

Distribution and Activity of Caspian Whip Snake Dolichophis caspius (Gmelin, 1789) (Reptilia: Colubridae) in South-Western Bulgaria

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Abstract. The purpose of the study is to supplement, summarize and analyse data about the distribution and activity of *Dolichophis caspius* in south-western Bulgaria. The new data about the species were collected from 1991 to 2019 during herpetological surveys. The total number of records until now is 420: 148 of them can be found in previous publications, and 272 are reported for the first time. There are published data about 10 pieces of shed skins, and other 17 are newly registered. All data available indicate, that *D. caspius* is widespread in the study area. The species spreads northward throughout Zemen Gorge in the Struma River valley, and northward throughout Momina Klisura Gorge in the Mesta River valley. It is the most common snake in these areas (up to 1000-1100 m a.s.l.) where 12 other snake species also occur. *D. caspius* is active from the third decade of March till the first decade of November. No winter activity of the species has been recorded, despite the active search in December, January and February in some years. The period of activity can be divided in three – a period of very low, low and high activity. The snake is very warm-loving. It remains active even during the hottest months, and was observed only during the day most often around mid-day and 4 p.m.

Key words: Serpentes, colubrid snakes, ecology, ethology, biogeography, Balkan Peninsula.

Introduction

The Caspian Whip Snake (or the Large Whip Snake), *Dolichophis caspius* (Gmelin, 1789), is one of the largest, swiftest and strongest European snakes. In the recent past this Whip Snake was regarded as a subspecies of *Dolichophis jugularis* (Linnaeus, 1758), but today it has a rank of a species. Until recently, in addition to the nominate form (*D. caspius caspius*) the subspecies *D.*

caspius eiselti (Zinner, 1972) was also included (see ZINNER, 1972). It is considered now that the taxon *D. caspius eiselti* belongs to the species *D. jugularis*, so *D. caspius* is a monotypic species (see CATTANEO, 2012; 2018).

The geographical range of the Caspian Whip Snake spreads over south-eastern Europe and the extreme part of western Asia: Hungary, S Romania, E Bosnia-Herzegovina,

Croatia, Macedonia (now North Macedonia), S Montenegro, Serbia, Albania, Bulgaria, Greece (including many islands), W Turkey (including Imroz Island), Moldavia, S Ukraine, SW Russia (Dagestan), extreme NW Georgia, extreme NE Turkey and extreme NE Azerbaijan (WALLACH *et al.*, 2014). In Bulgaria the species is widespread in the lower parts, up to about 800-1100 m a.s.l., where the climate is warmer (BESHKOV & NANEV, 2002; BISERKOV *et al.*, 2007; STOJANOV *et al.*, 2011). As an exception, the species was found in Maleshevska Mountains (south-western Bulgaria) at 1580 m a.s.l. (BESHKOV, 1974). In south-western Bulgaria this snake is distributed in some parts of the valleys of Struma and Mesta Rivers, as well as on the slopes of the surrounding mountains (BISERKOV *et al.*, 2007; STOJANOV *et al.*, 2011). The species is a East Sub-Mediterranean faunal element and its significance for the zoogeographical subdivision of Bulgaria was defined by PULEV (2016) to be quite great. *D. caspius* was defined as an *indicator species* which range delineates very well the boundaries of the Sub-Mediterranean areas in the country.

The Caspian Whip Snake occurs in natural, but also in anthropogenic habitats. It was registered in some large cities in Bulgaria – Russe (KOVATSCHEFF, 1912), Plovdiv (MOLLOV & VELCHEVA, 2010), Blagoevgrad (PULEV & SAKELARIEVA, 2013), and Burgas (NATCHEV *et al.*, 2016).

Concerning its activity, according to ZINNER (1972) “throughout its distributional range the species hibernates between December and March; the time of highest activity is from April to June; the mating season is between the end of March and the end of May; the eggs are laid about 1½ to 2 months after mating”. In the territory of Bulgaria, the species is active from late March/early April to late October, and the copulation takes place in May/early June (BESHKOV & NANEV, 2002; BISERKOV *et al.*, 2007; STOJANOV *et al.*, 2011). The results from a research conducted in south-western Bulgaria by DYUGMEDZHIEV *et al.* (2019)

indicate that in 2018 the species emerged from hibernation during the third decade of March and the first decade of April. There are also 2 published records of winter activity in Bulgaria (see BURESCH & ZONKOV, 1934; BESHKOV, 1964). In the territory of the country the Whip Snake is active only during the day (BESHKOV & NANEV, 2002; BISERKOV *et al.*, 2007; STOJANOV *et al.*, 2011).

Data about the distribution and activity of the Caspian Whip Snake in south-western Bulgaria are reported by BURESCH & ZONKOV (1934), BESHKOV (1964, 1974), BESHKOV & NANKINOV (1979), BESHKOV & GERASIMOV (1980), BESHKOV & DUSHKOV (1981), NÖLLERT *et al.* (1986), KANTARDZHIEV (1992), BISERKOV (1995), PETROV & BESHKOV (2001), PESHEV *et al.* (2005), NAUMOV (2005), PETROV *et al.* (2006), PULEV & SAKELARIEVA (2011, 2013), TZANKOV *et al.* (2011), DOMOZETSKI (2013), POPGEORGIEV *et al.* (2016), GROZDANOV *et al.* (2016), MALAKOVA *et al.* (2018), MANOLEV *et al.* (2019), CAS (2010-2019), BALEJ & JABLONSKI (2006-2019), and DYUGMEDZHIEV *et al.* (2019). Most publications contain the place and date (sometimes the time) of registration, the individuals observed (number, age, condition), the shed skins, and more recent papers include also geographical coordinates of the locations.

The main purpose of the study is to supplement, summarize and analyze data about the distribution and activity (seasonal and 24-hour) of *D. caspius* in south-western Bulgaria.

Material and Methods

The new data about the Caspian Whip Snake were collected from 1991 to 2019, more intensively during the last years – 2013-2019 (more than the half of the records), and with single records in some years (1991, 1994, 1999-2001, 2004, 2007). The species has been registered during herpetological surveys (field trips) in various habitats. It has been searched for, day and night, in different months (including in December, January, and February in some years), and in various weather conditions. The specimens killed on

the road have been registered both accidentally and as a result of targeted searches. The dead individuals have been defined as “fresh” when their death occurred within 48 hours before their registration.

Unpublished data from the collection of the Regional Historical Museum in the city of Blagoevgrad (RHMB), collected in south-western Bulgaria in 1978, 1980, 1982, and 1984, were also used for the present research. All published and new data about observed alive and dead individuals, and shed skins have been used to specify the spread of the species in south-western Bulgaria. All data (published and new) about alive, “fresh” road-killed and other found “fresh” dead specimens have been included in the analysis of the seasonal activity pattern. The twenty-four-hour activity pattern has been analysed based on all published and new data about the alive active individuals for which the time of observation was recorded.

The separate locations of the species (both new and published) were grouped according to their affiliations to the squares of the Universal Transverse Mercator (UTM) grid with a resolution of 5×5 km. The grid-cells were indicated by the codes of the 10-km quadrates of Military Grid Reference System (MGRS; spatially identical with UTM) and capital letters (A-D) were used to denote the separate 5×5 km squares within every 10×10 km square (A indicates the southwestern square, B – the northwestern, C – the southeastern, and D – the northeastern). Mapping and map visualization were done in the projection coordinate system “WGS 84 UTM 35N” by means of ArcGIS v. 10.1 (ESRI, Redlands, CA, USA).

Most of the new records have been collected by the authors of the paper: A. Pulev [AP], G. Manolev [GM], L. Domozetski [LD], B. Naumov [BN], and L. Sakelarieva [LS]. Some of the data have been collected separately or in collaboration with the authors by other colleagues (see the Acknowledgements). The collectors have been noted with their initials in Appendices 3 and 4.

Data which are not included in some previous publications (NAUMOV, 2005; PULEV & SAKELARIEVA, 2011; 2013; DOMOZETSKI, 2013; MALAKOVA *et al.*, 2018) are added in this article and marked with ** in Appendices 1 and 2.

All data of observation (locality, geographic coordinates, altitude, date and time, the number, age and condition of individuals) are summarized in tables and the localities are marked on a map.

Results and Discussion

The total number of records of *Dolichophis caspius* in south-western Bulgaria until now is 420: 148 of them can be found in previous publications, and 272 are reported now for the first time (see Appendices 1 and 3).

Records of more than 168 individuals have been published till now (not always detailed). At least 135 of them were alive at the time of their registration, 11 were found dead (probably killed by people) and 22 were road-killed (15 of them “fresh”). The number of reported adults is the highest (n=55), followed by the number of juveniles (n=13) and subadults (n=8). Exact dates, geographic coordinates or sufficiently precise locations have been specified for most of the records (three of them were during the hibernation period), while the information about the time of observation is extremely scarce (see Appendix 1).

The new data about *D. caspius* in south-western Bulgaria include 272 records (263 field observations and 9 museum specimens) of 293 individuals. Most of them (163, 148 of which “fresh”) have been registered killed on the road, but the number of the alive individuals was not small as well (127). The dead ones found, without specified cause of death, were only 3. Most of the individuals registered were adult (n=225), and the number of subadults (n=38) and juveniles (n=30) was significantly smaller (see Appendix 3).

There are published data about 10 pieces of shed skins, and other 17 pieces are newly

registered (16 of adult individuals, and 1 of juvenile) in 11 localities (see Appendices 2 and 4).

The large number of published (102) and new (283) exact locations indicate, that the Caspian Whip Snake is widespread in the study area. The species spreads northward throughout Zemen Gorge in the Struma River valley, and northward throughout Momina Klisura Gorge in the Mesta River valley. It is the most common snake in these areas (up to 1000-1100 m a.s.l.),

where according to BESHKOV & NANEV (2002) 12 other snake species also occur. The known localities of *D. caspius* in the research area fall into 94 squares of a 5 km UTM grid. The published localities refer to 43 squares (for 22 of them new data are presented here as well), and the new ones fall in other 51 squares (Fig. 1). The presence of "white spots" on the map in the areas, where the species is likely to occur, as described above, is due to the less explored or unexplored territories.

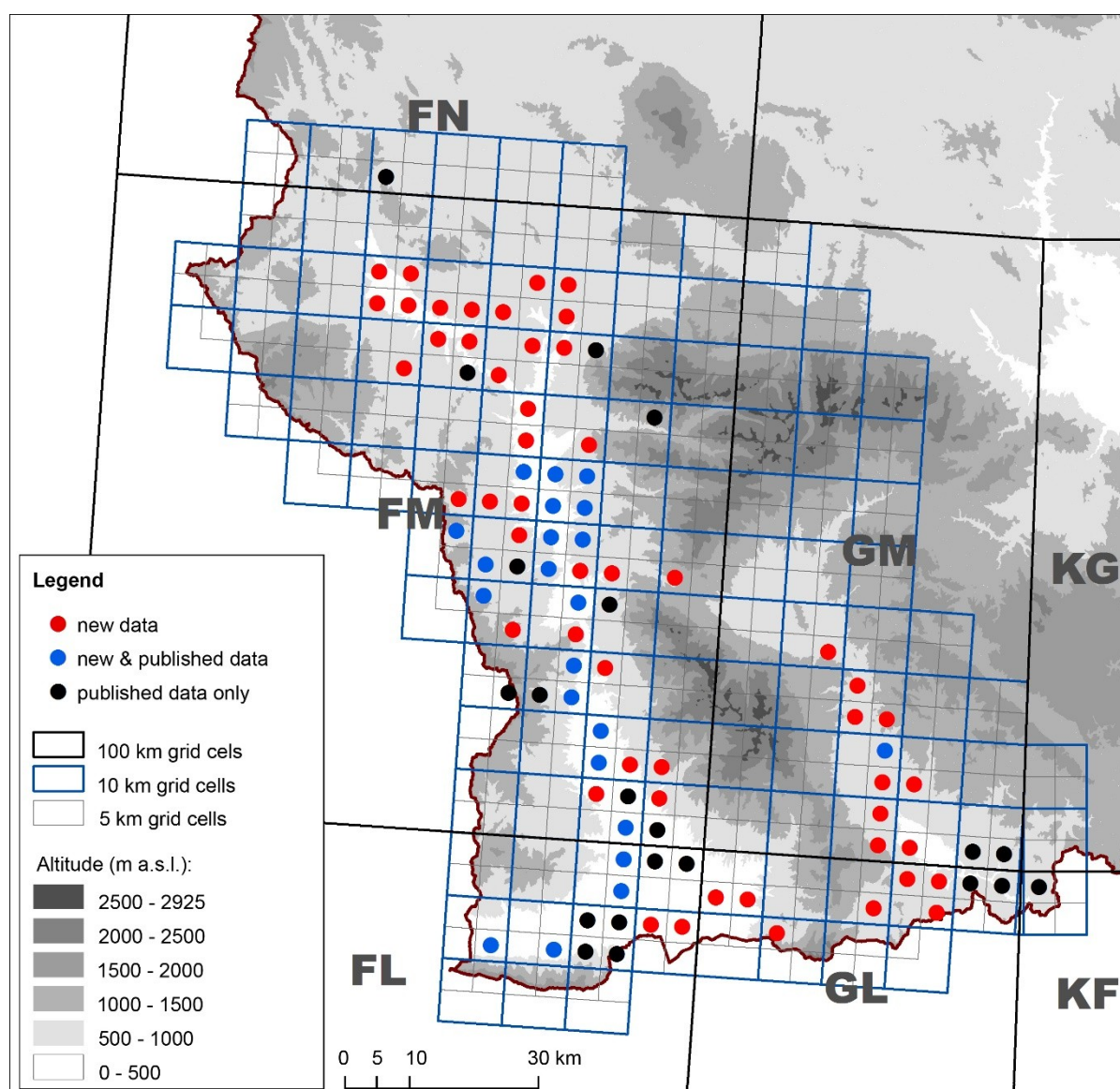


Fig. 1. Distribution of *Dolichophis caspius* in south-western Bulgaria, based on a 5 km UTM grid.

The species is found mainly in the plain-hilly belt. The new records are from areas with altitude up to 1000-1100 m, which corresponds to the publications of BESHKOV & NANEV (2002), BISERKOV *et al.* (2007) and STOJANOV *et al.* (2011) about the vertical distribution of *D. caspius* in the country. As the altitude increases, the number of registrations sharply decreases. In the range 700-1000 m a.s.l. there are only 11 new records, and other 8 have been reported in previous publications (the highest of which was from 936 m, TZANKOV *et al.*, 2011) (see Appendices 1, 2 and 3). Above 1000 m a.s.l. the species was registered only three times – two of the records are reported now (from 1036 and 1095 m a.s.l.) (see Appendix 3), and the third one was published by BESHKOV (1974). It was from 1580 m a.s.l., but against the background of this study such altitude seems rather like an exception.

The species is found at the highest altitudes in the territory of south-western Bulgaria. Reaching altitudes of 1000-1100 m by this plain-hilly species is probably due to the warmer climate, the great difference in altitude, and the suitable habitats in this part of the country. Most of the other reptile species (see PULEV *et al.*, 2018a) also occur at a higher altitude in south-western Bulgaria compared to other parts of the country.

This research confirmed the conclusion made by PULEV (2016) that the Caspian Whip Snake has significant role for the zoogeographical subdivision of Bulgaria, as its range delineates very well the boundaries of the Sub-Mediterranean areas in the country. The species has been indicated as a typical representative of Sub-Mediterranean biogeographic space in southern Romania (DRUGESCU & GEACU, 2004).

The distribution of *D. caspius*, as well as of two other reptile indicator taxa defined by PULEV (2016) – *Testudo graeca ibera* Pallas, 1814 and *Podarcis tauricus* (Pallas, 1814), show the presence of two Sub-Mediterranean zoogeographical areas in south-western Bulgaria. They cover the valleys of Struma and Mesta Rivers, as well

as the slopes of the surrounding mountains, from the boundaries of the Struma and Mesta Mediterranean areas (see PULEV *et al.*, 2018b) to 800-1100 m a.s.l. Struma Sub-Mediterranean area can expand to the north covering the entire Zemen Gorge, and Mesta Sub-Mediterranean area can end northward including the entire Momina Klisura Gorge. The two areas are isolated from each other by Slavyanka, Pirin and Rila Mountains.

The large number of published (76) and new (276) records of active individuals, “fresh” road-killed or other dead ones indicates that *D. caspius* in south-western Bulgaria is active for most of the year. The species is active from the third decade of March till the first decade of November and most active during the third decade of April, the first decade of May and the first decade of June. It is the least active in the beginning and at the end of the active period (Fig. 2). The annual activity corresponds (generally) to what is reported by BESHKOV & NANEV (2002), BISERKOV *et al.* (2007) and STOJANOV *et al.* (2011) for the territory of Bulgaria, as well as to what is published by ZINNER (1972) for the whole range, but the present research offers more details. The activity pattern of the species in south-western Bulgaria is similar to that of another snake – *Malpolon insignitus* (Geoffroy Saint-Hilaire, 1827) (see PULEV *et al.*, 2018a), although the latest survey was presented by months rather than decades and includes a much smaller number of records.

The period of activity of *D. caspius* in south-western Bulgaria can be divided in three – a period of very low, low and high activity. The period of very low activity covers the time before and after hibernation (the third decade of March, the third decade of October and the first decade of November). The earliest spring registration of an active individual is from March 26, and the latest autumn one is from November 08 (see Appendix 3). Both individuals were recorded in sunny and warm weather. They were subadults, and were moving very slowly (in semi-torpid state). Probably emerging and entering hibernation depend on the meteorological conditions of the year and on the habitats (type, location, altitude, exposure), i.e.

vary to some extent. Therefore, we assume that in addition to the indicated period of very low activity, emerging from and entering hibernation include the first decade of April and the second decade of October. Thus, in different years, the populations of the species in south-western Bulgaria emerge from hibernation within 2 decades and enter hibernation within three. A

recent study by [DYUGMEDZHIEV et al. \(2019\)](#) shows the same period of emerging from hibernation (the third decade of March and the first decade of April). The very low activity at the end of the active period (the third decade of October and the first decade of November) was identified in that study, although this activity is not surprising.

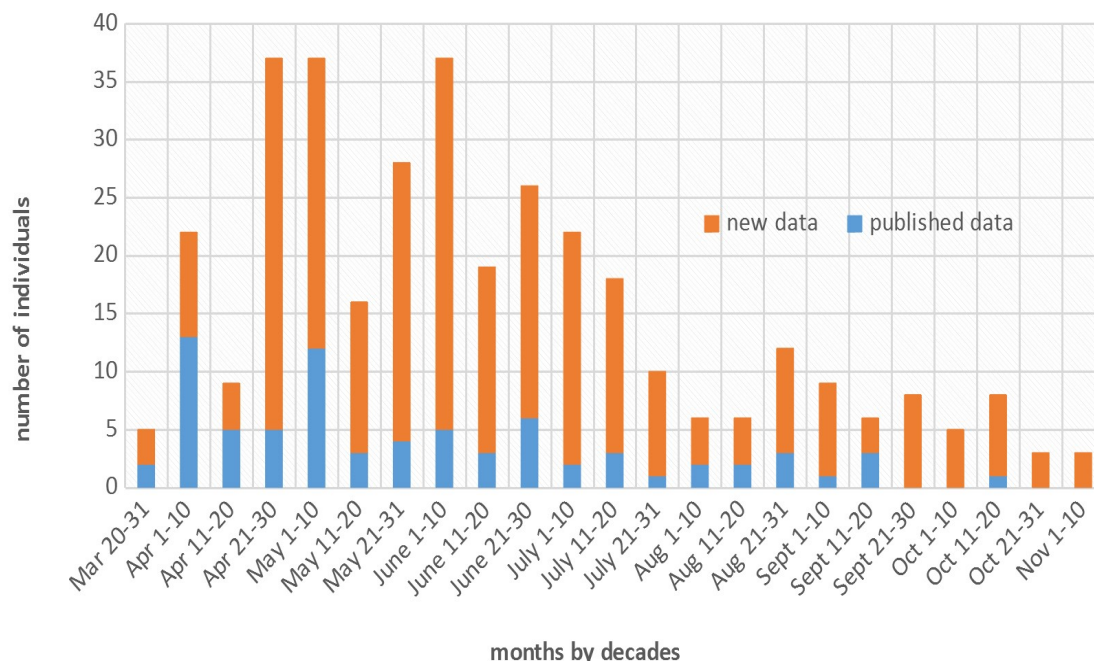


Fig. 2. Number of observed individuals of *Dolichophis caspius* per decades in south-western Bulgaria.

The high activity period includes the time from the first decade of April to the second decade of July with a peak around the middle (a total of 11 decades). Decreases in values during some of the decades (the second of April, the second of May and the second of June) are probably due to irregular and insufficient observations. The period of high activity can be related to the reproductive behavior – emerging from hibernation (active eating, territorial behavior, finding a partner, copulation) to laying eggs. We do not have data on copulation of this species in the territory of south-western Bulgaria, but we do have one observation from a territory very close to the

one surveyed (in North Macedonia) from the middle of the high activity period. On 27.05.2018, 12:15 *p.m.* 2 copulation individuals were registered near the Bulgarian church in Star Doyran (N41°11'19" E22°43'08", 163 m a.s.l.). A copulation from the same decade of May (22.05.2006) was registered also in Hungary by [BELLAAGH et al. \(2008\)](#).

The low activity period starts from the third decade of July and ends by the second decade of October, including a total of 9 decades. It covers the time from laying eggs to preparing for hibernation. Activity is stable during this period with no sharp downturns and peaks that outline any trend. The differences in the values in the separate

decades can also be explained by irregular and insufficient number of observations.

No winter activity of the species has been recorded in south-western Bulgaria, despite the active search in December, January and February. The two reported observations are from other parts of the country – in the vicinity of the town of Septemvri on 18.12.1930 (BURESCH & ZONKOV, 1934), and near the village of Lakatnik on 02.02.1955 (BESHKOV, 1964). The winter activity of the species reported by BESHKOV (1977) and BESHKOV & NANEV (2002) probably refers to the one registered in Lakatnik. The lack of such activity in south-western Bulgaria (though it is possible) indicates that this behavior is rather an exception for *D. caspius*.

The diurnal activity of the Caspian Whip Snake reported by BESHKOV & NANEV (2002), BISERKOV *et al.* (2007) and STOJANOV *et al.* (2011) in the territory of the country has been confirmed completely. Information is available about 121 live individuals (107 new and 14 published records) with an exact time of registration. The snake was only observed during the day from 7:55 a.m. to 7:05 p.m. (recorded in this study). The highest activity is recorded around mid-day, there is a second peak around 4 p.m. While during the high and low seasonal activity the registrations are at different times of the day, during the very low activity period (emerging from and entering hibernation) the records are only from the warmer part of the day (between 10:40 a.m. and 4:25 p.m., maximum around and after mid-day) (see Appendices 1 and 3, Fig. 3). Similar data about the activity of *Vipera ammodytes* (Linnaeus, 1758) in Bulgaria were reported by BESHKOV (1993a). No nocturnal activity of the Caspian Whip Snake was recorded during the study, unlike other mainly daily active snake species (*Natrix natrix* (Linnaeus, 1758), *Natrix tessellata* (Laurenti, 1768), *Zamenis situla* (Linnaeus, 1758), *Zamenis longissimus* (Laurenti, 1768), and *Vipera ammodytes*) which have been registered in the night during the research period.

During the warmest and driest months of the year (July, August), *D. caspius* has been found throughout the day, including in the hours with the highest temperatures – 1:00-4:00 p.m. (see Appendix 3). This shows the great heat resistance of the species reported by other authors too. BESHKOV (1993a) writes that in the southern half of Kresna Gorge and the neighboring parts of the Maleshevska Mountains, in June and July, when daytime temperatures are particularly high (between 1:00 and 2:30 p.m.), the largest number of specimens of *D. caspius* was collected (compared to other snakes in the area).

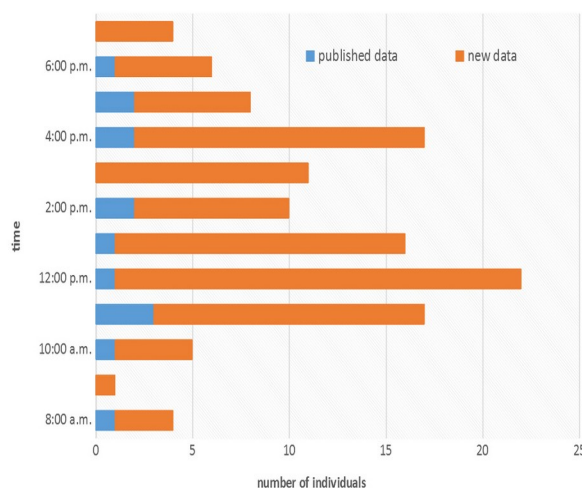


Fig. 3. Number of observed individuals of *Dolichophis caspius* per hours in south-western Bulgaria.

The activity pattern of the species in south-western Bulgaria shows that it is very warm-loving – it emerges from hibernation relatively late, it is even active during the hottest months as well as in the hours with the highest temperatures.

The species has been found in urbanized habitats in the study area. There are a number of records not only from the city of Blagoevgrad (including from the city center), but also from many smaller settlements (see Appendices 1 and 3). Possible prerequisites for this are the availability of suitable micro-habitats and a

good nutritional base. According to its level of synanthropy after the classification given by KLAUSNITZER (1990) *D. caspius* was determined as a *hemerodiaphoric* species for the city of Blagoevgrad (PULEV & SAKELARIEVA, 2013) and for the city of Plovdiv (MOLLOV, 2014; 2019).

Most of the individuals recorded are adults (n=225) and their ratio to the subadults is 6:1. The very small number of juveniles (n=30) is probably due mainly to their small size. It is much more difficult to observe alive juvenile individuals in the wild, as well as to record road-killed ones. Since their small size makes them difficult to kill on the road. Juveniles may be much more cautious and less active than adults and subadults, since they have many natural enemies, have no reproductive behavior. On the other hand, the large number of adult and subadult individuals can be partly explained by the long life of the species. It matures at 3-4 years of age and lives up to 10-15 years (ZINNER, 1972; ARNOLD, 2002).

Different authors (BESHKOV, 1993b; ARNOLD, 2002; NATCHEV *et al.*, 2016; TYTAR & NEKRASOVA, 2016; SPEYBROECK *et al.*, 2016) note that the Caspian Whip Snake is often killed by traffic. Specific cases of road-killed specimens are found in many publications (for example PULEV & SAKELARIEVA, 2011; MALAKOVA *et al.*, 2018; MANOLEV *et al.*, 2019; BALEJ & JABLONSKI, 2006-2019; SAHLEAN *et al.*, 2019). There are even specialized studies addressing the problem of reptiles killed on the road (containing data about *D. caspius*) as those published by TOK *et al.* (2011), KAMBOUROVA-IVANOVA *et al.* (2012), COVACIU-MARCOV *et al.* (2012), MOLLOV *et al.* (2013). According to ARNOLD (2002) the basks on roads is the main reason for the frequent road killing in its entire range, while SPEYBROECK *et al.* (2016) indicate the species active foraging strategy. NATCHEV *et al.* (2016) reported both reasons for the city of Burgas and the surrounding area (south-eastern Bulgaria).

The large number of road-killed specimens in south-western Bulgaria (found

in both previous and present studies) could not be related only to the above mentioned reasons. We have data for both cases, but they are rare. For example, the juvenile individual of *D. caspius* registered on 04.06.2017 (MALAKOVA *et al.*, 2018) pursued subad. *Lacerta viridis* (Laurenti, 1768) on the road – a case of foraging behavior. The published ad. *D. caspius* recorded on 13.10.2018 by MANOLEV *et al.* (2019) was sunbathing on the road. Much larger is the number of registrations at which individuals are observed to cross the road during their daily movements without knowing the exact reason for this. For example, those published by MANOLEV *et al.* (2019): 1 subad. on 01.07.2018, 1 juv. on 19.09.2018, 1 subad. on 19.09.2018, the records from this study: 1 ad. on 29.04.2012, 1 ad. on 11.06.2016, 1 ad. on 20.05.2017, 1 ad. on 10.06.2017, 1 ad. on 31.05.2018, 1 ad. on 02.06.2018, 1 juv. on 11.05.2019, 1 ad. on 07.07.2019, 1 subad. on 07.07.2019, 1 ad. on 10.08.2019, and others. *D. caspius* is the most widespread snake up to 1000 m a.s.l. with high population densities in the study area. The large size of the species also makes it very vulnerable to traffic (this is the largest snake in Bulgaria – see BESHKOV, 1964; TELENICHEV *et al.*, 2019). Last but not least, the diurnal activity of the species probably contributes to its killing on the road (traffic is much busier during the day).

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Appendix 1. Published data about *Dolichophis caspius* in south-western Bulgaria (data source, locality, geographic coordinates, altitude, date, time, observed individuals) and UTM (when it is possible to be determined) in Fig. 1

BURESCH & ZONKOV (1934): Blagoevgrad vicinity, 1930, 1931, 2 spec. – UTM: FM75A; near Poruchik Minkov railway station (Sandanski vicinity), 11.07.1927, 1 ad. – UTM: FM80D; near Petrich, 25.06.1931, 2 spec. – UTM: FL88B; **BESHKOV (1964):** above Gorna Breznitsa, 26.06.1964, 8:00 a.m., 1 ad.; **BESHKOV (1974):** Maleshevska Planina Mts. (1971-1972), 22 spec. – UTM: FM62C (n=1), FM72A (n=2), FM72C (n=16), FM72D (n=3); **BESHKOV & NANKINOV (1979), BESHKOV & GERASIMOV (1980), BESHKOV & DUSHKOV (1981):** Maleshevska Planina Mts. (1971-1974), April, 1 spec.; May, 10 spec. (incl. 1 spec. 28.05.1974); June, 26 spec. (incl. 1 ad. male 04.06.1972, 1 ad. female 17.06.1974); July, 8 spec. (incl. 1 spec. 19.07.1974); August (26.08.1972, ca 6:00 p.m.), 1 ad.; September, 1 spec.; October, 1 spec.; **BESHKOV & DUSHKOV (1981):** Zemen, 1 spec. – UTM: FN40A; Dolna Gradeshnitsa, 1 spec. – UTM: FM81B; **NÖLLERT et al. (1986):** Melnik, 1 ad. – UTM: FL99D; **KANTARDZHIEV (1992):** northern part of Kozhuh volcanic ridge – UTM: FL89C; **BISERKOV (1995):** Petrich – UTM: FL88B; Sandanski – UTM: FM80C; **PETROV & BESHKOV (2001):** Kresna Gorge; **PESHEV et al. (2005):** Rilska River basin (FM76;86); **NAUMOV (2005):** two kilometers SE of Pastuh (FM57), (N42°12'01" E22°54'44")**, 600 m a.s.l. (438 m a.s.l.)**, 02.05.2001, (10:10 a.m.)**, 1 spec. (1 ad.)** – UTM: FM57C; **PETROV et al. (2006):** Gospodintsi, 575 m a.s.l., 06.06.1999, 1 male RK – UTM: GM21D; S of Ablanitsa, 550 m a.s.l., 30.04.2001, 1 spec. – UTM: GM40A; **PULEV & SAKELARIEVA (2011):** Blagoevgrad, 10.05.1983, 1 spec. – UTM: FM75A; Blagoevgrad vicinity, 10.05.1994, 1 spec. – UTM: FM75A; Blagoevgrad, Strumsko residential area, 15.04.1975, 1 spec. – UTM: FM75A; Belo pole, 10.08.1985, 1 spec. – UTM: FM65D; at the mouth of the Mishavets River, N42°02'14" E23°08'25", 483 m a.s.l., 1 spec. – UTM: FM75D; at the road fork to Gorno Harsovo, N42°02'06" E23°08'02", 462 m a.s.l., 1 spec. RK – UTM: FM75D; W of Gorno Harsovo, N42°01'00" E23°10'07", 619 m a.s.l., 06.07.2003, (2:35 p.m.)**, 1 spec. RK (1 ad. RK)** – UTM: FM75C; at the mouth of the Sheitanski Andak River, N42°01'55" E23°07'04", 435 m a.s.l., summer 2007, 1 spec. – UTM: FM75D; same locality, N42°01'52" E23°07'04", 424 m a.s.l., spring 2010, 1 dead spec. – UTM: FM75D; the Zoo of Blagoevgrad, N42°00'51" E23°06'08", 425 m a.s.l., 1 spec. – UTM: FM75A; by the road from Blagoevgrad to Delvino, N42°01'23" E23°07'23", 653 m a.s.l., 28.08.2006, 2 juv. (1 dead) – UTM: FM75C; Blagoevgrad, Orlova chuka residential area, on the road to Delvino, N42°00'42" E23°06'30", 493 m a.s.l., 01.06.2004, (5:10 p.m.)**, 1 spec. RK (1 ad. RK)** – UTM: FM75A; Blagoevgrad, the industrial area, N42°00'17" E23°05'14", 351 m a.s.l., 1 dead spec. – UTM: FM75A; E of Strumsko residential area, N41°59'20" E23°05'50", 414 m a.s.l., 1 dead spec. – UTM: FM75A; the Kaimenska chuka height, S of Blagoevgrad, N41°58'40" E23°05'27", 348 m a.s.l., 1 spec. – UTM: FM74B; S of the Kaimenska chuka height, on the road fork to Izgrev, N41°58'28" E23°05'38", 333 m a.s.l., 1 spec. RK – UTM: FM74B; S of Blagoevgrad, on the road before the road fork to Tserovo, N41°58'23" E23°05'41", 327 m a.s.l., 14.07.2009, (1:10 p.m.)**, 1 spec. RK (1 subad. RK)** – UTM: FM74B; S of Blagoevgrad, on the road after the road fork to Tserovo, N41°58'08" E23°06'05", 426 m a.s.l., 1 spec. RK – UTM: FM74B; S of Blagoevgrad, on the road to Dolno Tserovo after the road fork to Tserovo, N41°57'48" E23°06'06", 319 m a.s.l., 1 spec. RK – UTM: FM74B; N of Dolno Tserovo, N41°57'02" E23°06'08", 335 m a.s.l., 1 spec., 1 spec. RK – UTM: FM74B; E of Riltsi, N42°02'42" E23°04'58", 452 m a.s.l., 04.05.2008, (11:05 a.m.)**, 1 spec. RK (1 ad. RK)** – UTM: FM75B; between Belo pole and Riltsi, N42°02'15" E23°03'04", 390 m a.s.l., 29.06.1996, (3:55 p.m.)**, 1 spec. RK (1 ad. RK)** – UTM: FM65D; between Pokrovnik and the Struma River, N41°59'13" E23°03'41", 326 m a.s.l., 1 spec. – UTM: FM75A; Obel, Zlatkovtsi

neighbourhood, 1 juv. – UTM: FM54D; **TZANKOV *et al.* (2011)**: Rilska River basin, N42°07'19.0" E23°16'20.2", 936 m a.s.l. – UTM: FM86D; **PULEV & SAKELARIEVA (2013)**: Blagoevgrad, (N42°00'21" E23°05'08")**, (352 m a.s.l.)**, (1 ad.)** – UTM: FM75A; Blagoevgrad, (N42°00'20" E23°06'03")**, (414 m a.s.l.)**, (1 ad.)** – UTM: FM75A; **POPGEORGIEV *et al.* (2016)**: E/SE of Klyuch, 41.35763 23.03192, 10.08.2011, 1 ad. – UTM: FL68C; SW outskirts of Belasitsa, 41.36423 23.1331, 13.08.2011, 1 ad. – UTM: FL78C; S of Petrich, 41.38357 23.2018, 14.08.2011, 1 ad. – UTM: FL88A; SE outskirts of Petrich, 41.39335 23.22346, 07.04.2012, 1 juv. – UTM: FL88C; NE of Razhdak, 41.40532 23.251, 25.04.2013, 1 ad. – UTM: FL88D; **GROZDANOV *et al.* (2016)**: SW of Rakitna, 41°50'50"N 23°10'29"E, 697 m a.s.l., 10.05.2015, 1 ad. – UTM: FM83B; SW of Rakitna, 41°50'48"N 23°10'31"E, 678 m a.s.l., 10.05.2015, 1 juv. – UTM: FM83B; Between Poletto and Brezhani, 41°51'50"N 23°09'58"E, 420 m a.s.l., summer 2015, 4 dead ind. – UTM: FM73D; SW of Rakitna, 41°50'48"N 23°10'31"E, 690 m a.s.l., 2011, 1 dead ind. – UTM: FM83B; **MALAKOVA *et al.* (2018)**: NW of Tserovo, N41°58'17" E23°06'02", 359 m a.s.l., 04.06.2017, (3:50 p.m.)**, 1 juv. – UTM: FM74B; W of Tserovo, N41°57'32" E23°06'16", 320 m a.s.l., 28.07.2017, 1 ad. RK – UTM: FM74B; E of Tserovo, N41°57'35" E23°08'20", 777 m a.s.l., 29.05.2016, (10:30 a.m.)**, 1 ad. – UTM: FM74D; same locality, N41°57'21" E23°08'35", 812 m a.s.l., 11.06.2016, (12:55 p.m.)**, 1 ad. – UTM: FM74D; N/NE of Dolno Tserovo neighbourhood, Tserovo, N41°57'11" E23°06'18", 317 m a.s.l., 27.06.2016, 1 ad. RK* – UTM: FM74B; S of Dolno Tserovo neighbourhood, N41°56'20" E23°06'08", 309 m a.s.l., 10.07.2016, 1 ad. RK* – UTM: FM74B; same locality, N41°56'16" E23°06'09", 322 m a.s.l., 28.04.2016, (11:55 a.m.)**, 1 juv. RK – UTM: FM74B; E of Dzhaleva Mahala neighbourhood, Zheleznitsa, N41°56'07" E23°05'53", 348 m a.s.l., 22.06.2014, 1 dead ad. – UTM: FM74A; W of Zheleznitsa, N41°55'38" E23°05'56", 448 m a.s.l., 19.06.2016, (1:30 p.m.)**, 1 ad. – UTM: FM74A; **MANOLEV *et al.* (2019)**: SW outskirts of Bogolin, N41°32'19" E23°57'13", 610 m a.s.l., 22.04.2018, 6:00 p.m., 1 ad. RK – UTM: GM40C; E outskirts of Beslen, N41°28'20" E23°58'13", 639 m a.s.l., 13.05.2018, 10:35 a.m., 1 ad. – UTM: GL49D; E of Hadzhdimovo, N41°31'12" E23°53'09", 484 m a.s.l., 20.05.2018, 11:15 a.m., 1 juv. – UTM: GM40A; E/SE of Hadzhdimovo, N41°30'22" E23°54'17", 457 m a.s.l., 02.06.2018, 11:55 a.m., 1 ad. – UTM: GL49B; W outskirts of Slashten, N41°29'55" E24°00'41", 608 m a.s.l., 01.07.2018, 5:25 p.m., 1 subad. – UTM: KF59B; Valkosel, N41°31'49" E23°59'32", 770 m a.s.l., 19.09.2018, 4:30 p.m., 1 juv. – UTM: GM40C; NW of Slashten, N41°30'06" E24°00'34", 612 m a.s.l., 19.09.2018, 3:45 p.m., 1 subad. – UTM: KF59B; N of Godeshevo, N41°29'00" E24°03'03", 788 m a.s.l., 19.09.2018, 4:05 p.m., 1 juv. RK – UTM: KF59B; N of Godeshevo, N41°29'06" E24°03'07", 791 m a.s.l., 13.10.2018, 1:50 p.m., 1 ad. – UTM: KF59B; **CAS (2010-2019)**: Gorna Breznitsa, 30.04.1977, 1 ad. – UTM: FM72C; Strumyani, 200 m a.s.l., 17.05.2000, 1 subad. – UTM: FM81A; **BALEJ & JABLONSKI (2006-2019)**: Bistritsa, Rila Mts, 08.05.2015, 1 ad., 1 subad. – UTM: FM77D; Damyanitsa, 150-200 m a.s.l., 27.03.2005, 1 juv.; Damyanitsa, 120 m a.s.l., 16.04.2006, 1 ad. RK*; Damyanitsa, 150-230 m a.s.l., 16.04.2006, 3 ad.; Damyanitsa, 150 m a.s.l., 02.05.2007, 1 ad.; Damyanitsa, 140 m a.s.l., 21.05.2013, 1 subad. RK*; Damyanitsa, 140 m a.s.l., 22.05.2013, 1 subad.; Damyanitsa, 130 m a.s.l., 22.05.2013, 1 ad. – UTM: FL89D; Kresna, 250 m a.s.l., 20.04.2006, 1 ad.; Kresna, 270 m a.s.l., 01.05.2007, 1 ad.; Kresna, 2001, 1 ad.; Kresna, 400 m a.s.l., 27.06.2007, 1 ad.; Kresna, 01.09.2011, 1 ad. – UTM: FM72C; Leshnitsa, 150 m a.s.l., 16.04.2006, 1 ad. RK* – UTM: FM90A; Melnik, 2001, 1 juv.; Melnik, 450 m a.s.l., 04.05.2011, 1 subad. – UTM: FL99D; Novo Delchevo, 06.05.2015, 1 dead ad. – UTM: FL99B; Sandanski, 140 m a.s.l., 27.07.2011, 1 ad. RK*; Sandanski, 350 m a.s.l., 22.05.2013, 1 juv. RK* – UTM: FM80C; **DYUGMEDZHIEV *et al.* (2019)**: the vicinity of the town of Kresna, 41°43'N 23°10'E, 180 m a.s.l., 06.04.2013, 4 ad. (in hibernation); 18.03.2014, 2 ad. (in hibernation); 21.03.2017, 2 ad. (in

hibernation); 28.03.2018, 1 ad.; 01.04.2018, 2 ind.; 02.04.2018, 1 ind.; 03.04.2018, 2 ind.; 05.04.2018, 5 ind.; 08.04.2018, 2 ind. –UTM: FM81B.

*individuals killed on the road more than 48 hours prior to the registration

**additional data about the species published by NAUMOV (2005), PULEV & SAKELARIEVA (2011, 2013), and MALAKOVA *et al.* (2018)

Appendix 2. Published data of *Dolichophis caspius* shed skins in south-western Bulgaria (data source, locality, geographic coordinates, altitude, date, observed skins) and UTM (when it is possible to be determined) in Fig. 1

PULEV & SAKELARIEVA (2011): N of Dolno Tserovo, N41°56'56" E23°05'54", 325 m a.s.l., 22.07.1997, 2 shed skins – UTM: FM74B; **DOMOZETSKI (2013):** NE of Beslen, (N41°28'21" E23°58'15")**, (626 m a.s.l.)**, 07.09.2012, 1 shed skin – UTM: GL49D; **MALAKOVA *et al.* (2018):** NW of Zheleznitsa, N41°55'49" E23°05'07", 538 m a.s.l., 19.06.2016, 1 shed skin (ad.) – UTM: FM74A; same locality, N41°55'44" E23°04'32", 534 m a.s.l., 10.07.2016, 1 shed skin (ad.) – UTM: FM74A; same locality, N41°55'52" E23°03'45", 698 m a.s.l., 10.07.2016, 1 shed skin (ad.) – UTM: FM74A; S of Gabrovo, N41°53'21" E22°56'48", 799 m a.s.l., 09.10.2016, 1 shed skin (ad.) – UTM: FM63B; W of Leshko, N41°56'04" E22°57'42", 616 m a.s.l., 15.10.2016, 1 shed skin (ad.) – UTM: FM64A; E of Padesh, N41°56'03" E23°02'56", 771 m a.s.l., 29.07.2017, 2 shed skins (ad.) – UTM: FM64C.

**additional data about the species published by DOMOZETSKI (2013)

Appendix 3. New data of *Dolichophis caspius* individuals in south-western Bulgaria

Locality	Geographic coordinates (N/E)	Altitude (m)	Date and time of observation	Individuals observed	UTM 5×5 km
Marino Pole near Struma River, museum number (<i>mn</i>) RHMB 7.3/4.14	n/a	n/a	17.07.1978	1 ad.	FL98D
Marino Pole, <i>mn</i> RHMB 7.3/4.35	n/a	n/a	17.07.1978	1 ad.	FL98D
Kresna Gorge, <i>mn</i> RHMB 7.3/4.36	n/a	n/a	20.07.1978	1 subad.	n/a
Kresna Gorge, <i>mn</i> RHMB 7.3/4.47	n/a	n/a	July 1978	1 ad.	n/a
Kolarovo, <i>mn</i> RHMB 7.3/4.33	n/a	n/a	05.04.1980	1 ad.	FL78C
Kolarovo, <i>mn</i> RHMB 7.3/4.28	n/a	n/a	15.04.1980	1 ad.	FL78C
Kolarovo, <i>mn</i> RHMB 7.3/4.41	n/a	n/a	17.06.1980	1 ad.	FL78C
Kolarovo, <i>mn</i> RHMB 7.3/4.34	n/a	n/a	July 1982	1 ad.	FL78C
Kolarovo, <i>mn</i> RHMB 7.3/4.69	n/a	n/a	10.04.1984	1 ad.	FL78C
Kresna Gorge (S) [BN, ZV]	41°45'36" 23°09'21"	221	25.08.1991 n/a	1 ad.	FM72D
Kresna Gorge (N) [BN, IL]	41°46'46" 23°09'14"	240	30.04.1992 3:30 p.m.	1 ad.	FM72D
N of Kresna [BN, MS, IL]	41°43'58" 23°09'26"	197	05.07.1992 n/a	1 ad.	FM72C
Kozhuh volcanic ridge (N) [BN]	41°27'36" 23°15'23"	196	30.04.1993 4:00 p.m.	1 juv.	FL89C
Kozhuh volcanic ridge (N) [BN]	41°27'59" 23°15'32"	93	30.04.1993 7:05 p.m.	1 juv.	FL89C
Kresna Gorge (N) [BN, MS]	41°48'42" 23°09'47"	266	08.05.1993 n/a	1 subad.	FM73C
Kresna Gorge (N) [BN, MS]	41°47'31" 23°09'46"	250	11.05.1994 4:15 p.m.	1 ad.	FM72D
Kresna Gorge (N) [BN, MS]	41°46'27" 23°09'19"	222	09.06.1995 4:25 p.m.	1 ad.	FM72D
Kresna Gorge (S) [BN, MS]	41°45'46" 23°09'20"	198	09.06.1995 6:30 p.m.	1 ad.	FM72D

Distribution and Activity of Caspian Whip Snake Dolichophis caspius (Gmelin, 1789) (Reptilia: Colubridae)...

Kresna Gorge (N) [BN, MS]	41°48'26" 23°09'51"	252	09.06.1995 11:30 a.m.	1 ad.	FM73C
Kresna Gorge (S) [BN, MS]	41°45'55" 23°09'08"	216	10.06.1995 2:00 p.m.	1 ad.	FM72D
Kresna Gorge (S) [BN, MS]	41°45'36" 23°09'20"	220	27.04.1996 10:30 a.m.	1 ad.	FM72D
Kresna Gorge (N) [BN, MS]	41°47'37" 23°09'40"	265	29.04.1996 1:15 p.m.	1 ad.	FM72D
Kresna Gorge (N) [BN, MN, SM]	41°47'30" 23°09'45"	241	30.04.1997 3:30 p.m.	1 ad.	FM72D
Kresna Gorge (S) [BN, MN, SM]	41°45'16" 23°09'03"	195	01.05.1997 11:30 a.m.	1 juv.	FM72C
Kresna Gorge (N) [BN, MN, SM]	41°47'35" 23°09'45"	274	02.05.1997 3:20 p.m.	1 ad.	FM72D
W/SW of Baldevo [AP]	41°37'36" 23°45'39"	547	17.05.1997 2:30 p.m.	1 ad.	GM21C
SE of Borovo [AP]	41°35'28" 23°44'31"	527	17.05.1997	1 ad. RK*	GM20D
W of Sandanski [AP]	41°33'56" 23°14'30"	118	30.07.1997 8:25 a.m.	1 ad. RK	FM80C
S of Dolna Gradeshnitsa [AP]	41°39'26" 23°10'52"	150	30.07.1997 2:40 p.m.	1 ad. RK	FM81A
E of Stob [AP]	42°05'38" 23°07'06"	577	24.08.1997 4:35 p.m.	1 ad.	FM76C
Kresna Gorge (N) [BN]	41°46'52" 23°09'17"	235	07.05.1998 12:50 p.m.	1 ad.	FM72D
Kresna Gorge (S) [BN]	41°46'15" 23°09'23"	225	09.05.1998 3:20 p.m.	1 subad.	FM72D
N of Novo Lyaski [AP]	41°32'53" 23°46'23"	490	15.08.1998 10:45 p.m.	1 ad. RK	GM30A
Kresna Gorge (N) [BN]	41°47'22" 23°09'15"	250	08.05.1999 12:30 p.m.	1 ad.	FM72D
Kresna Gorge (S) [BN, MN, SM]	41°45'52" 23°09'13"	205	01.05.2000 n/a	1 ad.	FM72D
SW outskirts of Gotse Delchev [DC]	41°33'49" 23°43'06"	637	07.07.2001 n/a	1 ad.	GM20C
Kresna Gorge (S) [BN, MN, MS]	41°46'06" 23°09'07"	227	23.04.2002 10:45 a.m.	2 ad.	FM72D
Kresna Gorge (S) [BN, MN]	41°45'58" 23°09'10"	211	10.05.2002 n/a	1 ad.	FM72D
Kresna Gorge (N) [BN, MN, BS]	41°47'18" 23°09'12"	236	24.05.2002 n/a	1 ad. RK	FM72D
NE of Simitli [LD]	41°53'48" 23°07'58"	410	02.06.2002 10:40 a.m.	1 ad.	FM74C
E of Kalimantsi [ML, SL]	41°27'36" 23°29'27"	462	22.06.2002 n/a	1 ad.	GL09C
Domozetska neighb., Debochitsa [LD]	41°51'19" 22°57'21"	1095	18.07.2002 11:15 a.m.	1 subad.	FM63B
Gotse Delchev, the industrial area [AP]	41°35'03" 23°44'37"	531	26.04.2003 n/a	1 subad. RK	GM20D
Kresna Gorge (S) [BN, MN]	41°46'10" 23°09'46"	306	03.05.2003 n/a	1 juv. RK	FM72D
Kresna Gorge (N) [AP, RI]	41°50'05" 23°09'16"	276	05.05.2003 11:10 a.m.	1 ad. RK	FM73C
Kresna Gorge (N) [AP, RI]	41°49'31" 23°09'09"	284	05.05.2003 11:45 a.m.	1 ad. RK, 1 subad. RK	FM73C
Kresna Gorge (N) [AP, RI]	41°50'05" 23°09'16"	276	26.05.2003 10:05 a.m.	1 ad. RK	FM73C
Kresna Gorge (N) [AP, RI]	41°48'52" 23°09'28"	264	26.05.2003 11:35 a.m.	1 ad. RK	FM73C
Kresna Gorge (S) [AP]	41°44'56" 23°09'31"	207	27.05.2003 12:15 p.m.	1 subad.	FM72C
Kresna Gorge (N) [AP, RI]	41°47'30" 23°09'42"	236	02.06.2003 3:10 p.m.	1 ad.	FM72D
Kresna Gorge (S) [ML]	41°45'49" 23°10'13"	452	03.06.2003 n/a	1 ad. RK	FM82B
S/SE of Strumsko residential area [LD]	41°58'28" 23°05'38"	329	07.09.2003 4:00 p.m.	1 ad. RK	FM74B
Kresna Gorge (N) [AP]	41°47'26" 23°09'28"	266	24.09.2003 4:00 p.m.	1 ad.	FM72D
Kresna Gorge (S) [AP, RI]	41°44'33" 23°09'39"	194	29.09.2003 3:45 p.m.	1 ad. RK	FM72C
N of Kresna [AP, RI]	41°44'03" 23°09'33"	188	29.09.2003 4:30 p.m.	1 juv. RK	FM72C
Kresna Gorge (N) [AP]	41°47'30" 23°09'42"	236	22.10.2003 4:25 p.m.	1 juv.	FM72D
SE of Brestovo [LD]	41°48'56" 23°01'04"	984	05.07.2004 12:10 p.m.	1 ad.	FM63C
N/NE of Simitli [LD]	41°54'06" 23°07'17"	294	28.06.2005 10:55 a.m.	1 ad.	FM74C
Gotse Delchev [AP, RI]	41°34'23" 23°44'02"	544	07.07.2005 9:40 a.m.	1 ad. RK	GM20D

E outskirts of Simitli [LD]	41°53'27" 23°07'39"	335	01.09.2005 4:50 <i>p.m.</i>	1 ad.	FM73D
S of Gospodintsi [ML]	41°38'18" 23°44'17"	554	06.06.2006 n/a	1 ad. RK	GM21C
Kresna Gorge (N) [LD]	41°47'31" 23°09'37"	260	03.07.2006 4:00 <i>p.m.</i>	1 subad.	FM72D
SW outskirts of Katuntsi [BN]	41°26'25" 23°25'13"	176	04.07.2006 n/a	1 subad. RK	GL09A
Kresna Gorge (S) [LD]	41°45'59" 23°10'25"	530	27.07.2006 n/a	1 ad. RK	FM82B
N outskirts of Novo Lyaski [DD]	41°32'13" 23°46'47"	518	05.10.2006 1:55 <i>p.m.</i>	1 ad.	GM30A
Rupite Area [LD]	41°27'31" 23°15'47"	88	24.09.2007 3:00 <i>p.m.</i>	1 juv.	FL89C
N of Mesta [DD]	41°46'28" 23°40'33"	672	13.05.2008 1:25 <i>p.m.</i>	1 ad.	GM22B
E of Domozetska neighb., Debochitsa [LD]	41°51'21" 22°57'46"	1036	06.07.2008 11:30 <i>a.m.</i>	1 ad.	FM63B
Kresna Gorge (S) [LD]	41°45'53" 23°10'04"	384	09.08.2008	1 subad. RK*	FM82B
E outskirts of Novo Lyaski [ML]	41°31'53" 23°47'02"	520	12.05.2009 n/a	1 ad.	GM30A
E/NE of Paril [ML]	41°26'27" 23°42'17"	952	06.07.2009 n/a	1 ad.	GL29C
N of Simitli [LD]	41°54'32" 23°07'09"	324	23.09.2009 11:35 <i>a.m.</i>	1 ad.	FM74C
W/SW of Rakitna [AP, GM, ES]	41°50'44" 23°09'50"	719	10.10.2009 11:30 <i>a.m.</i>	1 juv.	FM73C
Rupite Area [LD]	41°27'39" 23°15'47"	90	29.08.2010 11:45 <i>a.m.</i>	1 juv. RK	FL89C
Kozhuh volcanic ridge (N) [LD]	41°27'42" 23°15'28"	220	09.09.2010 6:50 <i>p.m.</i>	1 juv.	FL89C
Rupite Area [LD]	41°27'43" 23°15'42"	96	25.04.2011 5:45 <i>p.m.</i>	1 dead subad.	FL89C
Rupite Area [LD]	41°27'05" 23°16'02"	94	23.05.2011 8:05 <i>a.m.</i>	1 subad.	FL89C
Rupite Area [LD]	41°27'16" 23°15'58"	88	07.06.2011 8:20 <i>a.m.</i>	1 ad.	FL89C
W of Ognyanovo [LS]	41°36'40" 23°46'12"	531	29.04.2012 11:05 <i>a.m.</i>	1 ad.	GM31A
Gotse Delchev [AP]	41°34'15" 23°43'30"	545	03.05.2012 1:35 <i>p.m.</i>	1 ad.	GM20D
N of Kresna [KD]	41°43'52" 23°09'32"	201	01.06.2012 n/a	1 ad. RK	FM72C
SW of Bukovo [LD]	41°42'27" 23°42'30"	639	05.06.2012 2:10 <i>p.m.</i>	1 ad.	GM22C
Dolistovo [AP]	42°18'16" 23°00'33"	521	13.06.2012 2:05 <i>p.m.</i>	1 ad.	FM68D
Dupnitsa [AP]	42°14'56" 23°05'36"	468	10.07.2012	1 ad. RK*	FM77B
Kresna Gorge (S) [LD]	41°45'40" 23°09'21"	216	15.07.2012 12:45 <i>p.m.</i>	1 subad.	FM72D
SE of Petrovo [LD]	41°25'10" 23°32'36"	641	20.07.2012 11:55 <i>a.m.</i>	1 juv.	GL18B
W of Zhelezmitsa [LD]	41°55'37" 23°04'57"	420	22.08.2012 12:15 <i>p.m.</i>	1 ad.	FM74A
Kresna Gorge (S) [LD]	41°46'15" 23°09'23"	225	27.04.2013 3:05 <i>p.m.</i>	1 ad.	FM72D
NW of Piperkov Chiflik [GM]	42°16'52" 22°43'27"	507	28.04.2013 12:30 <i>p.m.</i>	1 ad. RK	FM48A
N of Marino Pole [LD]	41°25'20" 23°20'54"	175	02.05.2013 11:35 <i>a.m.</i>	1 ad.	FL98D
N of Nevestino [GM]	42°15'33" 22°51'04"	448	05.05.2013 6:25 <i>p.m.</i>	1 ad. RK	FM58A
Kresna Gorge (S) [NK]	41°45'57" 23°09'13"	205	26.05.2013 n/a	1 ad. RK	FM72D
N of Simitli [GM]	41°53'58" 23°06'56"	302	02.06.2013 10:20 <i>a.m.</i>	1 ad. RK	FM74C
NE of Blagoevgrad [GM]	42°02'06" 23°08'04"	469	19.06.2013 6:35 <i>p.m.</i>	1 ad. RK	FM75D
NE of Blagoevgrad [GM]	42°02'14" 23°08'28"	495	21.06.2013 3:40 <i>p.m.</i>	1 ad. RK	FM75D
Rupite Area [LD]	41°27'25" 23°15'48"	87	25.06.2013 11:15 <i>a.m.</i>	1 subad.	FL89C
"	"	"	26.06.2013 6:15 <i>p.m.</i>	1 ad.	FL89C
"	41°27'03" 23°16'10"	88	18.08.2013 9:40 <i>a.m.</i>	1 ad.	FL89C
N of Golyam Varbovnik [GM]	42°16'24" 22°58'27"	556	26.08.2013 7:25 <i>p.m.</i>	1 ad. RK	FM68A
NE outskirts of Boboshevo [GM]	42°09'13" 23°00'52"	377	03.09.2013 12:05 <i>p.m.</i>	1 ad. RK	FM66D

Distribution and Activity of Caspian Whip Snake Dolichophis caspius (Gmelin, 1789) (Reptilia: Colubridae)...

SE of Dolna Koznitsa [GM]	42°15'49" 22°55'10"	488	14.09.2013 8:30 a.m.	1 ad. RK	FM58C
N of Nevestino [GM]	42°15'27" 22°50'59"	444	29.09.2013 2:40 p.m.	1 subad. RK	FM58A
E of Novi Chiflik [OK]	42°16'03" 22°48'49"	453	29.09.2013 1:10 p.m.	1 ad.	FM48C
NW outskirts of Banichan [AP, GM]	41°37'17" 23°44'05"	545	06.10.2013 3:35 p.m.	1 juv.	GM21C
SE of Kopilovtsi [GM]	42°19'22" 22°45'13"	467	12.10.2013 1:30 p.m.	1 subad. RK	FM48B
W of Konyavo [GM]	42°19'20" 22°45'52"	482	12.10.2013 1:45 p.m.	1 subad. RK	FM48D
W/SW of Kocherinovo [AP]	42°04'51" 23°02'26"	373	07.04.2014	1 ad. RK*	FM66C
Boboshevo [GM]	42°09'14" 23°00'00"	379	09.04.2014 6:20 p.m.	1 ad. RK	FM66D
SW of Lilyanovo [LD]	41°36'36" 23°18'33"	455	07.05.2014 11:20 a.m.	1 juv.	FM90B
NE of Lilyanovo [LD]	41°37'20" 23°19'41"	547	07.05.2014 12:40 p.m.	1 subad.	FM91A
Blagoevgrad [AP]	42°01'10" 23°06'02"	391	10.05.2014 4:10 p.m.	1 dead juv.	FM75A
NE of Blagoevgrad [GM]	42°01'50" 23°07'09"	444	26.05.2014 8:15 a.m.	1 ad. RK	FM75D
S outskirts of Simitli [AP]	41°53'02" 23°07'05"	284	05.06.2014 7:10 p.m.	1 ad. RK	FM73D
N outskirts of Kolarovo [AP]	41°21'58" 23°06'46"	371	09.06.2014 4:25 p.m.	1 ad. RK	FL78C
SW of Ilindentsi [RI]	41°38'40" 23°13'10"	243	11.06.2014 7:55 a.m.	1 ad.	FM81A
NW of Golyam Varbovnik [GM]	42°16'05" 22°57'09"	665	22.06.2014 3:25 p.m.	1 ad. RK	FM68A
N/NE of Dolno Tserovo neighb., Tserovo [AP, GM]	41°57'05" 23°06'14"	319	22.06.2014 12:35 p.m.	1 juv. RK	FM74B
NW of Predel Pass [LD]	41°54'01" 23°18'59"	989	25.06.2014 9:30 a.m.	1 ad. RK	FM94A
SW of Kocherinovo [GM]	42°04'42" 23°02'19"	379	27.06.2014 10:00 a.m.	1 ad. RK	FM66C
S/SE of Strumsko residential area [GM]	41°58'30" 23°05'36"	341	27.06.2014 8:15 p.m.	1 ad. RK	FM74B
E of Nevestino [GM]	42°15'24" 22°52'45"	449	28.06.2014 11:00 a.m.	1 ad. RK	FM57D
S/SE of Strumsko residential area [GM]	41°58'48" 23°05'23"	331	12.07.2014 7:50 p.m.	1 ad. RK	FM74B
Kresna gorge (S) [AP]	41°45'08" 23°09'09"	198	28.07.2014 7:25 p.m.	1 ad. RK	FM72C
SE of Dobrovo [GM]	42°10'03" 22°59'42"	394	16.08.2014 9:10 a.m.	1 ad. RK	FM67A
SW of Gradevo [GM]	41°54'29" 23°10'40"	429	19.09.2014 10:45 a.m.	1 ad. RK	FM84A
N/NW of Kolarovo [GG]	41°22'20" 23°06'13"	315	20.09.2014 n/a	1 ad.	FL78C
"	"	"	21.09.2014 n/a	1 ad.	FL78C
E of Novi Chiflik [OK]	42°16'03" 22°48'49"	453	08.11.2014 1:25 p.m.	1 subad.	FM48C
E/NE of Boboshevo [GM]	42°09'20" 23°01'26"	384	13.04.2015 12:20 p.m.	1 subad. RK	FM66D
SE outskirts of Levski neighb., Kocherinovo [AP]	42°03'48" 23°02'20"	357	24.04.2015	1 ad. RK*	FM65D
N/NW of Pastuh [OK]	42°12'57" 22°54'01"	445	27.04.2015 5:40 p.m.	1 ad. RK	FM57D
N of Simitli [GM]	41°54'09" 23°06'49"	312	03.05.2015 12:00 p.m.	1 ad. RK	FM74C
NE of Dobrovo [OK]	42°10'38" 22°59'06"	397	04.05.2015 12:20 p.m.	1 ad.	FM67A
SE of Skrinko [LD]	42°10'45" 22°57'47"	577	04.05.2015 11:25 a.m.	1 juv. RK	FM67A
E/NE of Novi Chiflik [OK]	42°16'11" 22°48'47"	447	14.05.2015 5:45 p.m.	1 ad. RK	FM48C
Blagoevgrad [AP]	42°01'06" 23°04'44"	374	14.05.2015 10:25 a.m.	1 juv.	FM75A
E/SE of Kremen [AP]	41°44'30" 23°39'24"	947	24.05.2015 3:25 p.m.	1 ad.	GM22A

E outskirts of Simitli [LD]	41°53'27" 23°07'39"	335	24.05.2015 1:20 p.m.	1 ad.	FM73D
E of Ribnik [AP]	41°29'24" 23°15'58"	94	28.05.2015 9:45 a.m.	1 ad. RK	FL89D
N outskirts of Nevestino [OK]	42°15'28" 22°51'04"	444	01.06.2015 2:00 p.m.	1 ad. RK	FM58A
NE of Blagoevgrad [AP, GM]	42°02'08" 23°08'22"	488	06.06.2015 9:50 p.m.	1 ad. RK	FM75D
N/NE of Dobrovo [GM]	42°10'40" 22°58'56"	391	07.06.2015 10:30 a.m.	1 ad. RK	FM67A
SE of Dobrovo [GM]	42°09'54" 22°59'43"	388	07.06.2015 10:25 a.m.	1 ad. RK	FM67A
E/NE of Boboshevo [GM]	42°09'18" 23°01'47"	376	07.06.2015 10:15 a.m.	1 ad. RK	FM66D
Novi Chiflik [OK]	42°16'01" 22°48'26"	459	12.06.2015 4:30 p.m.	1 ad. RK	FM48C
S of Mursalevo [AP]	42°05'59" 23°02'24"	363	14.06.2015	1 ad. RK*	FM66C
NE of Blagoevgrad [GM]	42°02'09" 23°08'10"	462	21.06.2015 3:40 p.m.	1 ad. RK	FM75D
NW outskirts of Dolna Grashitsa [OK]	42°18'07" 22°47'26"	489	30.06.2015 10:15 a.m.	1 ad. RK	FM48C
N of Nevestino [OK]	42°15'37" 22°50'52"	453	17.07.2015 1:35 p.m.	1 ad. RK	FM58A
NE of Blagoevgrad [GM]	42°02'28" 23°09'04"	507	19.07.2015 12:30 p.m.	1 ad. RK	FM75D
Levski neighb., Kocherinovo [AP]	42°03'55" 23°02'10"	367	31.07.2015 2:45 p.m.	1 ad.	FM65D
Blagoevgrad [GM]	42°00'41" 23°05'47"	381	30.08.2015 1:10 p.m.	1 juv. RK	FM75A
E of Dyakovo [GM]	42°20'01" 23°06'01"	630	03.10.2015 9:45 a.m.	1 ad. RK	FM78B
W of Marulevo [GM]	41°59'55" 23°08'51"	625	01.11.2015 12:45 p.m.	1 ad.	FM75C
SW of Moshtanets [GM, MI]	41°57'46" 23°04'02"	522	07.04.2016 4:05 p.m.	2 ad.	FM74B
W outskirts of Blagoevgrad [AP]	42°00'53" 23°04'19"	348	18.04.2016 3:50 p.m.	1 ad.	FM75A
NW of Marulevo [GM]	42°00'30" 23°10'01"	779	20.04.2016 3:15 p.m.	1 ad.	FM75C
NE of Levski neighb., Kocherinovo [AP]	42°03'59" 23°02'20"	368	23.04.2016 9:40 a.m.	1 subad. RK	FM65D
E of Levski neighb., Kocherinovo [AP]	42°03'54" 23°02'25"	362	23.04.2016	1 ad. RK*	FM65D
E/SE of Levski neighb., Kocherinovo [AP]	42°03'50" 23°02'29"	359	23.04.2016 9:45 a.m.	3 ad. RK, 1 subad. RK	FM65D
SE of Levski neighb., Kocherinovo [AP]	42°03'44" 23°02'34"	358	23.04.2016 9:50 a.m.	3 ad. RK, 1 ad. RK*	FM65D
SE of Levski neighb., Kocherinovo [AP]	42°03'33" 23°02'45"	384	23.04.2016 10:05 a.m.	1 subad. RK, 2 ad. RK*	FM65D
SE of Levski neighb., Kocherinovo [AP]	42°03'30" 23°02'47"	392	23.04.2016 10:10 a.m.	5 ad. RK	FM65D
N of Tserovo [AP, GM]	41°58'25" 23°07'24"	468	30.04.2016 5:00 p.m.	1 ad.	FM74D
NW of Pelatikovo [GM]	42°10'58" 22°46'15"	774	01.05.2016 12:15 p.m.	1 subad.	FM47C
NW outskirts of Dzherman [AP]	42°13'44" 23°04'52"	448	14.05.2016 1:15 p.m.	1 ad.	FM77B
SW of Barakovo [AP]	42°03'19" 23°02'53"	404	14.05.2016 1:40 p.m.	1 ad. RK	FM65D
W of Selishte [AP, GM]	41°59'47" 22°58'33"	548	23.05.2016 4:40 p.m.	1 ad.	FM65A
Blagoevgrad [AP]	42°00'39" 23°05'31"	363	29.05.2016	1 ad. RK*	FM75A
Blagoevgrad [AP, MI]	41°59'59" 23°05'22"	358	29.05.2016 2:10 p.m.	1 ad. RK	FM75A
S/SW of Mursalevo [AP]	42°06'08" 23°02'05"	357	02.06.2016 5:30 p.m.	1 ad. RK	FM66C
W of Dupnitsa [AP]	42°15'38" 23°04'20"	543	02.06.2016 5:45 p.m.	1 ad. RK	FM78A
Blagoevgrad, the industrial area [AP, KS]	42°00'15" 23°04'55"	348	05.06.2016 1:15 p.m.	1 ad.	FM75A
N outskirts of Blagoevgrad [AP]	42°01'47" 23°05'20"	468	05.06.2016 3:15 p.m.	1 juv. RK	FM75B

Distribution and Activity of Caspian Whip Snake Dolichophis caspius (Gmelin, 1789) (Reptilia: Colubridae)...

W of Barakovo [AP]	42°03'39" 23°02'40"	367	07.06.2016 11:00 a.m.	1 ad. RK	FM65D
SE of Dyakovo [AP]	42°19'25" 23°05'45"	611	10.06.2016	1 ad. RK*	FM78B
W of Dupnitsa [AP]	42°15'38" 23°04'20"	543	10.06.2016	1 ad. RK*	FM78A
E outskirts of Blagoevgrad [AP, MI]	42°00'27" 23°06'39"	458	10.06.2016	1 ad. RK*	FM75A
NE of Levski neighb., Kocherinovo [LP]	42°04'08" 23°02'18"	382	11.06.2016 10:50 a.m.	1 ad.	FM65D
Selishte [GM, AP]	41°59'46" 22°59'47"	536	11.06.2016 2:30 p.m.	1 ad. RK	FM65C
Simitli [MI]	41°53'26" 23°07'03"	291	12.06.2016 2:45 p.m.	1 ad. RK	FM73D
N of Mursalevo [LP]	42°07'28" 23°02'22"	375	12.06.2016 5:15 p.m.	1 ad. RK	FM66D
W of Selishte [AP, GM, LP]	41°59'48" 22°59'00"	540	12.06.2016 4:30 p.m.	1 ad. RK	FM65A
NE of Blagoevgrad [MI]	42°02'05" 23°07'59"	463	24.06.2016 11:50 a.m.	1 ad. RK	FM75D
N of Simitli [GM]	41°54'27" 23°06'48"	302	03.07.2016 10:20 a.m.	1 ad.	FM74C
E/NE of Boboshevo [GM]	42°09'19" 23°01'24"	382	03.07.2016 4:20 p.m.	1 ad. RK	FM66D
E of Zhelezuitsa [AP]	41°55'24" 23°06'37"	310	09.07.2016	1 ad. RK*	FM74A
Pashovtsi neighb., Delvino [MI]	42°00'43" 23°07'54"	647	25.07.2016 n/a	1 dead ad.	FM75C
N/NE of Blagoevgrad [AP]	42°02'19" 23°05'50"	560	09.08.2016 1:20 p.m.	2 ad. RK	FM75B
Ilindentsi [RI]	41°38'48" 23°13'48"	310	11.08.2016 3:00 p.m.	1 ad. RK	FM81C
W outskirts of Blagoevgrad [GM]	42°00'30" 23°04'33"	348	13.10.2016 11:35 a.m.	4 juv.	FM75A
NE of Riltsi [MI]	42°03'08" 23°04'38"	464	03.11.2016 2:50 p.m.	1 subad.	FM75B
SW of Koprivlen [LD]	41°29'46" 23°45'36"	919	26.03.2017 10:40 a.m.	1 subad.	GL39B
NE outskirts of Kulata [LD]	41°23'33" 23°22'07"	133	07.04.2017 11:20 a.m.	1 ad.	FL98D
SE of Gospodintsi [AP]	41°39'13" 23°44'00"	555	09.04.2017 7:15 p.m.	1 ad. RK	GM21C
Blagoevgrad, the industrial area [AP]	42°00'13" 23°05'36"	373	14.05.2017 2:00 p.m.	1 ad. RK	FM75A
SW of Bukovo [AP, LS]	41°42'22" 23°42'19"	598	20.05.2017 2:55 p.m.	1 ad.	GM22C
S/SW of Logodazh [LD]	41°58'53" 22°55'52"	783	02.06.2017 11:45 a.m.	1 ad.	FM54D
NW outskirts of Izgrev [KS]	41°59'37" 23°06'24"	429	10.06.2017 12:05 p.m.	1 ad., 1 ad. RK	FM75A
SE outskirts of Sadovo [AP]	41°30'08" 23°49'31"	524	13.06.2017 2:10 p.m.	1 ad. RK	GL39D
NE outskirts of Balgarchevo [MI]	42°01'44" 23°02'13"	355	13.06.2017 7:30 p.m.	1 ad. RK	FM65C
E/NE of Dobrinishte [AP]	41°49'32" 23°35'49"	779	23.06.2017 5:25 p.m.	1 ad. RK	GM13C
N of Blagoevgrad [MI]	42°01'56" 23°05'16"	471	26.06.2017 4:50 p.m.	1 juv. RK	FM75B
N of Blagoevgrad [MI]	42°02'21" 23°05'07"	477	26.06.2017 4:55 p.m.	1 ad. RK	FM75B
S/SE of Zhelezuitsa [GM]	41°54'50" 23°06'48"	311	04.07.2017 10:15 p.m.	1 juv. RK	FM74C
W of Tserovo [GM]	41°57'39" 23°06'13"	321	04.07.2017 11:10 p.m.	1 ad. RK	FM74B
S of Mesta [AP]	41°44'42" 23°40'30"	752	08.07.2017 1:15 p.m.	1 ad. RK	GM22A
N/NW of Cherniche [AP, GM]	41°52'08" 23°07'15"	284	21.07.2017 11:40 p.m.	1 subad. RK	FM73D
NE of Boboshevo [MI]	42°09'18" 23°01'13"	390	22.08.2017 6:10 p.m.	1 ad.	FM66D
SE of Koprivlen [AP]	41°30'47" 23°48'33"	506	10.09.2017 3:30 p.m.	1 subad.	GL39B
SW of Blagoevgrad [GM, MI]	41°59'26" 23°04'06"	322	20.10.2017 2:10 p.m.	1 ad.	FM75A
NW of Nevestino [GM]	42°15'38" 22°49'56"	449	09.04.2018 11:10 a.m.	1 ad. RK	FM58A
N/NW of Topolnitsa [LD]	41°24'59" 23°18'57"	92	09.04.2018 1:15 p.m.	1 juv.	FL98B
E of Borovo [GM]	41°35'38" 23°44'31"	529	29.04.2018 4:05 p.m.	1 ad.	GM20D
S/SE of Strumsko residential area [GM]	41°58'41" 23°05'24"	331	07.05.2018 5:30 p.m.	1 ad. RK	FM74B

Simitli [GM]	41°53'20" 23°06'54"	288	10.05.2018 3:10 <i>p.m.</i>	1 subad. RK	FM73D
Slokoshtitsa [AP, GM]	42°16'00" 22°42'09"	589	17.05.2018 11:15 <i>a.m.</i>	1 subad. RK	FM48A
W outskirts of Blagoevgrad [LP, GM]	42°01'00" 23°04'16"	354	18.05.2018 2:40 <i>p.m.</i>	1 ad. RK	FM75A
Selishte [AP]	41°59'54" 23°00'04"	527	23.05.2018 1:10 <i>p.m.</i>	1 subad.	FM65C
NE outskirts of Blagoevgrad [GM]	42°01'37" 23°06'34"	399	25.05.2018 11:45 <i>a.m.</i>	1 ad.	FM75A
N outskirts of Dupnitsa [LP]	42°16'06" 23°07'13"	529	26.05.2018 6:15 <i>p.m.</i>	1 ad. RK	FM78A
S of Mursalevo [LP]	42°06'28" 23°02'18"	378	26.05.2018 6:35 <i>p.m.</i>	1 ad. RK	FM66C
S of Ribnik [AP]	41°28'30" 23°15'19"	103	27.05.2018 5:30 <i>p.m.</i>	1 ad. RK	FL89C
E of Krupnik [AP]	41°50'53" 23°08'28"	274	27.05.2018 6:45 <i>p.m.</i>	1 ad. RK	FM73D
E/SE of Simitli [GM]	41°52'57" 23°08'47"	335	27.05.2018 6:25 <i>p.m.</i>	1 ad.	FM73D
Kardzhali neighb., Gradevo [AP]	41°55'38" 23°12'20"	505	29.05.2018 7:05 <i>a.m.</i>	1 ad. RK	FM84A
SE of Novo Lyaski [AP]	41°31'46" 23°47'07"	524	29.05.2018 4:40 <i>p.m.</i>	1 ad. RK	GM30A
Strumsko residential area [AP]	41°59'46" 23°05'35"	365	31.05.2018 3:40 <i>p.m.</i>	1 ad.	FM75A
E of Zlatarevo [MN]	41°23'51" 22°59'47"	198	02.06.2018 5:35 <i>p.m.</i>	1 ad. RK	FL68C
N/NE of Levski neighb., Kocherinovo [LP]	42°04'18" 23°02'20"	401	02.06.2018 5:05 <i>p.m.</i>	1 ad.	FM65D
NE outskirts of Gospodintsi [AP]	41°39'32" 23°43'57"	560	24.06.2018 5:15 <i>p.m.</i>	1 ad. RK	GM21D
W outskirts of Blagoevgrad [AP, GM]	42°00'30" 23°04'31"	347	08.07.2018 1:25 <i>p.m.</i>	1 ad. RK	FM75A
N of Novo Lyaski [GM]	41°32'24" 23°46'38"	508	22.07.2018 10:15 <i>a.m.</i>	1 ad. RK	GM30A
W outskirts of Koprivlen [AP]	41°31'17" 23°47'24"	531	27.08.2018 2:35 <i>p.m.</i>	1 ad. RK	GM30A
SE of Mesta [AP]	41°45'12" 23°40'46"	656	29.08.2018 3:35 <i>p.m.</i>	1 ad. RK	GM22B
NW outskirts of Blagoevgrad [KS]	42°01'23" 23°04'50"	414	02.09.2018 7:25 <i>p.m.</i>	1 juv. RK	FM75A
Barakovo [LP]	42°03'51" 23°03'37"	383	03.09.2018 2:15 <i>p.m.</i>	1 juv.	FM75B
N of Blagoevgrad [MI]	42°02'03" 23°05'47"	516	06.09.2018 7:50 <i>p.m.</i>	1 juv. RK	FM75B
Sadovo [AP]	41°30'11" 23°49'27"	518	05.10.2018 11:05 <i>a.m.</i>	1 ad. RK	GL39D
Blagoevgrad, the industrial area [AP]	42°00'19" 23°04'56"	349	21.10.2018 3:05 <i>p.m.</i>	1 ad. RK	FM75A
N of Simitli [AP]	41°54'45" 23°06'59"	302	29.10.2018 2:40 <i>p.m.</i>	1 subad. RK	FM74C
Rupite Area [LD]	41°26'56" 23°16'00"	90	30.03.2019 12:50 <i>p.m.</i>	1 ad.	FL89C
NE outskirts of Rupite [LD]	41°26'45" 23°14'46"	100	31.03.2019 11:35 <i>a.m.</i>	1 subad.	FL89C
E of Stara Kresna [HP]	41°47'25" 23°12'17"	606	26.04.2019 10:30 <i>a.m.</i>	1 ad., 1 subad.	FM82B
S/SE of Strumsko residential area [AP]	41°58'30" 23°05'38"	350	05.05.2019 2:20 <i>p.m.</i>	1 ad.	FM74B
Logodazh [AP]	41°59'37" 22°56'15"	693	11.05.2019 5:25 <i>p.m.</i>	1 juv.	FM65A
NE of Drakata [LD]	41°37'02" 23°13'09"	130	24.05.2019 10:15 <i>a.m.</i>	1 ad.	FM80B
S/SE of Zheleznitsa [AP]	41°54'55" 23°06'49"	310	26.05.2019 3:35 <i>p.m.</i>	1 ad. RK	FM74C
S/SE of Strumsko residential area [AP]	41°58'24" 23°05'35"	326	02.06.2019 4:40 <i>p.m.</i>	1 ad. RK	FM74B
S/SW of Parvomay [GG]	41°23'32" 23°07'41"	171	08.06.2019 9:25 <i>a.m.</i>	1 ad.	FL78C
E of Musomishta [AP]	41°33'10" 23°46'15"	493	08.06.2019 11:20 <i>a.m.</i>	1 ad. RK	GM30A
NE outskirts of Pokrovnik [AP]	41°59'07" 23°03'29"	330	12.06.2019 4:50 <i>p.m.</i>	1 subad. RK	FM75A

Distribution and Activity of Caspian Whip Snake Dolichophis caspius (Gmelin, 1789) (Reptilia: Colubridae)...

E/SE of Ilinden [AP]	41°27'23" 23°49'28"	630	15.06.2019 3:05 p.m.	1 ad. RK	GL39C
E/SE of Musomishta [AP]	41°32'50" 23°46'24"	492	15.06.2019 3:25 p.m.	1 ad. RK	GM30A
Izgrev [KS, AP]	41°59'18" 23°06'37"	385	19.06.2019 10:30 a.m.	1 ad. RK	FM75A
N of Mesta [AP]	41°46'24" 23°40'30"	674	27.06.2019 5:50 p.m.	1 ad.	GM22B
N of Pokrovnik [AP]	41°59'34" 23°03'14"	321	30.06.2019 3:30 p.m.	1 ad. RK	FM75A
N outskirts of Blagoevgrad [HP]	42°01'49" 23°05'19"	467	01.07.2019 1:30 p.m.	1 ad. RK	FM75B
E/SE of Musomishta [AP]	41°32'53" 23°46'23"	490	01.07.2019 3:35 p.m.	1 subad. RK	GM30A
Gradevo [AP, KD]	41°55'30" 23°11'59"	496	06.07.2019 3:40 p.m.	1 ad. RK	FM84A
W outskirts of Selishte [AP]	41°59'48" 22°59'31"	536	07.07.2019 6:05 p.m.	1 ad.	FM65A
E/NE of Eredeltsi neighb., Selishte [AP]	42°00'15" 23°01'10"	419	07.07.2019 6:40 p.m.	1 subad.	FM65C
N/NW of Tserovo [AP]	41°58'13" 23°07'03"	513	09.07.2019 3:40 p.m.	1 ad. RK	FM74D
N outskirts of Blagoevgrad [MI]	42°01'37" 23°05'25"	460	13.07.2019 5:50 p.m.	1 ad. RK	FM75A
N of Pokrovnik [AP]	42°00'02" 23°03'26"	323	15.07.2019 2:35 p.m.	1 ad. RK	FM75A
W of Logodazh [AP]	41°59'36" 22°55'43"	672	18.07.2019 5:55 p.m.	1 ad. RK	FM55C
SW of Barakovo [GG, AP]	42°03'00" 23°02'59"	411	19.07.2019 11:00 a.m.	1 ad. RK	FM65D
W outskirts of Blagoevgrad [AP]	42°00'51" 23°04'15"	345	19.07.2019 11:10 a.m.	1 ad. RK	FM75A
Ushite neighb., Padesh [AP]	41°56'54" 23°01'21"	602	20.07.2019 3:30 p.m.	1 subad. RK	FM64D
S of Simitli [AP]	41°52'31" 23°07'17"	301	31.07.2019 10:05 a.m.	1 ad. RK	FM73D
W of Strumsko residential area [AP]	41°59'27" 23°04'22"	324	08.08.2019 1:40 p.m.	1 ad. RK	FM75A
E outskirts of Kamenik [HP]	42°12'59" 23°01'19"	545	10.08.2019 12:05 p.m.	1 ad.	FM67D

*individuals killed on the road more than 48 hours prior to the registration

Appendix 4. New data of *Dolichophis caspius* shed skins in south-western Bulgaria

Locality	Geographic coordinates (N/E)	Altitude (m)	Date of observation	Shed skins observed	UTM 5×5 km
S outskirts of Banichan [BP]	41°36'55" 23°44'21"	531	01.11.1994	1 shed skin (ad.)	GM21C
SW vicinity of Dolna Gradeshnitsa [AP]	41°40'36" 23°11'05"	145	30.07.1997	1 shed skin (ad.)	FM81B
SE of Levski neighbourhood, Kocherinovo [AP]	42°03'45" 23°02'20"	357	24.08.1997	1 shed skin (ad.)	FM65D
"	"	"	03.07.1998	3 shed skins (ad.)	FM65D
SW of Chetirtsi [BN]	42°13'49" 22°51'50"	497	03.07.2008	1 shed skin (ad.)	FM57B
Rupite Area [LD]	41°27'22" 23°15'39"	112	21.08.2010	1 shed skin (ad.)	FL89C
NE of Riltsi [AP, GM]	42°02'49" 23°05'06"	440	19.05.2013	1 shed skin (ad.)	FM75B
NW outskirts of Banichan [AP, GM]	41°37'17" 23°44'05"	545	06.10.2013	2 shed skins (ad.)	GM21C
E of Starchevo [GM]	41°28'15" 23°15'26"	132	27.10.2013	2 shed skins (ad.)	FL89C
N/NE of Leshko [GM, MI]	41°56'19" 22°58'44"	639	20.10.2017	1 shed skin (juv.)	FM64A
W of Delvino [AP]	42°01'23" 23°07'19"	631	25.07.2019	1 shed skin (ad.)	FM75C
SE of Kresna [AP]	41°42'30" 23°10'52"	181	08.08.2019	2 shed skin (ad.)	FM81B