

**THE FIRST RECORD OF EUROPEAN FREE-TAILED BAT
TADARIDA TENIOTIS (RAFINESQUE, 1814) IN SERBIA**

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European free-tailed bat, *Tadarida teniotis* (Rafinesque, 1814) is the only representative of the Molossidae family in Europe. It has Palearctic distribution, but occurs mainly in the Mediterranean region (Fig. 1) (Benda & Piraccini 2016, Dietz & Kiefer 2016). In Europe, it is present on the Iberian Peninsula, in southern France, Switzerland, Italy, Slovenia (Presetnik *in lit.*), Croatia and the southern Balkan Peninsula (Benda & Piraccini 2016).

The species roosts in inaccessible cliffs and rock crevices, often near the coastline or in mountainous regions up to 3,000 m above the sea level. Alternative roost sites can be fissures in cave ceilings, but also artificial objects resembling natural roosts, such as cracks in high buildings and bridges (Dietz & Kiefer 2016, Paunović 2016). *Tadarida teniotis* forages primarily over forested areas, but also acts as an opportunistic forager depending on the temporary concentration of prey, so it also uses alluvial

plains and valleys in mountainous regions, scrublands, lakes and urban areas (Marques *et al.* 2004). It flies high, 10-300 m above the ground, in straight and high-speed flight (up to 65 km/h), and therefore capturing this species using mist-nets is usually difficult. *T. teniotis* are capable of long forages (up to 10 hours without rest), usually within the radius of 20-100 km from their roosts, but they do not migrate seasonally (Marques *et al.* 2014, Dietz & Kiefer 2016).



Fig. 1. – Distribution of *Tadarida teniotis* (Benda & Piraccini 2016).

Pančić (1869) discussed the possibility of the presence of *T. teniotis* in Serbia, while Dokić (1883) later included this species in the mammal list of Serbia, however without specific details or locations. There was no further mention of the species until Ciechanowski *et al.* (2005) recorded it in Montenegro (State Union of Serbia and Montenegro at the time). Considering its presence in the neighbouring countries: Croatia (Domazetović & Hamidović 2014), Bosnia and Herzegovina (Milanolo *et al.* 2017), Montenegro (Presetnik *et al.* 2014), Albania (Ramaj 2014), Macedonia (Micevski *et al.* 2014) and Bulgaria (Pandourski 2014), and suitable habitats at least in the southern parts of Serbia, the presence of this species in Serbia was to be expected (Paunović 2016).

According to the latest IUCN Red List (Benda & Piraccini 2016), the status of the European free-tailed bat is LC (least concern). It is internationally legally protected by the Bonn Convention (Appendix II and EUROBATS Agreement) and Bern Convention (Appendix II) (Benda & Piraccini 2016). It is not included in the current legislation of Serbia (Paunović 2016).

The protected area Landscape of the Outstanding Features (LOF) “Vlasina” is located at the farthest southeast part of the country (Fig. 2a), between the Južna Morava River valley and the Serbian-Bulgarian state border, in the territory of the Municipality of Surdulica (Belij & Nešić 2014). This area is a mountainous landscape whose altitudes range from 1,200 to 1,850 m a.s.l. (Belij & Nešić 2014) and are covered with

deciduous (beech and rare moor birch) forests and coniferous plantations (Nedeljković *et al.* 2014).

The survey of bat fauna in the LOF “Vlasina” was conducted in the period 2015-2017, two times per year, by bioacoustic recording using Pettersson 240x (PetterssonElektronik AB, Uppsala, Sweden) time-expansion ultrasound detector and Record M ESI handheld audio recorder. All recorded bat calls were subsequently analysed using the BatSound 4.03 software (Pettersson Elektronik AB, Uppsala, Sweden), and the species were identified following Russo & Jones (2002) and Boonman *et al.* (2009).

One of the recordings of echolocation calls made on 9 June 2015 near Vlasina Rid (Fig. 2b) (42.743578° N, 22.328800° E, 1225 m a.s.l.) during transect on the road along Vlasina Lake was suspected to be that of *Tadarida teniotis*. Unfortunately, the quality of the recording was low and it was impossible to unambiguously attribute the signal to this species. However, echolocation calls recorded on 18 October 2017, at 20:33, during transect along the lighted road in Vlasina Stojkovićeva (Fig. 2b) (42.691016° N, 22.373792° E, 1356 m a.s.l.) were unequivocally identified as those of *Tadarida teniotis*. This record represents the first finding of this species in Serbia.

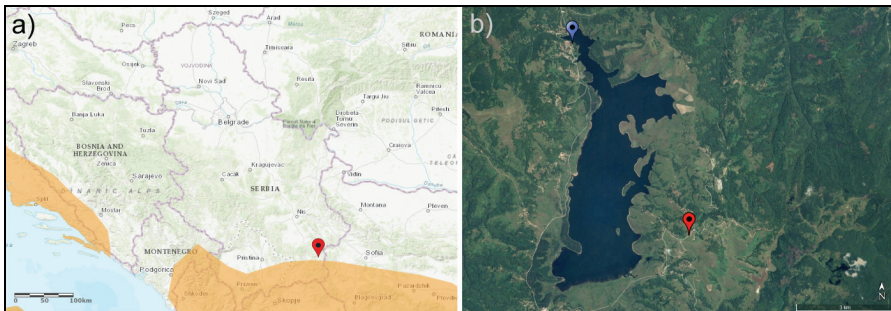


Fig. 2. – a) Geographic position of LOF “Vlasina” protected area on *T. teniotis* distribution map (modified Benda & Piraccini 2016) b) Vlasina Lake with Vlasina Rid (blue pin) and Vlasina Stojkovićeva (red pin) locations.

T. teniotis has echolocation signals whose frequency is lower than that of any other European species, with long QCF calls at 9-14 kHz, which are thus often audible to the human ear and quite easy to recognise (Dietz & Kiefer 2016). Signals that we recorded were of typical structure (Fig. 3), with the following parameters: QCF 10.6-11.4 kHz, start frequency 12.9-15.3 kHz, end frequency 8.9-10.5 kHz, frequency of maximum energy 11.4-12.4 kHz, pulse duration 9.0-14.9 ms, inter-pulse interval 305-638 ms. All the parameters fall within the range of *T. teniotis* call variability (Russo & Jones 2002, Boonman *et al.* 2009).

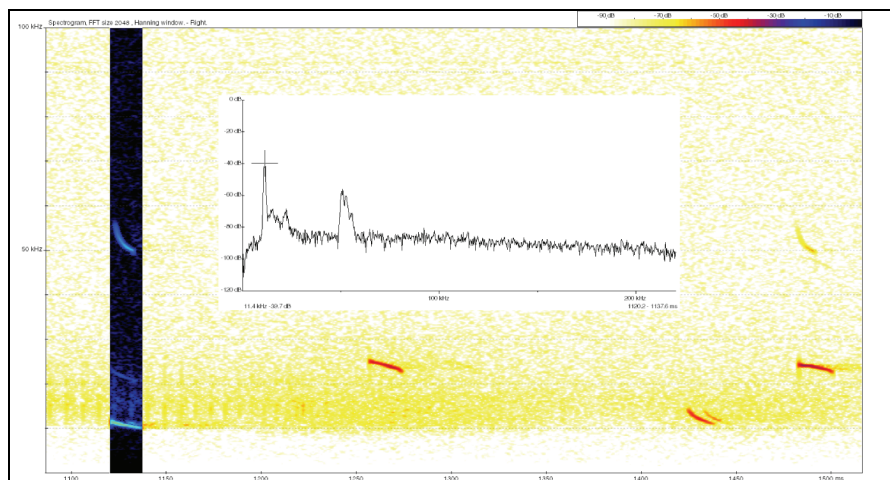


Fig. 3. – Echolocation calls of *Tadarida teniotis* recorded on 18th October 2017 in Vlasina Stojkovićevo.

Given the roosting preferences of the species, no potential natural roosts (such as rocks, cliffs and caves) are present in the immediate vicinity of the Vlasina Lake, where the signal was recorded. Nevertheless, the bat is capable of flying long distances (up to 100 km) in a single night (Dietz & Kiefer 2016). Few localities in Bulgaria where *T. teniotis* is relatively common (Stoycheva *et al.* 2009), are located 200 km (Plovdiv) and 100 km (Rila mountains) from the Vlasina Lake, and it is possible that some of those animals sometimes visit south-eastern parts of Serbia. However, potential roosts in areas closer to our locality are plentiful. Future research of this species in Serbia is necessary to find out whether it roosts, breeds and/or hibernates in Serbia, or individuals of this species just commute and/or forage over the country's territory. Higher sampling efforts should be made in southern and south-eastern parts of Serbia, since the presence of this species was expected and confirmed in these parts of the country.

Tadarida teniotis was recorded for the first time in Serbia during our research. Until now, bat fauna of Serbia counted 30 species (Budinski *et al.* 2016, Paunović 2016), and with this finding the number rises to 31.

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ПРВИ НАЛАЗ СРЕДОЗЕМНОГ РЕПАША *TADARIDA TENIOTIS* (RAFINESQUE, 1814) У СРБИЈИ

БРАНКА ПЕЈИЋ, ИВАНА БУДИНСКИ, БРАНКО КАРАПАНЏА,
МИЛАН ПАУНОВИЋ

Средоземни репаш, *Tadarida teniotis* (Rafinesque, 1814) је врста слепог миша из породице Molossidae, распрострањена углавном на подручју Медитерана. Припадници ове врсте користе склоништа у пукотинама тешко доступних литица и стена, лете брзо и високо изнад тла, и способни су за дуге летове. Будући да је *T. teniotis* забележена у суседним државама и да у Србији постоје за њу погодна станишта, присуство ове врсте на територији Србије је било очекивано.

На подручју заштићеног природног добра Предео изузетних одлика „Власина“ вршена је инвентаризација фауне слепих мишева у периоду 2015-2017. године. У вече 18. октобра 2017. године на локалитету Власина Стојковићева (42.691016° северне географске ширине, 22.373792° источне географске дужине, 1356 м н.в.) применом методе ултразвучне аудиодетекције дефинитивно је потврђено присуство врсте *T. teniotis*, што представља њен први налаз у Србији. Овим је укупан број врста фауне слепих мишева Србије повећан на 31. Даља истраживања су неопходна како би се утврдило да ли постоје склоништа ове врсте, да ли се репродукује и/или хибернира на територији Србије.