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# Distribution and Morphological Comparison of Two Sibling Bat Species *Myotis myotis* and *Myotis blythii* (Mammalia, Chiroptera) in Greece

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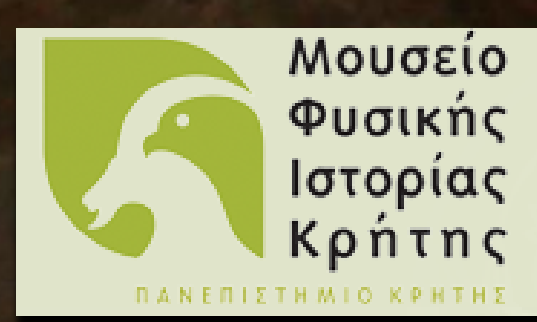
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*M. myotis*



*M. blythii*

## Introduction

The greater mouse-eared bat, *Myotis myotis*, and the lesser mouse-eared bat, *Myotis blythii*, are sister species, with great morphological similarities, as they were separated recently in the evolutionary time at species-level. The two species occur in sympatry in a zone which extends from the Iberian Peninsula to the eastern Anatolia, where they often form mixed colonies.

A combination of morphological characteristics is used to distinguish the two species. However, their discrimination is complicated, since hybridization between them has been confirmed in some areas of their co-existence.

Their distribution in Greece is not completely understood, due to their close genetic relationship and morphological similarities.



*M. blythii*

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## Our Aims

- To clarify the distribution of both species in Greece, which is part of the sympatric zone.
- To determine areas of hybridization.

## Materials and Methods

- We captured bats at cave entrances and foraging sites (for example, streams, reservoirs) with a "harp-trap" or mist-nets at night as well as inside roosts by hand or hand-net during day time.
- We recorded the following biometric characteristics: forearm length, length of the upper tooth row (CM<sup>3</sup>) and of the 3<sup>rd</sup> and 5<sup>th</sup> finger, ear length and width, presence of a white spot on the top of the head between the ears or of a black tip on the tragus (Fig 1).
- We collected tissue samples from the wing membrane for future genetic analysis.
- Species identification was primarily based on CM<sup>3</sup>:
  - CM<sup>3</sup> < 9.2 mm → *M. blythii*
  - CM<sup>3</sup> > 9.5 mm → *M. myotis*
  - CM<sup>3</sup> = 9.2 - 9.5 mm → "Big Myotis" (unidentified individuals)
- We also examined the rest of the biometric characteristics afore mentioned, in order to investigate the presence of individuals carrying features of both species (individuals with mixed characteristics).
- Distribution maps were created using our results and published data.



Setting up mist-nets



**Fig. 1.** Colour characters used for species identification: **A & C:** *M. blythii*, presence of white spot between the ears and absence of a dark tip on the tragus. **B & D:** *M. myotis*, absence of a white tuft and presence of a dark tip on the tragus.

*M. myotis* (left) & *M. blythii* (right)



## Results & Conclusions

- A total of 338 adult individuals were captured between 2002 – 2015 at 54 sites.
- *Myotis blythii* is common on the mainland and occurs on many islands (Map 1), while *M. myotis* occurs primarily in northern and central Greece. It is less frequent in the south of the country and it is absent from most islands (Map 2).
- The presence of individuals with mixed characteristics (Map 3), mainly in northern Greece and eastern Aegean islands, suggests evidence of hybridization, pointing out the need for molecular analysis.

## Acknowledgements

We are grateful to all people who helped with the fieldwork and to Christian Dietz for two of the *Myotis blythii* photos. Part of the fieldwork was done within the framework of the project: "Monitoring and Evaluation of Conservation Status of Mammal Species of Community Interest in Greece". Ministry of Environment, Energy and Climatic Change, Athens, scholars partnership and consultancy firms.

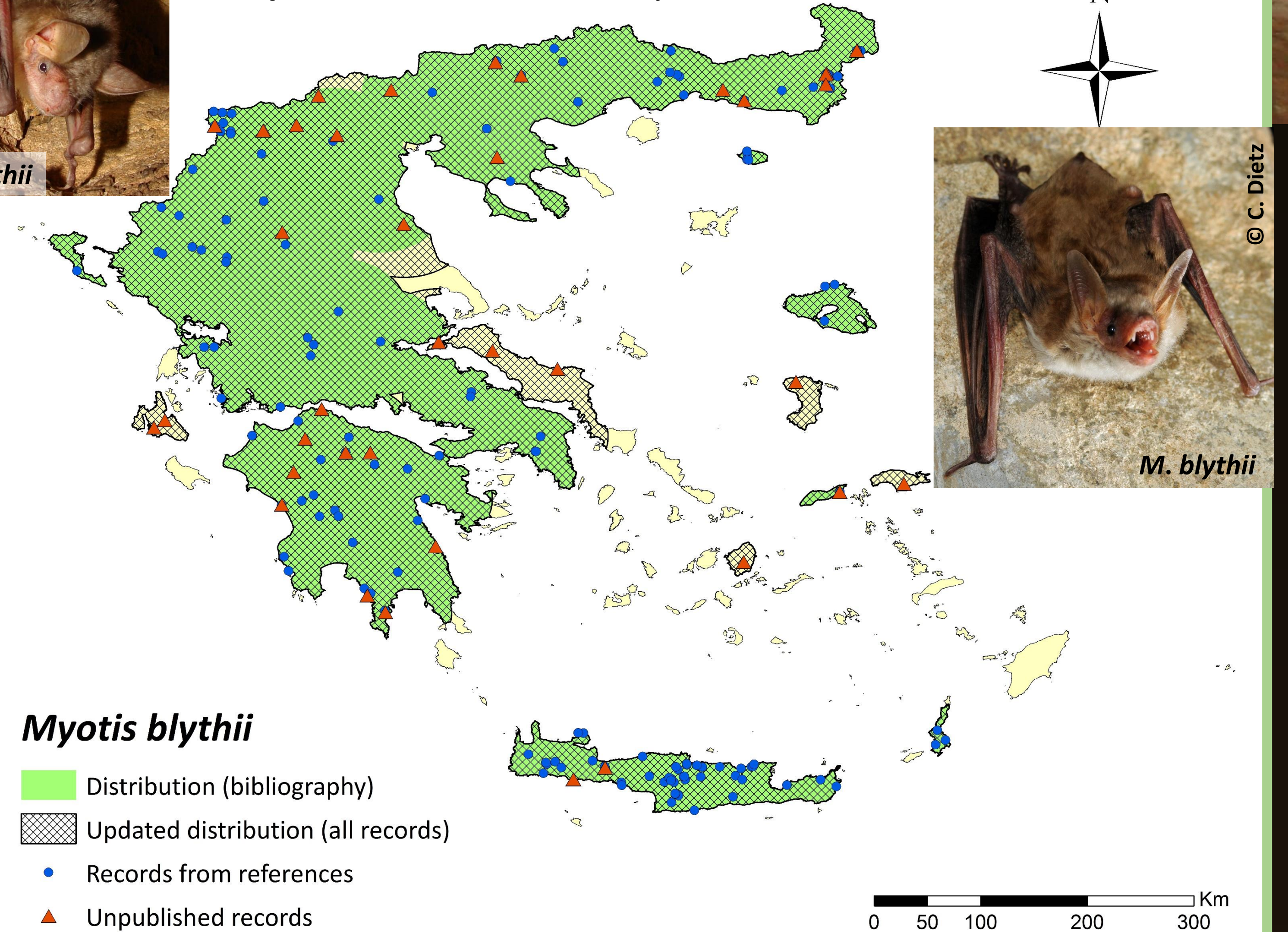
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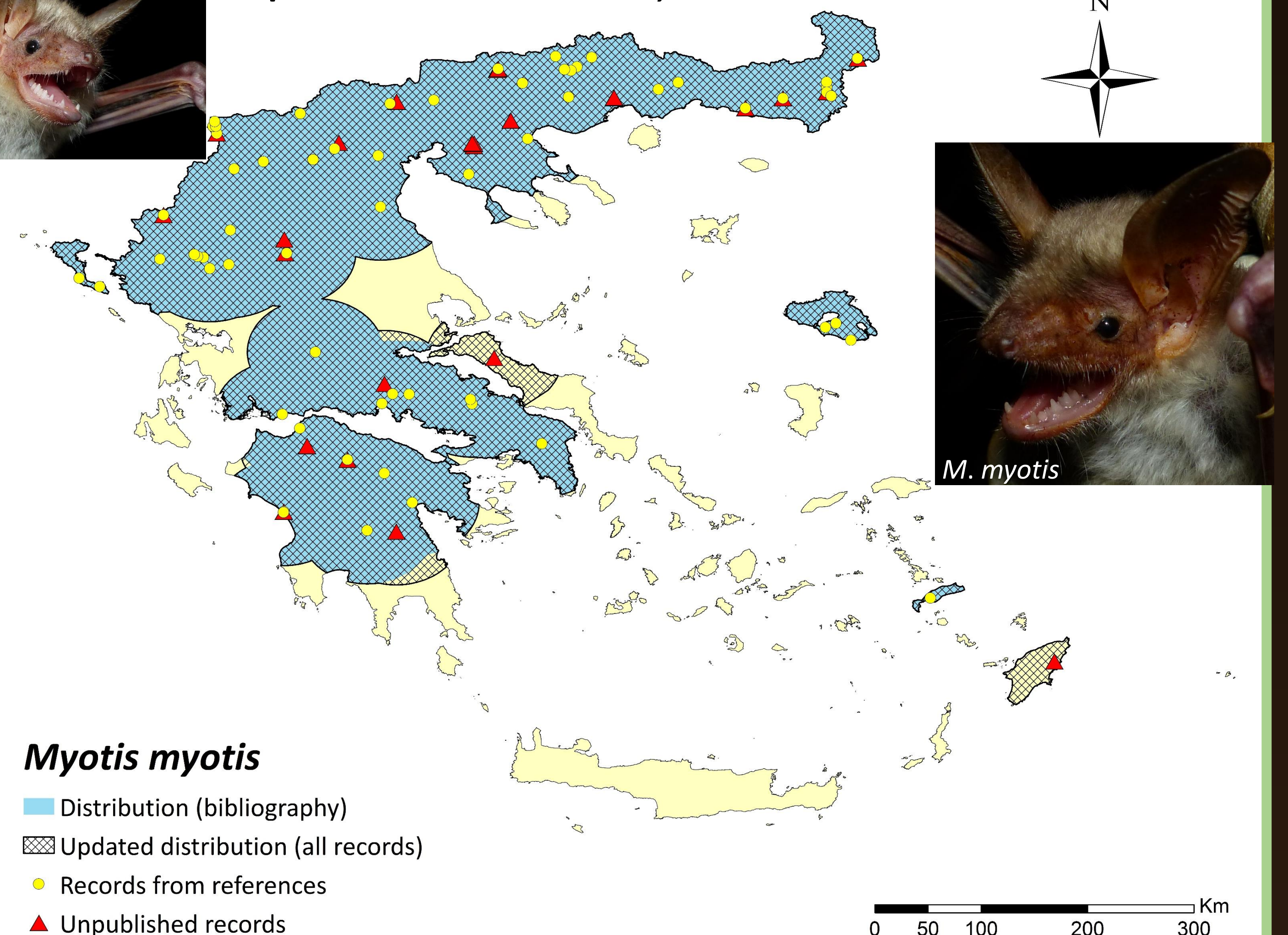
*M. blythii*

**Map 1.** Distribution of *M. blythii* in Greece.



*M. myotis*

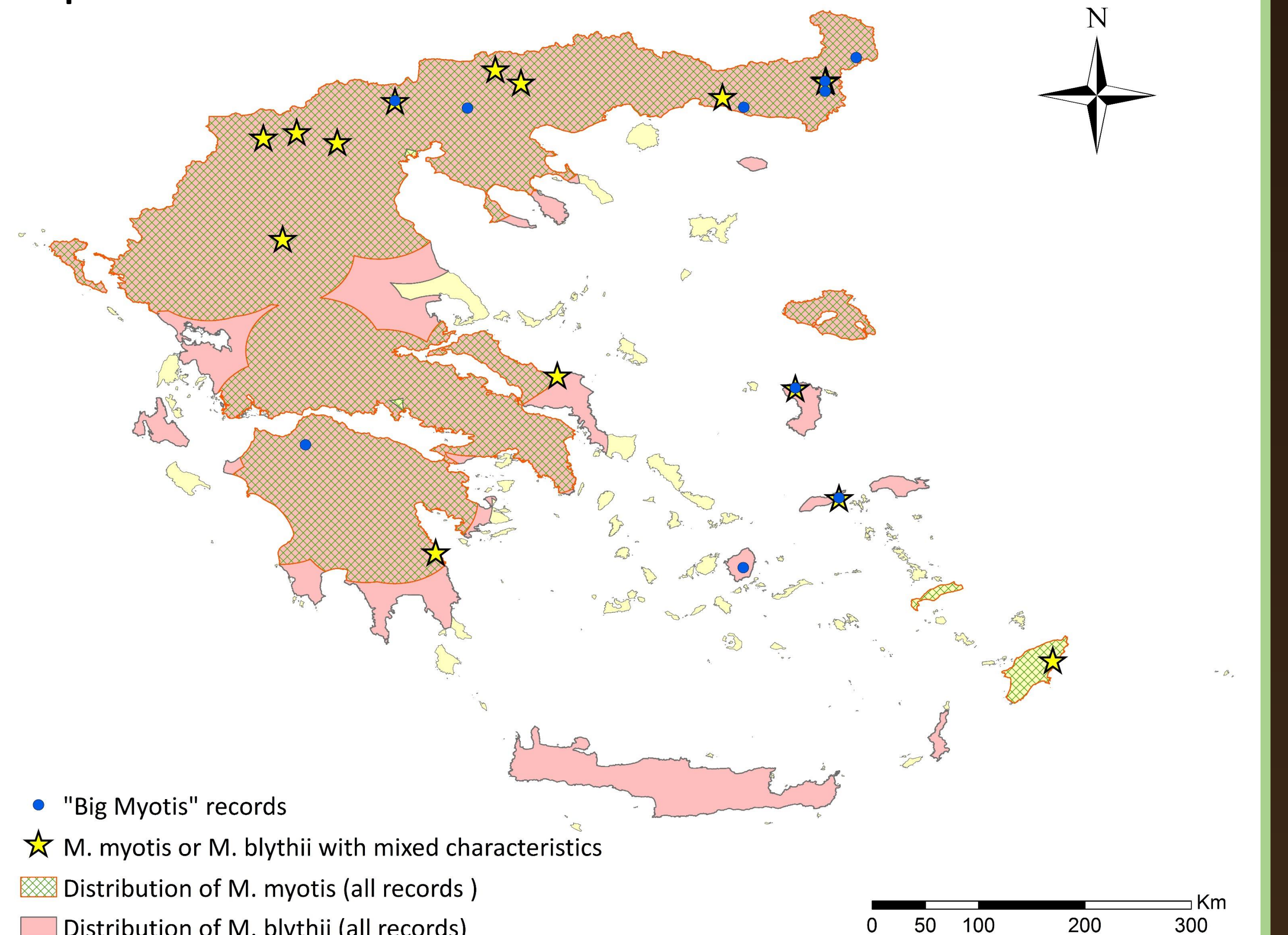
**Map 2.** Distribution of *M. myotis* in Greece.



**Myotis myotis**

Distribution (bibliography)  
 Updated distribution (all records)  
 Records from references  
 Unpublished records

**Map 3.** Presence of individuals with mixed characteristics.



"Big Myotis" records  
 M. myotis or M. blythii with mixed characteristics  
 Distribution of *M. myotis* (all records)  
 Distribution of *M. blythii* (all records)