



Short Note

Rediscovery of Mehely's horseshoe bat (*Rhinolophus mehelyi*) in peninsular Italy

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Abstract

Rhinolophus mehelyi is strictly confined to the Mediterranean. Its populations are reported to be declining in much of the species' geographical range, which is quite fragmented. In Italy *R. mehelyi* was thought to be extinct in peninsular Italy, and still occurring in Sardinia (with large colonies) and Sicily (two remnant colonies). For peninsular Italy its presence was reported only for Apulia (SE Italy) but the latest records dated back to the 1960's. In this note we confirm the presence of this species in the same region for the Zinzulusa Cave (Castro, Lecce).

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Rhinolophus mehelyi is strictly confined to the Mediterranean. It has a discontinuous distribution from north Africa (Morocco, Algeria, Tunisia, Libya and Egypt) and southern Europe (southern Portugal and Spain, possibly one record for France, the Balkans, Cyprus) through Asia Minor, Anatolia, to Transcaucasia, Iran and Afghanistan (Gaisler, 2001; Csorba et al., 2003; Dietz et al., 2009). In Italy it is quite rare, and up to now its presence has been recorded only in Sardinia, Sicily and Apulia (Mucedda et al., 2009; Lanza, 2012).

R. mehelyi is infrequent and seems to have declined in all countries in its range for which data are available. In Andalucía (Spain), a 10% rate of decline has been estimated over the last ten years. The species is close to extinction in France (Rodrigues and Palmeirim, 1999). It is also declining in southern Spain (Franco and Rodrigues de los Santos, 2001), Portugal (Rodrigues et al., 2003), the Russian Federation, Georgia, and Morocco. The total European population probably numbers ca. 50,000 animals concentrated into a few core populations (Dietz et al., 2009).

R. mehelyi forages in Mediterranean shrubland and woodland, and in dry steppes. It emerges at dusk, hunts low over ground, also amongst bushes and trees, flying slowly and feeding mainly on moths (Salsamendi et al., 2008; Lanza, 2012). Summer roosts are found in warm caves, often in karstic regions. Hibernacula are located in colder underground sites (usually large caves with a constant microclimate). The species is known to roost mainly in caves, but can use also artificial habitats (Mucedda et al., 2009). It is considered a sedentary species (the longest distance recorded is 94 km in Bulgaria; Hutterer et al. 2005; Dietz et al. 2007).

R. mehelyi is thought to be affected by disturbance and loss of underground habitats, changes in foraging habitats, and alteration of caves by tourism. However, the reasons for its decline are not fully understood.

R. mehelyi can be easily confused with *R. euryale*. The most important distinguishing morphological characters are the narrow tip of the nasal leaf's lancet, straight profile of sella, and eyes separated from the edge of nose leaf when seen frontally and surrounded by a dark facial mask (Mucedda et al., 2009). *R. mehelyi* emits echolocation calls whose frequency is on average higher than *R. euryale* but call frequency may overlap between the two, at least in mainland Europe (Russo et al., 2001; Salsamendi et al., 2005; Dietz, 2007; Mucedda et al., 2009). However, in Sardinia call frequencies of such species show no overlap, probably as a result of character displacement to maintain separate communication bandwidths (Russo et al., 2007).

In Apulia, the only region of peninsular Italy where *R. mehelyi* was recorded, the species was first reported by Lanza (1952) for Castellana Caves (Bari). Ariani (1969) observed *R. mehelyi* in Zinzulusa Cave (Lecce), where in August–September 1968 a female *R. mehelyi* was collected, together with specimens of other three species (*R. euryale*, *Myotis blythii*, *Miniopterus schreibersii*). The female was found "...roosting together with *Miniopterus schreibersii*...", in the non tourist part beyond the so-called "Duomo" (Ariani, 1969).

Since then, despite much survey work has been done in the region (Bux et al., 2003; Mucedda et al., 2003; Bux and Scillitani, 2005; Bux and Martimucci, 2006; Mucedda et al., 2009), the species has no longer been observed, and thus suspected to be extinct in Peninsular Italy (Dietz et al., 2009; Mucedda et al., 2009; Lanza, 2012; Russo, 2013).

Zinzulusa Cave is a famous tourist cave facing the sea with a wide entrance. During a preliminary survey of bats supported by Consorzio "Otranto Coast–S. Maria of Leuca and Wood of Tricase Nature Park" and Apulia Speleological Federation (FSP) we surveyed the cave on 29 September 2013 and observed *R. mehelyi*. It was hung to the lower roof of the non tourist part, near Cocito lake. We caught it with a hand net for close inspection and held it in hand to record its echolocation calls. To make the recordings of call resting frequency RF (the frequency of maximum energy of calls broadcast while stationary, unaffected by

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Doppler shift) the bat was held ca. 20 cm from the microphone of a bat detector (Salsamendi et al., 2005; Russo et al., 2007). Recordings were made in the time expansion mode with a Pettersson Elektronik D-240X ultrasound detector connected to an Edirrol R-09. The resulting sequence was then analyzed (BatSound 3.10) using a sampling frequency of 44.1 kHz and a 512 pt FFT.

The spectrogram analysis (Fig. 1) shows an average RF value of 110.5 kHz. In Italy the only rhinolophid showing similar values is *R. hipposideros*, but that species has very different morphological characters.

The specimen, a male, was identified according to the criteria described in Dietz (2007), Mucedda et al. (2009), and Lanza (2012) (Fig. 2–3).

Our finding confirms the current occurrence of this species at least in a small portion of south-east Italy (Fig. 4), where *R. mehelyi* is likely to be very rare. Future studies will aim to assess its population size and help develop urgent conservation actions. 🦇

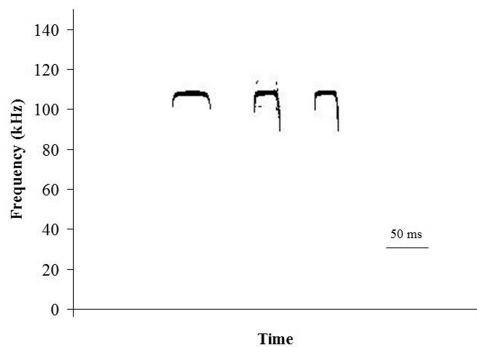


Figure 1 – Echolocation call of *R. mehelyi* recorded in the Zinzulusa Cave.



Figure 2 – Shape of *R. mehelyi* nose-leaf: the lancet narrows sharply in its upper half; note the dark mask surrounding the eyes.

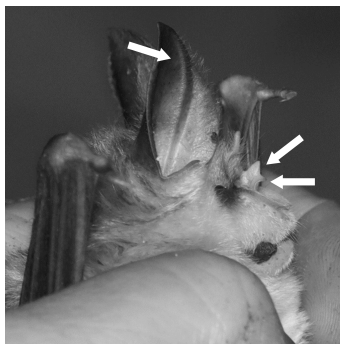


Figure 3 – Profile view: the sella's upper connecting process is relatively blunt in profile, only slightly longer than the lower.

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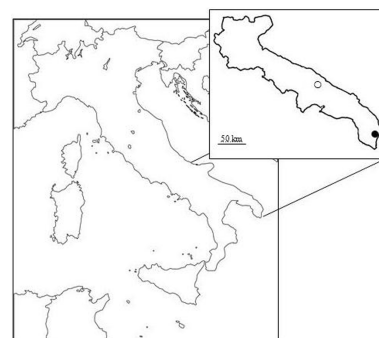


Figure 4 – Distribution of *R. mehelyi* in Apulia: the filled circle is the present finding at Zinzulusa Cave, the empty circle is the old unconfirmed record (Castellana Caves).