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Distribution of the genus *Vipera* in the western and central Balkans
(Squamata: Serpentes: Viperidae)

Verbreitung der Gattung *Vipera* auf dem westlichen und zentralen Balkan
(Squamata: Serpentes: Viperidae)

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KURZFASSUNG

Die Balkanhalbinsel ist ein anerkannter europäischer Biodiversitäts-Hotspot, an welchem Giftschlangen der Gattung *Vipera* durch zwei Unterarten der Kreuzotter (*V. berus*), zwei der Wiesenotter (*V. ursinii*) und drei der Hornotter (*V. ammodytes*) vertreten sind. Verbreitungsatlanten und Rote Listen bieten nur unzureichende Informationen über die gegenwärtige Verbreitung und den Bedrohungs- und Schutzstatus dieser Schlangen. Die meisten Nachweise entstammen der älteren Literatur, blieben aber vielfach unbestätigt. Auch finden sich bekannte oder vermutete Verbreitungslücken, deren Lage und Verlauf überprüfenswert sind. Insbesondere können aber Schutzmaßnahmen hinsichtlich ihrer Priorität und der Vorgangsweise ohne präzise faunistische Daten nicht zielführend sein. Verschiedene schutzrelevante Proleme betreffen alle drei Vipernarten auf dem Balkan gleichermaßen, wie etwa der Mangel an systematischen Untersuchungen und öffentlichem Interesse, historisch-politisch bedingte Erschwernisse, Unwissenheit, Aberglaube und Schlangenfurcht in der Bevölkerung, zunehmende Verstädterung der Landschaft, Habitatzerstörung, illegaler Fang sowie unzureichende oder fehlende gesetzliche Schutzbestimmungen in einzelnen Ländern. Mit dieser Arbeit legen die Autoren vervollständigte und aktualisierte Verbreitungsangaben der Vipern von Kroatien, Bosnien und Herzegowina, Montenegro, Serbien und Mazedonien vor.

ABSTRACT

The Balkan Peninsula is generally recognized as one of the hot-spots of European biodiversity, where vipers of the genus *Vipera* are represented by two subspecies of the European Adder, (*V. berus*), two of the Meadow Viper (*V. ursinii*) and three of the Nose-horned Viper (*V. ammodytes*). The available atlases and Red Data Books do not provide precise information on their present distribution or conservation and threat status. Most available records originate from older literature and remain unconfirmed; moreover, there are known or supposed distributional gaps, the course and position of which need verification. In particular, conservation measures, priorities and strategies cannot be established without precise faunistic data. However, the three viper species share additional conservation problems in the Balkans, such as lack of systematic study and public interest, "historical and political burdens", lack of knowledge, superstition and fear among people, increasing urbanization, habitat destruction, illegal collection, as well as lack of adequate legislation (or regulations at all) in various countries. Presented here is a more complete and new data about the distribution of the vipers in Croatia, Bosnia and Herzegovina, Montenegro, Serbia and FYR of Macedonia.

KEY WORDS

Reptilia: Squamata: Viperidae; *Vipera ursinii*, *Vipera ammodytes*, *Vipera berus*, distribution Balkan Peninsula, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, FYR of Macedonia

INTRODUCTION

The Balkan Peninsula, as a part of the Mediterranean basin, is generally recognized as one of the hot-spots of European biodiversity (Blondel & Aronson 1999; Médail & Quézel 1999; Petkovski et al. 2000/2001; Džukić & Kalezić 2004). The western and central parts of the peninsula are geographically diverse, extending from the southern slopes of the Alps in the northwest, to the Great Pannonian Plain in the east and across the Great Dinaric Mountain Chain down to the shores of the Adriatic Sea in the southwest. The study area consists of five countries: Croatia, Bosnia and Herzegovina, Serbia, Montenegro and FYR of Macedonia, all situated within the territo-

ry of the former Yugoslavia. Due to this historical background, most of the earlier authors dealt with these individual countries in a collective way when they described and discussed data from this part of the Balkan Peninsula (e.g., Werner 1899; Bolkay 1919; Karaman 1922; Radovanović 1951; Brelih & Džukić 1974; Džukić & Kalezić 2004).

The oldest data about vipers in the study area were provided by Francesco Carrara in his 1846 work "La Dalmazia descritta", in which he mentioned the Nose-horned Viper as a very common snake in Dalmatia and some of the islands. After that, during the end of 19th century, two of the most famous herpetologists of that time, Franz Werner and Lajos Méhely, published several papers about the herpetofauna of the Balkan Peninsula (e.g., Werner 1897, 1898, 1899; Méhely 1894) and due to their precision and quality, are still referenced today. To the list of herpetological species of the Balkan Peninsula, they added *Vipera ursinii* (Bonaparte, 1833) and *Vipera berus* (Linnaeus, 1758). The first mention of *Vipera ursinii* from the region under study was actually made by Werner (1893) when he reported a "strange looking *V. berus*, similar in characters to var. *rakosiensis,* described by Méhely from Hungary", from the Dinara Mountain (today in Croatia). From Werner's description of the number of apical, ventral and dorsal scales it is clear that he characterized a Meadow Viper, *Vipera ursinii macrops* Méhely, 1911. At the beginning of the 20th century, Bolkay (1919), Doflein (1921) and Karaman (1921, 1922) contributed considerably to the knowledge of the distribution of amphibians and reptiles in the area of the western Balkans, whereas subsequent papers (Radovanović 1951, 1964; Radovanović & Martino 1950; Brelih & Džukić 1974) mainly listed already known record localities.

The recent systematic publications confirmed the the vipers' subspecific diversity at the Balkans. In its western and central parts, the European Adder is represented by two subspecies, *Vipera berus berus* (Linnaeus, 1758), in the westernmost portion of Croatia and *V. berus bosniensis* Boettger, 1889 in the rest of the study area (Ursenbacher et al. 2006). According to molecular analyses by these authors, the northwestern populations belong to the "Italian clade" of *V. b. berus*. Populations from montane areas around Trebinje (Bosnia and Herzegovina) were described by Boettger (1889) as a distinct Balkan race, *V. berus* var. *bosniensis*, which is still accepted as a valid subspecies (*V. berus bosniensis*) occurring from Croatia, through Bosnia and Herzegovina, Serbia, Bulgaria, to FYR of Macedonia, Montenegro and Albania (Kalyabina-Hauf et al. 2004; Ursenbacher et al. 2006). The variation of *V. berus* named *pseudaspis* was described by Schreiber (1912) from the plains of Slavonia (Croatia), as straw-yellow above, with narrow, dark cross-bars, thereby resembling *Vipera aspis* (Linnaeus, 1758). This coloration type, with partly or completely broken elements of the dorsal zigzag pattern, is actually typical to populations of *V. berus bosniensis*. In 1927, Reuss (1927a, 1927b) described several specimens of *V. berus* from the valley of the River Sava (Croatia, Serbia), which he assigned to *Mesocornis*, a new subgenus of *Vipera*. Later he included all Adders from the Balkans (which is a synonym of *V. b. bosniensis*) in that subgenus and claimed that these possess neurotoxic venom (Krecsák 2007) rather than hematotoxic.

Five subspecies of the Nose-horned Viper were described from the Balkans: *Vipera ammodytes ammodytes* (Linnaeus, 1758), *V. a. illyrica* (Laurenti, 1768), *V. a. meridionalis* Boulenger, 1903, *V. a. montandoni* Boulenger, 1904, and *V. a. gregorwallneri* Sochurek, 1974 (Crnobrnja-Isailović & Haxhiu 1997). According to the morphological paper by Tomović (2006), three subspecies inhabit the central and eastern Balkan Peninsula: *ammodytes* in the northwest (Croatia, Bosnia and Herzegovina, Montenegro, most of Serbia, northwestern Bulgaria), *montandoni* in the central and eastern parts (southernmost Serbia, northern and central Albania, FRY of Macedonia, Romania, most of Bulgaria and northern Greece and Turkey), and *meridionalis* in the southernmost Balkan Peninsula (Greece). Genetic analyses by Ursenbacher et al. (2008) largely confirmed these results, and in addition, found

high genetic diversity in the areas of the central, eastern and southern Balkans.

In the case of the Meadow Viper, currently two subspecies are known from the Balkans, *V. ursinii macrops* MÉHELY, 1911, and *V. u. graeca* NILSON & ANDRÉN, 1988 (NILSON & ANDRÉN 2001; CRNOBRNJA-ISAILOVIĆ 2002; STERIJOVSKI 2006; KORSÓS et al. 2008).

Vipers are poisonous and relatively secretive snakes which certainly adds to the reasons why they were comparatively poorly studied in the Balkans. The available atlases and Red Data Books do not provide precise information on their present distribution or conservation and threat status. Most available records originate from older literature and remained unconfirmed; moreover, there are known or supposed distributional gaps, the course and position of which need to be verified. In particular, conservation measures, priorities and strategies cannot be established without precise faunistic data. Regarding *V. ursinii*, a highly threatened viper species, the number of detailed locality records from the Balkans is conspicuously scarce. For *V. berus*, a species of extremely wide distribution, little more than historical records exist. And with respect to the predominant Balkan species *V. ammodytes*, there are more distribution records from Austria, Slovenia and Italy than from the Balkans, although constituting the main part of its distribution range.

Present here is a more complete and updated distribution of the genus *Vipera* in the western and central Balkan Peninsula, based on both older and recent records. Data from Croatia, Bosnia and Herzegovina, Montenegro, Serbia and FYR of Macedonia were compiled to create informative distribution maps and assess the most important areas for the conservation of the vipers. Problems, legal protection and important areas for the conservation of the vipers are dissccused in a separate publication.

MATERIALS AND METHODS

This study includes information on records provided by the Croatian, Serbian, Macedonian, German, Italian, Hungarian and English literature (705 records, many of them referring to museum vouchers, Appendixes I and II) along with unpublished data available from European museum collections that hold specimens from the study area (84 records, Appendix IV). In this way, several repeatedly cited errors such as *V. ursinii* from Krk, Slavonia and Serbia, and *V. berus* from the Velebit) were corrected. New data was collected from 2000 onward (1,029 records); they came from *ad-hoc* observations by the authors and collaborators mentioned in the acknowledgments (Appendix III). None of these observations was the result of systematic sampling and, therefore, available information is patchy and absence of a record on the map does not imply absence of the viper, but merely inadequate data. Thus, interpreting the distribution maps, one should take into account this possible bias.

Gathered records were mapped in the 10 km x 10 km UTM (Universal Transverse Mercator) geographic coordinate grid system. Grid cells in marginal position that cover the study area with less than 10 % of their surface area (border areas toward the Adriatic or neighboring countries) were excluded from the analysis, leaving 2,811 cells for consideration.

All collected records were analyzed regarding plausibility and assigned to their respective UTM cells. Some record localities refer to areas rather than sites, and thus extend across several grid cells. Two types of records became part of the study: (i) records previously published in the literature and (ii) unpublished data, and as such are distinguished in the grid maps.

Institutional abbreviations: BMNH – British Museum (Natural History), London; GNM – Göteborgs Naturhistoriska Museum; HNHM – Hungarian Natural History Museum, Budapest; MHNG – Muséum d'Histoire Naturelle de Genève; MNHN – Museum National d'Histoire Naturelle, Paris; MZUF – Museo Zoologico dell'Universita degli Studi di Firenze "La Specola"; NHMB – Natural History Museum Belgrade; NMW – Naturhistorisches Museum Wien; SFNM – Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt am

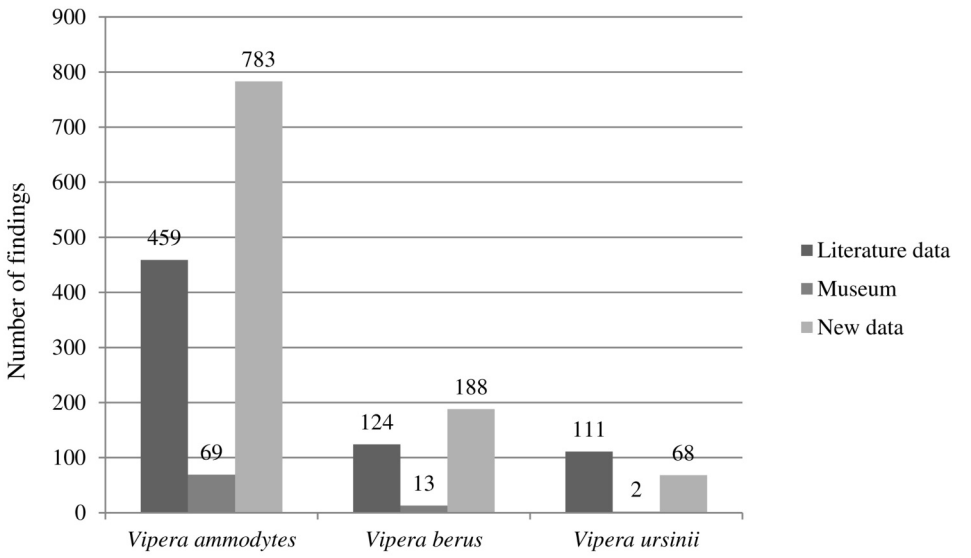


Fig. 1: Number of literature, museum and new field records of *Vipera ammodyte*s, *V. berus* and *V. ursinii*, with regard to the study area of the western and central Balkans.

Abb. 1: Anzahl der Vorkommensnachweise aus Literatur, Museumsmaterial und aktuellen Felderhebungen für *Vipera ammodyte*s, *V. berus* und *V. ursinii* im Untersuchungsgebiet des westlichen und zentralen Balkans.

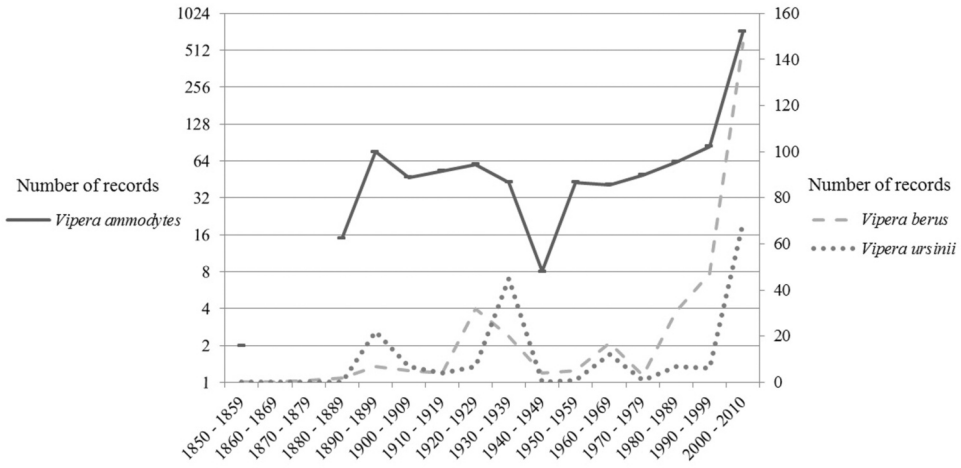


Fig. 2: Number of records of *Vipera ammodyte*s, *V. berus* and *V. ursinii*, obtained from the western and central Balkans in the last 160 years, indicated per decade.

Abb. 2: Anzahl der Vorkommensnachweise von *Vipera ammodyte*s, *V. berus* und *V. ursinii* im Untersuchungsgebiet des westlichen und zentralen Balkans, erbracht in den letzten 160 Jahren; nach Jahrzehnten gegliedert.

Main; SMNHLj – Slovenian Museum of Natural History, Ljubljana; SMNH – Swedish Museum of Natural History, Stockholm; ZFMK – Zoologisches Forschungsmuseum "Alexander Koenig", Bonn; ZMB – Zoologisches Museum Berlin; MSNM - Museo Civico di Storia Naturale di Milano; ZMS – Zemaljski Muzej Bosne i Hercegovine u Sarajevu.

RESULTS

In this study, a total of 1,818 records of vipers were collected from the period of 1850-2010. *Vipera ammodytes* was the best represented species, accounting for 1,311 records (72.1 %), followed by *V. berus* with 326 records (17.9 %), and *V. ursinii* with 181 records (10.0 %). Literature data (n = 705) constitute 38.8 % of the records, unpublished museum data (n = 84) 4.6 % and unpublished field data (n = 1,029) 56.6 %. However, in *V. ursinii* the literature records (n = 111; 61.3 %) and unpublished museum data (n = 2; 1.1 %) outnumbered the new field records (n = 68; 37.6 %) (Fig. 1).

Distribution of records originating from the last 160 years (Fig. 2) shows that 52 % were brought together only in the last 10 years. Visible peaks correlate with the work of famous herpetologists in these areas: 1890-1899 (F. WERNER, L. MÉHELY); 1920-1929 and 1930-1939 (G. VEITH, I. BOLKAY, F. DOFLEIN, S. KARAMAN). It is not surprising that the most widespread species *V. ammodytes* displayed most rapid increase of new records (>56 % in the last 10 years) and the less understood, secretive and rare *V. ursinii* the slowest (38 % in the last 10 years). *Vipera berus* which is secretive, but not so rare, showed an intermediate increase with about 45 % of records collected in the last 10 years.

Altitudinal distribution analysis revealed a very wide and continuous span for *V. ammodytes* from 0 to more than 2,000 m a.s.l., with the peak around 400-800 m a.s.l. Only one individual was found above 2,000 m, viz. on Mt. Ošljak, Šar planina (Serbia) at 2,150 m a.s.l. *Vipera berus* interestingly showed an uncontinuous two-peaked altitudinal distribution from 0-400 m and 800-2,600 m a.s.l. with the predominant peak from 1,600-2,000 m a.s.l. The observed distribution gap in medium altitudes is due to the lack of favorable habitats (predominance of closed pure forest habitats). *Vipera ursinii* was found to range from 1,000-2,000 m a.s.l., somewhat in between *V. ammodytes* and *V. berus* (Fig. 3), with the peak around 1,500-1,800 m a.s.l. Due to this intermediate position, syntopic situations are much more common in combined populations of *ammodytes-ursinii* and *ursinii-berus*, than *ammodytes-berus* or even *ammodytes-ursinii-berus*. In all three viper species, the preferred altitudinal distribution is lowest in the north-west and highest in the south-east of the Balkans.

Confirmed syntopic presence of all three vipers is only known from the areas of the Troglav and Zelengora Mountains (Bosnia and Herzegovina), and of *ammodytes-berus* communities from few localities at the Stogovo and Jablanica Mountains (FYR of Macedonia), Vlašić and Šator Mountains (Bosnia and Herzegovina) and Velika Kapela Mountain (Croatia). *Ammodytes-ursinii* co-occurrence is very common in the northwestern part of the *V. ursinii* distribution area (Croatia, Bosnia and Herzegovina), where *V. ursinii* reaches its lowest altitudes at 1,000 m a.s.l. At higher altitudes, *ursinii-berus* syntopic populations are known from the Bjelasica and Durmitor Mountains (Montenegro), Šar Planina and the Korab Mountains (FYR of Macedonia). This syntopy is probably also very common in the Herzegovinian mountains, but no recent data are available to support this assumption.

Croatia held the highest number and percentage of records (840 records, 46.2 %; 14.8 per 1,000 km^2) followed by Bosnia and Herzegovina (436 records, 24.0 %; 8.5 per 1,000 km^2), Serbia (211 records, 11.5 %; 2.4 per 1,000 km^2), FYR Macedonia (209 records, 11.5 %; 8.1 per 1,000 km^2) and Montenegro (123 records, 6.8 %; 8.9 per 1,000 km^2) (Fig. 4).

Individual numbers of records for *V. ammodytes* and *V. berus* generally fol-

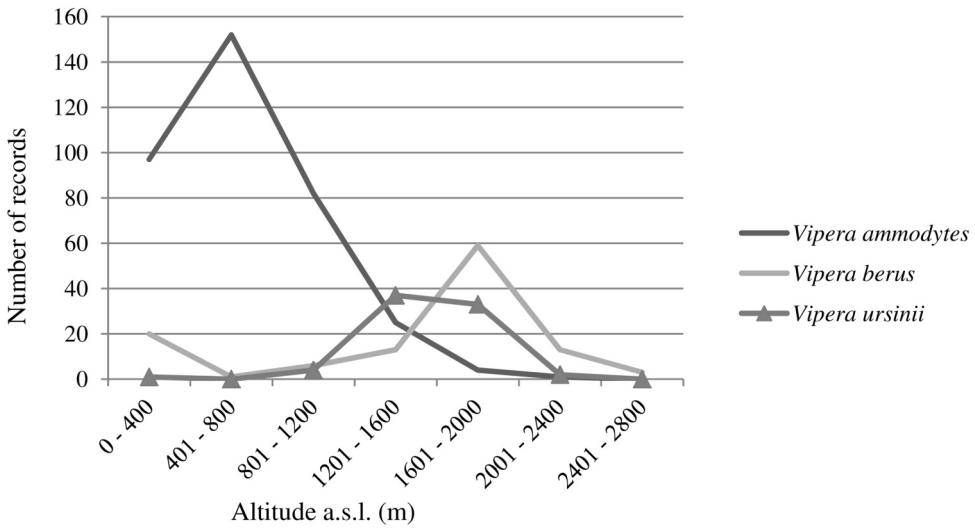


Fig. 3: Altitudinal distribution of the record localities for *Vipera ammodytes*, *V. berus* and *V. ursinii* in the western and central Balkans.

Abb. 3: Die Höhenverteilung der Fundorte von *Vipera ammodytes*, *V. berus* und *V. ursinii* im Untersuchungsgebiet des westlichen und zentralen Balkans.

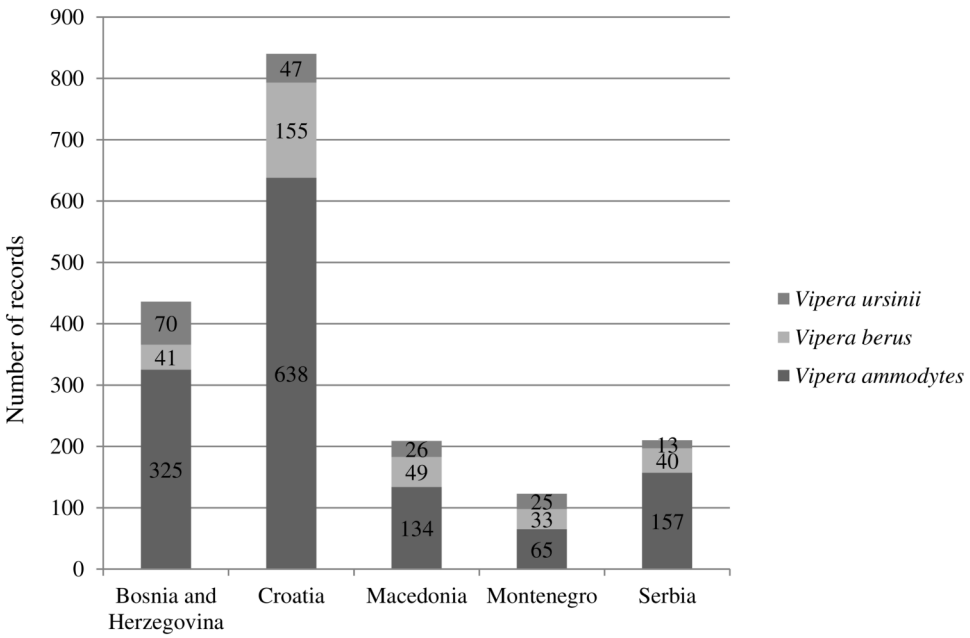


Fig. 4: Number of records of *Vipera ammodytes*, *V. berus* and *V. ursinii* in the countries of the western and central Balkans.

Abb. 4: Die Anzahl der Vorkommensnachweise für *Vipera ammodytes*, *V. berus* und *V. ursinii*, angegeben für die Länder des Untersuchungsgebietes auf dem westlichen und zentralen Balkan.

lowed this order, whereas *V. ursinii* records were most numerous in Bosnia and Herzegovina and declined successively toward Croatia, FYR Macedonia, Montenegro and Serbia.

All 1,819 records were plotted to 10 km x 10 km UTM grid maps and occupy 634 UTM cells (22.5 %) from 2,811 cells covering the whole research area. Serbia (88,361 km^2) contained 23.1 %, Croatia (56,594 km^2) 31.6 %, Bosnia and Herzegovina (51,129 km^2) 22.0 %, FYR of Macedonia (25,713 km^2) 16.4 % and Montenegro (13,812 km^2) 7.0 % of all occupied UTM cells (Fig. 5a).

There are 2190 (77.9 %) UTM cells in the research area that contain no record of vipers. This is partly because they are not present in some areas (parts of Slavonia and Vojvodina, some of the Adriatic Islands) but also because of poor knowledge of their distribution and lack of systematic search. *Vipera ammodytes*, the most common venomous snake in the western and central Balkans, was recorded from 505 (18.0 %) of the UTM cells, *V. berus* from 130 (4.6 %) and *V. ursinii* from just 68 (2.4 %) (Fig. 5b). There was little overlap in the viper species' distribution in that only 84 (3 %) of the occupied UTM cells contained records of more than one species.

Vipera ammodytes (Linnaeus, 1758)

In the western and central Balkans, the Nose-horned Viper is represented by two subspecies (Fig. 6). The nominal subspecies *V. ammodytes ammodytes* is found throughout the majority of the countries (Croatia, Bosnia and Herzegovina, Montenegro and major parts of Serbia), whereas *V. ammodytes montandoni* occurs in southernmost Serbia and most parts of FYR of Macedonia. *Vipera ammodytes* is not present in the large river lowlands of the Pannonian Basin in Croatia and Serbia and lacks some Adriatic islands (Rab, Dugi otok, Korčula). From Cres and Lošinj islands there are only very old and unconfirmed literature records. The Nose-horned Viper is considered to be close to extinction on the island of Mljet because of an introduced predator, the Small Indian Mongoose.

Vipera berus (Linnaeus, 1758)

The European Adder is also represented by two subspecies in the research area where it forms three isolated population groups: (i) A northwestern group of mountain populations of *V. berus berus* (at 800-1,600 m a.s.l.) in the area of Gorski kotar (west Croatia), distributed in continuation of the West European "Italian" clade (*sensu* Ursenbacher et al. 2006), which inhabits Slovenia and Italy. Literature records of *V. berus* from the Velebit Mountains were never reconfirmed, thus, their taxonomic status is unknown. (ii) An eastern lowland population group of *V. berus bosniensis* inhabiting large river lowlands (Danube, Mura, Sava, Drava) of the Pannonian Basin (0-400 m a.s.l.) in Croatia and Serbia. The lowland populations are exposed to rapid degradation and loss of favorable habitats and therefore in a rapid decline. This can be seen clearly from the ratio of records mentioned in the older literature to recently reconfirmed records (Fig. 7). (iii) A high mountain population group of *V. berus bosniensis* inhabiting the Dinaric and Scardo-Pindic mountain chains in the studied area. They prefer open high-mountain grasslands and mildly forested habitats in an altitudinal range from 1,400-2,450 m a.s.l. The record of *V. berus* from Knin (southern Croatia) is considered doubtful because there are no suitable habitats in the vicinity, and the climate is too warm (Mediterranean) for this cool adapted species. Maybe this individual was collected on the nearby Dinara Mountain (1,831 m a.s.l.), but the collectors assigned Knin as the closest city. Since Dinara provides favorable habitats for *V. berus*, it can be expected to occur on this mountain. However, its presence there is still unconfirmed, in spite of frequent visits by the first author.

Vipera ursinii (Bonaparte, 1835)

In the study area, the Meadow Viper is only found on the high mountain grasslands of the Dinaric (Croatia, Bosnia and Herzegovina, and Montenegro) and northwest Scardo-Pindic (FYR of Macedonia)

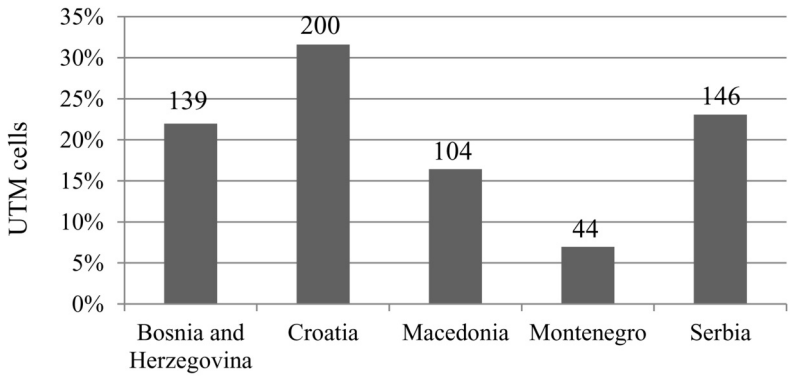


Fig. 5a: Percentage of UTM grid cells of the studied region containing confirmed *Vipera* records (100 % = all cells occupied by records), plotted per country.
The numbers on top of the columns represent numbers of specimens.

Abb. 5a: Prozentsatz der UTM-Rasterzellen des Untersuchungsgebietes, die Vorkommensnachweise der Gattung *Vipera* enthalten (100 % = alle durch Nachweise belegten Rasterzellen), angegeben für die einzelnen Länder.
Die Zahlen am oberen Säulenende geben die Anzahl der Nachweise an.

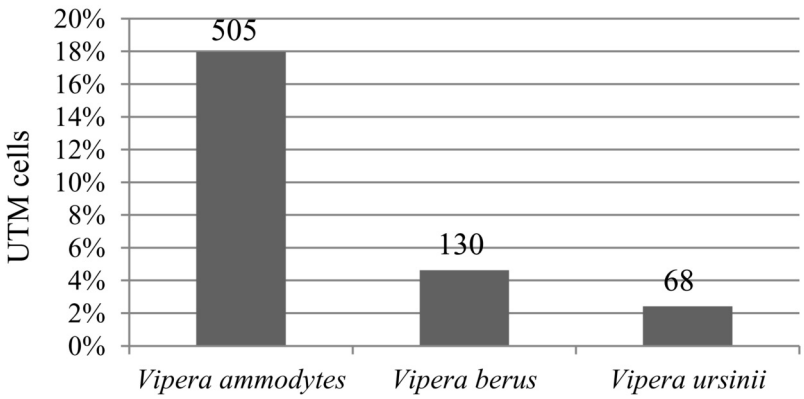


Fig. 5b: Percentage of UTM grid cells of the studied region containing confirmed *Vipera* records (100 % = all cells occupied by records), plotted per species (3.0 % of cells contain records of more than one species).
The numbers on top of the columns represent numbers of specimens.

Abb. 5b: Prozentsatz der UTM-Rasterzellen des Untersuchungsgebietes, die Vorkommensnachweise der Gattung *Vipera* enthalten (100 % = alle durch Nachweise belegten Rasterzellen), angegeben getrennt nach Arten (3,0 % der Rasterzellen beinhalten Nachweise von mehr als einer Art).
Die Zahlen am oberen Säulenende geben die Anzahl der Nachweise an.

mountain chains. The lowland subspecies *V. u. rakosiensis* MÉHELY, 1894 was never recorded, although there are known favourable meadow habitats in the northern lowlands of Serbia. The Hungarian Natural History Museum (HNHM) kept a preserved specimen inventoried with the remark "to be found in Slavonia" (the geographical term Slavonia refers to the lowlands of northeastern Croatia and northwestern Serbia). Unfortunately, this specimen got lost in a fire during the Second World War, and only the museum inventory records persisted. However, the first author's examination of the data that came with this specimen revealed that the individual was actually found in Hungary, somewhere by the Danube river, next to a pile of wood debris that was purported originating in Slavonia. Since Slavonia is situated downstream from Hungary, the collector's unsubstantiated assumption would imply active transport. Another doubtful lowland habitat is the Kvarnerian Island of Krk. WERNER (1894) was the first to report *V. ursinii* from that island, based on a single preserved specimen deposited in the Zoological Collection of the Naval Academy in Rijeka (k. und k. Marineakademie Fiume, in his words) that was reputedly collected at Castelmuschio (today Omišalj) on the Island of Krk. Later, during the First World War (1914), the Naval Academy was burnt down and this specimen got lost or destroyed, as it is no longer present or cannot be found at the Natural History Museum in Rijeka. In the Herpetological Collection of the Natural History Museum in Berlin, there exists a specimen of *V. ursinii* (ZMB 23614) collected by Franjo DOBIAŠ (alias M. PADEWIETH) on Krk in 1913. The original record card reads: "Insel Veglia, Cast. Muschio, hier sehr selten" – "Island of Krk, Omiš, here very rare.". The species was again reported from Krk Island by KRAMER (1961) "coll. KNOEPFFLER, 2 specimens nearby "freshwater", BRUNO (1980) "16.9.1968, 1 juvenile, S[ilvio]B[runo Collection] 337, surroundings of Jezero, 35 m circa"; deposited at Museo Zoologico dell'Universita degli Studi di Firenze, MZUF 31887) and SOCHUREK (1985) who found one shed skin in the north of the island, that he claimed belongs to *V. u. macrops*.

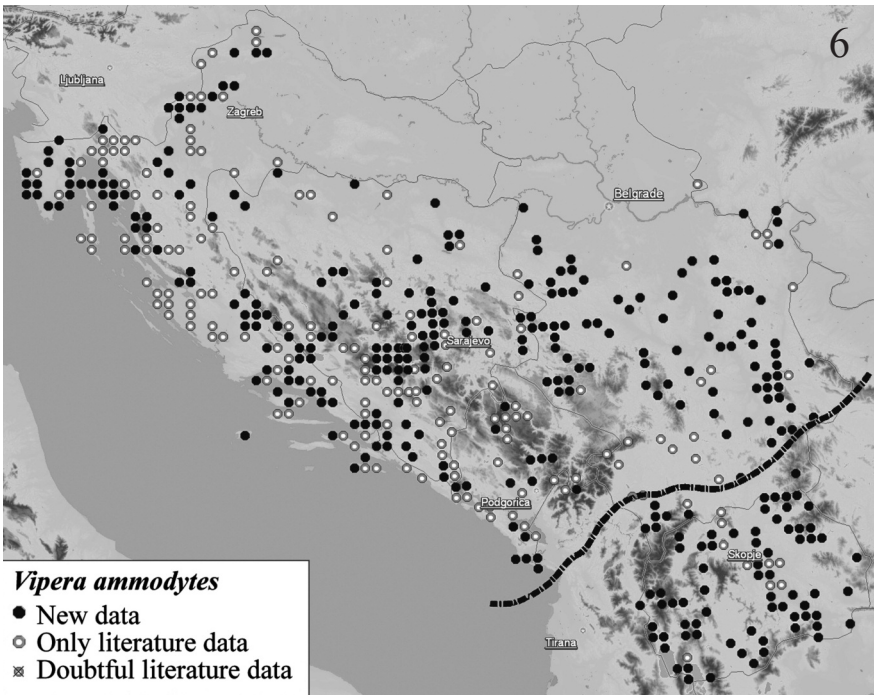
The Karst Viper *V. u. macrops*, inhabits mountain areas in all five countries under study. It is exclusively found in high mountain grassland habitats, mainly between 1,000 and 2,000 m a.s.l. The snake's favoured altitude increases from the northwest towards the southeast of its range, following grassland vegetation and colder climate. Accordingly, the lowest finding (970 m a.s.l.) is at the Poštak Mountain (northwest Croatia) and the highest one (2,200 m a.s.l.) at the Šar Planina Mountain (FYR of Macedonia).

The *V. ursinii* record from Novi Pazar (Vranovina, southern Serbia) (NHMW 16338:1-6; SCHWARZ 1936; KRAMER 1961) is considered doubtful because there are virtually no suitable high mountain habitats in the vicinity. A possible *V. ursinii* location in the environs of Novi Pazar is Golija Mountain (1,833 m a.s.l.), where, however, this species remains unknown.

The recent distribution of this taxon in Croatia, Serbia, Montenegro and FYR of Macedonia is quite well known (Fig. 8), whereas regarding the territory of Bosnia and Herzegovina, 75 % of the records are very old and need reconfirmation.

DISCUSSION

In spite of 1,819 locality records of vipers, one can generally conclude that the knowledge of their presence in the studied area is clearly insufficient (Figs. 6-8), in spite of the strong increase of new data (57.2%). The known records cover just small parts of the species' suspected ranges. This deficiency calls for increased specific field research of all taxa. This is well visible in the map of *V. berus*, which has a large distribution area, underlain by a conspicuously small number of records and confirmed localities (4.6% of all UTM cells). This species is considered by the authors to be in serious decline that was overlooked, because of the prevalent fallacy that it is very common everywhere. In the present survey, this was found to be far from true;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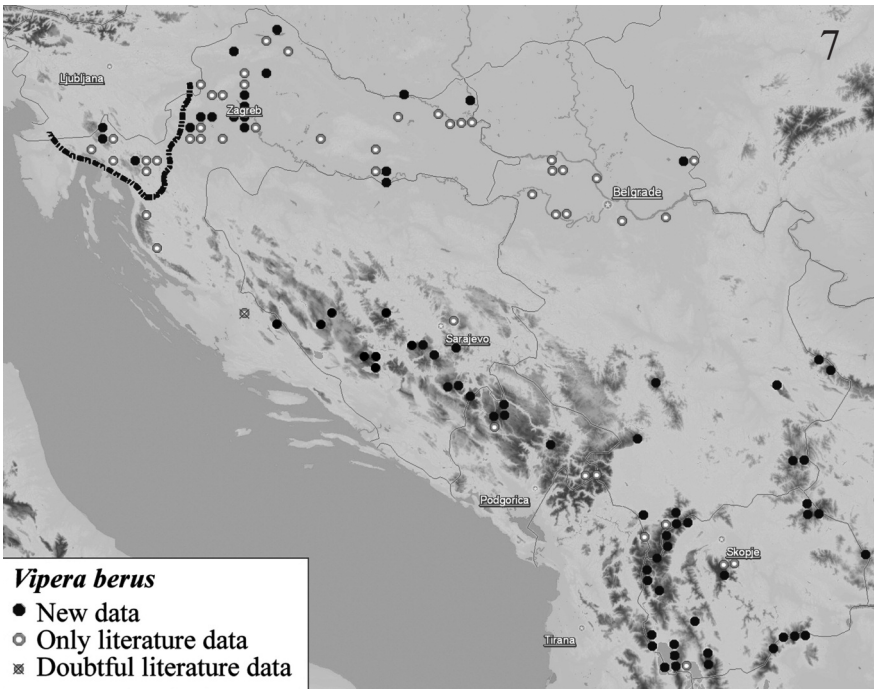
Tirana
Vipera ammodytes
New data
Only literature data
Doubtful literature data


7
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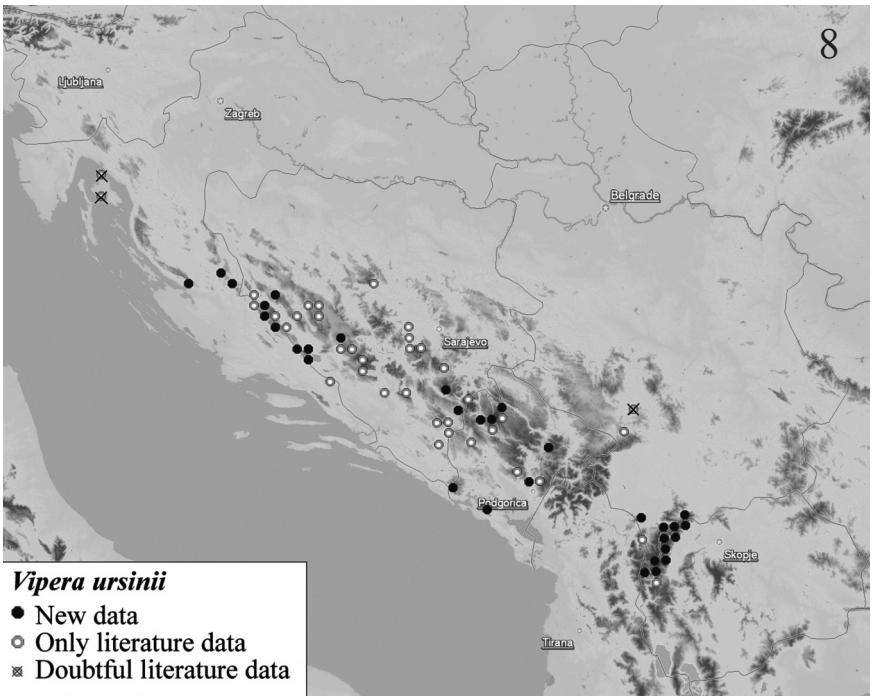

Figs. 6-8 (this and opposite page): Distribution of the genus *Vipera* in the western and central Balkans. ● - New field data (this study); ○ - Data from the literature only; ■ - Doubtful information from the literature.

Abb. 6-8 (diese und gegenüberliegende Seite): Verbreitung der Gattung *Vipera* auf dem westlichen und zentralen Balkan. ● - Neue Felddaten aus dieser Untersuchung; ○ - Nur Angaben aus der Literatur; ■ - Zweifelhafte Angaben aud der Literatur.

Fig. 6: Distribution of *Vipera ammodytes* in the western and central Balkans. To the best of the authors' knowledge but not fully in accordance with URSENBACHER et al. (2008), the dashed line represents the border between *V. ammodytes ammodytes* (LINNAEUS, 1758) in the north and *V. ammodytes montandoni* BOULENGER, 1904, . New data symbols override literature data symbols.

Abb. 6: Die Verbreitung von *Vipera ammodytes* auf dem westlichen und zentralen Balkan. Die strichlierte Linie veranschaulicht nach bestem Wissen der Autoren aber nicht voll in Übereinstimmung mit URSENBACHER et al. (2008) die Grenze zwischen *V. ammodytes ammodytes* (LINNAEUS, 1758) im Norden und *V. ammodytes montandoni* BOULENGER, 1904. Neue Felddaten überlagern ggf. ältere Angaben.

Fig. 7: Distribution of *Vipera berus* in the western and central Balkans. To the best of the authors' knowledge but not fully in accordance with URSENBACHER et al. (2006), the dashed line represents the border between the west European populations of *V. berus berus* (LINNAEUS, 1758) (="Italian" clade *sensu* URSENBACHER et al. 2006) and *V. berus bosniensis* BOETTGER, 1889 in the southeast. New data symbols override literature data symbols.

Abb. 7: Die Verbreitung von *Vipera berus* auf dem westlichen und zentralen Balkan. Die strichlierte Linie veranschaulicht nach bestem Wissen der Autoren aber nicht voll in Übereinstimmung mit URSENBACHER et al. (2006) die Grenze zwischen Westeuropäischen Populationen von *V. berus berus* (LINNAEUS, 1758) (="Italian" clade *sensu* URSENBACHER et al. 2006) und *V. berus bosniensis* BOETTGER, 1889 im Süden. Neue Felddaten überlagern ggf. ältere Angaben.

Fig. 8: Distribution of *Vipera ursinii* in the western and central Balkans. New data symbols override literature data symbols.

Abb. 8: Die Verbreitung von *Vipera ursinii* auf dem westlichen und zentralen Balkan. Neue Felddaten überlagern ggf. ältere Angaben.

moreover, the authors argue that *V. berus* is threatened at least as much as *V. ursinii*, or even more. This concerns the Adder's lowland populations in particular, whose environments are the most endangered habitats of all vipers in the study area, heavily impacted by human activities such as agriculture, pollution, urbanization, flood regulation and habitat fragmentation.

A strongly increased survey effort is critically needed for the chorological study of *V. ursinii*, as there is a large number of localities (62.4 %) that were not recently reconfirmed (especially in Bosnia and Herzegovina), and there are many sites with a high potential of being home to this viper (especially in Bosnia and Herzegovina, Montenegro and FYR of Macedonia). There are on-going scientific and conservation projects for this species in all five countries of the study area which significantly increases the level of knowledge.

In conclusion, this study presents updated grid maps of the distribution of *V. ammodytes*, *V. berus* and *V. ursinii* on the western and central Balkan Peninsula, based on 1,818 records from the literature (Appendixes I and II), museum specimens (Appendix IV) and a comprehensive list of record localities compiled from the authors' field surveys (Appndix III). The study increased the current knowledge on the vipers' distribution by 57.2 % in terms of filled grid cells by addition of unpublished data, documenting that this study was urgently needed. Nonetheless, much more effort will be necssary to verify the large distribution gaps (almost 80 % of grid cells remained empty) by implementation of serious mapping projects.

Vipera ammodytes is by far the most common species of viper, with its records covering 18.0 % of the study area. *Vipera berus* and *V. ursinii* were clearly much rarer, contributing only 4.6 % and 2.4 % to the coverage of the area. This poor represenation could indicate that both species are strongly threatened by the small population size and its fragmentation.

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REFERENCES see APPENDIX I

APPENDIX I – References to vipers in the western and central Balkans

Anonymous (1890): Nova zmija u Srbiji.- Nastavnik, Beograd; 1: 411-412.

Anonymous (1932): Razgovori.- Priroda, Zagreb; 22: 64.

Blondel, J. & Aronson, J. (1999): Biology and wildlife of the Mediterranean region; Oxford (Oxford University Press), pp. 352.

Boettger, O. (1889): *Vipera aspis* var. *bosniensis*; pp. 272; In: Mojsisovics von Mojsvár, J. A. E. (Ed.): Nachträgliche Bemerkungen zu meiner Arbeit "Über die geographische Verbreitung einiger westpalaearktischer Schlangen".- Mittheilungen des Naturwissenschaftlichen Vereines für Steiermark, Graz; 25: 270-273.

Bolkay, St. J. (1919): Prinosi herpetologiji zapadnoga dijela Balkanskog Poluostrva.- Glasnik Zemaljskog Muzeja u Bosni i Hercegovini, Sarajevo; 31: 1-38.

Bolkay, St. J. (1920): O razvojnom redu *Vipera gedulyi* By. - *Vipera ammodytes* L. - *Vipera meridionalis* Blgr.- Glasnik Zemaljskog Muzeja u Bosni i Hercegovini, Sarajevo; 32: 1-12.

Bolkay, St. J. (1923): On a case of cannibalism among *V. ammodytes* L.- Glasnik Hrvatskog Prirodoslovnog Društva, Zagreb; 35: 16.

Bolkay, St. J. (1924): Popis vodozemaca i gmizavaca, koje se nalaze u. bos.-herc. Zemljskom muzeju u Sarajevu s morfološkim, biološkim i zoogeografskim bilješkama [A list of the amphibians and reptiles preserved in the Bosnian-Hercegovinian Federal Museum, with morphological, biological and zoogeographical notes.].- Spomenar Srpske Kraljevske Akademije, Beograd; 61: 1-37.

Bolkay, St. J. (1928): Die zoogeographische Bedeutung des Neretva- (Narenta-) Tales.- Glasnik Zemaljskog Muzeja u Bosni i Hercegovini, Sarajevo; 40: 35-44.

Bolkay, St. J. (1929a): Die Amphibien und Reptilien von Sarajevo und Umgebung.- Glasnik Zemaljskog Muzeja u Bosni i Hercegovini, Sarajevo; 41: 57-78.

Bolkay, St. J. (1929b): Contribution to the Herpetology of Northeastern Bosnia.- Glasnik Zemaljskog Muzeja u Bosni i Hercegovini, Sarajevo; 41: 1-6.

Bolkay, St. J. & Ćurčić, V. (1920): O našim zmijama otrovnicama [Über unsere Giftschlangen].- Glasnik Zemaljskog Muzeja u Bosni i Hercegovini, Sarajevo; 32: 155-206.

Bolkay, St. J. & Ćurčić, V. (1933): Skaču li poskoci i tjeraju li ljude? [Wird der Mensch von Sandvipern verfolgt und angegriffen?].- Bosansko-hercegovački Težak, Sarajevo; 16: 1.

Boulenger, G. A. (1913): The snakes of Europe. London (Methuen & Co.), pp. 350.

Brelih, S. & Džukić, G. (1974): Catalogus faunae Jugoslaviae. IV/2. Reptilia. Beograd (Consilium Academiarum Scientiarum Rei Publicae Socialisticae Foederativae Jugoslaviae), pp. 32.

Bruno, S. (1968): I serpenti Europei della Collezione Edoardo de Betta conservata nel Civico Museo di Storia Naturale di Verona.- Memorie del Museo Civico di Storia Naturale di Verona, Verona; 15: 173-211.

Bruno, S. (1980): L'erpetofauna delle isole di Cres, Trstenik, Plavnik e Krk (Kvarner, Jugoslavia).- Atti del Museo Civico di Storia Naturale di Trieste, Trieste; 31: 249-282.

Bruno, S. (1985): Le vipere d'Italia e d'Europa. Bologna (Edagricole), pp. 269.

Bruno, S. (1988): L'erpetofauna delle isole di Cres, Krk e Ada (Jugoslavia-Albania).- Bulletin d'Écologie, Paris; 19: 265-281.

Brusina, S. (1908): Naravoslovne crtice sa sjevero-istočne obale Jadranskoga mora.- Rad Jugoslavenske Akademije Znanosti i Umjetnosti (JAZU), Zagreb; 173: 1-31.

Buresch, I. & Zonkov, J. (1932): Die Verbreitung der Giftschlangen (Viperidae) in Bulgarien und auf der Balkanhalbinsel. Trudove na Balgarskoto Prirodoizpitatelno Druzestvo / Travaux de la Société Bulgare des Sciences Naturelles, Sofia; 15-16: 189-206.

Buresch, I. & Zonkov, J. (1934): [Untersuchungen über die Verbreitung der Reptilien und Amphibien in Bulgarien und auf der Balkanhalbinsel. II. Teil: Schlangen (Serpentes)].- Bulletin of Institute for Natural History / Mitteilungen aus den Königlichen naturwissenschaftlichen Instituten in Sofia, Bulgarien, Sofia; 7: 106-188. [Bulgarian with German summary].

Burlin, M. & Dolce, S. (1993): Osservazioni sui serpenti dell'Istria (Reptilia, Squamata, Serpentes).- Atti del Museo Civico di storia naturale di Trieste, Trieste; 45: 169-178.

Cafuta, V. (2003): Herpetološka skupina na taboru "Brač 2003".- Temporaria, Ljubljana; 9: 26-27.

Carrara, F. (1846): La Dalmazia descritta, con 48 tavole miniate rappresentanti i principali costumi nazionali (reprint 2006). Etnografski muzej Zadar, 130.

Crkvenac, M. (1928): Zmija ljutica, koja sama sebe ujeda.- Priroda, Zagreb; 18: 55-56.

Crnobrnja, J. (1982): Faunističke crtice o gmizavcima i vodozemcima Homolja. Homolje ´81: Rezultati bioloških istraživanja.- Mladi Istraživači Srbije, Beograd; 1982: 49-52.

Crnobrnja, J. & Rohalj, A. (1988): Prilog poznavanju herpetofaune Kopaonika [Contribution to knowledge of herpetofauna of Kopaonik].- Zbornik radova BID "Josif Pančić", Beograd, 1988: 59-76.

Crnobrnja-Isailović, J. & Džukić, G. (1995): First report about conservation status of herpetofauna in the Skadar Lake region (Montenegro): current situation and perspectives; pp. 373-380. In: Llorente, G. A. &. Montori, A. & Santos, X. & Carretero, M. A. (eds.): Scientia Herpetologica,: papers submitted from 7th Ordinary General Meeting of Societas Europaea Herpetologica, Barcelona, September 15-19, 1993. Barcelona.

Crnobrnja-Isailović, J. & Džukić, G. (1997): Raznovrsnost faune vodozemaca i gmizavaca u širem regionu Skadarskog jezera i značaj njenog očuvanja [Diversity of Amphibian and Reptilian fauna in Skadar lake region and its importance].- CANU, Posebna izdanja, Podgorica; 44: 237-261.

Crnobrnja-Isailović, J. (2002a): Another population of *Vipera ursinii macrops*, Méhely 1911, in Montenegro (Central Balkans).- Herpetozoa, Wien; 14: 137-141.

Crnobrnja-Isailović, J. (2002b): Notes of diurnal activity in *Vipera ammodytes* of the Central Balkans.- Biota, Ljubljana; 3: 9-16.

Crnobrnja-Isailović, J. & Dinov, J. & Ranđelović, V. (2011): Occurrence of European Adder (*Vipera berus*, Viperidae, Ophidia) on Vlasina Plateau (Southeastern Serbia).- Biologica Nissana, Niš; 2 (1): 1-7.

Crnobrnja-Isailović, J. & Haxhiu, I. (1997): *Vipera ammodytes*; pp. 384-385. In: Gasc, J.-P. & Cabela, A. & Crnobrnja-Isailović, J. & Dolmen, D. & Grossenbacher, K. & Haffner, P. & Lescure, J. & Martens, H. & Martínez, Rica J. P. & Maurin, H. & Oliveira, M. E. & Sofianidou, T. S. & Veith, M. & Zuiderwijk, A. (eds): Atlas of amphibians and reptiles in Europe. Societas Europaea Herpetologica and Museum National d'Histoire Naturelle, Paris.

Cvitanić, A. (1959): Prilog poznavanju zmija splitske okolice [Contribution to knowledge of snakes in Split sorroundings].- Biološki Glasnik, Zagreb; 12: 127-130.

De Luca, N. & Kovačić, D. & Đulić, B. (1990): Fauna vodozemaca, gmazova i sisavaca NP "Krka" [Amphibian, Reptile and Mammal fauna of Krka National Park]; pp. 523-550. In: Kerovec, M. (ed): NP Krka - stanje istraženosti i problemi zaštite ekosistema, Zbornik radova Simpozija, Zagreb.

Depoli, G. (1898): I rettili ed anfibii del territorio di Fiume.- Rivista Italiana di Scienze Naturali, Siena; 18: 47-50.

Dimovski, A. (1959a): I. prilog kon herpetofaunata na Makedonija [Beitrag zur Herpetofauna Mazedoniens].- Fragmenta Balcanica, Skopje; 3: 1-4.

Dimovski, A. (1959b): Prilog kon rasprostranuvanjeto i načinot na živenje na *Typhlops vermicularis* Merr. vo Makedonija [Contribution to the distribution and ecology of *Typhlops vermicularis* Merr. in Macedonia].- Fragmenta Balcanica, Skopje; 3: 13-17.

Dimovski, A. (1960): Biogeografska i ekološka karakteristika na Skopskata kotlina [Biogeographical and ecological characteristics of Skoplje valley]. Unpublished doctoral dissertation, University of Skopje.

Dimovski, A. (1963): Herpetofauna na skopska kotlina. I - zoogeografski i ekološki pregled [Herpetofauna of Skoplje valley. I – zoogeographical and ecological overview].- Godišen zbornik Prirodno-matematičkog fakulteta, Univerziteta u Skoplju, Skoplje; knjiga 14, Biologija 2: 189-221.

Dimovski, A. (1964): II Prilog kon herpetofaunata na Makedonija (II Beitrag zur Herpetofauna Mazedoniens).- Fragmenta Balcanica, Skopje; 5: 19-22.

Dimovski, A. (1966): Herpetofauna na skopska kotlina. II - faunistički del.- Godišen zbornik Prirodno-matematičkog fakulteta, Univerziteta u Skoplju, Skoplje; knjiga 16, Biologija 4: 179-188.

Dimovski, A (1971): Zoocenološki istražuvanja na stepskite predeli vo Makedonija.- Godišen zbornik Prirodno-matematičkog fakulteta, Univerziteta u Skoplju, Skoplje; knjiga 23, Biologija 4: 25-54.

Dimovski, A (1981): Vodozemci i vlečugi na Nacionalnot park Galičica. [Amphibies et reptiles du park national de Galitchitsa].- Makedonska Akademija na Naukite i Umetnostite, Skopje; 2 (1/2): 63-74.

Doflein, F. (1921): Mazedonien, Erlebnisse und Beobachtungen eines Naturforschers im Gefolge des Deutschen Heeres. Jena (Gustav Fischer), pp. 400.

Dolce, S. (1979): L'erpetofauna del Friuli, dell Venezia Giulia, dell'Istria e della Dalmzia nella collezione del Museo civico di storia naturale di Trieste. Catalogo ragionato. II: Reptilia, Serpentes.- Atti del Museo Civico di Storia Naturale di Trieste, Trieste; 31: 201-232.

Džukić, G. (1972): Herpetološka zbirka Prirodnjačkog muzeja u Beogradu. [Herpetological collection of the Belgrade Museum of Natural History]. - Glasnik Prirodoslovnog Muzeja Beograd, Beograd; (B) 27: 165-180.

Džukić, G. (1991): The fauna of Durmitor: Amphibians and reptiles. In: Nonveiller, G. (ed.): The Fauna of Durmitor part 4.- CANU, Posebna izdanja [special edition] 24, Odeljenje Prirodnih Nauka, Beograd; 15: 9-78.

Džukić, G. & Kalezić, M. (2004): The biodiversity of amphibians and reptiles in the Balkan Peninsula; pp. 1-26. In: Griffiths, H. & Krystufek, B. & Griffiths, J. (eds): Balkan biodiversity. Papers from the ESF exploratory workshop on Balkan biodiversity - Koper, September 2001, Koper.

Džukić, G. & Kalezić, M. & Marković, M. (2005): Poskok (*Vipera ammodytes*) – autohtona zmija Vojvodine [Nose-horned viper (*Vipera ammodytes*) – indigenous snake of Vojvodina].- Godišnji bilten Prirodnjačkog društva Gea, Beograd; 5: 13.

Džukić, G. & Purger, J. (1988): Significance of Adder - *Vipera berus* (Linnaeus, 1758) presence in Vojvodina.- Arhiv Bioloških Nauka, Beograd; 40: 13-14.

Fejérváry, G. (1922): The batrachians and reptiles collected by Mr. E. Csiki in the northern parts of central Albania and in Serbia.- Magyar Tudományos Akadémia, Budapest; 1: 7-65.

Frauenfeld, G. (1853): Briefliche Notiz über dalmatinische Inseln von M. Botteri - Verhandlungen des Zoologisch-Botanischen Vereins in Wien, Wien; 3: 129-130.

Gasc, J.-P. & Cabela, A. & Crnobrnja-Isailović, J. & Dolmen, D. & Grossenbacher, K. & Haffner, P. & Lescure, J. & Martens, H. & Martínez, Rica J. P. & Maurin, H. & Oliveira, M. E. & Sofianidou, T. S. & Veith, M. & Zuiderwijk, A. (eds) (1997): Atlas of amphibians and reptiles in Europe. Societas Europaea Herpetologica and Museum National d'Histoire Naturelle, Paris; pp. 493.

Haleš, J. (1988): Ugroženo herpetološko područje [Endangered herpetological area].- Bulletin of the Republic Institution for the Protection of Nature and the Museum of Natural History in Titograd, Titograd; 20: 85-88.

Heckes, U. & Gruber, H.-J. & Stümpel, N. (2005): *Vipera* (*Vipera*) *ammodytes* (Linnaeus, 1758) – Hornotter, Sandviper; pp. 81-150. In: Joger, U. & Stümpel, N. (eds.): Handbuch der Reptilien und Amphibien Europas, Vol. 3/IIB Schlangen (Serpentes) III. Wiebelsheim (Aula-Verlag).

Hirtz, M. (1924): Ridjovka (*Vipera berus* L.) [Adder (*Vipera berus* L.)].- Priroda, Zagreb; 14: 144-152.

Hirtz, M. (ed.) (1927a): Zmije na otoku Pelješcu [Snakes on the island of Pelješac].- Priroda, Zagreb; 17: 54-55 & 128-129.

Hirtz, M. (ed.) (1927b): Mungo na otoku Mljetu [Mongoose on the island of Mljet].- Priroda, Zagreb; 17: 186-189.

Hirtz, M. (1929a): Rijetka odlika riđovke [Rear quality of the Adder].- Priroda, Zagreb; 19: 181-182.

Hirtz, M. (1929b): Seljak plugom presjekao riđovku, a ona ga ujela [Farmer tried to plow an Adder and it bit him].- Priroda, Zagreb; 19: 261.

Hirtz, M. (1933): Zmije ribarice [Fishing snakes].- Priroda, Zagreb; 23: 97-99.

Hirtz, M. (1939): Zmije otrovnice u Hrvatskoj i Slavoniji [Venomous snakes in Croatia and Slavonia].- Priroda, Zagreb; 29: 125-127.

Hirtz, M. (ed.) (1939): Do koje visine ide poskok? [How high does the Nose-horned Viper go?].- Priroda, Zagreb; 29: 283-284.

Horvat, V. (1935): Zmijski splet [Serpentine tangle].- Priroda, Zagreb; 25: 215-217.

Ivančević, B. & Savić, S. & Sabovljević, M. & Niketić, M. & Tomović, G. & Zlatković, B. & Ranđelović, V. & Lakušić, D. & Ćetković, A. & Pavićević, D. & Krpo-Ćetković, J. & Crnobrnja-Isailović, J. & Puzović, S. & Paunović, M. (2007): Pregled vrsta Stare planine u Srbiji; pp. 159-219. In: Lakušić, D. & Ćetković, A. (eds.): Biodiverzitet Stare planine u Srbiji - Rezultati projekta: "Prekogranična saradnja kroz upravljanje zajedničkim prirodnim resursima - Promocija umrežavanja i saradnje između zemalja Jugoistočne Evrope". Beograd (Regionalni centar za životnu sredinu za Centralnu i Istočnu Evropu, kancelarija u Srbiji).

Jelić, D. & Kuljerić, M. & Janev-Hutinec, B. & Mekinić, S. & Treer. D. & Basta, J. & Koren, T. & Burić, I. (2009): Biodiversity and conservation of amphibians and reptiles in Croatia. Book of Abstracts, pp. 132. 2nd European Congress of Conservation Biology, Prague, Czech Republic 1-5 September 2009.

Jović, D. & Horvat, A. & Ranđelović, V. (1997): Vodozemci i gmizavci Sićevačke klisure [Amphibians and reptiles of Sićevačke cliff].- Natura Naissi, Niš; 5: 31-34.

Jurinac, E. A. (1886): Faunistični pabirci po okolici Krapinskoj [Faunistic research in Krapina sorroundings].- Glasnik Hrvatskog Naravoslovnog Društva, Zagreb; 1: 145-153.

Kalyabina-Hauf, S. & Schweiger S. & Joger, U. & Mayer, W. & Orlov, N. & Wink M. (2004): Phylogeny and systematics of adders (*Vipera berus* complex).- Mertensiella, Rheinbach; 15: 7-16.

Karaman, S. (1921): Beiträge zur Herpetologie von Jugoslavien.- Glasnik Hrvatskog Prirodoslovnog Društva, Zagreb; 33: 194-209.

Karaman, S. (1922): Beiträge zur Herpetologie von Mazedonien.- Glasnik Hrvatskog Prirodoslovnog Društva, Zagreb; 34: 1-22.

KARAMAN, S. (1928): III Prilog herpetologiji Jugoslavije [Third contribution to herpetology of Yugoslavia].- Glasnik Skopskog Naučnog Društva, Skoplje; 4: 129-143.

KARAMAN, S. (1937): Fauna južne Srbije [Fauna of southern Serbia].- Spomenica, Skoplje: 161-179.

KARAMAN, S. (1938): *Vipera ursinii* BONAP., treća otrovnica iz južne Srbije [*Vipera ursinii* BONAP., third viper from south Serbia].- Glasnik skopskog naučnog društva, Skoplje; 20 (7): 165-166.

KARAMAN, S. (1939): Über die Verbreitung der Reptilien in Jugoslavien.- Annales Musei Serbiae Meridionalis, Skoplje; 1: 1-20.

KARAMAN, S. (1948): Prilog herpetologiji Sjeverne Srbije [Beitrag zur Herpetologie Nordserbiens).- Rad Jugoslavenske Akademije Znanosti i Umjetnosti (JAZU), Zagreb; 24: 5-28.

KATURIĆ, M. (1883): Notizie Zoologiche.- Bollettino della Societa Adriatica di Scienze Naturali in Trieste, Trieste; 8: 1-9.

KOEN, G. (1960): Herpetološka ispitivanja u okolici Zadra [Herpetological research in surroundings of Zadar]. Pismeni domaći rad za stručni (profesorski) ispit (Biologija) u jesenskom roku 1960 godine. Professoral dissertation, Zadar, pp. 54.

KOLOMBATOVIĆ, G. (1882): Mammiferi, anfibi e rettili della Dalmazia e pesci rari e nuovi per l'adriatico che furono gatturati nelle acque di Spalato. Split (A. Zannoni), pp. 35.

KONTE, T. & PIPAN, Ž. & KOSTANJŠEK, R. & LUŽNIK, M. & TURJAK, M. & KRAMBERGER, P. & BORDJAN, D. & JAZBEC, K. & UHAN, J. & GORJAN, A. & ČUDEN, I. & KROFEL, M. & PETKOVSKA, V. & SLAVIKOVSKI, A. & MIRT, T. & ŽAGAR, A. & REMŽGAR, T. & CIPOT, M. & VINKO, D. & LUŠTRIK, R. (2006): Ekosistemi Jadrana - Crna Gora 2005 i Pelješac 2006 [Adriatic ecosystems – Montenegro 2006 and Pelješac 2006]. Spomladanski biološki dnevi Jovsi 2006. Društvo študentov biologije. [Student field trip reports for 2006], Biology Student Association, Ljubljana; 2006: 50-56, 59-65.

KOPSTEIN, F. & WETTSTEIN, O. (1920): Reptilien und Amphibien aus Albanien.- Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien, Wien; 70: 387-457.

KORSÓS, Z. & BARINA, Z. & PIFKÓ, D. (2008): First record of *Vipera ursinii graeca* in Albania.- Acta Herpetologica, Firenze; 3: 167-173.

KOSIĆ, B. (1910): Crnokrug (*Vipera ammodytes*, LATR.) u Dubrovačkom muzeju [Nose-horned viper (*Vipera ammodytes*, LATR.) in Dubrovnik museum].- Glasnik Hrvatskog Prirodoslovnog Društva, Zagreb; 22: 21-26.

KRAMER, E. (1961): Variation, Sexualdimorphismus, Wachstum und Taxonomie von *Vipera ursinii* (BONAPARTE, 1835) und *Vipera kaznakovi* NIKOLSKIJ, 1909.- Revue Suisse de Zoologie, Genève; 68: 627-725.

KRANJČEV, R. (1995): Priroda Podravine. Koprivnica (Mali Princ), pp. 225.

KRANJČEV, R. (1997): Neke biološke značajke Kalnika.- Priroda, Zagreb; 87: 22-27.

KRECSÁK, L. (2007): An account of the generic and specific names and type specimens of viperid taxa described by Albert Franz Theodor Reuss (Squamata: Viperidae).- Zootaxa, Auckland; 1514: 1-36.

KRPAN, M. (1962): Prilog poznavanju kopnenih Kralješnjaka splitske okolice i bliže Zagore [Contribution to the knowledge of terrestrial vertebrates of Split and Zagora muncipality].- Radovi, Pedagoška Akademija, Split; 4: 1-51.

LAZAR, B. & BALENT, S. (2000): Prilog poznavanju faune vodozemaca (Amphibia) i gmazova (Reptilia) zapadne Hercegovine [Contribution to the knowledge of the amphibian and reptile fauna in western Herzegovina].- Bilten / Drustvo Ekologa Bosne i Hercegovine, Sarajevo, Drustvo; (A Ekološke monografije): 5 (2): 267-273.

MARČIĆ, L. (1927): Nekoliko riječi o poskoku po dalmatinskim ostrvima [Some notes on the Nose-horned viper on Dalmatian islands].- Priroda, Zagreb; 17: 157-158.

MÉDAIL, F. & QUÉZEL, P. (1999): Biodiversity hotspots in the Mediterranean Basin: Setting global conservation priorities.- Conservation Biology, Malden; 13: 1510-1513.

MÉHELY, L. (1894): *Vipera ursinii* BONAP., eine verkannte Giftschlange Europas.- Zoologischer Anzeiger, Leipzig; 17: 57-61.

MÉHELY, L. (1911): Systematisch-phylogenetische Studien an Viperiden.- Annales historico-naturales Musei nationalis Hungarici, Budapest; 9: 186-243.

MERTENS, R. & MÜLLER, L. (1928): Liste der Amphibien und Reptilien Europas. - Abhandlungen der Senckenbergischen naturforschenden Gesellschaft, Frankfurt a. M.; 41: 1-62.

MIHAILINOVIC, M. (1963): Les amphibiens (Amphibia) et les reptiles (Reptilia) du Mont Kozara.- Glasnik Zemaljskog Muzeja Bosne i Hercegovine u Sarajevu, Sarajevo; 2: 73-80.

MIHALJEVIĆ, M. & MARTINČIĆ, J. (1999): Kopački rit. Pregled istraživanja i bibliografija. Osijek (HAZU, Zavod za znanstveni rad), pp. 155.

MIKAČIĆ, D. (1967): Moji susreti sa zmijama [My encounters with snakes].- Priroda, Zagreb; 5: 138-140.

MÖLLENDORFF, O. (1873): Beiträge zur Fauna Bosniens. Görlitz (Hoffman & Reiber), pp. 73.

MRŠIĆ, N. (1978): Prispevek k poznavanju taksonomije, zoogeografije in ekologije plazilcev Velebita [Contribution to the knowledge of taxonomy, zoogeography and ecology of reptiles from Velebit Mountain]. Ljubljana (Slovenska akademija znanosti in umetnosti), pp. 43.

MRŠIĆ, N. & NEMESCHKAL, H. L. & POTOČNIK, F. & SCHWAMMER, G. & SCHWAMMER, H. (1989): Ein Beitrag zur Herpetofauna der Quarner-Inseln (Jugoslawien - Kroatien).- Biološki Vestnik, Ljubljana; 37: 57-74.

NILSON G. & ANDRÉN C. (2001): The meadow and steppe vipers of Europe and Asia - the *Vipera* (*Acridophaga*) *ursinii* complex.- Acta Zoologica Academiae Scientiarum Hungarici, Budapest; 47: 87-267.

PASULJEVIĆ, G. (1968): Prilog poznavanju herpetofaune Kosova i Metohije [Contribution to the knowledge of the herpetofauna in Kosovo and Metohija].- Zbornik filozofskog fakulteta u Prištini, Priština; 1: 61-74.

PAVLETIĆ, J. (1962): Prilog istraživanju herpetofaune otoka Paga [Contribution to the knowledge of the herpetofauna of Pag island]; pp. 26-29. In: PAVLETIĆ, J. & PAVLOVSKY, M. & BRAJDIĆ, V. (eds.): VI. plenum prirodoslovne sekcije saveza muzejskih društava Jugoslavije [VI. meeting of the Natural History section of the network of museum societies in Jugoslavia] Zagreb 5-8.IX.1962, Abstracts.

Pavletić, J. (1964): Amphibia i Reptilia zbirke Hrvatskog narodnog zoološkog muzeja u Zagrebu [Amphibians and Reptiles of the Croatian Natural History Museum, Zagreb].- Hrvatski Narodni Zoološki Muzej, Zagreb; 4: 1-37.

Petkovski, S. & Sidorovska, V. & Džukić, G. (2000/2001): Biodiverzitetot na faunata na zmiite (Reptilia: Serpentes) vo Makedonia (Biodiversity of the Macedonian snake fauna (Reptilia: Serpentes)).- Ekologija i Zaštita Životne Sredine, Skopje; 7: 41-54.

Popović, E. & Kostić, D. & Karaman, I. (1999): Nalaz podvrste *Vipera berus bosniensis* Boettger, 1889 na Fruškoj Gori.- Zbornik radova PMF / Serija za biologiju, Novi Sad; 25: 16-20.

Pozzi, A. (1966): Geonemia e catalogo ragionato degli anfibi e dei rettili della Jugoslavia.- Atti della Societa Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano, Milano; 57: 5-55.

Praunsperger, F. (1930): Iz života riđovke [The life of the Adder].- Priroda, Zagreb; 20: 15-20.

Radovanović, M. (1951): Vodozemci i gmizavci naše zemlje [Amphibians and reptiles of our country]. Beograd (Naučna knjiga), pp. 249.

Radovanović, M. (1964): Die Verbreitung der Amphibien und Reptilien in Jugoslawien.- Senckenbergiana biologica, Frankfurt a. M.; 45: 553-561.

Radovanović, M. & Martino, K. (1950): Zmije Balkanskog poluostrva [Snakes of the Balkan Peninsula]. Beograd (Srpska akademija nauka), pp. 46.

Reuss, T. (1927a): Beschreibung neuer Vipern aus Jugoslawien.- Zoologischer Anzeiger, Leipzig; 71: 215-223.

Reuss, T. (1927b): Sechs europäische Giftschlangengattungen.- Zoologischer Anzeiger, Leipzig; 73: 124-129.

Rössler, E. (1904): Popis reptilia i amfibija hrvatske faune koji su prispjeli "narodnom zoološkom muzeju" u Zagrebu do konca godine 1900 [Verzeichnis der Reptilien und Amphibien der kroatischen Fauna, welche an das zoologische Nationalmuseum in Zagreb bis zum Schluss des Jahres 1900 eingesendet wurden].- Glasnik Hrvatskog Narovoslovnog Društva, Zagreb; 15: 221-224.

Rucner, D. & Rucner, R. (1971): Prilog poznavanju faune nekih šumskih zajednica u Hrvatskoj [Contribution to the knowledge on some forest communities in Croatia].- Larus, Zagreb; 23: 129-201.

Šalomon, D. & Sterijovski, B. & Šilić, T. (2005): Inventarizacija herpetofaune Parka Prirode "Biokovo" [Inventarisation of the herpetofauna in "Biokovo" Nature park]; pp. 32-37. In: Mazija, M. (ed): Zbornik istraživačkih radova Udruge studenata biologije - BIUS u Parku prirode Biokovo. Zagreb (BIUS - Udruga studenata biologije, Zagreb).

Schimmenti, G. & Fabris, V. (2000): Note sull' erpetofauna dell' isola di Krk (Croazia nordoccidentale).- Atti del I° Congresso Nazionale della Societas Herpetologica Italica, 2-6 October 1996; pp. 643-652. Torino (Museo regionale di scienze naturali Torino).

Schmidtler, J. F. (1999): Notes on the altitudinal distribution of lizards and some other reptiles on Mount Biokovo (Croatia) and its immediate surroundings.- Natura Croatica, Zagreb; 8: 223-237.

Schreiber, E. (1912): Herpetologia europaea (2nd edition). Jena (G. Fischer), pp. 639.

Schwarz, E. (1936): Untersuchungen über Systematik und Verbreitung der europäischen und mediterranen Ottern.- Behringwerke-Mitteilungen, Marburg/Lahn; 7: 159-262.

Schweiger, M. (2004): Herpetologische Exkursion zur Insel Krk, Kroatien im Mai 2004. Web document available at < http://www.vipersgarden.at > (last accessed 28.04.2012.)

Schweiger, M. (2007): Report on my short trips to Croatia in spring 2007; Istria: April, 6th till April, 9th, 2007; island Krk: May, 15th till May, 20th, 2007. Web document available at < http://www.vipersgarden.at > (last accessed 28.04.2012.)

Sebišanović, G. (1898): Narodna zoološko-nomenklaturska viest [Folklore zoological nomenclature news].- Glasnik Hrvatskog Prirodoslovnog Društva, Zagreb; 4: 305.

Sochurek, E. (1984): Liste der Schlangen Jugoslawiens.- Elaphe, Rheinbach; 2: 3-36.

Stanković, M. (2005): Vodozemci i gmizavci specijalnog rezervata prirode Zasavica. I. Simpozijum biologa Republike Srpske, Banja Luka 10.-12.11. 2005. Program rada i zbornik sažetaka, pp. 29-30. Prirodno-matematički fakultet Univerziteta u Banja Luci, Odsjek za Biologiju, Banja Luka.

Sterijovski, B. (2006): A new record of *Vipera ursinii* (Reptilia: Serpentes) from Macedonia; pp. 181-182. In: Vences, M. & Köhler, J. & Ziegler, T. & Böhme, W. (eds): Herpetologia Bonnensis II. - Proceedings of the 13th Congress of the Societas Europaea Herpetologica, 27.9-2.10.2005. Bonn (SEH).

Stipančić B. (1934): Ujela ga zmija.- Priroda, Zagreb; 24: 318-319.

Strijbosch, H. & Creemers, R. C. M. & Lamberts, J. & Martens, J. G. W. & Mulder, J. & Muster, J. C. M. & Rijst, J. van der & Spaargaren, J. J. & Zollinger R. (1986): Verslag excursie N.W. Joegoslavië 1986. Verslag nr. 270, Zoölogisch Laboratorium Afd. Dieroecologie, Katholieke Universiteit Nijmegen.

Strijbosch, H. & Pouwels, W. Th. G. & Bellink, P. J. & Bugter, R. J. F. & Creemers, R. C. M. & Erftemeyer, P. L. A. & Foppen, R. P. B. & Hagemeyer, E. J. M. & Laan, R. M. & Marijnissen, J. W. N. & Moonen, M. P. H. M. & Peeters, S. A. M. & Schelwald, R. A. & Swaay, C. A. M. van & Teunis, H. & Vergeer, L. H. T. & Verouden, F. H. & Wynhoff, I. (1985): Verslag excursie N.W. Joegoslavie 1985. Verslag nr. 250, Zoölogisch Laboratorium Afd. Dieroecologie, Katholieke Universiteit Nijmegen.

Tadić, A. (1976): Zašto mungos na otoku Hvaru? [Why are mongooses on the island of Hvar?].- Priroda, Zagreb; 65: 221-222.

Tomasini, O. (1890): Crtice o životu gmazova, koji žive u Bosni i Hercegovini [Notes on reptiles that live in Bosnia and Herzegovina].- Glasnik Zemaljskog Muzeja u Bosni i Hercegovini, Sarajevo; 3: 274-283.

Tomović, L. (2006): Systematics of the nose-horned viper (*Vipera ammodytes*, Linnaeus, 1758).- Herpetological Journal, London; 16: 191-201.

Tonković, M. (1934): Zmije u srezu Imotskom [Snakes in Imotski].- Priroda, Zagreb; 24: 89-90.

Töth, T. & Grillitsch, H. & Farkas, B. & Gál, J. & Sušić, G. (2006): Herpetofaunal data from Cres Island, Croatia.- Herpetozoa, Wien; 19: 27-58.

Tvrtković, N. (1982): Neobični susreti s poskokom [Unusual encounters with the nose-horned viper].- Priroda, Zagreb; 71: 93-94.

Tvrtković, N. (1993): Istraženost i ososbitosti faune područja od Cetine do Neretve [Research and characteristics of the fauna in the area of Cetina and Neretva rivers].- Kongres, prirodoslovna istraživanja biokovskog područja, Makarska, 11.-16.10.1993, pp. 32.

Tvrtković, N. (1994): Zoogeografske osobitosti Gorskog kotara s obzirom na faunu gmazova, vodozemaca i sitnih terestričkih sisavaca [Zoogeographic characteristics of Gorski kotar with respect to the fauna of reptiles, amphibians and small terrestrial mammals]; pp. 109-111. In: Frković, A. (ed): Zbornik radova 40 godina nacionalnog parka "Risnjak" (1953-1993). Crni Lug (National Park Risnjak).

Tvrtković, N. & Kletečki E. (1993): Preliminarna istraživanja terestričkih kralješnjaka Biokova [Preliminary research of terrestrial vertebrata on the mountain Biokovo].- Acta Biokovica, Podgora; 6: 11-18.

Ursenbacher, S. & Carlsson, M. & Helfer, V. & Tegelström, H. & Fumagalli, L. (2006): Phylogeography of the adder (*Vipera berus*) as inferred from mitochondrial DNA sequence data.- Molecular Ecology, Oxford; 15: 3425-3437.

Ursenbacher, S. & Schweiger, S. & Tomović, L. & Crnobrnja-Isailović, J. & Fumagalli, L. & Mayer, W. (2008): Molecular phylogeography of the nose-horned viper (*Vipera ammodytes*, Linnaeus (1758)): Evidence for high genetic diversity and multiple refugia in the Balkan Peninsula.- Molecular Phylogenetics and Evolution, San Diego; 46: 1116-1128.

Veith, G. (1991a): Die Reptilien Bosniens und der Herzegowina. Teil I.- Herpetozoa, Wien; 3 (3-4): 99-194.

Veith, G. (1991b): Die Reptilien Bosniens und der Herzegowina. Teil II.- Herpetozoa, Wien; 4 (1-2): 1-96.

Veith, G. (1910): Zur Fresslust der *Vipera ammodytes*.- Annalen des k. k. Naturhistorischen Hofmuseums, Wien; 24: 70.

Werner, F. (1893): Zur Herpetologie von Bosnien.- Zoologischer Anzeiger; 16: 421-426.

Werner, F. (1897): Die Reptilien und Amphibien Oesterreich-Ungarns und der Occupationsländer. Wien (A. Pichlers Witwe & Sohn), pp. 162.

Werner, F. (1898): Prilozi poznavanju faune reptilija i batrahija Balkanskog poluostrva [Contribution to the knowledge of the reptile and amphibian fauna in the Balkan Peninsula].- Glasnik Zemaljskog Muzeja u Bosni i Hercegovini, Sarajevo; 10: 131-156.

Werner, F. (1899): Beiträge zur Kenntnis der Reptilien- und Batrachierfauna der Balkanhalbinsel.- Wissenschaftliche Mittheilungen aus Bosnien und der Herzegowina, Sarajevo; 6: 817-841.

Werner, F. (1904): Drugi prilog poznavanju faune reptilija i batrahija Bosne i Hercgovnine [Second contribution to the knowledge of the reptile and amphibian fauna in Bosnia and Herzegovina].- Glasnik Zemaljskog Muzeja u Bosni i Hercegovini, Sarajevo; 16: 499-511.

Werner, F. (1920): Zur Kenntnis der Reptilien- und Amphibienfauna Albaniens.- Zoologischer Anzeiger, Leipzig; 51: 20-23.

Wettstein, O. von (1928): Beiträge zur Wirbeltierfauna der kroatischen Gebirge.- Annalen des Naturhistorischen Museums in Wien, Wien; 42: 1-45.

Živković, S. (1956): Crna šarka u Fruškoj Gori.- Priroda, Zagreb; 43: 152-153.

APPENDIX II – Literature reviewed for obtaining distribution data

Anonymous 1890; Anonymous 1932; Bolkay & Ćurčić 1920; 1933; Bolkay 1920, 1923, 1924, 1928, 1929a, 1929b; Bruno 1968, 1980, 1985, 1988; Brusina 1908; Buresch & Zonkow 1932, 1934; Burlin & Dolce 1993; Cafuta 2003; Carrara 1846; Crkvenac 1928; Crnobrnja-Isailović & Džukić 1995, 1997; Crnobrnja 1982; Crnobrnja & Rohalj 1988; Crnobrnja-Isailović 2002a, 2002b; Crnobrnja-Isailović et al. 2011; Cvitanić 1959; De Luca et al. 1990; Depoli 1898; Dimovski 1959a, 1959b, 1960, 1963, 1964, 1966, 1971, 1981; Dolce 1979; Doflein 1921; Džukić & Purger 1988; Džukić et al. 2005; Džukić 1972, 1991; Fejervary 1922; Frauenfeld 1853; Gasc et al. 1997; Haleš 1988; Heckes et al. 2005; Hirtz 1924, 1927a, 1927b, 1929a, 1929b, 1933, 1939; Horvat 1935; Ivančević et al 2007; Jović et al. 1997; Jurinac 1886; Karaman 1921, 1928, 1931, 1937, 1938, 1939, 1948; Katurić 1883; Koen 1960; Kolombatović 1882; Konte et al. 2006; Kopstein & Wettstein 1920; Kosić 1910; Kramer 1961; Kranjčev 1995, 1997; Krpan 1962; Lazar & Balent 2000; Marčić 1927; Méhely 1894; Mertens & Müller 1928; Mihailinović 1963; Mihaljević & Martinčić 1999; Mikačić 1967; Möllendorff 1873; Mršić et al. 1989; Mršić 1978; Pasuljević 1968; Pavletić 1962, 1964; Popović et al. 1999; Pozzi 1966; Praunsperger 1930; Radovanović 1951, 1964; Reuss 1927a, 1927b; Rössler 1904; Rucner & Rucner 1971; Schimmenti & Fabris 2000; Schmidtler 1999; Schwarz 1936; Schweiger 2004, 2007; Sebišanović 1898; Sochurek 1984; Stamenković 1979; Stanković 2005; Sterijovski 2006; Stipančić 1934; Strijbosch et al. 1985, 1986; Šalomon et al. 2005; Tadić 1976; Tomassini 1890; Tonković 1934; Toth et al. 2006; Tvrtković & Kletečki 1993; Tvrtković 1982, 1993, 1994; Veith 1910, 1991a, 1991b; Werner 1893, 1897, 1898, 1899, 1904, 1920; Wettstein 1928; Živković 1956.

APPENDIX III – New materials and observations

All of the observations are formatted in the order of locality name, UTM 10 km x 10 km cell code, year, and observer (collector). Where data is missing, the place is left blank.

Vipera berus

Bosnia and Herzegovina - Bjelašnica (by Sarajevo), BP74, 1934, ?; Maglić-pl., CN19, 1959, ?; Cincar-pl., XJ66, 2000, ?; Igman (Veliko polje), BP74, 2005, A. Safić; Igman (Veliko polje), BP74, 2004, A. Ćatović; Igman (Veliko i Malo polje), BP74, 2008, D. Smaić; Treskavica, Veliko jezero, BP83, 2008, D. Smaić; Bjelašnica by Sarajevo, Hranisava, BP64, 2009, D. Smaić; Bjelašnica by Sarajevo, Lokvanjsko jezero, BP74, 2009, D. Smaić; Bjelašnica by Sarajevo, Sitnik, BP74, 2009, D. Smaić; Lelija (marked road) to

Zelengora, BP90, 2008, E. Šunje; Zelengora, CP00, 2008, E. Šunje; Čvrsnica, BiH, YJ03, 2009, I. Grubnić; Vlašić, YK00, 2010, D. Jelić; Klekovača, close to the top, XK12, 2010, D. Jelić; Šator, XJ29, 2010, D. Jelić; Klekovača, near the top, XK22, 2010, D. Jelić; Bjelašnica (by Sarajevo), Salihagina bajta, BP74, 2002, K. Muftić; Bjelašnica, Stanari, BP74, 2002, K. Muftić; Bjelašnica, Lokvanjsko jezero, BP74, 2009, K. Muftić; Čvrsnica, Hajdučka vrata, YJ13, 2003, D. Kulijer; Bjelašnica, BP74, 2006, D. Kulijer; Zelengora, Orlovačko jezero, CP00, 2007, D. Kulijer; Čvrsnica, BiH, YJ13, 1999, N. Landeka; Čvrsnica, BiH, YJ03, 2004, N. Landeka; Čvrsnica, vrh Vilinac, BiH, YJ13, 2005, N. Landeka; Čvrsnica, BiH, YJ13, 2008, N. Landeka; Vranica (above Prokoško jezero), YJ27, 2005, R. Ajtić & S. Lelo; Čabulja (road to Rosne poljane), YJ12, 2007, S. Lelo; Maglić, CN19, 2009, S. Lelo; Bjelašnica (by Sarajevo), at the top, BP74, 2001, S. Trakić; Troglav, Veliki Troglav XJ26, 2011, I. Budinski.

Croatia - Turopoljski lug, north from Lekenik, WL96, 2007, ? ; Samarske stijene, Bjelolasica, VL91, 2009, A. Radelj; Turopolje, Okuje, WL85, 2007, D. Jelić; Turopolje, Okuje, WL85, 2010, D. Jelić; Begovo Razdolje, VL91, 2009, D. Jelić; Odransko polje, Lekenik, WL94, 2006, B. Janev Hutinec; Crna Mlaka, WL55, 1991, B. Janev Hutinec; Turopoljski lug, WL95, 1991, B. Janev Hutinec; Crna Mlaka, WL55, 1993, B. Janev Hutinec; Turopoljski lug, by the rockets, WL95, 1993, B. Janev Hutinec; Turopoljski lug, snake road, WL95, 1993, B. Janev Hutinec; Draganići, WL44, 2007, B. Janev Hutinec; Troglav, Dinara, V. Torine, XJ26, 2004, I. Budinski; Ivanščica, Konj, WM81, 2009, D. Šincek; Gorski kotar, Malo Tešnje, VL64, 2009, E. Hdžiselimovic; Gorski kotar, Čabarska polica, VL64, 2009, E. Hdžiselimovic; Okuje, WL85, 2009, B. Horvatić; Crna mlaka, WL55, 2008, B. Horvatić; Okuje, WL85, 2009, B. Horvatić; Hrebinec, near Dugo selo, WL97, 2009, I. Pavlović; Vrbovec, between Donji Tkalec and Novaki ravenski, XL19, 2000, I. Peranić; Okuje, WL85, 2008, D. Jelić; Šumeće, towards Bitelići, YL20, 2008, D. Jelić; Laktec, village WL97, 2008, D. Jelić; Brezje, WL65, 2008, D. Jelić; Snježnik, VL63, 2007, D. Jelić; Begovo razdolje, VL91, 2007, D. Jelić; Šumeće, Slavonski brod, YK29, 2008, D. Jelić; Žutica, XL06, 2010, D. Jelić; Žutica, XL16, 2010, D. Jelić; Obruč, Trstenik - Suho, WJ46, 2010, T. Koren, B. Lauš; Turopoljski lug, WL95, 2001, N. Mihoković; Cirkovljan kraj Preloga, Medimurska 2, XM23, 2007, N. Mihoković; Novi Perkovci, BR91, 2010, T. Bogdanović; Kešinci-Zgorelica, CR01, 2010, T. Bogdanović.

Macedonia - Galičica Mt., Asan Gjura, DL83, 2007, B. Sterijovski; Kriva Palanka, Vlaški kolibi, FM17, 2008, B. Sterijovski; Kamenica, Juručki grobišta, FM26, 2008, B. Sterijovski; Maleševski Planini Mt., Cengino, FM62, 2007, B. Sterijovski; Kožuf Mt., Džibarica, FL05, 2004, B. Sterijovski; Nidže Mt., Čemerikata, EL74, 2002, B. Sterijovski; Kožuf Mt., Orlov vrv peak, EL85, 2004, B. Sterijovski; Šar planina Mt., Belo ezero Lake, DM84, 2009, B. Sterijovski; Kožuf Mt., Porta, EL95, 2005, B. Sterijovski; Ilinska-Plakenska Mt., Straža, EL07, 2008, B. Sterijovski; Jablanica Mt., Crven kamen - near, DL66, 2005, B. Sterijovski; Dešat Mt., Gorno Gasevo ezero Lake, DM61, 2004, B. Sterijovski; Kožuf Mt., Dudica, EL95, 2004, B. Sterijovski; Šar planina Mt., Karabunar, DL84, 2007, B. Sterijovski; Šar planina Mt., Vakaf, DL84, 2007, B. Sterijovski; Pelister Mt., Kunina stena, EL14, 2001, B. Sterijovski; Pelister Mt., Crvena reka River, EL13, 2002, B. Sterijovski; Šar planina Mt., Popova šapka, DL85, 2007, B. Sterijovski; Jablanica Mt., Mečkina dupka, DL65, 2006, B. Sterijovski; Jablanica Mt., Mečkina dupka, DL66, 2006, B. Sterijovski; Bistra Mt., Golem Brezovec peak - bellow, DM70, 2003, B. Sterijovski; Jablanica Mt., Čumin vrv peak, DL66, 2005, B. Sterijovski; Jablanica Mt., Podgorečko ezero Lake, DL66, 2005, B. Sterijovski; Šar planina Mt., Karanikolićko ezero Lake, DL85, 2007, B. Sterijovski; Osogovski planini Mt., Sultan tepe, FM16, 2007, B. Sterijovski; Pelister Mt., Kunina stena, EL14, 2001, B. Sterijovski; Korab Mt., Kabaš, DM62, 2004, B. Sterijovski; Dešat Mt., Golema Stena - bellow, DM61, 2004, B. Sterijovski; Jablanica Mt., Krstec, DL66, 2005, B. Sterijovski; Jablanica Mt., Podgorečko ezero Lake, DL66, 2006, B. Sterijovski; Galičica Mt., Tepeno, DL83, 2006, B. Sterijovski; Jakupica Massif, Golemo Kule, EM31, 1999, B. Sterijovski; Pelister Mt., Bolnici, EL14, 2002, B. Sterijovski; Šar planina Mt., Rasangule, DL73, 2007, B. Sterijovski; Kožuf Mt., Zelen beg, FL05, 2004, B. Sterijovski; Korab Mt., Kobilino pole field, DM62, 2004, B. Sterijovski; Galičica Mt., Magaro, DL83, 2005, B. Sterijovski; Pelister Mt., near Malo ezero Lake, EL13, 2001, B. Sterijovski; Šar planina Mt., Plat, DM85, 2009, B. Sterijovski; Pelister Mt., near Pelister peak, EL13, 2002, B. Sterijovski; Pelister Mt., near Golemo stopalo peak, EL13, 2002, B. Sterijovski.

Montenegro - Durmitor Mt., Crvene Grede-Žute Grede, CN48, 2003, Đ. Đoković; Durmitor Mt., Ograđenica, CN48, 2004, Đ. Đoković; Durmitor Mt., Savin Kuk, CN47, 1996, G. Tomović; Bjelasica Mt., Lalevića Dolovi, CN84, 2000, Lj. Tomović, R. Ajtić; Durmitor Mt., Valovito jezero Lake, CN47, 2002, Lj. Tomović, R. Ajtić; Durmitor Mt., Jablan bara, CN48, 1993, M. Niketić; Durmitor Mt., Malo Škrčko jezero Lake, CN37, 2004, S. Preradović.

Serbia - Suva planina Mt., Trem peak, EN98, 1997, Ch. Gussev; Milevska planina Mt., village Božica (above), FN11, 1992, G. Anačkov; Prokletije Mts., Jerebinje, DN64, 1996, I. Krizmanić; Šar planina Mt., Durlov potok, EM06, 1995, I. Krizmanić; Stara planina Mt., Midžor, Bugarska granica, FP30, 1991, I. Krizmanić; Stara planina Mt., Tupanar, FP30, 1991, I. Krizmanić; Šar planina Mt., Gornjeselsko jezero Lake, DM96, 1996, I. Krizmanić; Šar planina Mt., Veli Beg, DM73, 1995, I. Krizmanić; Šar planina Mt., Ošljak Mt., DM97, 1996, I. Krizmanić; Šar planina Mt., Jažinačka jezera Lakes, Gornje Šije, DM97, 1995, I. Krizmanić; Stara planina Mt., Žarkova čuka, FP30, 1991, I. Krizmanić; Šar planina Mt., Mekuš Bor, Careve Livade, EM06, 1997, I. Krizmanić; Vršački breg Mt., Planinarski dom, EQ29, 2008, Lj. Tomović; Kopaonik Mt., Pančićev vrh peak, DN89, 2000, Lj. Tomović; Stara planina Mt., Arbinje, FN49, 1999, Lj. Tomović, R. Ajtić; Valozi Mt.,, FN01, 2006, Lj. Tomović, R. Ajtić; Stara planina Mt., Kopren, Tri kladenca, FN49, 1999, Lj. Tomović, R. Ajtić; Kopaonik Mt., Metođe, DN89, 1982, M. Niketić; Paštrik Mt., village Planeja, Šeh Mahala, DM67, 2008, R. Ajtić; Oštri Krš, DN98, 1987, J. Crnobrnja Isailovic; Jaram, Zljeb, DN98, 1987, J. Crnobrnja Isailovic; Babin Zub, FP30, 1983, R. Mandic; Obedska bara, DQ15, 1995, J. Crnobrnja Isailovic; Vršačke planine, Dugačko bilo, , 2001, J. Crnobrnja Isailovic.

Vipera ursinii

Bosnia and Herzegovina - Lebršnik, Čemerno, CN08, 1978, H. Billing; Zelengora, CP00, 2007, K. Mebert; Zelengora, CP00, 2011, D. Jelić; Kamešnica, ridge Kamešnica-Konj, XJ54, 2004, I. Peranić; Kamešnica, ridge Kamešnica-Konj, XJ54, 2007, D. Jelić; Kamešnica, ridge Kamešnica-Konj, XJ54, 2005, V. Elez; Razvale on Troglav, V. Duvjakusa, XJ26, 2005, HHD-HYLA; Troglav, Gubalj, XJ26, 2005, I. Budinski; Troglav, Marasovac, by Čakolice, XJ26, 2005, I. Budinski; Troglav, Veliki Troglav XJ26, 2011, J. Dušan and I. Budinski.

Croatia - Dinara, XJ17, 2006, I. Budinski; Dinara, Martinove košare, XJ17, 2006, I. Budinski; Dinara, from Glavaš, XJ17, 2007, I. Peranić; Dinara, Samar, XJ18, 2006, G. Ochsenhofer; Dinara, Samar, XJ18, 2005, I. Peranić; Dinara, Velike Torine (na granici), XJ26, 2005, HHD-HYLA; Dinara, under the mean peak Sinjal, XJ18, 2006, D. Jelić; Dinara, from Glavaš, XJ17, 2005, HHD-HYLA; Duler and Samar, XJ18, 2008, D. Jelić; Kamesnica, Gornja Korita_iznad, XJ54, 2005, HHD-HYLA; Kamešnica, Kamešnica, XJ54, 2007, D. Jelić; Kamešnica, Kapine, XJ53, 2004, I. Peranić; Lisac, WK71, 2008, I. Peranić; Velebit, Sveto brdo, Vlaški grad, WK40, 2009, D. Jelić; Velebit, Debelo brdo, WK40, 2007, D. Jelić; Velebit, Dokoznici dol, WK40, 2007, I. Peranić; Velebit, Sveto brdo, WK40, 2007, I. Peranić; Velebit, Veliki Štirovac, WK40, 2007, K. Mebert and T. Ott; Veliki Poštak, WK80, 2007, I. Peranić; Veliki Štirovac, WK40, 2008, D. Jelić; Visibaba, WK71, 2009, I. Peranić.

Macedonia - Korab Mt., Kobilino pole field, DM62, 2004, B. Sterijovski; Šar planina Mt., Dedel Beg, DM72, 2006, B. Sterijovski; Šar planina Mt., Fudan, DM72, 2006, B. Sterijovski; Šar planina Mt., Idrizova dupka, DM73, 2006, B. Sterijovski; Šar planina Mt., Karabunar, DM84, 2007, B. Sterijovski; Šar planina Mt., Karanikolićko ezero lake, DM85, 2007, B. Sterijovski; Šar planina Mt., Kobilica, DM96, 2007, B. Sterijovski; Šar planina Mt., Kraište, DM95, 2008, B. Sterijovski; Šar planina Mt., Kuči baba, DM83, 2008, B. Sterijovski; Šar planina Mt., Ljubanski uši, DM86, 2008, B. Sterijovski; Šar planina Mt., Ljuboten Mt. Lodge - above, EM07, 2007, B. Sterijovski; Šar planina Mt., Mala Smreka, DM84, 2008, B. Sterijovski; Šar planina Mt., Popova Šapka, DM85, 2007, B. Sterijovski; Šar planina Mt., Radika, DM73, 2006, B. Sterijovski; Šar planina Mt., Rasangule, DM73, 2006, B. Sterijovski; Šar planina Mt., Rudoka, DM84, 2008, B. Sterijovski; Šar planina Mt., Selišta, DM85, 2008, B. Sterijovski; Šar planina Mt., Šija, EM07, 2007, B. Sterijovski; Šar planina Mt., Vakaf, DL84, 2007, B. Sterijovski; Šar planina Mt., Venec, DM73, 2006, B. Sterijovski; Šar planina Mt., Vojvodino, DM84, 2007, B. Sterijovski; Šar planina Mt., Vratnički bačila, EM06, 2007, B. Sterijovski.

Montenegro - Bjelasica Mt., Lalevića Dolovi, CN84, 2000, Lj. Tomović, R. Ajtić; Brotnjik Mt., CN61, 2009, S. Vuksanović; Durmitor Mt., Komarnica River canyon, Dragišnica forest, CN27, 2003, R. Ajtić; Durmitor Mt., Ograđenica, CN48, 2004, Đ. Đoković; Durmitor Mt., Planinica, CN37, 1995, M. Niketić; Durmitor Mt., Škrčko jezero Lake, CN37, 2004, M. Dajović; Durmitor Mt., Todorov Do, CN37, 1999, Đ. Đoković; Lovćen Mt., Ivanova Korita, CM29, 2005, D. Petrović; Orjen Mt., road from Orjenske lokve to peak, BN91, 2003, M. Niketić, G. Tomović.

Serbia - Paštrik Mt., village Planeja, Šeh Mahala, DM67, 2006, R. Ajtić; Šar planina Mt., Kobilica Mt., DM86, 2004, Š. Duraki.

Vipera ammodytes

Bosnia and Herzegovina - Bardača (near fishponds), XK99, 2008, S. Lelo; Bihać (Lohovo), WK66, 2000, S. Lelo; Binježevo - Blažuj, BP75, 2002, E. Žolković, S. Lelo; Binježevo (Blažuj by Sarajevo), BP75, 2002, E. Žolković; Bjelašnica (by Sarajevo), near a hotel, BP74, 2000, S. Lelo; Blagaj, YH39, 2000, S. Lelo; Blagovac II, Vogosca, BP86, 2009, R. Tokić; Prenj, Borci, BP53, 2005, K. Muftić; Prenj, Borci (Boračko polje), BP53, 2008, E. Šunje; Bosanska Krupa, WK97, 2006, S. Lelo; Bosanska Krupa (Jezerski), WK88, 2009, Š. Muzaferović; Botašnica (by Zavidovići), BQ72, 2000, S. Lelo; Bradina (towards Repovci), BP54, 2005, S. Lelo; Bratogošac (Ravno, Popovo p.), YH45, 2006, S. Lelo; Bugojno, XJ98, 2008, S. Lelo; Bugojno (Barice), XJ98, 2008, S. Lelo; Bukovik, BP96, 2001, K. Dejan; Bukovik (Ozren Mt. by Sarajevo), BP96, 2002, D. Kulijer; Crno polje (road to Jezerce)-Prenj, BP52, 2008, E. Šunje; Crno polje, forest, Prenj, BP52, 2005, K. Muftić; Crvanj, Zimomor, BP70, 2009, J. Čolaković; Čvrsnica (Diva Grabovica), YJ13, 2006, S. Lelo; Čvrsnica (Diva Grabovica), YJ13, 2007, S. Lelo; Čavljak, BP96, 2006, K. Dejan; Čavljak, BP96, 2006, K. Dejan; Čavljak, BP96, 2007, K. Dejan; Čvrsnica, YJ13, 2009, S. Begić; Čvrsnica (Diva Grabovica, YJ13, 2005, H. Bašić; Čvrsnica (Diva Grabovica, YJ13, 2006, H. Bašić; Čvrsnica Veliko Šljeme, YJ13, 2006, H. Bašić; Čvrsnica Mt. (Stipića livade), YJ14, 2007, S. Lelo; Čvrsnica, Diva Grabovica, (near Hondzina house), YJ13, 2003, K. Muftic; Čvrsnica, Diva Grabovica, YJ13, 2005, K. Dejan; Dokanj (near Tuzla), CQ14, 1999, S. Lelo; Donja Jablanica, YJ23, 2009, S. Begić; Drežnica, YJ12, 2007, S. Lelo; Džajići, Konjic, YJ33, 2008, K. Muftić; Gabela, YH17, 2006, S. Lelo; Gradac (bear Neum), YH25, 2009, S. Lelo; Gradačac, BQ97, 2000, S. Lelo; Gradačac (Tinja), CQ04, 2000, S. Lelo; Has, Prenj, YJ22, 2002, K. Muftić; Hrasnički stan, Igman, BP85, 2004, A. Avdić; Igman Mt. (Hrasnički stan), BP85, 2000, S. Lelo; East Bosnia (vicinty Višegrad), CP64, 2008, E. Šunje; Jablanica (by the bridge), YJ23, 2006, S. Lelo; Jablanica lower part of Prenj, YJ23, 2009, S. Begić; Jajce (vicinty Plivsko lake), XK71, 2000, S. Lelo; Johovača (near Vlasenica), CP39, 2000, S. Lelo; Kamenica, Zavidovići, BQ72, 2004, A. Bajraktarević; Konjic under Prenj, YJ33, 2009, S. Begić; Konjic under Prenj (Repovica), YJ33, 2009, S. Begić; Konjic under Prenj (Ovčari), YJ44, 2009, S. Begić; Kramer village (Romanija Mt.), CP35, 2000, S. Lelo; Kravice, YH18, 2006, S. Lelo; Kreševo, BP66, 2005, G. Stanić; Kupreško polje (Kukavičije lake), XJ87, 2009, S. Lelo; Kupreško polje (road to Livno), XJ76, 2008, Š. Muzaferović; Kupreško polje (Šuica), XJ75, 2008, S. Lelo; Lasni do, Prenj, BP52, 2008, K. Muftić; Lazine, Blagaj, YH39, 2002, K. Muftić; Livanjsko polje (Vaganj by Livno), BP96, 2007, S. Lelo; Livno, XJ65, 2005, D. Dilaver; Lucine, Prenj, YJ22, 2002, K. Muftić; Lupoglav, Prenj, YJ32, 2003, K. Muftić; Ljubinje, BN66, 2006, S. Lelo; Misoča (near Ilijaš), BP87, 2005, S. Lelo; Misoča (near Ilijaš), BP87, 2005, S. Lelo; Ljuta (by Konjic), BP73, 2000, S. Lelo; Neum, YH15, 2007, S. Lelo; Neum, YH15, 2008, S. Lelo; Novi Travnik, YJ19, 2008, Š.

Muzaferović; Tuzla, Modrac lake, CQ03, 2000, S. Lelo; Okruglica Mt. (Mahmutovića river), BP88, 2007, S. Lelo; Okruglica Mt. (Slivno), BP88, 2005, S. Lelo; Orlovac (Ozren Mt. near Sarajevo), BP97, 2004, F. Remzija, S. Lelo; Orlovac (Ozren Mt. near Sarajevo), BP97, 1998, S. Lelo; Ozren Mt. (Bukovik), BP96, 2002, Dejan Kulijer i Suvad Lelo; Ozren Mt. (Bukovik, BP96, 2008, S. Lelo; Ozren Mt. (Gornji Močioci; near Sarajevo), BP96, 2009, S. Lelo; Ozren Mt. (above Čavljak; near Sarajevo), BP96, 2008, S. Lelo; Ozren Mt. (Orlovac), BP97, 2003, F. Remzija, S. Lelo; Ozren Mt. (Skakavac), BP96, 2002, D. Kulijer, Suvad Lelo; Pesnik (kod Jajca), XK81, 2005, H. Majdanac; Pjerovo brdo (Visoko), BP77, 1999, S. Lelo; Plitki Do (Popovo polje), YH45, 2006, S. Lelo; Plitki Do (Popovo polje), YH45, 2006, S. Lelo; Popovo polje (Bratogošac), YH45, 2006, S. Lelo; Popovo polje (hill Bratogošac, Ravno), YH45, 2006, S. Lelo; Popovo polje (Grmljani), BN54, 2006, S. Lelo; Popovo polje (Plitki Do), YH45, 2006, S. Lelo; Popovo polje (Plitki Do), YH45, 2006, S. Lelo; Popovo polje (Plitki Do, near Ravno), YH45, 2006, S. Lelo; Popovo polje (Plitki Do, near Ravno), YH45, 2006, S. Lelo; Prenj, near peak Cetina, YJ23, 2009, S. Begić; Prenj, Barni do near Lupoglav, YJ32, 2006, H. Bašić; Ribnički most (Jablanica), YJ23, 2000, S. Lelo; Ričica (near Kakanj), BP69, 2004, E. Sarač; Riža (Igman Mt. above Hrasnica), BP85, 2001, S. Lelo; Rogatica, CP35, 2009, S. Lelo; Romanija Mt. (Ravna Romanija), CP16, 2005, S. Lelo; Romanija Mt. (village Bećari), CP15, 2008, S. Lelo; Romanija Mt. (village Kozadre), CP35, 2006, S. Lelo; Rudo (entrance to the city), CP63, 2007, S. Lelo; Salakovac, YJ31, 2006, S. Lelo; Sarajevo, BP85, 2003, F. Remzija, S. Lelo; Sarajevo (Bembaša), BP85, 2004, B. Šarančić; village Bjelimići (Visočica Mt.), YJ24, 2005, I. Tinjak; village Donji Mrkovići (Ozren Mt. near Sarajevo), BP96, 2005, F. Remzija, S. Lelo; village Grabovci (near Konjic), YJ34, 2004, S. Šoto; Selo Ljubnići (near Ilijaš), BP77, 2007, S. Lelo; Skakavac (Ozren Mt. near Sarajevo), BP96, 2002, D. Kulijer; Soplje, Prenj, YJ22, 2004, K. Muftic; Stolac, YH47, 2007, S. Lelo; Strmnica, Čavljak, BP96, 2007, K. Dejan; Suhi do, Konjic, YJ33, 2004, K. Dejan; Svitava, YH26, 2005, S. Lelo; Šipovo, Sokočnica River canyon, XK60, 2001, Lj. Tomović; Trebinje (Aleksina međa), BN83, 2006, S. Lelo; Vaganac River Canyon, XK60, 2001, Lj. Tomović, R. Ajtić; Vareš, BP89, 2000, S. Lelo; Vareš (road to Perun), BP89, 2000, S. Lelo; Velike bare, Prenj, YJ32, 2003, K. Muftic; Visočica near peak Puzim, BP77, 2009, D. Smaić; Visočica near peak Džamija, BP72, 2009, S. Begić; Visoko (Luke), BP77, 2006, S. Lelo; Visoko (Visočica), BP77, 2006, S. Lelo; Vitorog Mt., village Babići, above Vaganac River gorge, XK60, 2001, Lj. Tomović, R. Ajtić; Vitorog Mt., village Babići, Divan, XK60, 2001, Lj. Tomović, R. Ajtić; Vitorog Mt., village Babići, Kičeljevo, XK60, 2001, Lj. Tomović, R. Ajtić; Vlašić Mt, YK10, 2004, S. Lelo; Vlašić Mt., YK10, 2010, D. Jelić; Volujac (Popovo polje), BN82, 2006, S. Lelo; Vranica Mt. (near Prokoško lake), YJ27, 2000, S. Lelo; Zakantar, Prenj, YJ32, 2004, K. Muftic; Zmijinac (road Idbar-Tisovica)-Prenj, YJ33, 2008, E. Šunje; Zvijezda Mt. (Bijambare), CP08, 2000, S. Lelo; Zvijezda Mt. (Bijambare), CP08, 2005, S. Lelo; Zvijezda Mt. village Budoželje), BP88, 2002, S. Lelo; Žlijeb, Čvrsnica, YJ13, 2006, K. Dejan; Župča (near Breze), BP87, 1998, S. Lelo.

Croatia - Biokovo, XH79, 2009, D. Treer; Čulimovo village, XJ07, 2008, D. Jelić; Dalmacija, Gornja Brela, XJ50, 2004, P. Balej; Dalmacija, Kistanje, XJ41, 2006, J. Frantisek; Dalmacija, Neretva, YH17, 2000, P. Vlcek; Dalmacija, Srinjine, XJ31, 2004, P. Balej; Dinara, XJ17, 2006, I. Budinski; Dinara, Martinove košare, XJ17, 2006, I. Budinski; Draga, near V. Trabe, VL11, 2008, T. Koren; Duler and Samar, XJ08, 2008, D. Jelić; Gornja Brela, XJ50, 2004, P. Balej; Gorski Kotar, Špičasti Vrh, VL64, 2007, HPD Matica; city Vid, YH17, 2007, D. Jelić; Istra, Vodice, VL23, 2008, N. Rahme; Javorni summit, Ljubešćica, Novi Marof, XM01, 2000, K. Žganec; Kalnik Mt., XM11, 2008, B. Janev-Hutinec; Kamešnica, cesta Kamensko-Vostane_kamenjar, XJ53, 2005, HHD-HYLA; Kamešnica, Gornja Korita_iznad, XJ44, 2005, HHD-HYLA; Krasno, WK06, 2008, B. Janev-Hutinec; Krk, Punat, VK78, 2006, B. Horvatić; Mala Paklenica, WK40, 2005, K. Žganec; Martinove košare, XJ17, 2007, D. Jelić; Medvednica, Bizek, WL67, 2008, B. Janev-Hutinec; Medvednica, Čučerje, WL88, 2008, B. Janev-Hutinec; Medvednica, Markuševac, WL78, 2008, B. Janev-Hutinec; Medvednica, Markuševac, WL78, 2008, B. Janev-Hutinec; Medvednica, Vidovec, WL88, 2008, B. Janev-Hutinec; Modro oko, YH07, 2007, D. Jelić; Mosor, Dubrava, XJ31, 2005, S. Mekinić; Mosor, Studenac spring, XJ31, 2001, S. Mekinić; Ogulin, near Pećnik stream, midlle part, WL11, 2007, J. Stošić; Ogulin, Grabrk, WL22, 2007, D. Jelić; Ogulin, Kirasići, area of "Trsje", WL11, 2007, J. Stošić; Ogulin, Salopek Selo, forest road to Sebljevo, WL11, 2008, J. Stošić; Ogulin, Pećnik, upper part, WL20, 2006, J. Stošić; Ogulin, Pećnik, middle part, WL11, 2006, J. Stošić; Okić, Samobor, WL56, 2004, K. Žganec; Omiš, Gata/Dolac, XJ41, 2000, S. Mekinić; Orlovica, WJ99, 2008, D. Jelić; Oštarije, Viničica summit, near the reciver, WL11, 2003, J. Stošić; Pelješac, road to Sv Ilija, XH76, 2008, B. Janev-Hutinec; Pelješac, Sv. Ilija, XH76, 2008, B. Janev-Hutinec; Promina Mt., Promina, WJ96, 2007, D. Jelić; Sušica (bridge, Radatovići), WL26, 2009, M. Jelić; Ravno Vrdovo, XJ35, 2005, I. Budinski; Sitno Gornje/Dom/Gajna, WJ88, 2005, S. Mekinić; Slunjčica, Rastoke, WK49, 2008, V. Tutiš; Sniježnica, Sniježnica, BN81, 2007, D. Jelić; Biokovo, Crna Ledenica, XJ12, 2002, BIUS; Biokovo, XJ60, 2002, BIUS; Biokovo, Vrata Biokova, XH79, 2002, D. Treer; Island Čiovo, Orlice, XJ01, 2005, I. Budinski; Seveljev brig, Seveljev brig, XJ60, 2002, BIUS; Staševica, XH97, 2006, B. Janev-Hutinec; Velebnit, Sveto brdo, WK40, 2007, D. Jelić; Svilaja, XJ14, 2007, D. Jelić; Šušnjevica, VL31, 2004, T. Koren; Troglav, Troglav - Gubalj, XJ26, 2005, I. Budinski; Trpošnjik, XJ31, 2001, S. Mekinić; Una, Hrvatska Kostajnica, Šuplji kamen, XL20, 2009, NN; Velebit, Baške Oštarije, WK13, 2006, HPD Matica; Velebit, Krasno, WK06, 2006, B. Horvatić; Velebit, NP Paklenica, WK30, 2007, M. Vlcek; Velebit, Sveto brdo, Pećica spring, WK40, 2009, D. Jelić; Velebit, Sveto brdo, Štirovac, WK40, 2009, D. Jelić; Velebit, Sveto brdo, Vlaški grad, WK40, 2009, D. Jelić; Velebit, Zečjak, VK95, 2008, HPD Matica; Veliki Kabal, XJ32, 2006, S. Mekinić; Visibaba, WK71, 2009, I. Peranić; Vošac, XH69, 2008, S. Mekinić; Vrata Biokova, Biokovo, XH79, 2002, N. Mihoković; Vrh Kijevski Bat na Kozjaku, XJ06, 2008, D. Jelić; Vugrovec, WL88, 2007, D. Jelić; Vugrovec, WL88, 2007, M. Zadravec; Zamask, gromača, VL12,

2009, T. Koren; Zlabina, Zlabina markirana planin staza prema, XJ54, 2005, HHD-HYLA; Žumberak-samoborsko gorje, Brašljevica, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Budim, WL35, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Budinjak, WL37, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Cernik, WL36, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Doljani, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Dragoševci, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Dvor, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Galezova Draga, WL35, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Goleši, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Grmki, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Gudalji, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Hodinci, WL35, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Iznad kupeč Dola, WL46, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Jamnik, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Kamenci, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Kašt, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Kekići, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Keseri, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, križanje Sošice -Magovci, WL36, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Kuljaji, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Ljeśće, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Magovci, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Močila-Tupčina, WL36, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Mrzle drage, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Novo Selo Žumberačko, WL37, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Pilatovci, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Podgoršćak, WL36, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Radatovići, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Radina Vas-Dojutrovica, WL36, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Rađenovići, WL36, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Ratkovići, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Sekulići, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Slapnica, WL36, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Sošice, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Stari grad Žumberak, Gradina, WL36, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Stazine, WL26, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Veliki Kal - Mrzla draga, WL36, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Vivodina, WL35, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, Vrapci, WL36, 2006, B. Janev-Hutinec; Žumberak-samoborsko gorje, zabrdnica (Doljani), WL26, 2006, B. Janev-Hutinec; Dubrovnik, BN62, 1956, NN; Orebic, XH76, 1967, NN; Rabac, Istra, VK39, 1988, NN; Ston, Peljesac, YH24, 1984, NN; Ston, Peljesac, YH24, 1970, NN.

Macedonia - Bistra Mt., near village Tresonce, DM70, 2003, B. Sterijovski; Bistra Mt., village Galičnik, DM70, 2005, B. Sterijovski; Bistra Mt., village Lazaropole, DL79, 2003, B. Sterijovski; Bitola, Mogila, EL35, 2007, B. Sterijovski; Debar, Debar, DL59, 2008, B. Sterijovski; Dešat Mt., Bituse, DM60, 2008, B. Sterijovski; Dojran Lake area, Causli, FL46, 2006, B. Sterijovski; Galičica Mt., Čokolsko, DL83, 2006, B. Sterijovski; Galičica Mt., Elšani, DL83, 2007, B. Sterijovski; Galičica Mt., Golem Grad, DL93, 2008, B. Sterijovski; Galičica Mt., Gradište, DL83, 2007, B. Sterijovski; Galičica Mt., Konjsko, DL93, 2005, B. Sterijovski; Galičica Mt., Konjsko (Oh), DL83, 2007, B. Sterijovski; Galičica Mt., Leskoec, DL93, 2003, B. Sterijovski; Galičica Mt., Leskoec, DL93, 2005, B. Sterijovski; Galičica Mt., near village Stenje, DL93, 2003, B. Sterijovski; Galičica Mt., Oteševo, DL93, 2006, B. Sterijovski; Galičica Mt., Peštani, DL83, 2007, B. Sterijovski; Galičica Mt., Pljuska, DL93, 2005, B. Sterijovski; Galičica Mt., Prisoj, DL93, 2006, B. Sterijovski; Galičica Mt., Sir Han, DL93, 2007, B. Sterijovski; Galičica Mt., Stenje, DL93, 2004, B. Sterijovski; Galičica Mt., Stenje, DL93, 2005, B. Sterijovski; Galičica Mt., Suvo pole, DL83, 2006, B. Sterijovski; Galičica Mt., Trpeijca, DL83, 2006, B. Sterijovski; Galičica Mt., Trpeijca, DL83, 2007, B. Sterijovski; Galičica Mt., Volkolegalo, DL83, 2003, B. Sterijovski; Galičica Mt., Volkolegalo, DL83, 2005, B. Sterijovski; Galičica Mt., Zli dol, DL83, 2006, B. Sterijovski; Gevgelija, Kovanci, FL16, 2005, B. Sterijovski; Gevgelija, Miravci, FL17, 2005, B. Sterijovski; Gradeška Planina Mt., Konce, FL19, 2005, B. Sterijovski; Ilinska-Plakenska Mt., Babino, EL07, 2008, B. Sterijovski; Ilinska-Plakenska Mt., Brezanska reka, DL96, 2008, B. Sterijovski; Ilinska-Plakenska Mt., Golemo Ilino, DL97, 2008, B. Sterijovski; Ilinska-Plakenska Mt., Virovo, EL06, 2008, B. Sterijovski; Istibanja, Orizari, FM24, 2008, B. Sterijovski; Istibanja, Popova čuka, FM24, 2008, B. Sterijovski; Istibanja, Rusov Grob, FM24, 2008, B. Sterijovski; Istibanja, Sokolovci, FM24, 2008, B. Sterijovski; Jablanica Mt., Kalista, DL75, 2006, B. Sterijovski; Jablanica Mt., Krstec, DL66, 2006, D. Jelić; Jablanica Mt., Mala Krasta, DL66, 2006, B. Sterijovski; Jablanica Mt., Modric, DL67, 2006, B. Sterijovski; Jablanica Mt., Tasmaruništa, DL76, 2006, B. Sterijovski; Kavadarci, Dabnište, EL88, 2005, B. Sterijovski; Kavadarci, Demir Kapija, FL08, 2005, B. Sterijovski; Kavadarci, Krnjevo, EL97, 2005, B. Sterijovski; Kičevo,, DL99, 2008, B. Sterijovski; Kičevo, Izvor, DL89, 2008, B. Sterijovski; Kočani, Gradče, FM14, 2007, B. Sterijovski; Kočani, Jastrebnik, FM14, 2007, B. Sterijovski; Kočani, Sinkovica, FM15, 2007, B. Sterijovski; Kočani, Sokolarci, FM04, 2009, B. Sterijovski; Kozuf, Konopište, EL96, 2005, B. Sterijovski; Kožuf Mt., near Citate, FL15, 2004, B. Sterijovski; Kratovo, Jamiška reka, FM05, 2008, B. Sterijovski; Kratovo, Jamište, FM05, 2008, B. Sterijovski; Kratovo, Kriva Jabuka, FM05, 2008, B. Sterijovski; Kratovo, Kunovo, FM05, 2008, B. Sterijovski; Kratovo, Ramni nivi, EM95, 2008, B. Sterijovski; Kratovo, Slegovo, EM95, 2008, B. Sterijovski; Kriva Palanka, German, EM98, 2008, B. Sterijovski; Kriva Palanka, Luti rid, FM17, 2008, B. Sterijovski; Kriva Palanka, Petralica, EM97, 2008, B. Sterijovski; Kriva Palanka, Podržikonj, FM08, 2008, B. Sterijovski; Kriva Palanka, Varovište, FM17, 2008, B. Sterijovski; Kruševo, Dolno Divjaci, EL18, 2007, B. Sterijovski; Kumanovo, Pcinja, EM65, 2008, B. Sterijovski; Kumanovo, Ramno, EM88, 2007, B.

Sterijovski; Kumanovo, Strnovac, EM77, 2008, B. Sterijovski; Makedonski Brod, Slatina, EM10, 2008, B. Sterijovski; Maleševski planini Mt., near Berovsko ezero Lake, FM52, 2000, B. Sterijovski; Mariovo, Dunje, EL56, 2007, B. Sterijovski; Mariovo, Staravina, EL64, 2007, B. Sterijovski; Mariovo, Suvodol, EL44, 2007, B. Sterijovski; Mariovo, Vitolište, EL65, 2007, B. Sterijovski; Marjanska planina Mt., after Dren, FL07, 2005, B. Sterijovski; Negotino, Dubrovo, EL99, 2005, B. Sterijovski; Nidže Mt., near Skočivir, EL53, 2002, B. Sterijovski; Ograždenski Mt., near the mine Ograždenski, FL49, 2000, B. Sterijovski; Ograždenski Mt., Ograždenski rudnik, FL49, 2006, B. Sterijovski; Pelister Mt., Brajčino, EL12, 2002, B. Sterijovski; Prespa Lake area, Golem Grad, DL92, 2004, B. Sterijovski; Prespa Lake area, Golem Grad Island, DL92, 2004, B. Sterijovski; Prilep region, above village Sivec, EL78, 2004, B. Sterijovski; Probištip, Dobrevo, EM95, 2008, B. Sterijovski; Probištip, Kundino, EM95, 2008, B. Sterijovski; Reka, Zdunje, EM12, 2008, B. Sterjovski; Skopje region, village Orman, EM25, 2004, B. Sterijovski; Skoplje, Cresevo, EM45, 2009, B. Sterijovski; Skoplje, Divle, EM64, 2009, B. Sterijovski; Skoplje, Kučkovo, EM25, 2002, B. Sterijovski; Skoplje, Lepenec, EM25, 2003, B. Sterijovski; Skoplje, Orman, EM25, 2002, B. Sterijovski; Stogovo, Osino, DL68, 1670, B. Steriovski; Stracin, Luda Mogila, EM86, 2006, B. Sterijovski; Sveti Nikole, Gorobinci, EM73, 2009, B. Sterijovski; Šar planina Mt., above Tetovo, DM95, 2004, B. Sterijovski; Šar planina Mt., Selce Kec, DM94, 2009, B. Sterijovski; Štip region, Bekirlija, EM71, 2004, B. Sterijovski; Tetovo, Grupčin, EM14, 2008, B. Sterijovski; Treska River gorge, Matka, EM24, 2004, B. Sterijovski; Veles, Babuna, EM61, 2009, B. Sterijovski; Veles, Lozja, EM62, 2009, B. Sterijovski; Veles, Rosoman, EL79, 2009, B. Sterijovski; Zletovo, Stalkovica, FM05, 2008, B. Sterijovski; Zletovo, Tursko rudare, FM04, 2008, B. Sterijovski.

Montenegro - Ada bojana, CM65, 1994, J. Crnobrnja-Isailovic; Durmitor Mt., Ćurevac, CN48, 2004, Đ. Đoković; Durmitor Mt., Komarnica River canyon, Javorje, CN36, 2003, R. Ajtić; Durmitor, kanjon Komarnice, CN27, L. Tomović; Morača River Canyon, village Đuđevina, CN73, 2000, Lj. Tomović, R. Ajtić; Mrtvica River Canyon, village Mrtvo Duboko, CN63, 2001, Lj. Tomović; Lovcen, Ivanova Korita, CM29, 1958, NN; Rumija, CM46, 1934, NN; Orjen Mt., Pazua, CN01, 1998, M. Niketić; Orjen Mt., Veliki Štirovnik, village Vrbanje, BN91, 1999, A. Vlajić; Piperi Region, village Baće, CN61, 2002, V. Pešić; Prokletije Mts., Ropojana, DN00, 2005, A. Westerstrom; Skadarsko jezero Lake, village Đuravci, CM56, 2005, Lj. Tomović; Skadarsko jezero Lake, Virpazar, CM47, 1986, M. Schweiger; Tara River Canyon, Radovan Luka, CN48, 2001, A. Jovanović, D. Čitaković; Tara River Canyon, village Tepca, CN48, 1999, Đ. Đoković; Ulcinj, Ada Bojana, CM63, 1998, J. Radojičić; Ulcinj, city, hotel Galeb, CM54, 2005, G. Anačkov; Ulcinj, Valdanos, CM44, 2001, G. Anačkov.

Serbia - Aleksinac, village Kraljevo, EP52, 1983, M. Niketić; Bagrdan, EP11, 1984, J. Crnobrnja-Isailovic; Bagrdanski gorge, village Miljkovo, Miljkov Monastery, EP19, 2003, M. Niketić, G. Tomović; Beli Drim River valley, village Landovica, DM77, 1989, J. Rosandić; Beli Drim River valley, village Vrbnica, DM66, 1999, Z. Jovanović; Beli Rzav River gorge, villages Kotroman and Kršanje, CP75, 2003, M. Niketić; Beljanica Mt.,, EP58, 1997, R. Ajtić; Beljanica Mt., Beljanička kapa, EP58, 1997, R. Ajtić; Beljanica Mt., Kločanica (Suvaja) River, EP57, 1997, R. Ajtić; Beljanica Mt., Resava River, EP67, 1997, R. Ajtić; Blagaja, DP24, 2002, J. Crnobrnja-Isailovic; Bujanovac, village Končulj, EN50, 2005, B. Lukić; Cer Mt.,, CQ83, 2002, Lj. Tomović; Crni Vrh, FP20, 1983, J. Crnobrnja-Isailovic; Devica Mt., Ždrelo gorge, EP72, 1983, M. Niketić; Donji Milanovac, village Dobra, EQ74, 2003, G. Tomović, P. Lazarević; Đakovica, Erenik River valley, DM69, 1989, J. Rosandić; Đerdapska gorge, Kazan, FQ04, 1994, M. Niketić; Đerdapska gorge, FQ24, 2004, J. Crnobrnja-Isailovic; Đetinja River gorge, Užice (fortress), DP05, 2004, M. Niketić; Đetinja River gorge, village Stapari, CP95, 2004, B. Zlatković; Gornjačka gorge, Gornjak Monastery, EQ40, 1986, M. Niketić; Gornji Milanovac, Brđanska gorge, DP57, 2004, G. Tomović, M. Niketić; Grdelička gorge, village Predejane, EN94, 2004, S. Antić; Homoljske planine Mts., Vukan Mt., Veliki Vukan peak, EQ40, 2003, M. Niketić; Ibar River gorge, dolina Jorgovana (Ušće), DP71, 1991, R. Ajtić; Javor Mt., village Kušići, DP21, 1996, Lj. Tomović; Jelašnička gorge,, EN89, 2005, R. Ajtić; Jelašnička gorge, Inatovac peak, EN89, 2001, M. Niketić, G. Tomović; Jelašnička gorge, Radovanski kamen, EN89, 1988, M. Niketić; Jelašnička gorge, village Jelašnica, Prozorac, EN89, 1984, M. Niketić; Jelica Mt., DP44, 1989, M. Niketić; Jerma River gorge, Zvonačka banja, FN25, 2002, B. Zlatković; Josanicka banja, Gornje i Donje Camage, DP70, 1986, J. Crnobrnja-Isailovic; Juhor, Odzinacka kosa, EP16, 1984, J. Crnobrnja-Isailovic; Kamenička River gorge, village Kamenica, EP70, 1978, M. Niketić; kanjon Milesevke, CP09, 1995, J. Crnobrnja-Isailovic; kanjon Uvca, DP00, 1995, J. Crnobrnja-Isailovic; klisura Rzava, DP24, 2000, J. Crnobrnja-Isailovic; klisura Suvi Do, EP95, 1981, J. Crnobrnja-Isailovic; klisura Velike Tisnice, EP96, 1981, J. Crnobrnja-Isailovic; Knić, village Borač, Boračko hill, DP66, 2004, G. Tomović, M. Niketić; Kopaonik Mt., Čajetinsko brdo, DN88, 1983, M. Niketić, D. Lakušić; Kopaonik Mt., Lukovska banja, EN07, 2000, M. Niketić; Kopaonik Mt., Treska, DN88, 2005, V. Bjedov; Kopaonik Mt., village Brzeće, Ravelj, DN99, 2000, Lj. Tomović, R. Ajtić, Đ. Đoković; Kragujevac, village Dobrača, Lazarevići, DP77, 2004, G. Tomović, M. Niketić; Kruševac, Ćelijsko jezero Lake, EP10, 2004, R. Ajtić; Kučajske planine Mt., Malinik peak, EP77, 1984, M. Niketić, D. Lakušić; Kukavica Mt., vilage Krpejce, EN83, 2004, S. Antić; Loznica, village Badovinci, CQ76, 2004, M. Paunić; Medveđa, village Maćedonce, EN44, 2002, M. Živić; Milevska planina Mt., village Donja Ljubata, FN00, 2004, G. Anačkov; Miroč Mt.,, FQ03, 2005, M. Raković; Niška banja, Banjsko brdo, EN89, 1980, M. Niketić; Ovčarsko-Kablarska gorge, Ovčar banja, DP35, 2004, M. Niketić; Paraćin,, EP45, 2004, M. Niketić, G. Tomović; Paraćin, Baba planina Mt., EP45, 2004, M. Niketić, G. Tomović; Pčinja River, Crnovska River gorge, EM98, 2000, Lj. Tomović, R. Ajtić; Pčinja River, St. Prohor Pčinjski, village Čivčije, patrol path, EM78, 2002, Lj. Tomović, R. Ajtić; Pčinja River, St. Prohor Pčinjski, village Gornji Starac, EM78, 2002, Lj. Tomović, R. Ajtić; Ploce-Hajducka vodenica, FQ04, 2005, J. Crnobrnja-Isailovic; Prijepolje, Mileševska River canyon, CP90, 2004, R. Ajtić; Prizren,, DM77,

1988, R. Ajtić; Prizren, Cvilen hill, DM76, 1987, Z. Rosandić; Prizren, St. Arhangeli Monastery, DM87, 1990, R. Ajtić; Prokuplje, village Viča, Ložđe, EN38, 1999, Lj. Tomović, M. Tomović; Radosice, Savinac, DN97, 1986, J. Crnobrnja-Isailovic; Raška, road Raška-Leposavić, DN79, 2004, G. Tomović, M. Niketić; Rtanj Mt., Kusača, EP74, 1991, M. Niketić; Seličevica Mt., Mala Ibrovica peak, EN78, 1978, M. Niketić; Seoca , Skadarsko jezero, CM47, 1994, J. Crnobrnja-Isailovic; Sićevačka gorge, Gradištanska River gorge, EN99, 1997, G. Tomović, B. Zlatković; Sićevačka gorge, Oblik Mt., EN99, 1997, Z. Romčević; Sićevačka gorge, village Sićevo (Via Militaris), EN89, 2005, R. Ajtić; Soko Banja, Bovansko Lake, EP63, 1998, V. Žikić; Sokolovica Mt., Sokolov krš, EN36, 1998, M. Niketić, G. Tomović; Stalać,, EP33, 2005, R. Ajtić; Stalaćka gorge, villages Trubarevo and Cerovo, peninsula, EP42, 1993, M. Niketić; Stolovi Mt., village Kamenica, DP72, 2002, M. Niketić; Suva planina Mt., Lužnička River gorge, FN06, 1989, M. Niketić; Suva planina Mt., Mosor peak, EN98, 1994, B. Zlatković, G. Anačkov; Suva planina Mt., Trem peak, EN98, 1997, V. Ranđelović; Suva planina Mt., village Donji Dušnik, EN87, 2005, Lj. Tomović; Suva planina Mt., village Gornji Dušnik, EN97, 2005, Lj. Tomović; Suva planina Mt., village Kaletinac, EN97, 1976, M. Niketić; Suva planina Mt., village Šebet, EN97, 2001, B. Zlatković; Suvo Rudiste-Siljak, DN88, 1987, J. Crnobrnja-Isailovic; Svilajnac,, EP19, 2005, R. Ajtić; Svilajnac, village Oreškovica, EQ20, 1997, J. Bulić; Svrljiške planine Mt., Zeleni vrh peak, EP90, 1994, B. Zlatković, G. Anačkov; Svrljiški Timok River gorge, villages Podvis and Paliliula, EP92, 1983, M. Niketić; Šar planina Mt., Ošljak Mt. peak, DM87, 1991, M. Niketić; Šar planina Mt., village Brezovica, hotel Narcis, EM07, 2000, P. Lazarević; Šargan Mt., Mećavnik, CP85, 2005, G. Anačkov; Šumanska River gorge, village Grgurevci, EN65, 2002, M. Živić; Tara Mt.,, CP76, 1994, I. Krizmanić; Tara Mt., Derventa River canyon, CP66, 1990, M. Niketić; Tara Mt., Janjač hill, CP66, 2004, R. Ajtić; Tara Mt., village Kremna, CP85, 2005, G. Anačkov; Tara Mt., Zaovinsko jezero Lake, CP75, 2004, R. Ajtić; Topli do, FP30, 1983, J. Crnobrnja-Isailovic; Topluga River valley, village Smać, DM78, 1989, J. Rosandić; Tresibaba Mt.,, EP91, 2003, M. Niketić; Tresibaba Mt., village Miljkovo, EP91, 2003, M. Niketić, G. Tomović; Trstenik, village Donja Crnišava, Zbeg hill, EP02, 2002, T. Luković; Tubici, Kosjeric, DP07, 1983, J. Crnobrnja-Isailovic; Uvac River gorge, Uvac Monastery, CP93, 2001, B. Zlatković; Valjevo, Jablanica River, DQ00, 1994, M. Niketić, I. Krizmanić; Valjevo, village Blizonje, DQ11, 2004, G. Tomović, M. Niketić; Valjevo, Vlašić Mt., CQ82, 2004, M. Niketić, G. Tomović; Valjevske planine Mts., between Devojački vir and Gradac River spring, DQ10, 2005, Đ. Đoković; Valjevske planine Mts., Debelo Brdo Mt., Stubice hill, DP08, 1999, R. Ajtić; Valjevske planine Mts., Gradac River, road to village Konjičko, DQ10, 2004, Đ. Đoković; Valjevske planine Mts., left bank of Zabava River, DP18, 2002, Đ. Đoković; Valjevske planine Mts., Medvednik Mt., CP99, 1997, Đ. Đoković; Valjevske planine Mts., Povlen Mt., village Gornji Taor, DP08, 2003, Lj. Tomović, R. Ajtić; Valjevske planine Mts., Srednji Povlen Mt., Kneževo polje, CP98, 2001, D. Jovanović; Valjevske planine Mts., village Mravinci, road to Magleš hill, DP08, 2005, Đ. Đoković; Valjevske planine Mts., village Paštrić, right bank of Ribnica River, DP29, 2000, Đ. Đoković; Valjevske planine Mts., village Poćuta, hill near the Ledenjak stream, CP99, 2002, Đ. Đoković; Vlasina Mt., village Brod, FN04, 1982, J. Crnobrnja-Isailović; Vratna River gorge, Vratna Monastery, FQ01, 2005, R. Ajtić; Zlatar Mt., Vranjak peak, DP00, 2005, G. Anačkov; Zlatarsko Lake, Nova Varoš, village Debelja, Božetići, DP11, 2003, B. Mitić; Zlatibor Mt., Partizanske vode, CP94, 2005, G. Anačkov; Zlatibor Mt., village Ljubiš, DP02, 2000, I. Krizmanić; Zlotska klisura, EP07, 1985, J. Crnobrnja-Isailovic; Zlotska River gorge,, EP86, 2005, G. Tomović; Zlotska River gorge, Vernjikica, EP77, 1998, M. Niketić.

APPENDIX IV – Unpublished data from museum specimens used in this paper

All of the museum records are formatted in the order of locality name, UTM 10 km x 10 km cell name, observer (collector), museum acronym. Where data is missing the space was left blank.

Vipera berus

Bosnia and Herzegovina - Kalinovik, Gvozno, BP92, 1985., ZFMK.

Croatia - Donji Miholjac, BR77, 1984, Kovačić, D., HPM; Dugo Selo, WL97, 1956., Iggalffy, K., HPM; Jastrebarsko, Eabdin, WL55, 1985., no name, HPM; Jastrebarsko, Eabdin, WL55, 1985., no name, HPM; Jastrebarsko, ZdenčinaWL55, 1986., Radović, HPM; Karlovac, Draganići, WL44, 1984., Turk, HPM; Lekenik, Turopolje, Lekenik, WL94, 1960, Iggalffy, K., HPM; Peščenica, Turopolje, Vratovo, WL95, 1995, Perović, F., HPM; Vukojevac, Turopolje, WL85, 1981, Švehle, HPM; Zelina, WL99, 1984, Videc, HPM; Oriovac, YL10, 1920, determined by Krecsak, L. 2005, MNHN; Oriovac, YL10, 1926, Determined by Reuss, T. (1926), MNHN.

Vipera ursinii

Croatia - Velebit, Mali Štirovac southern Velebit, WK40, 2002, Lukač, G., HPM; Dalmazia, Monte Dinara, XJ26, 1920, Pavesi Maurizio, MSNM.

Vipera ammodytes

Croatia - Zagreb, Mlinovi, Šušnjevac, WL77, 1956, Postružin, P., HPM; Zagreb, Bizek, WL67, 1959, Magerle, A., HPM; Velebit, Zavižan, VK96, 1980, HPM; Velebit, Zavižan, VK96, 1987, Vukušić,, HPM; otok Pag, Lun, VK84, 1955, Magerle, A., HPM; otok Pag, Sankovi, VK83, 1957, Postružin, P., HPM; Delnice, Koèiæin, Koèiæin, VL83, 2004, Perović, F., HPM; Karlobag, WK03, 1976, Dolan, Cartner, HPM; Zagreb, Bačun, WL78, 1959, Magerle, A, HPM;

Dalmazia, Dubrovnik, BN62, 1978, Calmonte Toni, Bovone L., MSNM; Dalmazia, Zadar, Dintorni aeroporto, WJ28, 1990, Bozo Mesnic, Ferri Vincenzo, MSNM; Dalmazia, Zadar, Penisola di Vir, WK00, 1987, Ferri Vincenzo, MSNM; Dalmazia, Zadar, Vir, WK00, 1987, Ferri Vincenzo, MSNM; Dalmazia, Zadar, Vir, WK00, 1992, Tavecchio Guido, Ferri Vincenzo, MSNM; Dalmazia, Zara, WJ18, 1924, MSNM; Dalmazia, Zara, WJ18, MSNM; Dalmazia, Zara, WJ28, 1931, MSNM (2 individuals); Dalmazia, Zara, WJ18, Senizza A., MSNM (8); Dalmazia, Zara,, WJ28, Senizza A., MSNM (7 individuals); Istria, Rovigno, UK99, 1931, MSNM (4 individuals); Istria, Rovigno, UK99, 1931, Senizza A., MSNM; Istria, Rovigno, UK99, Senizza, A., MSNM (21 individuals); Orsovo, Banat, WJ96, 2008, Karl Brandenburg, SFNM; Velebit, Babrovača, VK96, 1961, SMNHLj; Velika Kapela, Razvala, WK18, 1961, SMNHLj; Plitvice, rijeka Korana, WK47, 1939, determined by Cyrén, O., SMNH.

Montenegro - Ulcinj, Ada Bojana, Donji Štoj, CM64, 1988, NHMB; Podgorica, CN50, 1901, Steindachner, NHMW; Skadarsko jezero Lake, Virpazar, CM47, 1986, M. Schweiger, NHMW; Šavnik, CN45, 1899, Steindachner, NHMW.

Serbia - Čičavica Mt., DN93, 1973, SMNHLj.

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