

Distribution of the Eurasian Blind Snake *Xerotyphlops vermicularis* (Merrem, 1820) (Reptilia: Typhlopidae) in South-western Bulgaria and its Zoogeographical Significance

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Abstract: The aim of the study is to supplement and summarize data about the distribution of *Xerotyphlops vermicularis* in south-western Bulgaria and to determine its importance for zoogeographical subdivision of the country. Many new records are reported from this part of the country (94 specimens at 46 localities). The distribution of the species in the Struma River basin has been specified. Some of the new records are from Oranovo Gorge, north of the town of Simitli. The Eurasian blind snake has been recorded for the first time in the Bulgarian part of the Mesta River basin, in the region of the village of Beslen. The distribution of this species is important from zoogeographical point of view and has to be taken into account in future zoogeographical subdivision of the territory of south-western Bulgaria.

Key words: *Xerotyphlops vermicularis*, distribution, faunistic element, Mediterranean areas, Bulgaria

Introduction

The Eurasian blind snake *Xerotyphlops vermicularis* (Merrem, 1820) of the family Typhlopidae is the only extant and native representative of the infraorder Scolecophidia in Europe. So far, the species is considered monotypic. The species binomen *Typhlops vermicularis* Merrem, 1820 has remained unchanged since the description of the species for almost 200 years. Recently, this species was transferred to the genus *Xerotyphlops* Hedges, Marion, Lipp, Marin & Vidal, 2014 (known as desert blind snakes). The generic name *Typhlops* Oppel, 1811 (Antillean blind snakes) remains valid for representatives of the family living in the New World (HEDGES et al. 2014).

The range of *X. vermicularis* is rather vast and spreads on the Balkan Peninsula and in south-western Asia. The species occur in Croatia (Dugi Otok Island), S Serbia, SW Montenegro, SE Kosovo, W Albania, SE Macedonia, S Bulgaria, Greece (including many of the islands), Cyprus, SW Turkey,

E Dagestan, SE Georgia, S Armenia, Azerbaijan, W Uzbekistan, SW Turkmenistan, SW Tajikistan, Syria, Jordan, W Lebanon, Israel, NE Egypt, W Saudi Arabia, Iraq, Iran and NW Afghanistan (WALLACH et al. 2014). The Eurasian blind snake is a representative of the Irano-Turanian faunistic elements (BESHKOV & BERON 1964, PULEV 2016). Its distribution in Bulgaria is in the southern part only, mainly in the lowest parts of some river valleys: the Struma River valley in south-western Bulgaria, the valleys of Byala Reka and Arda rivers in the Eastern Rhodopes, the valleys of Maritsa and Tundzha rivers, the southern Black Sea coast as well as near the village of Varvara in the western Rhodope Mts. (BESHKOV & NANEV 2002, NAUMOV 2007, STOJANOV et al. 2011, JABLONSKI & BALEJ 2015, BALEJ & JABLONSKI 2006-2017).

In south-western Bulgaria, the Eurasian blind snake was found for the first time in 1930. The

Bulgarian naturalist K. Tuleschkoff registered it near the village of Sali Aga at the southern end of Kresna Gorge (BURESCH & ZONKOV 1934). The village has no longer existed and the exact place of capture was specified by BESHKOV (1974). Later, more records of the species from the Struma River valley were published (BURESCH & ZONKOV 1934, BESHKOV 1974, 1981, 1985, BESHKOV & NANKINOV 1979, BESHKOV & GERASIMOV 1980, BELCHEVA et al. 1993, BISERKOV 1995, PETROV & LAZAROV 2000, PETROV & BESHKOV 2001, STOJANOV et al. 2011, TZANKOV et al. 2013, PULEV et al. 2014, POPGEORGIEV et al. 2016, BALEJ & JABLONSKI 2006-2017, CAS 2017).

Data about the altitudinal distribution of the Eurasian blind snake in the territory of Bulgaria are differing: up to 350 m (BESHKOV & NANEV 2002), up to 400 m (PETROV 2007), up to about 500 m (NAUMOV 2007, STOJANOV et al. 2011).

According to BESHKOV (1993), until the 1990s *X. vermicularis* was considered too rare and it was therefore included in the Red Data Book of Bulgaria in the category "Rare species". For the same reason, NANKINOV (2000) included the species in the list of the threatened animals of Bulgaria. More recent field studies have shown that the abundance of the populations in the known and in a number of newly discovered localities has been too high and the species is out of threat of extinction (BESHKOV 1993, BESHKOV & NANEV 2002, STOJANOV et al. 2011). Therefore the Eurasian blind snake has not been included in the second edition of the Red Data Book of Bulgaria.

Most of the zoogeographical subdivisions of Bulgaria assumed a Mediterranean influence (to varying degree), which in south-western parts of the country is manifested in the valleys of Struma and Mesta rivers (DRENSKI 1936, 1946, 1966, PITTIONI 1940, BURESCH & POPOV 1973, GUÉORGIEV 1980, POPOV 2007, ZHELEZOV 2008). According to PULEV (2016), several reptile taxa have ranges delineating very well the boundaries of the Mediterranean subregion in Bulgaria: *Mauremys rivulata* (Valenciennes, 1833), *X. vermicularis* and *Malpolon insignitus fuscus* (Fleischmann, 1831).

The aim of the study is to supplement and summarize data about the distribution of the Eurasian blind snake in south-western Bulgaria and to determine its importance for zoogeographical subdivision of the country.

Materials and Methods

The study area is situated in south-western Bulgaria. It includes the valleys of the rivers Struma (south of the city of Blagoevgrad) and Mesta (south of the

town of Gotse Delchev) as well as the slopes of the surrounding mountains up to altitude of 600-700 m. The climate is Continental Mediterranean, characterized with dry summer and mild winter. The average temperature in January is above 0°C in the areas with altitudes less than 700 m (VELEV 2002). New data about the distribution of the Eurasian blind snake were obtained during several field trips in 2003, and in the period 2010-2017. Kresna and Oranovo gorges have been visited most often. Data on geographic coordinates and altitude of the spot localities (the specimens found within a radius of not more than 10 m from the specific geographic coordinates have been grouped into one locality), time of observation, environmental conditions. The observed individuals have been collected. Active specimens have been searched for at night. During the day, the species has been sought after by turning stones over. The specimens killed on the road have also been recorded.

Results

Totally, 66 localities of the Eurasian blind snake have been registered in south-western Bulgaria. The published sites are 20 (Appendix 1, Fig. 2). All they are from the Struma River valley, south of Kresna Inn. The new localities of the species are 46 (Table 1, Fig. 2). For the first time, a locality of *X. vermicularis* is reported from the region of the village of Beslen (Hadzhidimovo Gorge, near the mouth of Dzhambazki Dol Stream), situated in the Mesta River basin (No. 37 on Fig. 2). The other localities are from the basin of Struma River. Some localities (16) have been registered north of the town of Simitli, in Oranovo Gorge. One locality is from the Strumeshnitsa River valley, right tributary of Struma River (No. 16 on Fig. 2). The new localities are from sites at an altitude of 86-462 m. All localities from Oranovo Gorge and the only one from Hadzhidimovo Gorge are at the highest altitudes: from 306 to 462 m. The highest locality is from Tserovski Rid ridge, 810 m southwest of Tserovski Rid summit (Table 1). The other records are from sites at lower altitudes (less than 292 m).

The number of the new specimens recorded is 94: 27 road-killed, 8 found at night, 4 at dusk, and 55 during the day (hidden under stones) (Table 1). The number of specimens from Oranovo Gorge is 33 (Fig. 1). A total of 23 individuals were observed in the valley of Stara Reka River in one day only, and the highest number of specimens in one spot locality



Fig. 1. A specimen of *Xerotyphlops vermicularis* (Merrem, 1820) found under a stone in the valley of Stara Reka River (Oranovo Gorge) on 25 April 2016.

was 9. In most of the localities a small number of specimens, usually only one, have been recorded. The observed period of seasonal activity was short – 5 months only. Specimens were found in April and May only under stones, in June and July mainly during the night and in the dusk – active individuals (including road-killed specimens) but also under stones. In August, we found specimens at night and under stones but very rarely (4 specimens in total).

Discussion

All published localities of the Eurasian blind snake in south-western Bulgaria have been recorded from the Struma River valley. All of the new ones, except one, have also been registered in this area. It was considered, that the range of the species there extends northward to the middle of Kresna Gorge (around Kresna Inn) (BESHKOV 1985, PETROV & BESHKOV 2001, BESHKOV & NANEV 2002). However,

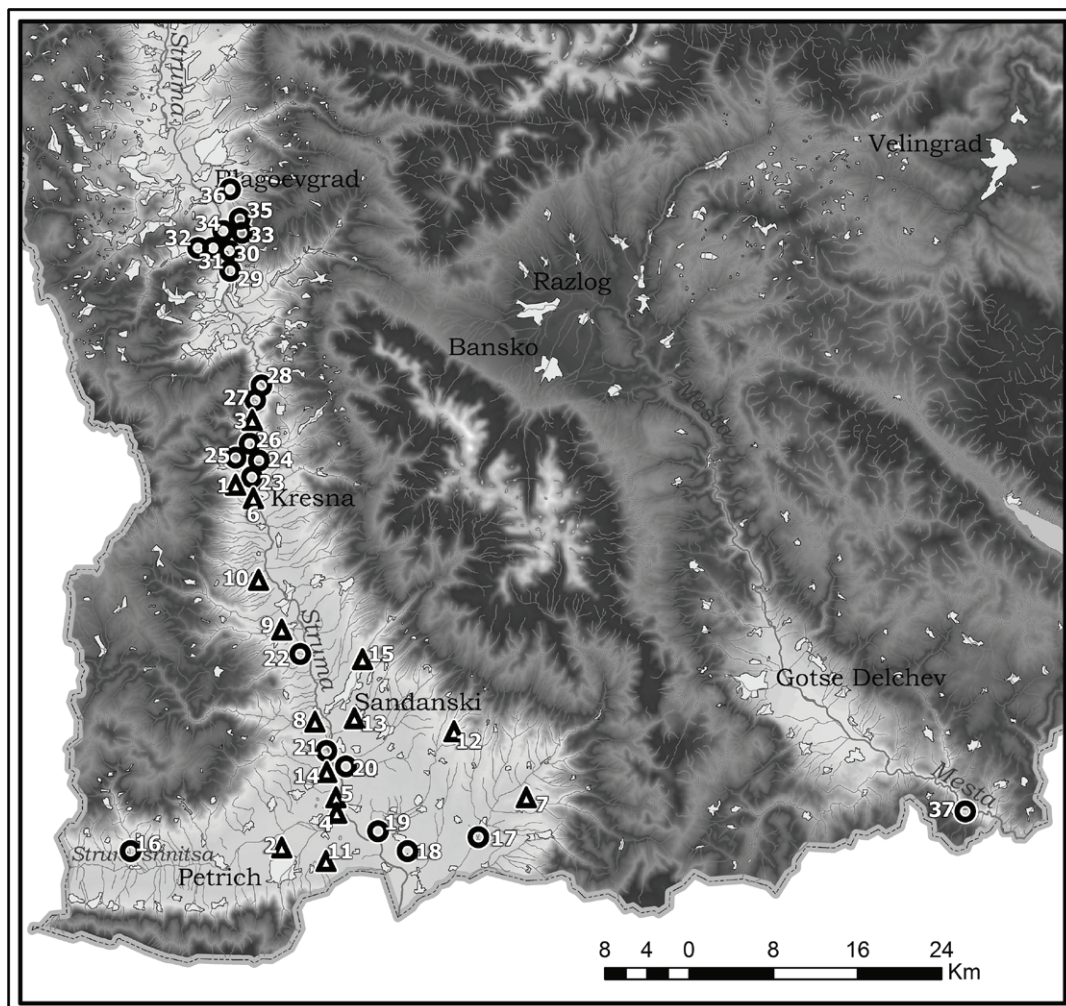


Fig. 2. Distribution of *Xerotyphlops vermicularis* (Merrem, 1820) in south-western Bulgaria: Δ – published localities; \circ – new localities.

Table 1. New data on the distribution of the Eurasian blind snake *Xerotyphlops vermicularis* (Merrem, 1820) in south-western Bulgaria.

Locality	Geographic coordinates	Altitude (m a.s.l.)	Time of observation	Environmental conditions	Specimens observed	No. in Fig. 2
Ograzhden Mts., next to the road, 880 m from the village of Strumeshnitsa towards the village of Borovichene	N41°24'19" E23°02'17"	292	25.08.2012 10:20 am	sunny, after rain	1 juv., under a stone	16
On the road, 850 m from the village of Katuntsi towards the village of Piperitsa	N41°26'00" E23°25'41"	154	19.07.2012 10:40 pm	night	1 juv., on the asphalt	17
Between the villages of Marino Pole and Marikostinovo	N41°25'14" E23°20'49"	139	02.05.2013 6:40 pm	sunny	1 juv., under a stone	18
Left bank of Melnishka Reka river (left tributary of Struma river), 760 m upstream from its mouth	N41°26'06" E23°18'32"	86	13.07.2012 11:15 pm	night	1 subad., on the ground	19
The foot of the southern slope of Kozhuh volcanic ridge (near the ruins of the ancient city of Heraclea Sintica)	N41°26'58" E23°15'48"	101	10.05.2003 11:15 am	air temperature +31°C, sunny	1 ad., under a stone	4
The foot of the southern slope of Kozhuh volcanic ridge	N41°27'03" E23°15'59"	104	25.06.2013 8:35 pm	dusk	3 ad., under stones	4
Rupite area, 500 m south of St. Petka of Bulgaria church complex	N41°27'15" E23°15'56"	87	07.06.2011 10:15 am	sunny	1 subad., under a stone	5
Rupite area, southwestern outskirts of the church complex	N41°27'27" E23°15'43"	93	12.08.2010 11:10 pm	night	1 subad., on the ground	5
Left bank of Struma river, 1000 m east/southeast of the village of Ribnik	N41°29'11" E23°16'02"	93	07.06.2014 11:15 pm	night	1 ad., on the ground	20
Skalata (Levunovski Bair) hill, 1400 m east of the village of Ribnik	N41°29'28" E23°16'12"	181	29.05.2016 1:30 pm	sunny	1 ad., under a stone	20
Close to the road between the villages of Ribnik and Lebnitsa	N41°30'15" E23°14'57"	124	08.05.2010 12:10-12:55 pm	sunny, after rain	6 ad., under a stones	21
Next to the road, 490 m from the village of Valkovo towards the village of Drakata	N41°35'07" E23°13'17"	126	23.08.2012 11:40 pm	night	1 ad., on the ground	22
Kresna Gorge, left bank of Struma river, 980 m north of the town of Kresna	N41°44'03" E23°09'30"	182	02.06.2003 4:05 pm	air temperature +35°C, sunny	3 ad., under two stones	23
Same locality			14.07.2003	sunny	1 ad., under a stone	
Kresna Gorge, on the main road E79, 860 m north of the town of Kresna	N41°44'02" E23°09'33"	187	14.07.2003		1 ad., road-killed	23
Same locality			28.07.2003		1 ad., road-killed	
Kresna Gorge, on the road E79, 1440 m north of the town of Kresna	N41°44'20" E23°09'32"	193	14.07.2003		1 ad., road-killed	23
Kresna Gorge, 780 m east/southeast of Peyo Yavorov railway station	N41°44'50" E23°09'47"	200	14.07.2003		1 ad., road-killed	24
Same locality			28.07.2003		1 ad., road-killed	
Kresna Gorge, 380 m east of Peyo Yavorov railway station	N41°44'57" E23°09'32"	214	11.05.2003 5:30 pm	air temperature +32°C, sunny	2 ad., under a stone	24
Kresna Gorge, 320 m north/northwest of Peyo Yavorov railway station	N41°45'09" E23°09'09"	198	14.07.2003		1 ad., road-killed	25
Same locality			28.07.2003		2 ad., road-killed	
Next to the railway, 800 m north of Peyo Yavorov railway station	N41°45'25" E23°09'11"	220	17.04.2012 9:10 am	sunny, after rain	1 ad., under a stone	25
Kresna Gorge, near the mouth of Sheytan Dere (Dyavolska Reka) river, next to the road E79	N41°45'37" E23°09'08"	203	21.06.2003 11:00 am	sunny	1 gravid female, under a stone	26
Kresna Gorge, near the mouth of Sheytan Dere river	N41°45'38" E23°09'17"	204	21.06.2003 11:30 am	sunny	2 ad., under a stone	26

Table 1. Continuation.

Locality	Geographic coordinates	Altitude (m a.s.l.)	Time of observation	Environmental conditions	Specimens observed	No. in Fig. 2
Kresna Gorge, Gabrovitsa area, near the road fork to the village of Stara Kresna	N41°45'54" E23°09'12"	205	14.07.2003	sunny	1 ad., road-killed, 1 juv., under a stone	26
Same locality			28.07.2003		3 ad., road-killed	
Kresna Gorge, on the road to the village of Stara Kresna near the railway crossing	N41°45'56" E23°09'20"	211	06.06.2012 11:40 pm	night	1 ad., on the ground	26
Kresna Gorge, the railway embankments, 150 m southeast of Kresna inn	N41°46'54" E23°09'24"	233	06.06.2015 11:30 pm	night	1 subad., on the ground	3
Kresna Gorge, near the main road E79, 1420 m north of Kresna inn, next to a tunnel bypass	N41°47'30" E23°09'42"	236	05.06.2011 6:15 pm	sunny	1 ad., under a stone	27
Kresna Gorge, on the road E79, 1700 m north of Kresna inn	N41°47'43" E23°09'30"	250	02.06.2003		1 ad., road-killed	27
Same locality			09.06.2003		1 ad., road-killed	
Same locality			16.06.2003		3 ad., road-killed	
Same locality			23.06.2003		2 ad., road-killed	
Kresna Gorge, on the road E79, 1930 m north of Kresna inn	N41°47'50" E23°09'28"	256	07.07.2003		1 ad., road-killed	27
Kresna Gorge, on the road E79, 140 m west/southwest of Stara Kresna railway station	N41°48'14" E23°09'44"	256	09.06.2003		2 ad., road-killed	28
Kresna Gorge, on the road E79, 360 m north/northwest of Stara Kresna railway station	N41°48'27" E23°09'44"	266	09.06.2003		1 ad., road-killed	28
Same locality			16.06.2003		1 ad., road-killed	
Same locality			07.07.2003		2 ad., road-killed	
Oranovo Gorge, next to the railway embankments, 1540 m south of the village of Zheleznitsa	N41°54'31" E23°06'48"	304	25.07.2013 9:30 pm	air temperature +25°C, dusk	1 ad., on the ground	29
Oranovo Gorge, left bank of Stara Reka river, 470 m upstream from the river mouth	N41°55'21" E23°06'14"	315	14.05.2014 11:00 am	sunny	1 subad., under a stone	30
Oranovo Gorge, left valley slope of Stara Reka river, 1110 m upstream from the river mouth	N41°55'24" E23°05'52"	356	25.04.2016 12:55 pm	air temperature +15°C, partly cloudy, after rain	4 ad., under stones	31
Oranovo Gorge, left valley slope of Stara Reka river, 1200 m upstream from the river mouth	N41°55'25" E23°05'49"	353	25.04.2016 1:10 pm	air temperature +15°C, partly cloudy, after rain	3 ad., under stones	31
Oranovo Gorge, left valley slope of Stara Reka river, 1340 m upstream from the river mouth	N41°55'29" E23°05'46"	366	25.04.2016 1:35 pm	air temperature +15°C, partly cloudy, after rain	2 ad., under stones	31
Oranovo Gorge, left valley slope of Stara Reka river, 1410 m upstream from the river mouth	N41°55'30" E23°05'43"	361	25.04.2016 1:50 pm	air temperature +15.5°C, partly cloudy, after rain	3 ad., under stones	31
Oranovo Gorge, left valley slope of Stara Reka river, 1700 m upstream from the river mouth	N41°55'34" E23°05'33"	367	25.04.2016 2:00 pm	air temperature +15.5°C, partly cloudy, after rain	1 ad., 1 juv., under stones	32

Table 1. Continuation.

Locality	Geographic coordinates	Altitude (m a.s.l.)	Time of observation	Environmental conditions	Specimens observed	No. in Fig. 2
Oranovo Gorge, left valley slope of Stara Reka river, 1870 m upstream from the river mouth	N41°55'33" E23°05'26"	360	25.04.2016 2:05-2:20 pm	air temperature +15.5°C, partly cloudy, after rain	9 ad., under stones	32
Oranovo Gorge, left valley slope of Stara Reka river, 1960 m upstream from the river mouth	N41°55'33" E23°05'22"	365	13.05.2017 4:30 pm	air temperature +31.5°C, sunny	1 subad., under a stone	32
Oranovo Gorge, left bank of Stara Reka river, 2500 m upstream from the river mouth	N41°55'34" E23°05'02"	390	19.06.2016	air temperature +27°C, cloudy	1 ad., under a board	32
Oranovo Gorge, right bank of Gramadsko Dere stream, 1200 m upstream from its mouth (south of Tserovski Rid ridge)	N41°56'09" E23°06'55"	420	28.04.2016 1:00 pm	air temperature +22°C, sunny, after rain	1 ad., under a stone	33
Oranovo Gorge, Tserovski Rid ridge, 1040 m southwest of Tserovski Rid summit	N41°56'08" E23°06'15"	404	16.07.2016 6:00 pm	air temperature +29.5°C, sunny, after rain	1 gravid female, under a stone	34
Oranovo Gorge, Tserovski Rid ridge, 810 m southwest of Tserovski Rid summit	N41°56'10" E23°06'29"	462	16.07.2016 6:15 pm	air temperature +29.5°C, sunny, after rain	1 ad., under a stone	34
Oranovo Gorge, right bank of Dolnotserovsko Dere stream, 700 m upstream from its mouth	N41°56'50" E23°06'20"	377	22.05.2016 12:00 pm	air temperature +22°C, sunny, after rain	1 ad., under a stone	35
Oranovo Gorge, right bank of Dolnotserovsko Dere stream, 1300 m upstream from its mouth	N41°56'43" E23°06'43"	449	22.05.2016 1:00 pm	air temperature +22°C, sunny, after rain	1 ad., under a stone	35
Oranovo Gorge, on the road, 1550 m after the road fork to the village of Tserovo	N41°58'08" E23°06'05"	426	01.08.2016 11:15 pm	night, rainy	1 ad., on the asphalt	36
Hadzhidimovo Gorge, near the mouth of Dzhambazki Dol stream (right tributary of Mesta river)	N41°28'27" E23°58'35"	447	04.05.2013 3:05 pm	sunny	2 juv., under a stone	37

the new distributional data show that the Eurasian blind snake occurs about 21 km north of the middle of Kresna Gorge. Its range extends north of Kresna Inn to the northern part of Oranovo Gorge. There are two main possible explanations of these records. One of them is the current climate change, i.e. the global warming, which has been impacting and altering species distribution. The latitudinal and altitudinal boundaries of the species ranges have been changing as the organisms move northward and uphill to reach slightly colder temperatures to track the environmental niche they are adapted to (RUSSO 2011). However, it seems unlikely that the species could rapidly expand its range because of its small size, short seasonal activity and limited mobility. The other possible explanation, which is more likely, is that *X. vermicularis* has not been sought intentionally north of Kresna Gorge. The species has a hidden underground way of life for much of the time and it is difficult to be found. For the same reasons, it

has not been registered in the Mesta River basin by previous studies.

The great number of new localities in the basin of Struma River shows that they are not isolated from each other to the great degree as previously believed (BURESCH & ZONKOV 1934, BESHKOV 1981, 1985).

The new data about the altitudinal distribution of the Eurasian blind snake in south-western Bulgaria corroborate the statement of NAUMOV (2007) and STOJANOV et al. (2011) that the species occur up to elevation of 500 m above sea level. It can be assumed that it will be found at higher altitudes in the southern part of the Struma River basin where climatic conditions are more favourable.

According to BESHKOV (1984), when defining the border between the Euro-Siberian and the Mediterranean Subregions on the territory of Bulgaria, it is necessary to take into account the ranges of the reptile species that occur only in

southern Bulgaria (not to the north of Stara Planina Mts.). Therefore *X. vermicularis* is one of the species of herpetofauna, which are very important in determining the Mediterranean influence on the territory of Bulgaria.

The recent molecular data show a hidden genetic diversity within this species. Probably, it is a complex of several species (KORNILIOS et al. 2011, 2012, HEDGES et al. 2014, JABLONSKI & BALEJ 2015, AFSAR et al. 2016). It is possible for specimens inhabiting the Balkan Peninsula and the western Asia Minor to represent a taxon that belongs to the Eastern Mediterranean faunistic element.

The penetration of the species northward in the Struma River valley is compatible with the boundaries of the Mediterranean areas in the zoogeographical subdivisions by DRENSKI (1936, 1946, 1966), GUÉORGUIEV (1980) and ZHELEZOV (2008) and is incompatible with those proposed by PITTIONI (1940), BURESCH & POPOV (1973) and POPOV (2007). The range of the species in the Mesta River basin coincides with the Mediterranean areas in the zoogeographical subdivisions of Bulgaria proposed by DRENSKI (1936, 1946, 1966) and BURESCH & POPOV (1973) and does not coincide with the Mediterranean areas proposed by PITTIONI (1940), GUÉORGUIEV (1980), POPOV (2007) and ZHELEZOV (2008).

The new data about the distribution of *X. vermicularis* should be taken into account in case of future zoogeographical subdivision of the territory of south-western Bulgaria. The new records give reason to suggest two separate Mediterranean areas: Struma and Mesta, which are very similar in fauna but geographically isolated by the Pirin and Slavyanka Mts. Struma area could spread to the north including the entire Oranovo Gorge, and Mesta area could end northward covering the entire Hadzhidimovo Gorge. Recently collected data on the distribution of two other reptile indicator taxa in southwestern Bulgaria: *Malpolon insignitus fuscus* (PULEV et al. 2018) and *Telescopus fallax fallax* (Fleischmann, 1831) (unpublished data by L. Domozetski, A. Pulev and G. Manolev) confirm this.

The role of the Eurasian blind snake as an indicator species in determining the Mediterranean areas in a future zoogeographical subdivision of Bulgaria can be defined as significant.

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Appendix 1. Published data about *Xerotyphlops vermicularis* in south-western Bulgaria (localities, data source and No. in Fig. 2).

Kresna Gorge, near the mouth of Breznishka Reka stream (the village of Sali Aga) (BURESCH & ZONKOV 1934, BESHKOV 1974) – No. 1. Close to the town of Petrich (BURESCH & ZONKOV 1934) – No. 2. At the northern outskirts of the town of Kresna (BESHKOV 1974) – No. 1. Maleshevska Planina Mts. (BESHKOV & NANKINOV 1979, BESHKOV & GERASIMOV 1980); Kresna Gorge, about 1000 m south of Kresna Inn (BESHKOV 1981) – No. 3. Kresna Gorge, around Kresna inn (BESHKOV 1985, CAS 2017) – No. 3. Kozhuh volcanic ridge (BESHKOV 1985, BALEJ & JABLONSKI 2006-2017) – No. 4. Rupite area (BELCHEVA et al. 1993, CAS 2017) – No. 5. Near the town of Kresna (BISERKOV 1995, BALEJ & JABLONSKI 2006-2017) – No. 6. Kresna Gorge (PETROV & LAZAROV 2000, PETROV & BESHKOV 2001); Kresna Gorge, on the road, very close to the town of Kresna (STOJANOV et al. 2011) – No. 1. Near the village of Kalimantsi in southern Pirin Mts. (STOJANOV et al. 2011) – No. 7. Maleshevska Planina Mts., northwest of the village of Lebnitsa (N41°31'29.32" E23°14'00.92") (TZANKOV et al. 2013) – No. 8. Maleshevska Planina Mts., southwest of the village of Drakata (N41.6 E23.2) (TZANKOV et al. 2013) – No. 9. Southeast of the village of Kamenitsa (PULEV et al. 2014) – No. 10. East/northeast of the village of Razhdak (POPGEORGIEV et al. 2016) – No. 11. Near the town of Melnik (CAS 2017) – No. 12. Near the village of Leshnitsa (BALEJ & JABLONSKI 2006-2017) – No. 13. Near the village of Ribnik (BALEJ & JABLONSKI 2006-2017) - No. 14. Near the town of Sandanski (BALEJ & JABLONSKI 2006-2017) – No. 15.

