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DISTRIBUTION OF TWO ALPINE-BOREAL BAT SPECIES, *EPTESICUS NILSSONII* (KEYSERLING & BLASIUS, 1839) AND *VESPERTILIO MURINUS* LINNAEUS, 1758, IN FRIULI VENEZIA GIULIA REGION (NE ITALY)

DISTRIBUZIONE DI DUE PIPISTRELLI BOREO-ALPINI, *EPTESICUS NILSSONII* (KEYSERLING & BLASIUS, 1839) E *VESPERTILIO MURINUS* LINNAEUS, 1758, NELLA REGIONE FRIULI VENEZIA GIULIA (ITALIA NORD-ORIENTALE)

Abstract - Distribution of two alpine-boreal bat species - Northern bat *Eptesicus nilssonii* and parti-coloured bat *Vespertilio murinus* - in Friuli Venezia Giulia Region is presented. All records collected until December 2015 are gathered and mapped onto 10x10 km UTM quadrats. Besides literature data, unpublished records due both to the accidental finding of individuals and to an extensive bat-detector survey conducted in 2014-2015 are included. Both species seem to be spread all over the region, from mountains to the lowlands, also up to the North Adriatic coast. Despite this, their reproduction in the region has not been ascertained yet. The findings of some nulliparous females of *V. murinus* indicate high probability that the species reproduces here. We show that accidental information from public and the use of bat detectors can increase enormously knowledge on both bat species, which are very difficult to find at the roosts.

Key words: *Eptesicus nilssonii*, *Vespertilio murinus*, Friuli Venezia Giulia Region, Distribution, Accidental findings, Bat-detector survey.

Riassunto breve - Gli Autori definiscono la situazione distributiva di due specie di pipistrelli boreo-alpini nella regione Friuli Venezia Giulia (Italia nord-orientale) utilizzando tutti i dati raccolti entro il mese di dicembre 2015, mappati secondo il reticolo UTM 10x10 km. I dati derivano dallo spoglio della letteratura scientifica, da catture accidentali e da dati bio-acustici raccolti nel corso del 2014 e 2015. *Eptesicus nilssonii* e *Vespertilio murinus* sembrano essere abbastanza comuni nella regione studiata, dove volano sia sui monti, sia sulle pianure, spingendosi talora fino alla costa alto Adriatica. Nonostante questa ampia distribuzione regionale, la loro riproduzione non è ancora stata localmente dimostrata. La raccolta di diverse femmine nullipare di *V. murinus*, tuttavia, indica che la sua riproduzione in queste zone è molto probabile. Dai dati di cui si riferisce appare evidente che la raccolta di dati occasionali e l'utilizzo del bat-detector possono aumentare enormemente le conoscenze su entrambe le specie, per le quali è molto difficile individuare i siti di sosta e riproduzione.

Parole chiave: *Eptesicus nilssonii*, *Vespertilio murinus*, Regione Friuli Venezia Giulia, Distribuzione, Catture accidentali, Survey bio-acustiche condotte con bat-detector.

Introduction

Even though bat fauna of Friuli Venezia Giulia Region is among the richest in Italy, with 30 species recorded so far, knowledge on distribution of many species is still very poor (LAPINI & DORIGO 2011; LAPINI et al. 2014; ZAGMAJSTER et al., submitted). Such is the example of two vespertilionid species, Northern bat *Eptesicus nilssonii* and parti-coloured bat *Vespertilio murinus*.

Eptesicus nilssonii and *V. murinus* are widely distributed in Northern Palaearctic, both showing an European-Asiatic choro-type (LANZA 2012). In Europe their distribution differs. While *E. nilssonii* is mainly distributed in Central and Northern Europe, *V. murinus*

occurs and reproduces also in Southern and Eastern Europe (DIETZ & KIEFER 2014).

Eptesicus nilssonii is the only bat that breeds over the Polar Circle, in Norway at least up to latitude of 70° 25' N (LANZA 2012). The species is widely distributed in Central and Eastern Europe, but there are rare findings from Great Britain, France and Southern Balkans (DIETZ et al. 2009; PRESETNIK et al. 2009; LANZA 2012; DIETZ & KIEFER 2014). It is absent from most of Italy, where it breeds only on the Alps from Alto Adige (LANZA 2012).

Vespertilio murinus is distributed up to 60° Parallel in Northern Europe; it is quite common in Central and Eastern Europe, spreading towards South Eastern

Europe (LANZA 2012; DIETZ & KIEFER 2014). There are only vagrant findings from Great Britain, Iberia, France, while a recent overview of many records has indicated that the species may be common in Slovenia (PRESETNIK et al. 2013). In the rest of the Balkans, anyway, it has a patchy distribution (PAVLINIĆ & TVRTKOVIĆ 2003; DIETZ et al. 2009), with hypothesized breeding based on the finding of a pregnant female in Slovenia (KRYŠTUFEK & ČERVENY 1997; PRESETNIK et al. 2009; PRESETNIK et al. 2013). The species was not recorded in most of Peninsular Italy, but various scattered data indicate the spreading of vagrant males to the North (LAPINI et al. 1996; LANZA 2012), recorded at least up to Tuscany (DONDINI & VERGARI 2015). Also in Italy the potential of its reproduction is presently based on the finding of a nulliparous female from the Canyon of Natisone/Nadiza River, in the town of Cividale del Friuli (Julian Pre-Alps, Udine, L. Lapini in LANZA 2012; LAPINI et al. 2014).

Both species are protected by local (Regional Law 9/2007 by Friuli Venezia Giulia), national (Italian Law 157/1992 and DPR 357/1997) and international Laws (they have been listed in the IV App. of the 92/43 EU “Habitat” Directive). They are also protected by various international conventions and agreements (Bern Convention, App. II; Bonn Convention, App. II with Eurobats Agreements). Under protection of all the European bats by the 92/43 EU “Habitat” Directive it is necessary to conduct a regular six-years monitoring in the whole EU Countries, in north-eastern Italy conducted both on regional (LAPINI & DORIGO 2011; LAPINI et al. 2014) and national scale (AA. Vv. 2014).

In 2013-2014 the Friulian Natural History Museum and the Public Administration of the Autonomous Region Friuli Venezia Giulia (Udine, Italy) started a first large-scale Regional bat monitoring programme, which include the use of mist-netting, harp-trapping and bat-detector study methods. The bat-detector field surveys had been conducted in cooperation with the Department of Biology of Biotechnical Faculty of the University of Ljubljana (Slovenia), in the frame of the project targeted to determine the regional distribution of *Pipistrellus pipistrellus* and *Pipistrellus pygmaeus* (ZAGMAJSTER 2014). In the frame of this wide Regional bat monitoring programme it was possible to collect and re-examine all records on both *E. nilssonii* and *V. murinus*, that are presented in this paper.

Material and methods

Accidental findings

These data were obtained from general public, hunters, forestry agents, game keepers, farmers, universities and from the provincial centres for the recovery of wild

fauna. All the obtained individual were, when possible, measured, sexed and their reproductive status determined. Whenever possible, they were released back into the wild. Died individuals are preserved in the mammal collections of the Friulian Natural History Museum (Museo Friulano di Storia Naturale, Udine) and of the Natural History Museum of the Municipality of Trieste (Museo Civico di Storia Naturale di Trieste). In many cases we received only photographic material, and determined the species and the sex (if possible) from them and by consulting the collectors.

Bat-detector survey

Bat-detector surveys were conducted in the summer and early autumn of 2014 and 2015, in nights without rain and temperature usually over 10°C (exception being autumn observations, when it was also colder), lasting till midnight, but often till the morning. D240x bat detector and D1000x bat detectors (Pettersson Elektronik AB) were used, with external digital recorder Roland RH-09 for D240x.

Bats were recorded during walking or car transects in various habitats. Bat detectors were set to heterodyne mode, with constant scanning of frequencies from 10 to 110 kHz. When a bat pass was registered, the calls were recorded in 10x time expansion mode. In the field, observations on habitats, weather conditions and behaviour of bats were recorded too.

Calls were transferred to the personal computer and analysed by using the bat-sound analysis program Batsound 4.0 (Pettersson Elektronik AB). Species identification was made based on characteristics of the calls, measured from spectrograms (RUSS 1999; RUSSO & JONES 2001; BARATAUD 2014; MIDDLETON et al. 2014; DIETZ & KIEFER 2014). Discrimination of *E. nilssonii* calls was made by measuring more parameters of the calls: end frequency, frequency of maximum energy and interpulse intervals (AHLÉN & BAAGØE 1999; PFALZER & KUSCH 2003). The echolocation calls of *V. murinus* are difficult to discriminate from various bats of the genus *Eptesicus* and *Nyctalus* (SCHAUB & SCHNITZLER, 2007), while its display calls are unmistakable (AHLÉN & BAAGØE 1999; ZAGMAJSTER 2003). For this reason we used only them for certain identification of this species.

Considering the available data of *E. nilssonii* from neighbouring Veneto and Slovenia (LAPINI & DORIGO 2011), the search for its echolocation calls had been particularly performed in various mountain habitats of Carnic and Julian Alps and Pre-Alps.

Considering the high fidelity of the *V. murinus* to its previous site of presence (PRESETNIK et al. 2013), the search for its territorial songs has been mainly performed starting from the geographic distribution of previous available records (LAPINI et al. 1996; LAPINI et al. 2014).

Organisation of the records

A complete data bank of all records has been compiled for both species, with a special attention to: UTM 10x10 km codification; Sex and number of individuals; Locality; Altitude; Municipality; Province; Collector; Notes on locality, other details, bibliographic quotation. New data have been collected both in the frame of a specific 2014 survey of the regional distribution of *Pipistrellus pipistrellus* and *Pipistrellus pygmaeus* (ZAGMAJSTER, 2014) and during independent and particularly focused additional surveys conducted both in 2014 and in 2015.

For both species, we present the list of all records for Friuli Venezia Giulia Region, in a form of a synthesis, containing information on: UTM 10x10 code, locality, municipality, province, date, survey method and bibliographic citation.

Cartographic representation of the data

All records, both from literature and newly gathered, have been put in a common database on bats of Friuli Venezia Giulia Region and surroundings of Veneto Region and Slovenia. Distribution maps are presented with 10x10 UTM network, distinguishing between bat detector data and accidental findings.

Results and discussion

Eptesicus nilssonii and *Vespertilio murinus* were recorded in many localities in Friuli Venezia Giulia, showing that both species are more widely distributed than previously thought. The complete synthesis of all the available records (in the list below) contain 25 localities for *E. nilssonii* and 23 localities for *V. murinus* strictly within Friuli Venezia Giulia region.

Eptesicus nilssonii

Friuli Venezia Giulia Region: **UM02**, Clearing and forest edge at the road Claut - Rif. Pordenone, 200 m N from Via Pinedo, val Settimana, Claut, Pordenone, 25.-26.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM14**, Street lights at SS52, 100 m SE from junction with Via IV Novembre, Forni di Sopra, Udine, 26.-27.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM14**, Street lights at the bridge on the right bank of F. Tagliamento, Davost, S Forni di Sopra, Forni di Sopra, Udine, 26.-27.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM24**, Street lights and forest edge at Via S Valentino (SP73), N part of the bridge over Torrente Lumiei, La Maina, Sauris, Udine, 26.-27.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM24**, Street lights and forest edge at Via S Valentino (SP73), N part of the bridge over Torrente Lumiei, La Maina, Sauris, Udine, 26.-27.8.2014,

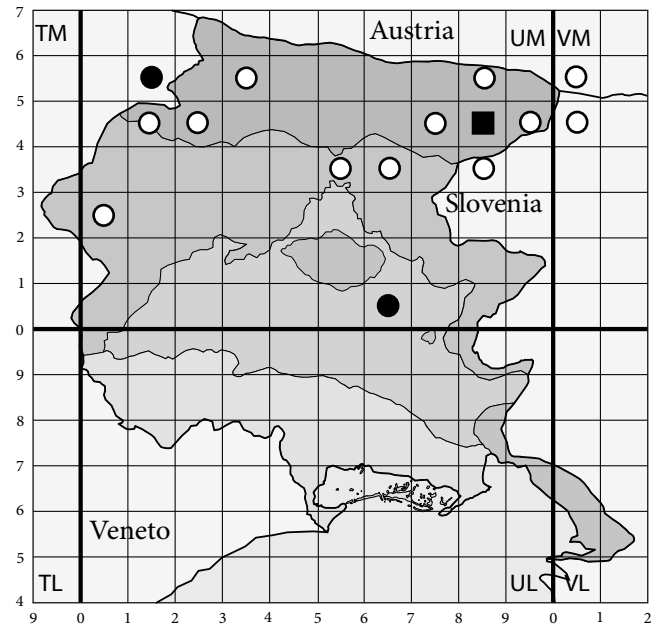


Fig. 1 - Distribution of *Eptesicus nilssonii* in the studied area (● = records of individuals; ○ = bat detector records; ■ = overlapping of records from both methods) on the basis of the UTM 10x10 km international cartographic grid system.

- *Distribuzione di Eptesicus nilssonii nell'area studiata* (● = catture o verifiche dirette; ○ = dati bio-acustici; ■ = sovrapposizione di catture o verifiche dirette e dati bio-acustici) in base al Sistema Cartografico Internazionale UTM 10x10 km.



Fig. 2 - *Eptesicus nilssonii*, male, caught in a backyard pool at the southern periphery of the village of Cave del Predil/Raibl (Tarvisio, Udine), m 900, 11. 9. 2014, photo by R. Pontarini.

- *Eptesicus nilssonii*, maschio, catturato in un cortile condominiale alla periferia Sud di Cave del Predil/Raibl (Tarvisio, Udine), m 900, 11. 9. 2014, foto R. Pontarini.

Bat detector, M. Zagmajster rec. & det.; **UM24**, Street lights at SP73, at the bus station "La Maina Albergo Domini", La Maina, Sauris, Udine, 26.-27.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM24**, Street lights at SP73, in the centre of Sauris di Sopra, Sauris, Udine, 26.-27.8.2014, Bat detector, M. Zagmajster rec. & det.;

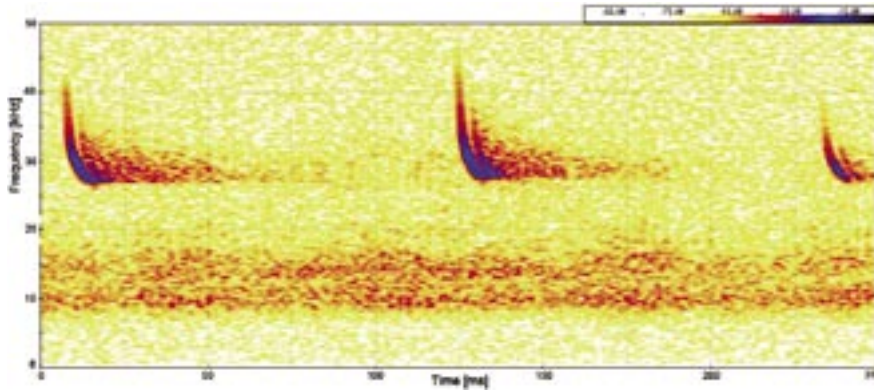


Fig. 3 - Spectrogram (Hanning window 2048 FFT) of *Eptesicus nilssonii* calls from Friuli Venezia Giulia (Street lamps near Sella Nevea, Chiusaforte, Udine, 9.-10.8.2014, M. Zagmajster rec.).

- Spettrogramma (Hanning window 2048 FFT) dell'ecolocazione di *Eptesicus nilssonii* registrato nel Friuli Venezia Giulia (Lampioni presso Sella Nevea, Chiusaforte, Udine, 9.-10.8.2014, registrazione M. Zagmajster).

UM35, Street lights at SS465, just south from the junction of Localita Pieria, in Pieria, prato Carnico, Udine, 26.-27.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM53**, Street lights at crossing of SS512 road and SP36 road, N part of Interneppo, Venzone, Udine, 8.-9.9.2014, Bat detector, M. Zagmajster rec. & det.; **UM60**, Regional Forestry Station at Via Longarone 38, Udine, 16.3.2015, one exhausted male collected in the backyard, R. Rigo leg., L. Lapini det.; **UM63**, In the forest at the road from Casera Pian dei Frassini to Musi, app. 290 m straight SE from C. Pian dei Frassini, Venzone, Udine, 8.-9.9.2014, Bat detector, M. Zagmajster rec. & det.; **UM63**, In the forest at the road from Casera Pian dei Frassini to Musi, app. 530 m straight SE from C. Pian dei Frassini, Venzone, Udine, 8.-9.9.2014, Bat detector, M. Zagmajster rec. & det.; **UM74**, Bridge of road SP76 over T. Raccolana, N from Tamaroz, Val Raccolana, Chiusaforte, Udine, 9. - 10. 8. 2014, Bat detector, M. Zagmajster rec. & det.; **UM74**, Street lights at road SP76, near the bridge over T. Raccolana, middle of Saletto, Val Raccolana, Chiusaforte, Udine, 9.-10.8. 2014, Bat detector, M. Zagmajster rec. & det.; **UM74**, Bridge of the road SP76 over Rio Impresis, confluent of T. Raccolana, Val Raccolana, Chiusaforte, Udine, 9.-10.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM74**, Street lights at road SP76, just after the highway bridge in Raccolana, Val Raccolana, Chiusaforte, Udine, 9.-10.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM74**, Piani di Montasio, around to the Agro-tourismus Malga Montasio, Chiusaforte, Udine, 22.9.2015, Bat detector, L. Lapini & L. Dorigo rec. & det.; **UM83**, Street lights at SP76 road, near the "Condominio Stella Alpina", in Sella Nevea, Tarvisio, Udine, 9.-10.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM83**, Street lights at SP76 road, close to the large hotel building in the centre of Sella Nevea, Tarvisio, Udine, 9.-10.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM83**, Street lights at the sharp turn of SP76 road, centre of Sella Nevea, Tarvisio, Udine, 9.-10.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM83**, Street lights in front of the two hotels near the SP76 road, centre of Sella Nevea, Tarvisio, Udine, 9.-10.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM83**, Street lights near the parking lot S from the me-

dium hotel building in centre of Sella Nevea, Tarvisio, Udine, 9.-10.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM83**, Southern periphery of Cave del Predil/Raibl village, Tarvisio, Udine, 11.9.2014, one injured male collected in a backyard pool, A. Chiavotti leg., L. Lapini det.; **UM85**, Street lights at SS13, at the junction with Via 13 Settembre, S of Ugovizza, Val Canale, Tarvisio, Udine, 9.-10.8.2014, Bat detector, M. Zagmajster rec. & det.; **UM85**, Street lights at Via Valcanale, SW start of Camporosso in Valcanale, Tarvisio, Udine, 9.-10.8.2014, Bat detector, M. Zagmajster rec. & det.

Presence of *E.nilssonii* in Friuli Venezia Giulia was already generically quoted from Julian Alps (LAPINI et al. 2014, on the bases of a male collected in Cave del Predil/Raibl), and it was also recorded in neighboring areas. A male was mistnetted near Belluno in Veneto region (**UM15**, Saddle between Col Rosolo and Mount Verna, near Casera Doana, Vigo di Cadore, Belluno, 21.8.2000, (DALL'ASTA et al. 2004; LAPINI & DORIGO 2011)). The species is present in Slovenia, with regular observations in and around Kranjska Gora (**VM04** and **VM05**, see KRYŠTUFEK & ČERVENY 1997; PRESETNIK et al. 2009; PRESETNIK et al. 2011) as well as in other parts of the country, where it also reproduces (PRESETNIK et al. 2014).

In Friuli Venezia Giulia the species is common especially in northern mountainous parts. The species was recorded both on the mountains and on the lowlands, where it reached the alluvial plains between the River Torre and the River Cormor, at least up to the town of Udine, ranging from 113 up to 2029 m above sea level. New localities come mainly from bat detector observations, proving that this method is very efficient for this species recording and monitoring. Bats were observed near street lights, were they were most likely feeding. There were only two accidental findings of injured males, none of them in potential roosts.

Vespertilio murinus

Friuli Venezia Giulia Region: **UL47**, Church square of Teor village, Rivignano-Teor, Udine, 01.12.2015,

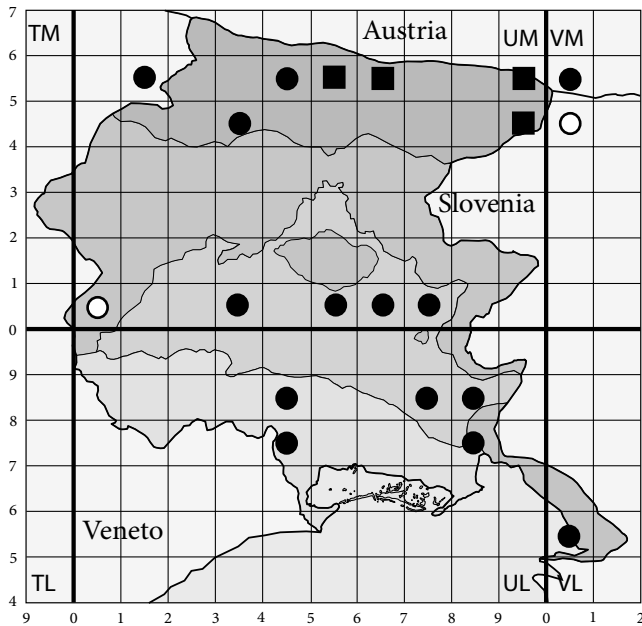


Fig. 4 - Distribution of *Vespertilio murinus* in the studied area (● = records of individuals; ○ = bat detector records (display songs only); ■ = overlapping of records from both methods) on the basis of the UTM 10x10 km international cartographic grid system.

- *Distribuzione di Vespertilio murinus nell'area studiata* (● = catture o verifiche dirette; ○ = dati bio-acustici (solo display song); ■ = sovrapposizione di catture o verifiche dirette e dati bio-acustici) in base al Sistema Cartografico Internazionale UTM 10x10 km.



Fig. 5 - *Vespertilio murinus*, male, caught in the agro-touristic farm "Cason di Lanza" (Paularo, Udine), m 1553, 3.10.2015, photo by L. Lapini.

- *Vespertilio murinus, maschio, catturato nell'azienda agri-turistica "Cason di Lanza" (Paularo, Udine), m 1553, 3.10.2015, foto L. Lapini.*

exhausted adult male, F. Mattiussi leg., L. Lapini det.⁽¹⁾; **UL48**, Flue chimney of a private house on Via Dante 45, Rivignano, Rivignano-Teor, Udine, 16.10.2015, adult nulliparous female, M. Comuzzi leg., L. Lapini det.; **UL77**, Wood stove of a private house in Aiello

village, Aiello del Friuli, Udine, 4.10.2015, subadult male, probably about 4 months old (this years bat), E. Antonutti leg., L. Lapini det.; **UL87**, On the floor near the railway station in Monfalcone, Monfalcone, Gorizia, 1.12.2013, exhausted female determined by L. Lapini thanks to various photos of M. Benfatto; **UL88**, On the floor near the Hotel Franz in centre of the village Gradisca d'Isonzo, Gorizia, 16.9.2014, injured male, P. Merluzzi leg., L. Lapini det.; **UM00**, Street lights around the cross-country skiing, Piancavallo, Roncjade, Aviano, Pordenone, 5.11.2015, Bat detector, L. Dorigo rec. & det.; **UM30**, In the building of the Hospital, Sanitary Direction, Spilimbergo, Pordenone, 13.8.2013, injured male found, T. Fiorenza leg., L. Lapini det. from the photographs; **UM34**, Loft of old Franciscan Convent of Raveo, Raveo, Udine, 20.8.2013, mummy of a male found together with *Glis glis* remains, L. Dorigo leg. & det.; **UM45**, Loft of a private house on Via M.te Zoncolan 1/b, Ravaschetto, Udine, 10.8.2015, mummy of a male C. Martini leg., L. Dorigo det.; **UM50**, In a door-window on the floor, Torreano village, via Plaino 23, Martignacco, Udine, 23.5.2014, injured male, P. Zandigiacomo leg., L. Lapini det. from the photographs; **UM55**, Cason di Lanza, Paularo, Udine, 5.10.2015, Bat detector, L. Lapini rec. & det.; **UM55**, Agro-tourism Farm in Cason di Lanza, Paularo, Udine, 3.10.2015, male collected, S. Cescutti leg., L. Lapini det.; **UM60**, Rolled mosquito net in private house in Via Gorizia 76, Udine town, 27.10.2011, injured male, M. Albarosa leg., L. Lapini det.; **UM60**, In a building in the center of Via Volontari della Libertà, Udine, 17.9.2009, injured male, T. Fiorenza leg., L. Lapini det. from the photographs; **UM65**, Passo Pramollo/Nassfeldpass, Pontebba, Udine, 4.9.2015, Bat detector, L. Lapini rec. & det.; **UM65**, Peat-bog in Passo Pramollo/Nassfeldpass, Pontebba, Udine, 6.9.1987, exhausted male resting on a tuft of moss, L. Lapini & J. Richard leg., L. Lapini det. (LAPINI et al., 1996); **UM70**, Backyard of a building in Borgo Brossana 69, Canyon of the River Natisone/Nadiza, Cividale del Friuli, Udine, 24.3.2007, one injured female, G. Dreossi leg., L. Lapini det. (L. Lapini, in LANZA 2012; LAPINI et al. 2014); **UM94**, Street lights near the centre of Rutte Piccolo village, Tarvisio, Udine, 27.10.2015, Bat detector, L. Lapini rec. & det.; **UM94**, Rural building number 7, Rutte Piccolo village, Tarvisio, Udine, 2.10.2013, male caught under tiles of a roof, M. De Bortoli leg., L. Lapini det.; **UM95**, Fusine-Ratece plain, near the cross road Fusine-Railway Station-Scicchizza, Fusine in Valromana, Tarvisio, Udine, 27.10.2015, Bat detector, L. Lapini rec. & det.; **VL05**, Old Building of the Sea Aquarium of Trieste, Trieste, 18.10.2008, male, A. Dall'Asta leg. et det. (LAPINI et al. 2014); **VL05**, Rozzol, Trieste, 7. 1969, Coloni leg., mummy of a male, A. dall'Asta det. (LAPINI et al. 2014); **VM05**, Tarvisio town, Tarvisio, Udine, 13.10.1989, one injured male, R. Zucchini leg., L. Lapini det. (LAPINI et al., 1996).

1) Data collected after the manuscript acceptance and communicated to the referee.

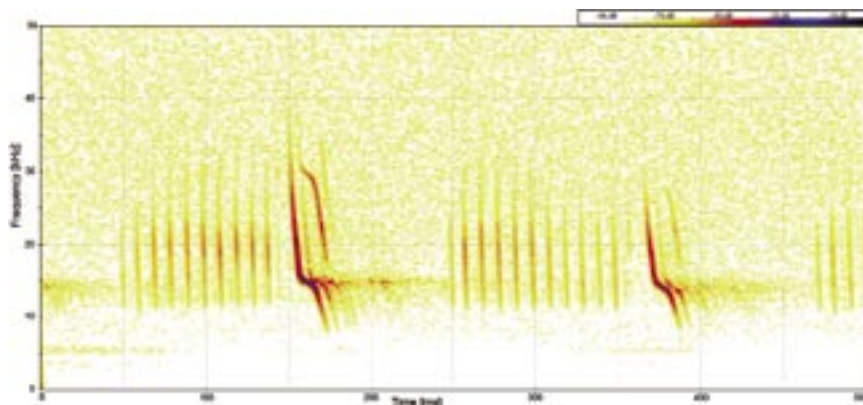


Fig. 6 - Spectrogram (Hanning window 2048 FFT) of the male display song of *Vespertilio murinus* from the Friuli Venezia Giulia (Cason di Lanza, m 1553 a.s.l., Paularo, Udine, 5.10.2015, L. Lapini rec.). - Spettrogramma (Hanning window 2048 FFT) del richiamo territoriale di un maschio di *Vespertilio murinus* registrato nel Friuli Venezia Giulia (Cason di Lanza, m 1553 s. l.m., Paularo, Udine, 5.10.2015, registrazione L. Lapini).

New records outside Friuli Venezia Giulia Region

Veneto Region: **TM70**, Via Conzago 63, Conzago, Mel, Belluno, 8. and 9.7.2015, two individuals under wooden sets in a private house, M. Villa obs., L. Lapini det., thanks to various video recordings by M. Villa; **TM71**, Via Manzoni 11, Sedico, Belluno, 6.8.2014, nulliparous female caught by a cat in a building, S. De Menech leg., L. Lapini det.; **TM71**, Via Manzoni 11, Sedico, Belluno, 9.6.2013 and 3.6.2014, each time one male caught by a cat in the same building, S. De Menech leg., L. Lapini det.; **UM15**, Saddle between Col Rosolo and Mount Verna, near Casera Doana, Vigo di Cadore, Belluno, 21.8.2000, 2 males mistnetted by M. Cassol, L. Lapini det. on the base of various photo.

Slovenia: **VM04**, Duty free shop between Rateče and the Italian-Slovenian border, Kranjska Gora, Slovenia, 27.10.2015, Bat detector, L. Lapini rec. & det.; **VM05**, Between the village of Ratece and the Italian-Slovenian border, Kranjska Gora, Slovenia, 13.5.2014, Road kill male, L. Dorigo leg. & det.

Previous (LAPINI et al. 1996) and most of new records of *V. murinus* presented here come from accidental findings of individuals, either in the wild or in the buildings. Similarly as in Slovenia (PRESETNIK et al. 2013), anyway, most findings are from September and October.

It must however be underlined that in the near Pre-Alps of Veneto Region there are also some records from June and July.

The species was observed from the upper Alpine quote above 2000 m a.s.l. up to the sea coasts, but it is quite common all over the studied area. Its presence seems to be mostly due to vagrant individuals, but both the seasonal distribution of the chance encounters, the findings of nulliparous females and of a subadult in Aiello village indicates that its local reproduction might be possible.

Moreover, also the recent discovery of a (June-August) summer roost of bats with at least one female in

the neighbouring Pre-Alps of Veneto region supports this possibility.

Even though the increasing number of findings of this species in north-eastern Italy is in accordance with the expansion hypothesis recently formulated by DONDINI & VERGARI (2015), lack of systematic work on bats in the past make such conclusions impossible.

Even though knowledge on distribution of both species is still far from complete, and many open questions about their ecology in Friuli Venezia Giulia remain, our contribution shows that both species are more spread than previously thought. We also show that accidental information from public and the use of bat detectors can increase enormously knowledge on both bat species, which are difficult to find at the roosts.

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