

*Distribution of Kotschy's Gecko *Mediodactylus kotschyi* (Steindachner, 1870) (Reptilia: Gekkonidae) in South-West Bulgaria*

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Abstract. The current paper presents the contemporary distribution of *Mediodactylus kotschyi* in south-west part of Bulgaria. The valleys of Struma River (to the south of the city of Blagoevgrad), and Mesta River (to the south of the town of Gotse Delchev), as well as the sides of the surrounding mountains up to the altitude of 650 m have been surveyed for the presence of the species. A great number of new localities (55) have been registered, and most of them (48) are situated in anthropogenized habitats. For the first time the subspecies *Mediodactylus kotschyi bibroni* has been found in natural (4 localities) and seminatural habitats (3 localities). The presence of Kotschy's Gecko in the city of Blagoevgrad - the northern frontier of its range in the Struma River valley, has been confirmed. The highest locality of Kotschy's Gecko, known till now all over Bulgaria, has been registered (the village of Lyubovka, 606 m above sea level).

Key words: *Mediodactylus kotschyi*, distribution, Struma River valley, Mesta River valley, Bulgaria.

Introduction

Three subspecies of Kotschy's Gecko *Mediodactylus kotschyi* (Steindachner, 1870) have been found in Bulgaria - *Mediodactylus kotschyi danilewskii* (Strauch, 1887), *Mediodactylus kotschyi rumelicus* (Müller, 1940), and *Mediodactylus kotschyi bibroni* (Beutler & Gruber, 1977). Their distribution in the country is allopatric and south-west Bulgaria (the Struma River and Mesta River valleys) is inhabited by *M. k. bibroni*. The distribution of this subspecies is a matter of a certain zoogeographical interest since part of the northern frontier of its range passes through Bulgaria. *M. k. bibroni* is a Balkan endemic. Its native range spreads in south-west Bulgaria, most of Greece (including some of the Aegean islands), Albania and

Macedonia. The subspecies has been introduced to south-east Italy (Apulia and Basilicata) (RÖSLER, 2000; BÖHME *et al.*, 2009).

For the first time in the Bulgarian part of the Struma River valley the Kotschy's Gecko have been found in the town of Petrich (BURESCH & ZONKOW, 1933). GEISLER & BRÜHL (1980) mentioned the town of Sandanski as a locality for the species. In an unpublished research DOBREV (1986) reported several localities - the village of Kulata, the village of Levunovo, the town of Melnik, the town of Kresna, the village of Gorna Breznitsa, and the building of Kresna inn (in the middle of Kresna gorge). The town of Melnik was published as a locality by MOELLER (1990), the village

of Kulata – by BESHKOV (1993), the village of Gorna Breznitsa – by RÖSLER (2000), and Kresna inn – by BESHKOV & NANEV (2002). STOJANOV *et al.* (2011) summarized the data and marked on a map the distribution of Kotschy's Gecko in Bulgaria without reporting the specific localities (one of the mapped localities in the Struma River valley is a new one – the village of Katuntsi, B. NAUMOV, 2013, Sofia, pers. comm.). By the beginning of 2013 it was assumed that the building of Kresna inn was the northernmost point of distribution of Kotschy's Gecko in the Struma River valley (DOBREV, 1986; PETROV & BESHKOV, 2001; BESHKOV & NANEV, 2002; STOJANOV *et al.*, 2011). PULEV & SAKELARIEVA (2013) reported two other localities – the city of Blagoevgrad and the village of Cherniche.

The subspecies belonging of Kotschy's Gecko specimens along the Struma River valley was identified by DOBREV (1986) and RÖSLER (2000) and later confirmed by BESHKOV & NANEV (2002), and by STOJANOV *et al.* (2011).

BESHKOV & NANEV (2002) registered the species in the Mesta River valley (the town of Gotse Delchev) without subspecies determination. STOJANOV *et al.* (2011) determined the specimens, found in Gotse Delchev, as belonging to *M. k. bibroni*. RÖSLER (2000) supposed the occurrence of this subspecies in the Bulgarian part of the Mesta River valley. The locality in the town of Gotse Delchev was considered to be the highest one in Bulgaria – up to the altitude of 550 m (BESHKOV & NANEV, 2002; STOJANOV *et al.*, 2011).

The occurrence of Kotschy's Gecko in Bulgaria is mostly synanthropic. Populations in natural habitats were described only for two of the subspecies – *M. k. danilewskii* (at some places on the Black sea coast and under the entrance of the Orlova chuka cave, Ruse region), and *M. k. rumelicus* (on the hills of the city of Plovdiv) (STOJANOV *et al.*, 2011). There are no data in the literature so far that *M. k. bibroni* occurs in natural habitats in the territory of Bulgaria.

The aim of the study is to establish the distribution of *Mediodactylus kotschyi* in south-west Bulgaria.

Material and Methods

The research was carried out in the period from 2001 to 2014 with high intensity after 2009. The studied area is situated in south-west Bulgaria. The climate is Continental Mediterranean, characterized with dry summer and mild winter – the average January temperature is above 0°C in the areas with altitudes less than 700 m (VELEV, 2002). The studied area includes the valleys of Struma River (to the south of the city of Blagoevgrad), and Mesta River (to the south of the town of Gotse Delchev), as well as the sides of the surrounding mountains up to 650 m above sea level.

Sixty one settlements in the Struma River valley and 9 – in the Mesta River valley, situated at different altitudes, have been researched. The Kotschy's Gecko has been registered mainly in the night through inspection of the buildings. Reliable data have been obtained also from local people. The species has been discovered accidentally during the day or at nightfall in natural habitats when searching for other species.

Results and Discussion

Totally 55 new localities in south-west Bulgaria have been registered (41 in settlements, 7 at single buildings, 4 in natural, and 3 in seminatural habitats).

The Kotschy's Gecko has been found in several villages in the Struma River valley: Chuchuligovo, Marino pole, General Todorov, Rupite (alt. 50-100 m); Marikostinovo, Novo Konomladi, Novo Delchevo, Ribnik, Damyanitsa, Lebnitsa, Struma, Valkovo, Drakata, Mikrevo (alt. 100-150 m); Karnalovo, Starchevo, Drangovo, Kapatovo, Kromidovo, Hotovo, Leshnitsa, Dolna Gradeshnitsa, Kamenitsa, Gorna Krushitsa, Slivnitsa, Strumyani (alt. 150-200 m); Strumeshnitsa, Sklave, Vranja (alt. 200-250 m); Kalimantsi, Zornitsa, Harsovo (alt. 250-300 m); Samuilovo, Polenitsa, Ilindentsi, Poletto (alt. 300-350 m); Petrovo (alt. 400-450 m); Klyuch (alt. 450-500 m); Lyubovka (alt. 600-650 m) (Fig. 1). The species has also been

registered on the walls of single buildings at Rupite area (between the church complex – N41°27'32" E23°15'52", alt. 87 m and the pumping station – N41°27'45" E23°15'41", alt. 99 m), the building of Peyo Yavorov railway station (Fig. 2), linesman's lodge at the railway crossing on the road to the village of Oshtava, and the railway station building of the town of Simitli (Fig. 1). The

species has been searched for but not found in the following villages: Topolnitsa, Parvomay, Kavrakirovo, Mihnevo, Spatovo, Laskarevo, Vinogradi, Lozenitsa, Ladarevo, Zheleznitsa, Strumsko, Pokrovnik, Belasitsa, Kolarovo, Gabrene, Krupnik, Yanovo, Kamena, Yavornitsa, Skrat, Bogoroditsa, Rozhen, Vlahi, Stara Kresna.

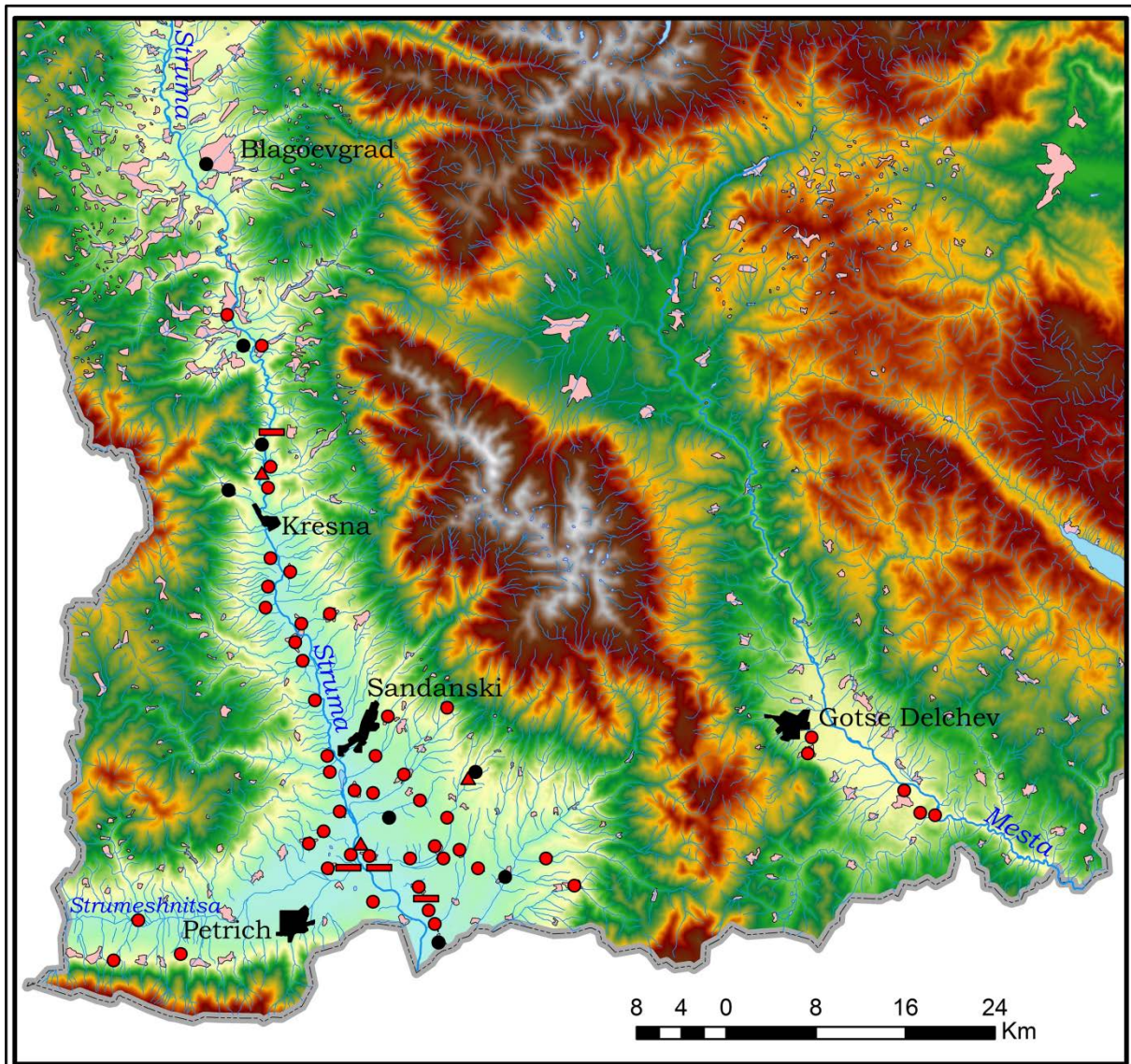


Fig. 1. Distribution of *Mediodactylus kotschy* in south-west Bulgaria. Legend: Towns in black and black circles – known localities; red circles – new anthropogenic localities; red rectangles – new localities in natural habitats; red triangles – new localities in seminatural habitats.

From the results of the study it could be concluded that the Kotschy's Gecko is widely distributed in the settlements situated at altitudes up to 300 m in the Struma River valley. It is rare to find it at higher altitudes. However, the species was

registered in a large barn, situated on a southwestern-facing slope in the village of Lyubovka, at the altitude of 606 m during the day (N41°34'39" E23°21'51", 5 ad., 24.08.2013). This is the highest locality of Kotschy's Gecko known till now all over

Bulgaria. Its occurrence there could be explained with the suitable microclimatic conditions on the southwestern-facing slopes of Pirin mountain.

The presence of Kotschy's Gecko in the industrial area of the city of Blagoevgrad (PULEV & SAKELARIEVA, 2013) has been confirmed. Several specimens (1 ad., 07.05.2013; 1 ad., 3 juv., 05.09.2013; 1 ad., 17.09.2013) were found at the city exit toward the village of Pokrovnik, N42°00'24" E23°05'02", alt. 356 m. Some new localities were registered - on the walls of buildings close to the railway crossing in the industrial area: N42°00'36" E23°05'17", alt. 361 m, 12 ad., 05.09.2013, and 1 juv., 06.10.2013, at air temperature of 14°C; on the walls of the linesman's lodge at the railway crossing toward the industrial area (N42°00'41" E23°05'20", alt. 365 m, 1 ad., 19.10.2013) (Fig. 3); on the walls of the linesman's lodge at the railway crossing toward Gramada residential district (N42°00'54" E23°04'55", alt. 364 m, 1 ad., 05.09.2013; 3 juv., 19.10.2013); and on the walls of buildings in the east part of the industrial area (N42°00'21" E23°05'34", alt. 367 m, many specimens, S. MARKOVSKA, 2013, Blagoevgrad, pers. comm.) (Fig. 1). The occurrence of Kotschy's Gecko at some other places, situated to the north of Kresna inn - the village of Cherniche railway station (PULEV & SAKELARIEVA, 2013), the town of Simitli railway station and the village of Poletto, indicates that the northern frontier of its range in the Struma River valley is not the middle of Kresna gorge as DOBREV (1986), PETROV & BESHKOV (2001), BESHKOV & NANEV (2002) and STOJANOV *et al.* (2011) assumed.

The Kotschy's Gecko has been found not only in anthropogenic, but also in several natural habitats in the Struma River valley. Some specimens were registered at the foot of the southern slope of Kozhuh volcanic hill, on stones around the ruins of the ancient city of Heraclea Sintica (N41°26'59" E23°15'52", alt. 104 m, several specimens, S. IVANOV, 2014, Petrich, pers. comm., and N41°27'03" E23°15'57", alt. 116 m; 2 ad., 10.08.2011; 1 ad., 24.08.2012). Five adults were observed at the foot of sand

scarps between the villages of Marino Pole and Marikostinovo (N41°25'20" E23°20'49", alt. 167 m) on 02.05.2013.



Fig. 2. *Mediodactylus kotschyi*, adult, Peyo Yavorov railway station, 06.09.2010, 15 h.



Fig. 3. *Mediodactylus kotschyi*, female, Blagoevgrad, 19.10.2013, 20 h.

Other two adults were found on stony ground south of the village of General Todorov, close to the railway (N41°26'53" E23°17'26", alt. 87 m) on 18.08.2013. Some specimens were registered in Kresna gorge - on the rocks opposite Kresna inn, beside the railway (N41°47'01" E23°09'23", alt. 245 m; 2 ad., 13.05.2012 and 3 ad., 26.06.2012) (Fig. 1).

The natural habitats, where specimens of Kotschy's Gecko have been found, are situated up to the altitude of 245 m, and all of them are pretty close to anthropogenic habitats (the most remote one is at a distance of 650 m). It is not clear whether the natural populations are autochthonous or have derived from the neighbouring synanthropic populations.

Probably the number of natural populations of Kotschy's Gecko in the Struma River valley are much more than the registered so far. It is difficult to observe the species because of its nighttime activity, and most likely, because of the lower number of these populations. But the range of the species is larger in anthropogenic habitats than in natural ones. All natural populations have been found in or to the south of Kresna gorge, where the driest and the warmest region in Bulgaria is with the longest period of vegetation (230 days) and the highest temperature sum during this period - up to 4400°C (VELEV, 2002).

Three other localities have been found in seminatural habitats during the study (Fig. 1): the railway embankments 500 m to the north of Peyo Yavorov railway station (N41°45'15" E23°09'10", alt. 204 m, 1 ad., 19.07.2011), the railway embankments 700 m to the north-west of the village of General Todorov (N41°27'37" E23°16'17", alt. 98 m, 2 ad., 12.06.2014) and the ruins of "St. Nikola" church near the town of Melnik (N41°31'14" E23°23'33", alt. 478 m, 4 ad., egg-shells, 22.09.2013) (Fig. 4). The church has not been used for more than 100 years and only its eastern wall, where the specimens and the clutches were found, has remained till nowadays.



Fig. 4. *Mediodactylus kotschygi*, adult, "St. Nikola" church near Melnik, 22.09.2013, 16 h.

The first specimen of Kotschy's Gecko, found in the Mesta River valley, was caught by G. Manolev on 01.08.1990 and sent to the

Institute of Zoology, Bulgarian Academy of Sciences (G. MANOLEV, 1990, Blagoevgrad, pers. comm.). The specimen (ad.) was caught on the brick wall of a single inhabitable building, southeast of the town of Gotse Delchev (N41°34'01" E23°45'03", alt. 514 m). The main locality in the Mesta River valley is the town of Gotse Delchev, where Kotschy's Gecko is widely distributed at the altitude from 520 to 570 m (Fig. 5). The species was also registered near the town in the village of Musomishta on 07.09.2013. 21 specimens (7 ad., 4 subad., 10 juv.) were observed on the walls of two houses in the center of the village (N41°33'12" E23°44'47", alt. 542 m) for about 30 minutes (Fig. 1).

Kotschy's Gecko has been found at some other localities in the Mesta River valley: on the walls of old houses in the northern part of the town of Hadzhidimovo (N41°31'17" E23°51'19", alt. 468 m); on the walls of a single building (villa), situated at 1100 m south-east of the town of Hadzhidimovo, by the road (N41°30'22" E23°52'15", alt. 499 m) and on the walls of "St. George" chapel near the Matnitsa River mouth (N41°30'20" E23°53'10", alt. 502 m) (K. MILUSHEVA, 2014, Hadzhidimovo, pers. comm.) (Fig. 1).

The species has been repeatedly searched for in other settlements in the Mesta River valley (the villages of Koprivlen, Novo Lyaski, Blatska, Hvostyane, Dabnitsa, Garmen), but has not been found yet. It has not been registered in the center part of the town of Hadzhidimovo as well. It is possible for the populations of Kotschy's Gecko in the towns of Gotse Delchev (and its surroundings) and Hadzhidimovo (and its surroundings) to be isolated one from another as well as from the populations in northern Greece.

STOJANOV *et al.* (2011) draws attention to the absence of the species at many places in Bulgaria despite the good living conditions there and this have been confirmed during the present study. *M. k. bibroni* is a Mediterranean faunistic element, and the temperature is a limiting factor for its distribution. However, it has not been found in many places with suitable climatic conditions in south-west Bulgaria. Its

(present) distribution in the Struma River and Mesta River valleys could be explained by the influence of temperature on the one hand and by its accidental spread by human activities on the other hand.



Fig. 5. *Mediodactylus kotschyi*, female, Gotse Delchev, 07.09.2012, 21 h.

Probably this spread is largely due to the railway infrastructure and the transportation of goods and loads. Finding Kotschy's Gecko at some railway stations and linesman's lodges (Cherniche, Simitli, Blagoevgrad) is a proof of this statement. At the same time, the species is absent or is sparsely distributed in the surrounding areas. The lack of railway infrastructure could explain the low species abundance in the Mesta River and the Strumeshnitsa River (right tributary of Struma River) valleys.

According to STOJANOV *et al.* (2011) the species could easily be found at lighted places where it preys in the night. However, it is not always (so) easy to observe Kotschy's Gecko in the settlements. In some of them (the villages of Samuilovo, Klyuch, Poleto and Musomishta, and the city of Blagoevgrad) it cannot be found in numerous suitable buildings but can be found in others with many specimens. Probably Kotschy's Gecko is rarer in the periphery of its range because of the limiting effect of climate and the altitude or due to its recent colonization. Local people not always pay attention to its existence despite the high density of its populations.

The populations of Kotschy's Gecko are usually with high density in the settlements. BESHKOV (1993) reported that about 70 specimens were recorded in the village of Kulata for 3 hours. In the present study, the highest numbers have been recorded in the villages of Mikrevo, Strumyani and Novo Delchevo where up to 25 - 30 specimens have been observed simultaneously on the walls of a single house.

The high number of anthropogenic localities and the large abundance of Kotschy's Gecko in most of them are due to several factors. The first factor is the heating of buildings in the winter, which facilitates the survival during this unsuitable season. Kotschy's Gecko has not been found in desolate buildings out of settlements (the ruins of "St. Nikola" church are not included). Probably spending the winter in buildings, which are not heated, is not possible. However, the species has been recorded in desolate buildings within the settlements (in the entire studied area), where possibly it periodically migrates from the adjacent habitable buildings. The second factor is the suitable microhabitats in the buildings. Kotschy's Gecko escapes from predators climbing on the walls, finds crevices in walls well lit by the sun or finds spaces for laying eggs under the roof-tiles. The third factor is the lighting in the evening, and in the night. It gives Kotschy's Gecko a certain advantage as it facilitates finding food and sustaining the body temperature.

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