

A view on human perception of snakes in Serbia with special reference to nose-horned viper

Original Article

Abstract:

Snakes are frequently misunderstood and ill-perceived animals. Having in mind the frequent killings of snakes near villages in Serbia as their habitats coincide with agricultural land, we administered questionnaire to the local inhabitants at several localities to evaluate human perception of the snakes with a special reference to *Vipera ammodytes*. We interviewed 87 individuals where the majority (68%) were men of age 65 and older. We classified responses to eight different topics: attitude, knowledge, awareness, folklore, knowledge about nose-horned vipers, possible threats to the vipers, direct killings and snakebite incidence. Younger age groups of the respondents (18-24 and 25-34) had positive attitude and more knowledge about snakes while other age groups were ambivalent. Further, gender groups were also ambivalent. Almost half (45%) of respondents recognized *V. ammodytes*, but 36% stated that this viper “jumps and attacks” humans, and majority of respondents (61%) perceived this species as aggressive. Regarding these results, we have proposed possible conservation measures.

Key words:

ophiophobia, Serbia, survey, snake awareness, folklore, *Vipera ammodytes*

Apstrakt:

Pregled ljudskog stava o zmijama u Srbiji sa posebnim osvrtom na poskoka

Zmije su često neshvaćene životinje. Imajući u vidu česta ubijanja zmija na selima u Srbiji obzirom na to da se staništa ovih životinja nekada nalaze u blizini ili na poljoprivrednim zemljištima, sprovedeno je istraživanje mišljenja o zmijama lokalnih meštana, putem dodele upitnika, na nekoliko lokaliteta kako bi bio procenjen stav prema zmijama sa posebnim osvrtom na vrstu *Vipera ammodytes*. Anketirano je 87 osoba od kojih su većina (68%) bili muškarci starosti 65 godina i više. Odgovore smo klasifikovali u osam različitih tema: stav, znanje, svest, folklor, znanje o poskoku, moguće pretnje zmijama, direktna ubistva i učestalost zmijskih ujeda. Mlađe starosne grupe ispitanika (18-24 i 25-34) imaju pozitivan stav i više znanja o zmijama, dok su ostale starosne grupe ambivalentne. Dalje, rodne grupe su takođe bile ambivalentne. Skoro polovina (45%) ispitanika prepoznala je vrstu *V. ammodytes*, ali je 36% izjavilo da ova zmija „skače i napada“ ljude, a većina ispitanika (61%) ovu vrstu doživljava kao agresivnu. U vezi sa ovim rezultatima, predložili smo potencijalne mere zaštite.

Ključne reči:

ofiofobija, Srbija, anketa, svest o zmijama, folklor, *Vipera ammodytes*

Introduction

Territory of the Republic of Serbia is inhabited by ten snake species (Tomović et al., 2015): seven are non-venomous and belong to family Colubridae while three are from venomous snakes' family Viperidae (*Vipera ammodytes* L. and *V. berus* L. are highly venomous, while *V. ursinii* B. is mildly venomous). In Serbia, snake species are protected by the national law where all of them, except *V.*

ammodytes, are in category “Strictly protected” (*V. ammodytes* is in a lesser category - “Protected”) (Tomović et al., 2015). *Vipera ammodytes* (nose-horned viper) is widely distributed throughout the Balkan Peninsula (Crnobrnja-Isailović & Haxhiu, 1997), where it have been traditionally persecuted and killed by local inhabitants, illegally traded as a pet, and over-collected for venom extraction (Jelić et al., 2013). In Serbia, where this viper inhabits area on the south of Sava and Danube rivers, during a 16

Tijana Čubrić

Department of Biology and Ecology, Faculty of Sciences and Mathematics, University of Niš, Višegradska 33, 18 000 Niš, Serbia
tijana.cubric@pmf.edu.rs (corresponding author)

Jelka Crnobrnja-Isailović

Department of Biology and Ecology, Faculty of Sciences and Mathematics, University of Niš, Višegradska 33, 18 000 Niš, Serbia
Department of Evolutionary Biology, Institute for Biological Research “Siniša Stanković”, University of Belgrade, Despota Stefana 142, 11000 Belgrade, Serbia

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year period (1993 - 2008), 9,800 adult nose-horned vipers were collected by local suppliers and sold to the National Institute for Immunology and Virology for venom extraction, where they later died due to improper care (Ajtić, 2009). The ban on harvesting nose-horned vipers in Serbia was proclaimed in 2009.

Many of the snake species in Serbia can be found near and/or in villages: e.g. *Dolichophis caspius* G., *Natrix natrix* L., *Zamenis longissimus* L., *Coronella austriaca* L. and *V. ammodytes*, among the other habitats, can be found on road banks, near or in the ruins and in abandoned houses – often in the basements (Speybroeck et al., 2016). Villagers are frequently encountering and killing snakes, and this persecution, besides the urban development, habitat fragmentation, road killings and pet trade, represents additional strong threat for the snake species (Soulsbury & White, 2016; de Souza et al., 2018). As snakes could be one of the apex predators in agricultural ecosystems, their eliminations by direct killings can severely damage trophic webs (Mills et al., 1993).

In regard to these anthropogenically caused threats to both non-venomous and venomous snake species in Serbia, the primary goal of this study was to analyze data obtained from questionnaires on human attitude, knowledge and awareness related to snakes in Serbia and particularly to the nose-horned viper, and to help development of future conservation programs by suggesting conservation measures based on implementation of acquired knowledge. Our secondary aim was to educate and possibly mitigate human-snake conflict by distributing leaflets and booklets among the respondents after the conducted survey. Leaflets were providing general information about nose-horned viper, instruction for proper reaction in case of venomous snake bite, rules on how to behave in nature, and information about the importance of nose-horned vipers, while booklets were containing photos and cohesive information about non-venomous and venomous snake species in Serbia.

Materials and Methods

Data collection

We conducted personal survey using structured anonymous questionnaire in several villages on the territories of Svilajnac town (Central Serbia), protected area “Sićevočka Gorge” (Southeastern Serbia), “Djerdap” National Park (Eastern Serbia), Bosilegrad town (southeasternmost part of Serbia), and Krupanj town (Western Serbia) in the year 2016. (Fig. 1). We purposefully selected these villages because their inhabitants have been in direct contact

with both agricultural land and forested areas which are suitable for snakes, their prey and predators. Furthermore, the areas surrounding Svilajnac and Krupanj are known as localities where the nose-horned vipers were collected for venom extraction in the past (information obtained by previous personal communication and from the press). Additionally, all these areas also represent habitats where we have been conducting monitoring of nose-horned viper’s populations. We have questioned any local inhabitant willing to help us and we have obtained consent from the participants for publication of this study and any accompanying photographs. We recorded age and gender of participants. The questionnaire consisted of 20 questions (Fig. 2) defined in a simple and concise way as older inhabitants have little or no education. Nineteen questions were close-ended with response options of “yes”, “no” or “I don’t know” and “I am not sure”, while one question was open-ended.



Fig. 1. Interviewing local villagers

Data analyses

We classified respondents into two gender groups and separately, into following six age groups: 1) 18-24, 2) 25-34, 3) 35-44, 4) 45-54, 5) 55-64 and 6) 65 and older. We classified questions into following topics:

1. Attitude - questions numbered 1, 4, 5, 10, 12 and 14 (Fig. 2); positive attitude was defined if the respondents have chosen answer “no” in questions no. 1, 4, 5, 10, 12 and “b” or “v” in question no. 14; negative attitude was defined if they have chosen “yes” for the questions no. 1, 4, 5, 10, “yes” and “I don’t know” for question no. 12, and answer “a” for question no. 14.
2. Knowledge - questions no. 2, 3, 7, 9, 11 and 13 (Fig. 2); demonstrates knowledge if the respondents have chosen answer “yes” in questions no. 2, 7, 9, 11, and “no” for questions

- no. 3 and 13; demonstrates lack of knowledge if the respondents have chosen answer “no” in questions no. 2, 7, 9, 11, and “yes” for question no. 3 and “yes” and “I don’t know” for question no. 13.
- Awareness – questions no. 6, 15, 16 and 17; we classified respondents as “aware” if they answered “yes” on three or more questions and not aware otherwise.
 - Folklore - questions no. 13, 18 and 19.
 - Knowledge about nose-horned viper in particular - open-ended question no. 8.
 - Possible threat to vipers - question no. 20.
 - Pressure on the snakes’ and in particular nose-horned viper’s local populations from direct killing with fear as possible source of conflict - questions no. 1, 4 and 10.
 - Snakebite incidence with lethal outcome - question no. 11.

For the attitude and knowledge, we analyzed answer scores using the non-parametric Wilcoxon test with median scores as the depended variable (Wilcoxon, 1992; Rosner et al., 2006). We used one sample Wilcoxon signed rank test to understand median scores for each demographic group (gender and age group) and Wilcoxon sum rank test to compare differences in scores. We proposed zero hypotheses as follows:

- Attitude.** Respondents do not have positive attitude if $H_0=4$ of 6 questions (as we had 6 questions, where median is 3.5; positive answers classified as the defined above), alternative hypothesis $H>H_0$.
- Knowledge.** Respondents did not give correct

answers if $H_0=4$ of 6 questions (as we had 6 questions, where median is 3.5; correct answers classified as the defined above), alternative hypothesis $H>H_0$

We considered all results to be significant at $p<0.05$. All analyses were done by STATISTICA 7.0.

For the remaining six topics, we summarized the results of the questionnaire as the percentages of the total number of respondents who selected each response for each question.

Results

Demographics

As the samples per village were not large enough, we analyzed them in total. We questioned 87 individuals where the majority were men ($n=59$; 68%) and 32% were women ($n=28$). Most respondents were 65 and older - 22% ($n=19$), followed by 55-64 -18% ($n=16$), 16% were of age groups 45-54 and 55-64 ($n=14$), and 14% were of age groups 25-34 and 18-24 ($n=12$). Detailed percentages per every yes/no question per gender group are given in **Appendix 1**, and per age group in **Appendix 2**, while percentages of answers per gender on triple choice questions are given in **Appendix 3** and per age group in **Appendix 4**.

Attitude

Men ($n=59$) gave 4 of 6 positive answers (median 35; **Tab. 1**) and 2 of 6 negative answers (median 24) while women ($n=28$) gave 2 positive (median 20; **Tab. 1**) and 4 negative answers (median=8) indicating that both groups have ambivalent attitude (**Tab. 2**). Regarding age groups, both group aged 18-24 ($n=12$) and 25-34 ($n=12$) had positive attitude

Table 1. Positive and negative attitudes towards snakes in general, and nose-horned viper in particular (positive and negative answers for questions numbered 1, 4, 5, 10, 12,14)

	Number of respondents	Positive attitude				Negative attitude			
		Median	Range	W	p value	Median	Range	W	p value
Gender									
Males	59	35	24-57	2.2	0.03*	24	2-35	2.2	0.03*
Females	28	20	5-27	2.2	0.03*	8	1-23	2.20	0.03*
Age group									
18-24	12	8	5-12	1.99	0.04*	4	0-7	2.20	0.03*
25-34	12	9	3-12	1.85	0.06	3	0-9	2.20	0.03*
35-44	14	9.5	6-14	1.85	0.06	4.5	0-8	2.20	0.03*
45-54	14	8	6-14	2.02	0.04*	6	0-8	2.20	0.03*
55-64	16	8	7-14	2.20	0.03*	8	2-9	2.20	0.03*
65 and older	19	11	5-18	2.20	0.03*	8	1-14	2.20	0.03*

* denotes p values<0.05

answering with 5 positive answers (median=8; median=9 respectively, **Tab. 1, Tab. 2**) while other 3 groups were ambivalent (**Tab. 1, Tab. 2**): 35-44 gave four positive and two negative answers (median=9.5; median=4.5 respectively; **Tab. 1**), 45-54 gave the equal number of positive and negative answers on 2 questions, 3 positive and 1 negative answer (median=8, median=6 respectively), 55-64 gave the equal number of positive and negative answers on 3 questions, 2 positive and 1 negative answer (median=8, median=8 respectively), 65 and older gave 3 positive and 3 negative answers

(median=11, median=8 respectively).

Knowledge

Men gave 4 of 6 correct answers (median 43.5; **Tab. 3**) and 2 of 6 incorrect answers (median 15.5) while women gave 3 correct (median 12.5; **Tab. 3**) and 3 incorrect answers (median=15.5) indicating that both groups had the same level of aptitude - medium one (**Tab. 4**). Regarding age groups, both group aged 18-24 and 25-34 had correct 4 answers, indicating high level of aptitude (median=8.5; median=7.5 respectively, **Tab. 3, Tab. 4**) while other 3 groups had medium aptitude (**Tab. 3, Tab. 4**): 35-44 gave 3 correct and two incorrect answers, and the equal number of correct and incorrect answers on one question (median=8; median=6 respectively; **Tab. 3**); 45-54 gave the equal number of correct and incorrect answers on one question, 4 correct and 1 incorrect answer (median=10.5, median=3.5 respectively); 55-64 gave 4 correct and 2 incorrect answers (median=11, median=5 respectively); 65 and older gave 4 correct and 2 incorrect answers (median=10.5, median=8.5 respectively).

Table 2. Scores for positive and negative attitudes toward snakes in general and nose-horned viper in particular, calculated separately for genders and age groups (questions numbered 1, 4, 5, 10, 12,14;H₀=4, H>H₀)

	Positive attitude		Negative attitude	
	W	p value	W	p value
Gender				
Males	0.31	0.75	1.36	0.17
Females	5	0.24	0.10	0.91
Age group				
18-24	2.02	0.04*	2.20	0.03*
25-34	2.20	0.03*	1.21	0.22
35-44	0.73	0.46	1.82	0.07
45-54	0.07	0.50	2.20	0.3
55-64	1.57	0.11	2.02	0.04*
65 and older	1.75	0.07	1.61	0.10

Awareness

70% of respondents answered that they know that snakes can be important part of ecosystem and useful in rodent populations control (**Appendix 1**); 61% of respondents didn't know that the nose-horned viper is lethargic snake as they considered it aggressive, while 10% of them didn't believe in that statement; 57% of villagers didn't know about the nose-horned viper's important role in ecosystem, while 79% knew about the usage of *V. ammodytes*

Table 3. Correct and incorrect answers on questions related to the knowledge on snakes and nose-horned viper in particular (questions numbered 2,3,7,9,11,13)

	Number of respondents	Correct answers				Incorrect answers			
		Median	Range	W	p value	Median	Range	W	p value
Gender									
Males	59	43.5	1-59	2.02	0.04*	15.5	0-58	2.20	0.03*
Females	28	12.5	1-26	2.20	0.02*	15.5	2-27	2.20	0.03*
Age group									
18-24	12	8.5	0-12	2.02	0.04*	3.5	1-12	2.02	0.04*
25-34	12	7.5	0-12	2.02	0.04*	4.5	0-12	2.02	0.04*
35-44	14	8	0-13	2.20	0.03*	6	1-14	2.02	0.04*
45-54	14	10.5	0-14	2.02	0.04*	3.5	0-14	2.02	0.04*
55-64	16	11	0-16	2.02	0.04*	5	0-16	2.02	0.04*
65 and older	19	10.50	2-19	2.02	0.04*	8.5	0.17	2.20	0.03*

Table 4. Scores for correct and incorrect answers on questions related to the knowledge on snakes and nose-horned viper in particular (questions numbered 2,3,7,9,11,13; $H_0=4$, $H>H_0$)

	Correct answers		Incorrect answers	
	W	p value	W	p value
Gender				
Males	0.73	0.46	0.31	0.75
Females	0.94	0.34	1.15	0.25
Age group				
18-24	1.99	0.046*	0.20	0.83
25-34	2.20	0.03*	1.78	0.07
35-44	1.36	0.17	1.04	0.29
45-54	2.20	0.06	0.41	0.67
55-64	1.57	0.11	0.27	0.78
65 and older	0.73	0.46	1.78	0.07

venom in anti-venom production. Therefore, we classified them as not completely aware.

Folklore

39% of villagers did not think that nose-horned viper is used in human consumption, while 34% did not know the answer (Appendix 3); 43% did not think that nose-horned viper’s meat can be used as a medicine, while 51% did not know the answer; 36% of respondents didn’t believe in the folklore premise that *V. ammodytes* “jumps and attacks” humans, while 30% did not know the answer.

Knowledge about nose-horned viper

45% of respondents gave correct answer when asked to describe the morphology of *V. ammodytes*, while

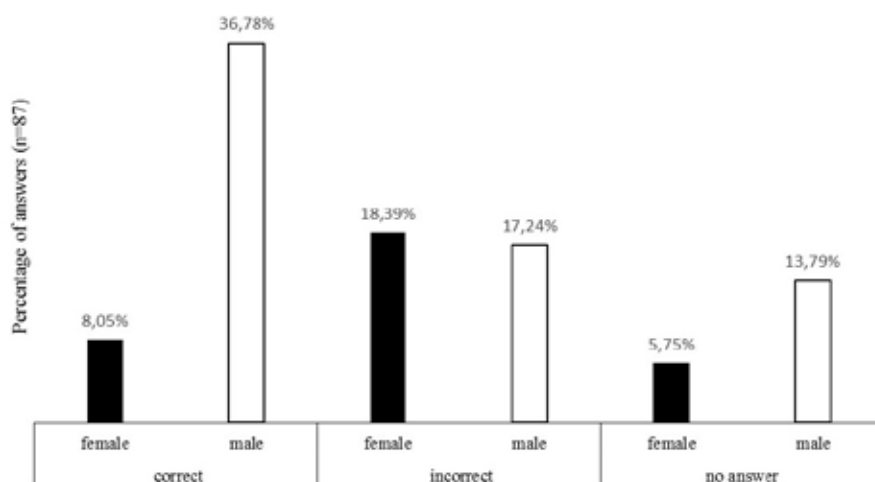


Fig. 3. Knowledge about nose-horned viper among genders

36% gave incorrect answers and 20% did not know to describe the snake. In regarding to the animal’s behavior, most common mistakes were in describing this viper as an animal which is very aggressive and which “jumps”, while in regard to morphology of the snake most common mistake was that this species can be uniformly colored (often mentioned brown and red color). Gender and age group differences in answers are given in Fig. 3 and Fig. 4, respectively.

Possible threat

32% of respondents answered they have heard or know person who had been (in case of Svilajnac) or is (in case of Krupanj) harvesting the nose-horned vipers for venom supply.

Direct killing and fear

53% of villagers were afraid of snakes, 51% of them never killed a snake while 84% never killed a nose-horned viper (Appendix 1). Interestingly, majority of the respondents who are afraid of snakes, never killed a snake (31% from 53%) while majority of the respondents who aren’t afraid of snakes did kill a snake in a past (31% from 47%) (Fig. 5).

Snakebite occurrence

Only 2 respondents (2%) answered that they knew the person who died due to the snakebite.

Further observations

In order to additionally evaluate human perception of snakes, here we report some further observations. In “Sićevačka Gorge” protected area, villagers have burned the vegetation subsequent day after we were seen performing morphometric measurements on one nose-horned viper. Respondents from one locality (Krupanj) stated that some neighbors captured nose-horned vipers, pulled out their fangs, skinned them and wore the skin as bracelets. In the year 2017, (year following our field activities and conducted survey), during our educational lecture in Krupanj and field work in Svilajnac, two of the inhabitants respectively stated that someone released nose-horned vipers in their village referring to us, which is of course false information. This was the main reason why we have suspended conducting survey further, as it draw’s attention on local snake

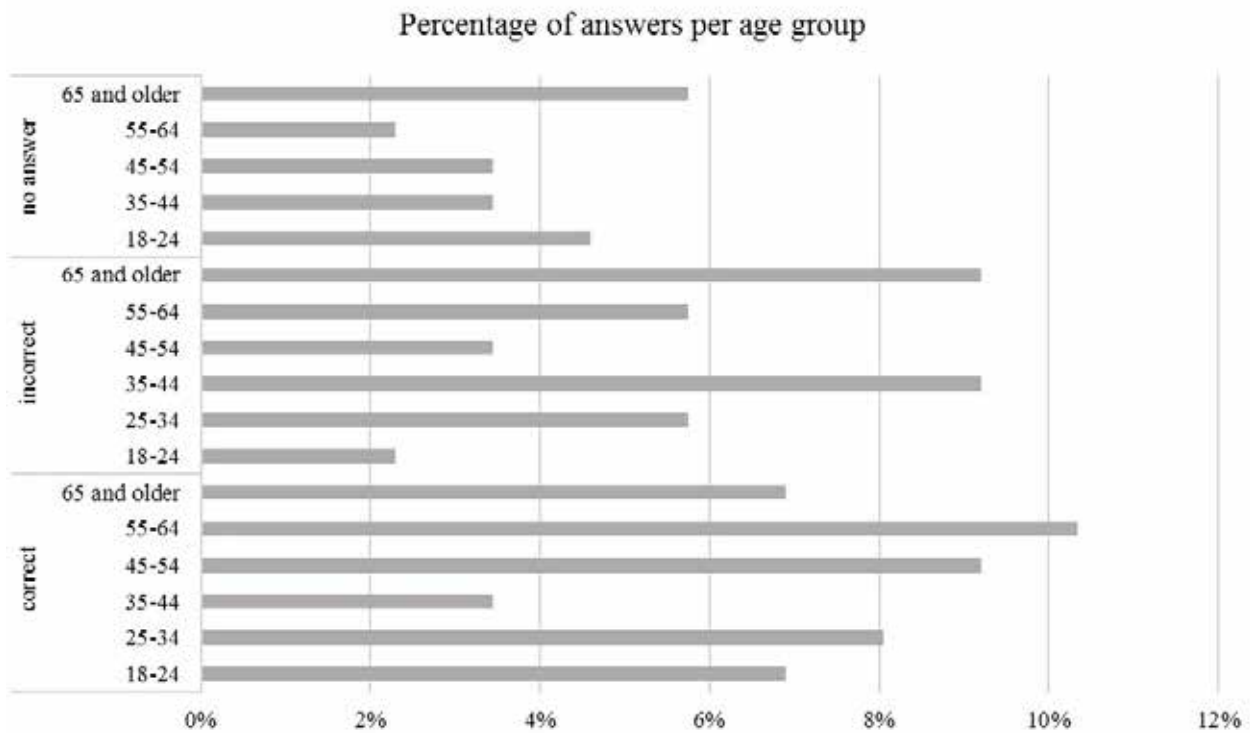


Fig. 4. Knowledge about nose-horned viper among age groups

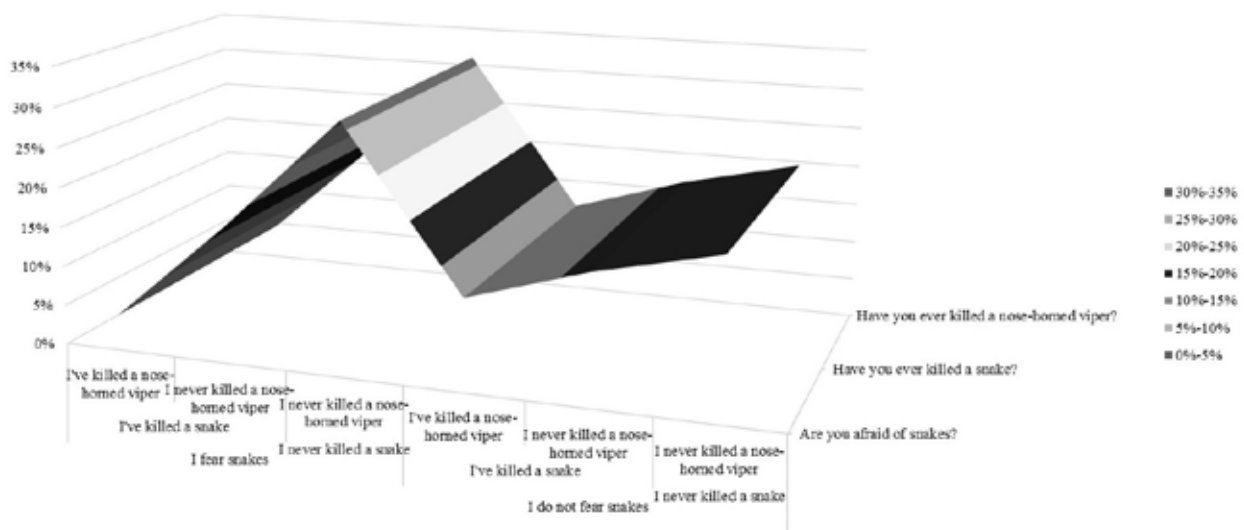


Fig. 5. Fear and responses to snake encounters

populations in the areas where local inhabitants were not even aware of their close proximity.

Discussion

In Serbia, relatively ambivalent current attitude toward snakes is the result of intermixing tradition with contemporary citizen science and education. In

general, human perception of snakes can be positive or negative, ranging from fascination to fear and hatred (Moura et al., 2010). Reasons for fear or adoration can be various; from innate to learned fear with conjunction of folklore and spiritual beliefs. Namely, South Slavic believed in protector-ancestor spirit which represented the male founder of the family who has been incarnated into a house-

snake, the white snake, which was called “house protector” (Conrad, 2001). In Serbia, in particular, one of traditional beliefs is that this white snake lives in the foundation wall of the house or nearby, where preys on mice, and must not be harmed as it was considered the source of good fortune (Conrad, 2001). On the contrary, in some villages in Serbia, on Lazar’s Saturday (Christian calendar marking the transition from winter to spring and from death to life), villagers perform acts such as throwing stones, shouting, making loud noise to chase away snakes (Moussakova, 2016). Among the Vlach people in eastern Serbia, it is commonly believed that nose-horned viper can jump and follow a person for a long time; also, snake skulls and sheds are there the most often used in magical rituals (Crnobrnja-Isailović et al., 2015).

The causes of ophiophobia are still up to debate; is ophiophobia innate, learned or both factors influence person’s cognitive response (Isbell, 2006; Van Le et al., 2013). Regardless the cause, the fear of snakes is most probably a silent stimulus and can easily be triggered and amplified by external causes such as secondary experiences i.e. a scary story (Ohman & Mineka, 2001). This could be the possible explanation for our finding that younger age groups (age 18-24 and 25-34) have positive attitude towards snakes as they were probably more educated and in our personal communication with them some stated that they learned about snakes more in the nature documentaries. Nevertheless, in our sample more people were afraid of snakes than not and, interestingly, the ones who were afraid tend to kill them less and possibly due to their avoidance of being in the proximity of the animal. Studies have shown that people with ophiophobia tend to avoid snakes (Geer, 1965; Lang, 1969). Our results have shown that people who are not afraid of snakes tend to kill them more often, probably to protect themselves, or they display excitement seeking behavior (Bradshaw et al., 2007), portrayed in movies, articles and documentaries with cheap sensationalism, including even charismatic storytellers whose reckless and attention seeking behavior lead to their death (Bradshaw et al., 2007). Direct killings and vigorous killings of snakes have also been frequently reported in other countries such as Nepal (Pandey et al., 2016), Jordan (Eid et al., 2021), etc. showing a consistency in ill-perceived attitude towards snakes. The same two age groups also gave most accurate answers about snakes. Our findings imply that even though education about snakes is important, fear of snakes can be beneficial as causes people to avoid snakes altogether as similar observations in Japan suggest (Tanaka et al., 1999). Even though 45% of respondents gave correct

answer when asked to describe the morphology and behavior of *V. ammodytes*, 36% gave incorrect answers, frequently stating that this viper “jumps and attacks” humans. Moreover, most respondents (61%) perceived this snake as aggressive, which is in concordance with previously mentioned folklore. Despite this belief, only two respondents in our sample knew a person who died due to the snakebite, which further confirms this viper’s lethargic nature. This is in concordance with report in Nikolić (2020) that 164 cases of venomous snakebites in Serbia were recorded between 1893 and 2018, and that only four deaths were reported in a ten-year period, although Serbia has no systematized information regarding this topic.

Having in mind unwillingness of some of the local villagers to participate in our study, it is important to reconsider that negative attitude could be more prevalent than described in this study. These inhabitants could decline to answer because they were aware of the potential law penalty for killing the wild animals although they would actually like to kill them; the other possible reason for declining to answer could be the feeling of animosity and distrust towards persons who study the species they are afraid of and/or do not like to see around. Therefore, even though most respondents gave negative and neutral answer on question number 12, it is important to interpret the ambivalent attitude with caution.

Conservation implications

Despite limited sample size, which is the result of performing the study in small villages, unwillingness of the inhabitants to participate in the survey and our further suspension of survey because of the possible negative influence on the local snake populations as described above and below, results of our study provided information about attitudes of people in the rural Serbia toward local snake species, especially about the most common and persecuted venomous one. Additionally, we revealed that, analysing answers on question number 20, even the ban has been proclaimed since 2009, some people have been illegally harvesting nose-horned vipers (this information was reported to the Institute for Nature Protection of Serbia). All these findings encouraged us to recommend a few guidelines for future national snake conservation action plans, originally proposed by Dodd on global level (2016) which we broadened and specified for the Republic of Serbia:

- a. Set the goals. It is important to choose the adequate core audience for education activities (lectures, documentaries, etc). Have in mind that people afraid of snakes mainly do not kill them, and that it is important to recognize and understand the reasons which motivate people unafraid of snakes

- to kill them and therefore target the education activities towards them.
- b. Choose the right education campaign, whether that be earned through media, digital media or direct community outreach. The education cannot be left to the income motivated zoos, serpentariums or sensationalized movies, documentaries and news reports. Snakes must be documented exclusively in their natural habitats with minimum to no handling in order to not send potentially harmful message.
 - c. It is important to be consistent and regularly engaging with members of local communities. Although, if it is recognized that local villagers are not aware of snakes' presence in their vicinity, it is best not to draw attention to them. Our experience is that villagers have burned the vegetation one day after we were seen performing morphometric measurements on one nose-horned viper; additionally, two of the inhabitants respectively stated that someone released nose-horned vipers in their village. In this case, our survey and community outreach were contra productive and this must be taken into consideration. Thankfully, answers on questions regarding folklore (questions no. 18. and no. 19.) were mostly negative compared to dangerous threat in form of overexploiting a wild reptile species for purpose of consuming its meat – the case of *Testudo hermanni* in some parts of Serbia (Crnobrnja-Isailović et al., 2015). Nevertheless, as the one third of interviewed villagers did not know the answer on question no. 18, while one half did not know the answer on the question 19., it would be the best not to mention it anymore in order to do not suggest to particular people the idea for very dangerous actions.
 - d. Education of primary and secondary school children could be quite beneficial. Ballouard et al. (2013) found that young children up to 14 years old, liked snakes and wanted them protected after they were given correct information and interacted with animals. Furthermore, similar preliminary children response was also noted by us when giving lectures in the primary school in Donji Milanovac (near Djerdap National Park) and in the secondary school in Svilajnac.

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Appendices

Appendix 1. Percentage of answers per gender on yes/no questions

Question number	Total in percentage		Males		Females	
	Yes	No	Yes	No	Yes	No
1	53	47	30	38	23	9
4	49	51	40	28	9	23
5	54	46	28	40	26	6
6	70	30	51	17	20	13
7	70	30	53	15	17	15
9	59	41	47	21	11	21
10	16	84	15	53	1	31
11	2	98	1	67	1	31
16	43	57	33	34	9	23
17	79	21	51	17	29	3
20	34	66	23	45	11	21

Appendix 2. Percentage of answers per age group on yes/no questions

Question number	18-24		25-34		35-44		45-54		55-64		65 and older	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1	6	8	7	7	9	7	8	8	9	9	14	8
4	8	6	1	13	6	10	9	7	9	9	16	6
5	5	9	10	3	9	7	8	8	10	8	11	10
6	8	6	8	6	14	2	14	2	13	6	14	8
7	11	2	8	6	10	6	14	2	14	5	13	9
9	8	6	9	5	8	8	10	6	11	7	11	10
10	1	13	0	14	0	16	5	11	7	11	3	18
11	0	14	0	14	0	16	0	16	0	16	2	20
16	6	8	5	9	8	8	10	6	9	9	5	17
17	9	5	8	6	15	1	14	2	16	2	17	5
20	2	11	3	10	3	13	7	9	8	10	10	11

Appendix 3. Percentage of answers per gender on triple choice questions

Question number	Total			Male			Female		
2	98	2	0	68	0	0	30	2	0
3	3	92	5	0	67	1	3	25	3
8	45	36	20	37	17	14	8	18	6
12	14	63	23	10	40	17	3	23	6
13	34	36	30	23	29	16	11	7	14
14	3	66	31	2	43	23	1	23	8
15	29	61	10	22	39	3	7	22	3
18	26	39	34	21	28	15	6	11	15
19	7	43	51	3	37	28	3	6	23

Appendix 4. Percentage of answers per age group on triple choice questions

Question number	18-24			25-34			35-44			45-54			55-64			65 and older		
	2	13	1	0	14	0	0	15	1	0	16	0	0	18	0	0	22	0
3	0	14	0	0	11	2	0	15	1	1	15	0	0	17	1	2	20	0
8	7	2	5	8	6	0	3	9	3	9	3	3	10	6	2	7	9	6
12	1	9	3	0	8	6	0	11	5	2	10	3	6	9	3	5	15	2
13	7	5	2	5	3	6	5	6	6	6	8	2	7	7	5	6	7	9
14	0	9	5	0	9	5	0	6	10	0	10	6	2	13	3	1	18	2
15	3	10	0	1	13	0	5	9	2	7	8	1	6	8	5	7	13	2
18	3	5	6	3	6	5	5	7	5	5	5	7	7	6	6	3	11	7
19	1	7	6	0	6	8	1	7	8	1	3	11	2	7	9	1	13	8

