guided by the following distinctive characters: the body length of the new-born females and males; the maximum body length of the mature females and males; the number of ventralia for males and females separately; the number of dorsale rows around the middle of the body; the number of supralabialia. Grubant et al. (1973) believed that “the additional criteria which makes the determination more simple” is the height of the second and the third supralabialia. According to their data, the second supralabialia of the common adder is usually higher than the third, and as for the black type, it’s vice versa — the second supralabialia is lower than the third. In another paper (Vedmederja et al., 1986) the same authors suggested another variant of the specific name for the viper from the partially wooded steppe of the European part of the USSR — *Vipera nikolskii*. They motivated their suggestion by the fact that the *Vipera nikolskii* “is distributed to the south from the line: Kanev – Kursk – Tambov – Buzuluk (this type is not found to the west and to the east of this line),” and “the name Coluber prester Linne, 1761 was given for the black specimens from the Sweden and is not suitable for the viper from the partially wooded

steppe.” In this article the number of differential characters had grown up to seven, and, besides the already mentioned, another three are described: the number of scales around the eyes; the ratio of height to the width of praenasa; the ratio of length to the width of frontale. The investigation of the two “species” of vipers [*Vipera berus* (L.) and *Vipera nikolskii* sp.n.] revealed their significance differences on these characters (the Student’s criteria varies from 5.70 up to 23.62). Unfortunately, the localities of the analysed samples are not mentioned in the paper, and the summarizing of data for males and females for all criteria, besides the number of ventralia, deprived the possibility to compare it with our data.

The papers of Ukrainian zoologists were really revived the interest to the problem among the number of herpetologists. But the opinions about “finding out” the new species had differed, as it often occurs in such cases. Some of the scientists (Ananjeva et al., 1998; Orlova and Semenov, 1999; Bozhanskiy, 2000) included *Vipera nikolskii* Vedmederja, Grubant et Rudaeva, 1986 into the list of species of herpetofauna of the former USSR. Others (Bakiev et al., 2000; Sokolov and Lada, 2000) had doubts in the reasons for separating the viper from partially wooded steppe into the separate species.

### MATERIAL AND METHODS

For study of intraspecific variability of the common adder we investigated the peculiarities of the external morphology of the subspecies *V. berus berus* — the “typical” form from the Ryazan Oblast’, from the northwest of Russia and from Bashkortostan and additionally of black viper of partially wooded steppe from Tambov and Voronezh Oblast’s (Oka – Don plain). Fourteen characters recommended for investigation of the common adder of the subgenus *Pelias* (Vedmederja, 1989) were analyzed: the number of ventralia (1), subcaudalia (2), rows of dorsales around the middle of the body (3), supralabialia on the left (4), and on the right (5), sublabialia on the left (6), and on

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TABLE 1. Comparison of Common Adder from Different Parts of Specific Range on Some Morphological Characters

Characters	Tambov Oblast' – – Voronezh Oblast'		Tambov Oblast' – – Ryazan Oblast'		Tambov Oblast' – – Northwest of Russia		Tambov Oblast' – – Bashkortostan		Northwest of Russia – – Ryazan Oblast'	
	<i>t</i>	<i>P</i>	<i>t</i>	<i>P</i>	<i>t</i>	<i>P</i>	<i>t</i>	<i>P</i>	<i>t</i>	<i>P</i>
<b>Males</b>										
1	1.61	>0.05	7.76	<0.001	7.35	<0.001	5.04	<0.001	1.09	>0.05
2	0.86	>0.05	3.31	<0.01	2.53	<0.05	3.05	<0.01	1.31	>0.05
3	2.11	<0.05	2.93	<0.01	3.80	<0.001	1.40	>0.05	0.18	>0.05
4	0.21	>0.05	4.00	<0.001	1.69	>0.05	1.56	>0.05	2.15	<0.05
5	0.38	>0.05	3.48	<0.001	1.67	>0.05	1.31	>0.05	2.27	<0.05
6	1.43	>0.05	0.33	>0.05	1.81	>0.05	1.29	>0.05	1.30	>0.05
7	0.95	>0.05	0.94	>0.05	3.53	<0.001	1.20	>0.05	2.12	<0.05
8	2.24	<0.05	0.59	>0.05	1.10	>0.05	2.30	<0.05	0.28	>0.05
9	1.18	>0.05	0.99	>0.05	3.63	<0.001	3.56	<0.001	4.68	<0.001
10	1.30	>0.05	7.69	<0.001	0.89	>0.05	1.95	>0.05	7.02	<0.001
11	0.03	>0.05	3.60	<0.001	5.69	<0.001	4.59	<0.001	0.97	>0.05
12	0.27	>0.05	0.98	>0.05	2.36	<0.05	1.69	>0.05	0.89	>0.05
13	0.95	>0.05	2.53	<0.05	2.64	<0.05	3.55	<0.001	0.27	>0.05
14	2.47	<0.05	3.42	<0.01	0.11	>0.05	2.88	<0.01	3.25	<0.01
<b>Females</b>										
1	1.44	>0.05	3.63	<0.001	3.94	<0.001	4.60	<0.001	0.93	>0.05
2	0.86	>0.05	3.29	<0.01	5.34	<0.001	4.92	<0.001	0.69	>0.05
3	0.21	>0.05	3.79	<0.001	4.81	<0.001	2.43	<0.05	0.09	>0.05
4	1.53	>0.05	1.27	>0.05	0.84	>0.05	1.43	>0.05	1.51	>0.05
5	2.31	<0.05	0.27	>0.05	0.60	>0.05	1.78	>0.05	0.15	>0.05
6	2.05	<0.05	1.88	>0.05	2.52	<0.05	1.71	>0.05	0.24	>0.05
7	1.64	>0.05	1.48	>0.05	2.61	<0.05	2.41	<0.05	0.42	>0.05
8	0.92	>0.05	0.60	>0.05	2.98	<0.01	2.71	<0.01	3.61	<0.001
9	1.68	>0.05	0.04	>0.05	3.29	<0.01	3.54	<0.001	2.62	<0.01
10	2.73	<0.01	6.45	<0.001	0.48	>0.05	1.05	>0.05	6.00	<0.001
11	3.11	<0.01	2.14	<0.05	5.04	<0.001	4.86	<0.001	1.86	>0.05
12	2.24	<0.05	0.30	>0.05	3.24	<0.01	2.86	<0.01	3.37	<0.001
13	0.29	>0.05	0.50	>0.05	0.73	>0.05	1.97	>0.05	0.03	>0.05
14	1.84	>0.05	1.21	>0.05	1.65	>0.05	2.21	<0.05	2.37	<0.05

the right (7), the ratios of the body's length to the tail's length (8), the head's width to its length (9), the head's length to its maximum width (10), the length of frontale to its width (11), the length of frontale to the distance between front edge of frontale and upper edge of rostrale (12), the height of second supralabialia to the height of third one (13), the height of praenasale to its width (14).

Totally 260 specimens were investigated. 106 specimens (46 females and 60 males) from the Tambov Oblast' and 18 ones (10 females and 8 males) from the Voronezh Oblast' were belonging to the black type of the common adder (so-called "*Vipera nikolskii*"). 30 vipers (11 females and 19 males) from the Ryazan Oblast', 58 ones (27 females and 31 males) from the northwest of Russia and 48 ones (22 females and 26 males) from the Bashkortostan were belonging to the typical form (*Vipera berus*). All the characters were studied separately for males and females. The collections are stored in the Zoological museum of

Tambov State University (samples from Tambov, Voronezh, and Ryazan Oblast's), in the Zoological Institute, Russian Academy of Sciences (samples from the northwest of Russia — Leningradskaya and Pskov Oblast's and Karelia) and in the Zoological Museum of Moscow State University (samples from Bashkortostan). Standard statistical parameters (min – max are limits, *M* is mean value, S.E. is standard error, S.D. is standard deviation, *t* is the Student's criteria) were used (Lakin, 1968).

**RESULTS AND DISCUSSION**

The results of comparison of the mentioned features in the samples from different parts of the viper's specific range are shown in Table 1. The first impression from the achieved results seems to leave no doubts in the rightness of herpetologists from Kharkov. The males from Tambov

and Ryazan Oblast's are distinguished in nine characters, and differences on five of them have the maximum level of significance ( $P < 0.001$ ). The females from these regions also have morphological differences, though more modest. The comparison of black type of the common adder with the "typical" form inhabiting the northwest of Russia and Bashkortostan gives just the same results. Well, does *Vipera nikolskii* really exist? The analysis of the degree of stability of the characters differentiating the samples under comparison makes us refrain from a positive answer. The stable differences between the "black" and "typical" males in all the three compared groups is noticeable in characters 1, 2, 11, and 13. As for the females from these groups, the differences here are noticeable in characters 1, 2, 3, and 11. So, both sexes of the two types of the common adder in all compared groups are distinguished for certain only in 1, 2, and 11 characters. As for the rest characters (4, 5, 6, 7, 8, 9, 10, 12, and 14), they can not be called "working" because there is no stability in their manifestation. The analysis of the column of the Table 1 showing the results of the comparison of the "typical" form of the common adder from Ryazan Oblast' and from the northwest of Russia testifies that the males are distinguished in six, and females — in five characters. It must be noted that the females of "black" form from Tambov Oblast' are distinguished from the "typical" females from Ryazan Oblast' also in five characters. The comparison of samples of "black" type (from Tambov and Voronezh Oblast's) has also revealed the significant differences in some characters, including the 11 (only the females are distinguished in this character). Moreover, we compared the black vipers from Tambov and Kharkov Oblast's in the character 1 (the number of ventralia). Comparing our data (number of ventralia in males  $M \pm m = 149.02 \pm 0.33$ , in females  $152.76 \pm 0.40$ ) with the materials given by Grubant et al. (1973) we identified that the degree of difference between the males isn't significant ( $t = 1.68$ ), but as for the females, it exceeds the third level ( $t = 5.07$ ;  $P < 0.001$ ). Vedmederja et al. (1986) gave a bit different information about the number of ventralia in *Vipera nikolskii* sp.n., and it naturally had resulted in the change of the before established degree of difference of the character in the samples of vipers under comparison. In this case the difference had become significant for males ( $t = 2.33$ ;  $P < 0.05$ ) as well as for females ( $t = 2.49$ ;  $P < 0.05$ ).

The question arises: which of the analyzed characters must be included in the identification of viper's forms? The number of ventralia? The number of subcaudalia? The form of frontale? In spite of the high level of significance of differences, these characters are highly variable, and this fact practically deprives them the possibility to be

used while identifying the analyzed types of the common adder. Besides, the available materials show that many of the analyzed characters have more or less stable connection with the latitude of the region. We compared the six samples of *V. berus* from the different parts of the specific range, and the comparison had revealed the high variability between populations. If the investigations will be continued, I believe the results will be almost the same.

To summarize, the common adder in their great specific range, naturally formed a number of types adequate to the conditions of the environment of the certain region. The level of genotypic and phenotypic differences between such forms is not the same. The problem of separating of new "races," "morphs," "subspecies," "species" is not new and will probably be open for discussion for a long period of time (for certain reasons). According the recommendations for the description of new taxons (Shcherbak, 1989), the number and degree of significance of differences of the mentioned above characters are certainly not enough for attaching the status of the species to the black form of *Vipera berus*. In my opinion, the total combination of these characters allows to separate the black form of the common adder as a subspecies. It will be natural to remain the specific name suggested by Vedmederja et al. (1986) as a subspecies name — *Vipera berus nikolskii*.

## REFERENCES

- Ananjeva N. B., Borkin L. J., Darevsky I. S., and Orlov N. L. (1998), *Amphibians and Reptiles*, ABF, Moscow [in Russian].
- Bakiev A. G., Malenev A. L., Peskov A. N., and Gridnev D. V. (2000), "Morphological characteristics of vipers from the forest-park zone of Samara," in: *The Actual Problems of Herpetology and Toxinology*. Vol. 4, Tolyatti, pp. 3 – 8 [in Russian].
- Bannikov A. G., Darevsky I. S., and Rustamov A. K. (1971), *Amphibians and Reptiles of the USSR*, Mysl', Moscow [in Russian].
- Bannikov A. G., Darevsky I. S., Rustamov A. K., Ishchenko V. G., and Shcherbak N. N. (1977), *Key to Amphibians and Reptiles of the USSR Fauna*, Prosveshchenie, Moscow [in Russian].
- Bozhanskiy A. T. (2001), "*Vipera nikolskii*," in: *The Red Data Book of the Russian Federation. Animals*, AST – Astrel', Tver', pp. 348 – 349 [in Russian].
- Grubant V. N., Rudaeva A. V., and Vedmederja V. I. (1973), "On the taxonomic status of the black form of the common

- adder,” in: *Problems of Herpetology*, Nauka, Leningrad, pp. 68 – 71 [in Russian].
- Lakin G. F.** (1968), *Biometry*, Vysshaya Shkola, Moscow [in Russian].
- Orlova V. F. and Semenov D. V.** (1999), *Amphibians and Reptiles*, AST, Moscow [in Russian].
- Shcherbak N. N.** (1989), “The procedures of description of new taxons,” in: *The Guide for Investigation of Amphibians and Reptiles*, Kiev, pp. 89 – 92 [in Russian].
- Shcherbak N. N. and Shcherban M. I.** (1980), *Amphibians and Reptiles of the Ukrainian Carpathians*, Naukova Dumka, Kiev [in Russian].
- Sokolov A. S. and Lada G. A.** (2000), “Reptiles,” in: *Red Data Book of the Tambov Oblast’. Animals*, Proletarskii Svetoch, Tambov, pp. 231 – 237 [in Russian].
- Terentjev P. V. and Chernov S. A.** (1949), *Key to Reptiles and Amphibians*, Sovetskaya Nauka, Moscow [in Russian].
- Vedmederja V. I.** (1989), “Vipers of the subgenus *Pelias*,” in: *The Guide for Investigation of Amphibians and Reptiles*, Kiev, pp. 35 – 39 [in Russian].
- Vedmedreja V. I., Grubant V. N., and Rydaeva A. V.** (1986), “On the problem of specific name for the black adder of the partially wooded steppe of the European part of the USSR,” *Trudy Khark. Univ.*, **288**, 83 – 85 [in Russian].