

First records of European free-tailed bat *Tadarida teniotis* Rafinesque, 1818 (Chiroptera: Molossidae) in Friuli Venezia Giulia region in NE Italy

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Abstract. The European free-tailed bat *Tadarida teniotis* is distributed mainly in the southern part of Europe, with gaps in the currently known distribution range. During the 2014 bat detector survey in Friuli Venezia Giulia in Italy, the species was recorded for the first time in the region. It was observed at three sites in Laghetti delle Noghère Nature Reserve (ca. 600 m from the border with Slovenia), where it was also feeding, and at a site near the border with the Veneto region. With these observations, the number of all recorded bat species in Friuli Venezia Giulia increased to 30. It remains to be answered with further studies, whether *T. teniotis* is a regular part of the regional fauna or an occasional vagrant only.

Key words: Chiroptera, *Tadarida teniotis*, Friuli Venezia Giulia, first records, echolocation

Izvleček. Prvi podatki o dolgorepem netopirju *Tadarida teniotis* Rafinesque, 1818 (Chiroptera: Molossidae) v Furlaniji - Julijski krajini na SV Italije – Dolgorepi netopir *Tadarida teniotis* je razširjen predvsem v južnih delih Evrope, z vrzeli v trenutno znanem območju razširjenosti. V letu 2014 smo to vrsto našli prvič v pokrajini Furlaniji Julijski krajini v Italiji med popisovanjem netopirjev z ultrazvočnimi detektorji. Zabeležili smo jo na treh mestih v naravnem rezervatu Laghetti delle Noghère (cca. 600 m od meje s Slovenijo), kjer se je tudi prehranjevala, in na enem mestu blizu meje s pokrajino Veneto. S temi opažanji se je število vrst netopirjev v Furlaniji Julijski krajini povzpelo na 30. Nadaljnje raziskave bodo pokazale, ali vrsta *T. teniotis* stalno živi v regiji, ali pa se tam pojavlja le občasno.

Ključne besede: Chiroptera, *Tadarida teniotis*, Furlanija Julijska krajina, prvi podatki, ehlokacija

Introduction

The European free-tailed bat, *Tadarida teniotis* Rafinesque, 1818, is the only representative of the family Molossidae in Europe. Its northern border of distribution range extends from southern France, southern Switzerland, Italy, Croatia, Bosnia and Herzegovina, Montenegro to Macedonia and Bulgaria (Aulagnier et al. 2008, Dietz & Kiefer 2014). Straying individuals have also been found in northern Switzerland and southern Germany

(Dietz & Kiefer 2014), with possible observations from Crimea (Uhrin et al. 2007). In Italy, *T. teniotis* is relatively common in central and southern parts of the country (Lanza 2012), while in the north it has been reported from Lombardy (Fornasari et al. 1999), Trentino Alto Adige (Gulino & Dal Piaz 1939, Vernier 1999, Niederfriniger 2002) and Veneto (Vernier 2000).

Tadarida teniotis is a fast flying bat, able to reach speeds of over 50 km/h (Marques et al. 2004, Dietz & Kiefer 2014). Its roosts are found mostly in rocky cliffs, sometimes in tall buildings (Arlettaz 1990, Dietz et al. 2009), where they are difficult to discover. But, the species can be identified rather easily in flight due to its characteristic echolocation calls (Barataud 2014, Dietz & Kiefer 2014).

The Friulian Natural History Museum conducted a project funded by the Public Administration of the Autonomous Region Friuli Venezia Giulia from September 2013 till the end of 2015, with the aim to improve the knowledge on bats of the Friuli Venezia Giulia region (from now on referred to as FVG). In 2014, a bat detector survey on the distribution of *Pipistrellus pipistrellus* and *P. pygmaeus* was conducted (Zagmajster 2014), when also data on other species were gathered. Echolocation calls of *T. teniotis* were registered during this study, presenting the first records of the species in FVG.

Material and methods

Bat detector surveys were conducted in the whole territory of FVG, with priority given to nature conservation and Natura 2000 sites. We observed bats on eleven nights or evenings from the middle of July to the end of September 2014, in the nights without rain and with evening ambient temperatures over 10°C. Bat calls were registered primarily during walking transects and point observations, but also during slow driving by car (up to 40 km/h).

Bat detectors were set in heterodyne mode, frequently scanning between different frequencies (from 20 to 110 kHz; mostly around 40 kHz) to detect bat calls. When a bat was heard, calls were recorded in 10× time expansion mode on D240x ultrasound detector (Pettersson Elektronik AB) and stored on external digital recorder Roland RH-09. All field recordings were studied with the sound analysis program Batsound 4.0 (Pettersson Elektronik AB). Species identification was made based on characteristics of the echolocation calls, measured from spectrogram and power spectrum (FFT, 2048 samples, Hanning window), using various references on bat calls (e.g. Russ 1999, Russo & Jones 2002, Barataud 2014, Dietz & Kiefer 2014, Middleton et al. 2014).

Results with discussion

We recorded the echolocation calls of *T. teniotis* on two nights in 2014 in two different areas of FVG (Tab. 1, Fig. 1).

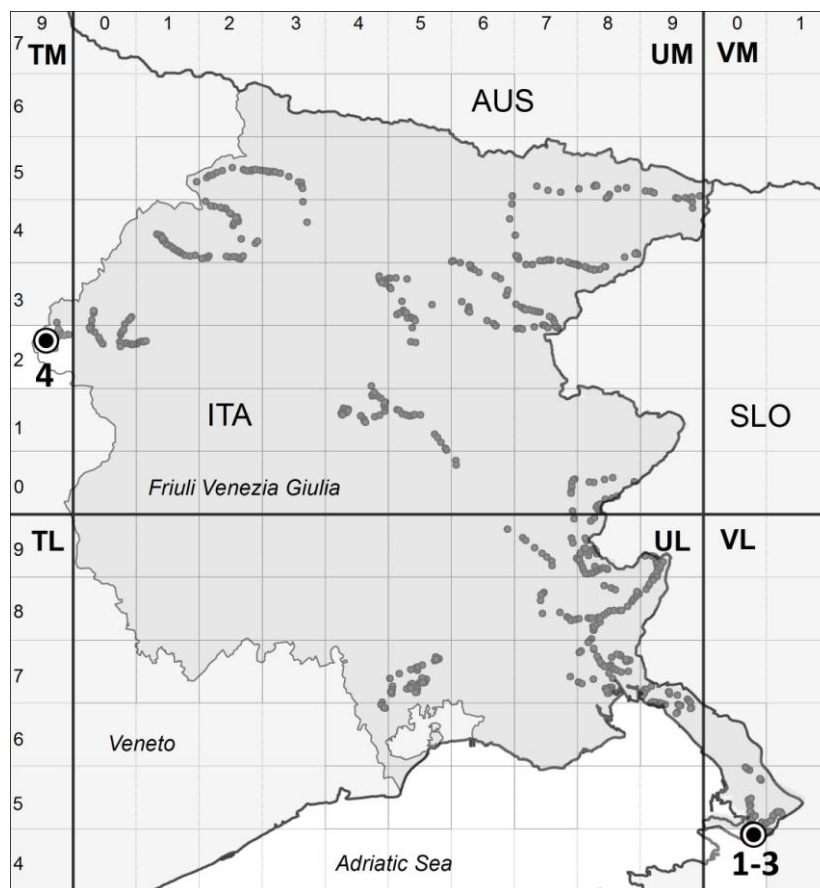


Figure 1. Map of *Tadarida teniotis* localities, recorded in the Friuli Venezia Giulia region in summer 2014 (large circles, numbers below them refer to Tab. 1). Grey dots mark all point observations done during the bat detector study in that same year. Mesh and numbers at the map border refer to the 10×10 km UTM squares.

Slika 1. Karta lokalitet, kjer smo poleti 2014 zabeležili vrsto *Tadarida teniotis* v Furlaniji - Julijski krajini (veliki krogi, številke pod njimi kot v Tab. 1). Sive pike ponazarjajo vse popisne točke v študiji z ultrazvočnimi detektorji v tem istem letu. Mreža in številke ob robu karte se nanašajo na 10×10 km UTM kvadrate.

Table 1. Localities of *Tadarida teniotis* recorded in the Friuli Venezia Giulia region in summer 2014. 10×10 km UTM squares are given (see also Fig. 1), coordinates are in WGS84 decimal degrees (X - longitude, Y - latitude), Z – altitude.

Tabela 1. Lokalitete, kjer smo poleti 2014 zabeležili vrsto *Tadarida teniotis* v Furlaniji Julijski krajini (glej tudi Sl. 1).

Podani so 10×10 km UTM kvadrati, koordinate so v WGS84 decimalnih stopinjah (X – zemljepisna dolžina, Y – zemljepisna širina), Z – nadmorska višina.

No	Locality description	UTM	X [°E], Y [°N]	Z [m]	Date	Time
1	At the road, near NE edge of the N-central pond of Laghetti delle Noghere, San Dorligo della Valle, Trieste	VL04	13.817670 45.587407	5	17.-18.7.2014	00:57
2	At the NE edge of the N-central pond of Laghetti delle Noghere, San Dorligo della Valle, Trieste	VL04	13.817654 45.587296	5	17.-18.7.2014	00:58
3	At the E-central edge of the largest (E) pond of Laghetti delle Noghere, San Dorligo della Valle, Trieste	VL04	13.819124 45.586883	5	17.-18.7.2014	01:31, 01:39
4	Shrubs and open land at Strada Regionale 251 della Val di Zoldo e Val Cellina, 200 m SE from Zona Industriale di Frasein, Erto e Casso, Pordenone	TM92	12.348062 46.268628	815	25.-26.8.2014	00:46

Laghetti delle Noghere Nature Reserve lies in the southeast of FVG, near the Slovenian border. It encompasses six ponds that used to be excavation sites of clay for the brick industry, with the Rio Osopo (Osapska reka) River on its northern border. The area around water bodies is overgrown with trees and shrubs. These 12 hectares present an area of semi-natural habitats in otherwise heavily urbanised land of the wider Trieste periphery. We investigated the reserve in the night 17.–18.7.2014, for about two hours (00:30 – 02:20). We recorded echolocation calls of *T. teniotis* at three different localities, with about 40 minutes between the first and the last observations (Tab. 1). The length of species presence, as well as the feeding buzz recorded at the largest pond (No. 3 in Tab. 1), indicated the species was feeding in the area. Foraging of *T. teniotis* near water bodies was observed also by other authors (e.g. Rydell & Arlettaz 1994).

The nature reserve was visited again in the same and the next year (19.8.2014 and 22.10.2015) for the first three hours of the nights, but *T. teniotis* was not recorded again. To establish whether the species regularly occurs in the reserve, the area should be checked more frequently, especially earlier in the summer and in different parts of the nights. The reserve is only about 600 m straight line from the Slovenian border, so a similar approach with bat detectors could reveal species occurrence also in nearby regions in Slovenia, where the species is expected but not yet found (Presetnik et al. 2009).

The fourth locality of *T. teniotis* is situated at the western edge of FVG, near the border with the Veneto region and close to the Dolomiti Friulane Regional Park (Tab. 1, Fig. 1). At the observation site there was an open area close to the road, with some shrubs and bushes. In the night 25.–26.8.2014, a single passing bat was recorded at the site. As our observations did not last longer than recording this bat pass, we cannot say anything about the duration of the species presence there or whether it was feeding.

Feedings sites of *T. teniotis* are situated mostly within 5 km from the colony, but can reach up to 30 km from the roost (Marques et al. 2004). Both areas where we recorded the species have rocky cliffs in vicinity. We checked for potential presence of the species at some rocky cliffs only around the Laghetti delle Noghère reserve. We recorded the species neither in Val Rosandra/Glinščica in Italy (17.–18.7. and 25.–26.7.2014) nor at rocky cliffs near Socerb in Slovenia (25.–26.7.2014), but repeated visits would be necessary. Rarity of *T. teniotis* observations during our study (the species was found at only four of more than 820 bat detector observation points in 2014; see Fig. 1) opens a question on the species regular presence in FVG.

Determinations of *T. teniotis* were based on characteristics of search echolocation calls (Fig. 2; Zbinden & Zingg 1986, Bayefsky-Anand et al. 2008, Barataud 2014, Dietz & Kiefer 2014). The parameters of recorded echolocation calls of *T. teniotis* were (average, \pm standard deviation, minimum – maximum, number of samples):

- start frequency 20.3 kHz (\pm 3.9 kHz, 15.3 – 30.6 kHz; n = 17),
- end frequency 12.1 kHz (\pm 0.7 kHz, 11.4 – 14.1 kHz; n = 17),
- frequency of most energy 13.8 kHz (\pm 0.9; 12.7 – 15.7 kHz; n = 17),
- pulse duration 16.1 ms (\pm 2.6 ms, 12.0 – 21.0 ms; n = 17),
- interpulse interval 510.5 ms (\pm 174.3 ms, 267 – 770 ms; n = 11).

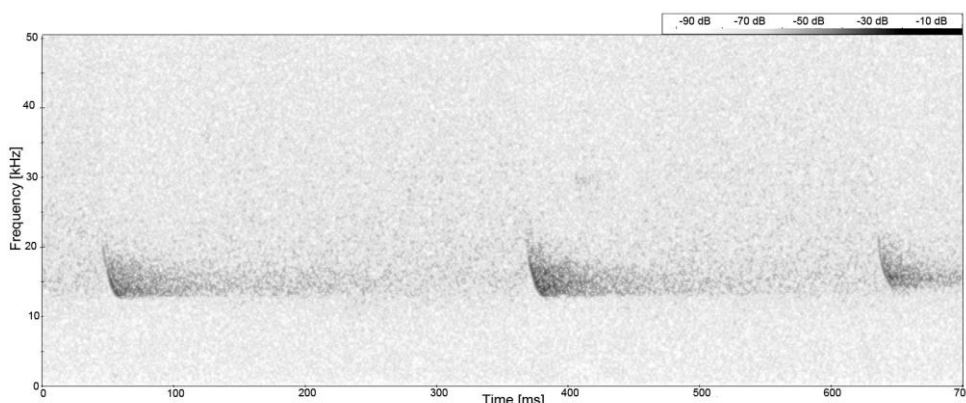


Figure 2. Spectrogram of echolocation calls of *Tadarida teniotis*, recorded at the largest pond in Laghetti delle Noghère in the night 17.–18.7.2014 (see Tab. 1).

Slika 2. Spektrogram ehokacijskih klicev vrste *Tadarida teniotis*, posnetih na bregu največjega jezera rezervata Laghetti delle Noghère v noči 17.–18.7.2014 (glej Tab. 1).

These characteristics are similar to the ones reported by Russo & Jones (2002), based on calls recorded in southern Italy. The calls can be discriminated from similar ones of *Nyctalus lasiopterus*, as the latter has calls of longer duration, with almost constant frequency and with typical *Nyctalus* alternation of two calls (Haquart & Disca 2007). Additionally, the two species can be discriminated by the feeding buzz: in *N. lasiopterus*, the feeding buzz is in the frequency part inaudible to human ear, while in *T. teniotis* feeding buzzes are in low frequency, in human audible sound range (Haquart & Disca 2007). The calls of *T. teniotis* could potentially be mixed also with *N. leisleri* male advertisement calls, but the latter are of longer duration and mostly emitted from a stationary point (Zingg 1990, Helversen & Helversen 1994, Russ 1999, Middleton et al. 2014).

Our observations present the first records of *T. teniotis* in FVG (Lapini & Dorigo 2011, Lapini et al. 2014), increasing the number of registered bats in the region to 30. As *T. teniotis* was known to occur in Italy (Russo & Jones 2002, Lanza 2012), with FVG lying within its European distribution range (Dietz & Kiefer, 2014), its occurrence in FVG is not surprising. Additionally, the species was recently recorded in Venetian portion of the Cansiglio area close to the FVG administrative borders (Cistrone et al. 2014). The status of the species presence, whether it is a common part of FVG fauna or only an occasional vagrant, remains to be ascertained with further studies.

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