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CAVE-DWELLING BATS (MAMMALIA: CHIROPTERA) OF ÇATALCA – KOCAELİ REGION, NORTHWESTERN TURKEY

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Abstract: Here we report the results of a survey in the Çatalca-Kocaeli region. The survey explored the interiors of 13 underground sites in the region and encountered 8 bat species. 10 of the underground sites were never studied before and provided new data on the distribution and abundance of the bats in northwestern Turkey. Comparison of our findings with data from the caves studied previously, revealed some changes in types of bat species inhabiting these sites.

Key words: caves, Chiroptera, distribution, northwestern Turkey

INTRODUCTION

The Çatalca-Kocaeli region, situated in northwestern Turkey, functions as a natural bridge between Balkan and Anatolian ecosystems and provides a habitat to a large variety of plant and animal species (DÖNMEZ 1979, 1990; DEMIRSOY 1996). In the recent years, this region has been facing an exceptionally rapid urbanisation and presently accommodates more than 14 million people, concentrated around Istanbul. Thus, all wildlife present in the region, including the bat species, may soon confront a threat challenging their very survival.

A recent study of BENDA and HORÁČEK (1998), compiling all known chiropteran records from Turkey, provided the most comprehensive and up to date source of information about bat distribution in the country. Yet all but one reference (data collected

in 1987 by ALBAYRAK [1993] from the Çatalca-Kocaeli region, reported there, refer to studies conducted between years 1953 and 1972. It has to be stressed that most data provide information only on the presence/absence of species. The region, however, is constantly changing due to urbanisation and immigration. Accordingly, the status of bats changes also and needs a constant update.

In this study, we report the most recent status of cave-dwelling bat species in the Çatalca-Kocaeli region. Our study aims to provide information about bat species present in the region, their distribution, main roosts, and their abundance. We hope that our data can prove useful in setting the right conservation programme for the bats in Turkey.

MATERIAL AND METHODS

The bat survey, reported here, covers the Çatalca–Kocaeli region, an area of 7000 km^2, which extends approximately 100 km at both sides of the Bosphorus Strait (Fig. 1). The actual field survey was preceded by detailed inventory of underground sites in the region based on all available speleological data. Additional information about the unknown and previously unexplored sites was obtained from the local residents.

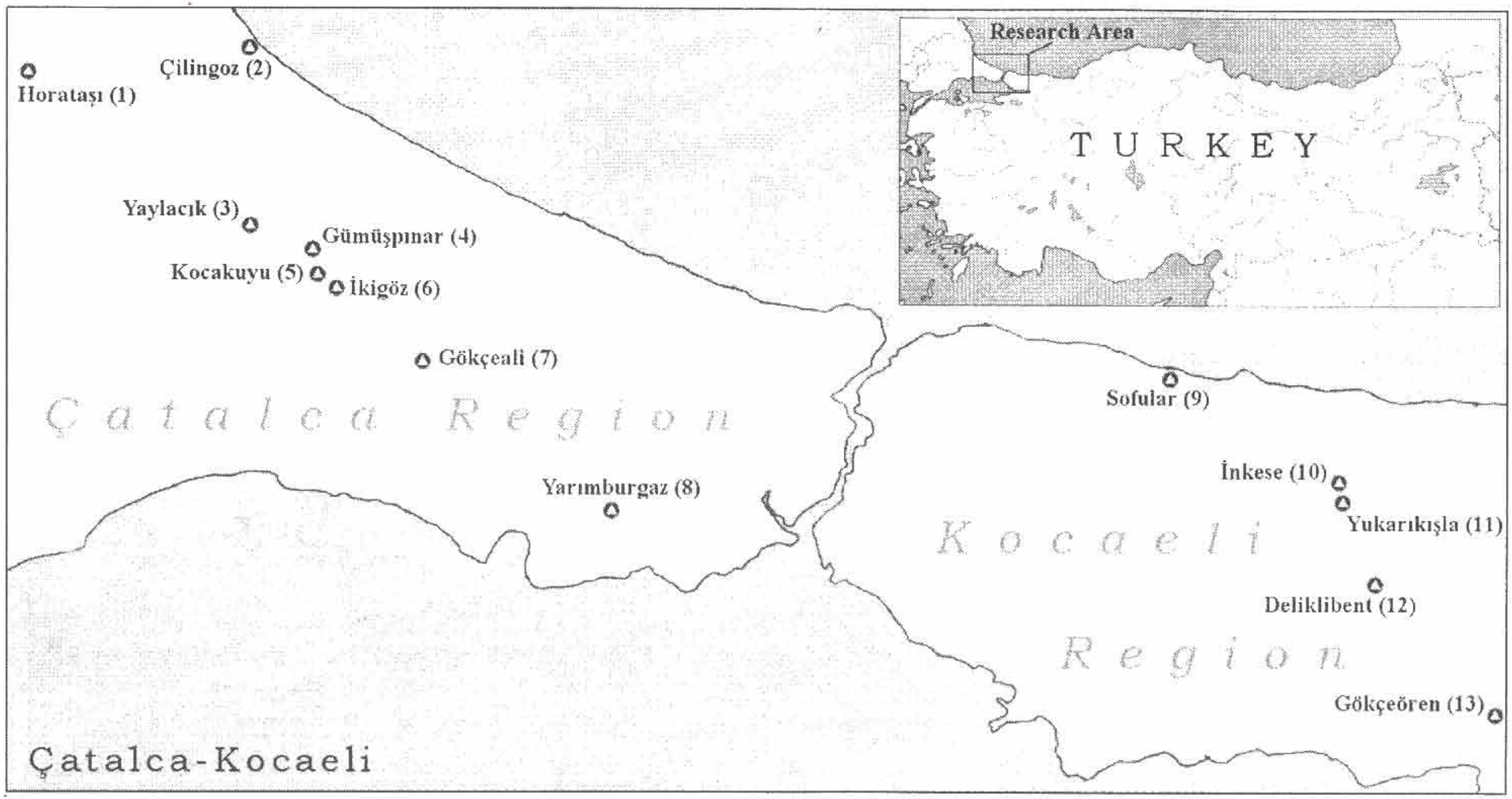
The study was carried on between March and July 1999. The survey covered 13 underground sites: five sites situated in the vicinity of Kocaeli (on Asian side) and eight sites situated nearby Çatalca (on European side). Most of the caves were visited twice, in spring and in summer, and their interiors examined in detail by the research team. A report dealing with detailed description of the roosts and spatial distribution of bat colonies inside the caves is currently being worked upon.

Species were identified on site, by visual examination of the individuals (ALBAYRAK 1993; SCHOBER and GRIMMBERGER 1997) caught by a hand net, and by reference to signals detected by an ultrasound heterodyne detector, Batbox III (BARATAUD 1996, SCHOBER and GRIMMBERGER 1997, VAUGHAN *et al.* 1997). It has to be stressed that our identification method was not sufficient for reliable differentiation between *Myotis myotis* (Borkhausen 1797) and *Myotis blythii* (Tomes 1857). Because of this limitation, we refer to both species as 'large *Myotis*' and report data regarding their distribution together. We used direct counting and analyses of the photographs taken in the sites to estimate the size of colonies.

RESULTS

During the fieldwork, eight bat species were encountered: *Rhinolophus euryale* Blasius, 1853, *Rhinolophus ferrumequinum* (Schreber, 1774), *Rhinolophus hipposideros* (Bechstein, 1800), *Miniopterus schreibersii* (Kuhl, 1817), *Myotis emarginatus*

Figure 1. A map of the Çatalca-Kocaeli region.



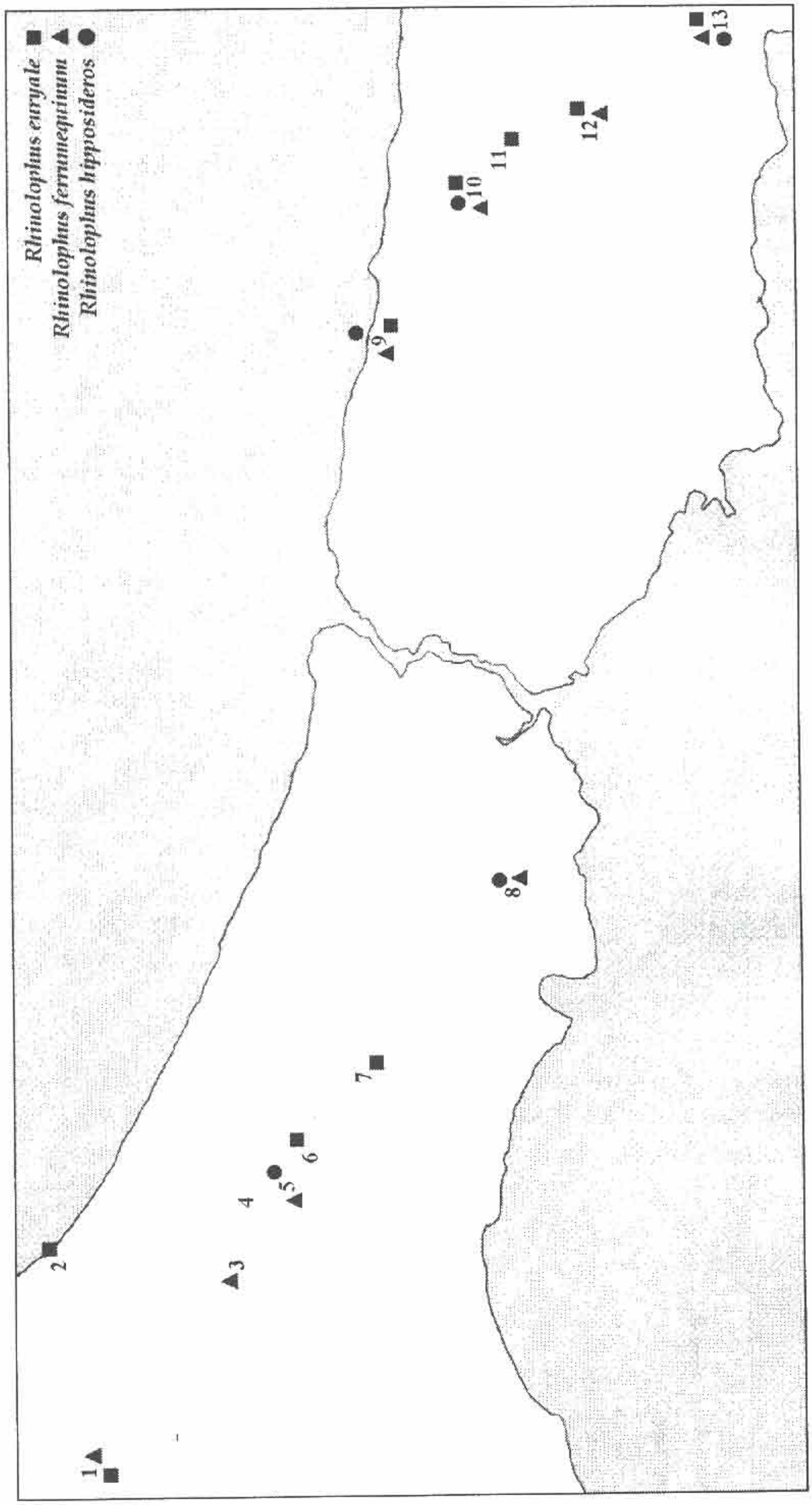


Figure 2. Records of *R. euryale*, *R. ferrumequinum* and *R. hipposideros* in the Çatalca-Kocaeli region. Caves' identification: (1) Horataşı, (2) Çilingoz, (3) Yaylacık, (4) Gümüşpınar. (5) Kocakuyu, (6) İkigöz, (7) Gökçeali, (8) Yarımburgaz, (9) Sofular, (10) İnkese, (11) Yukarıkışla, (12) Deliklibent, and (13) Gökçeören.

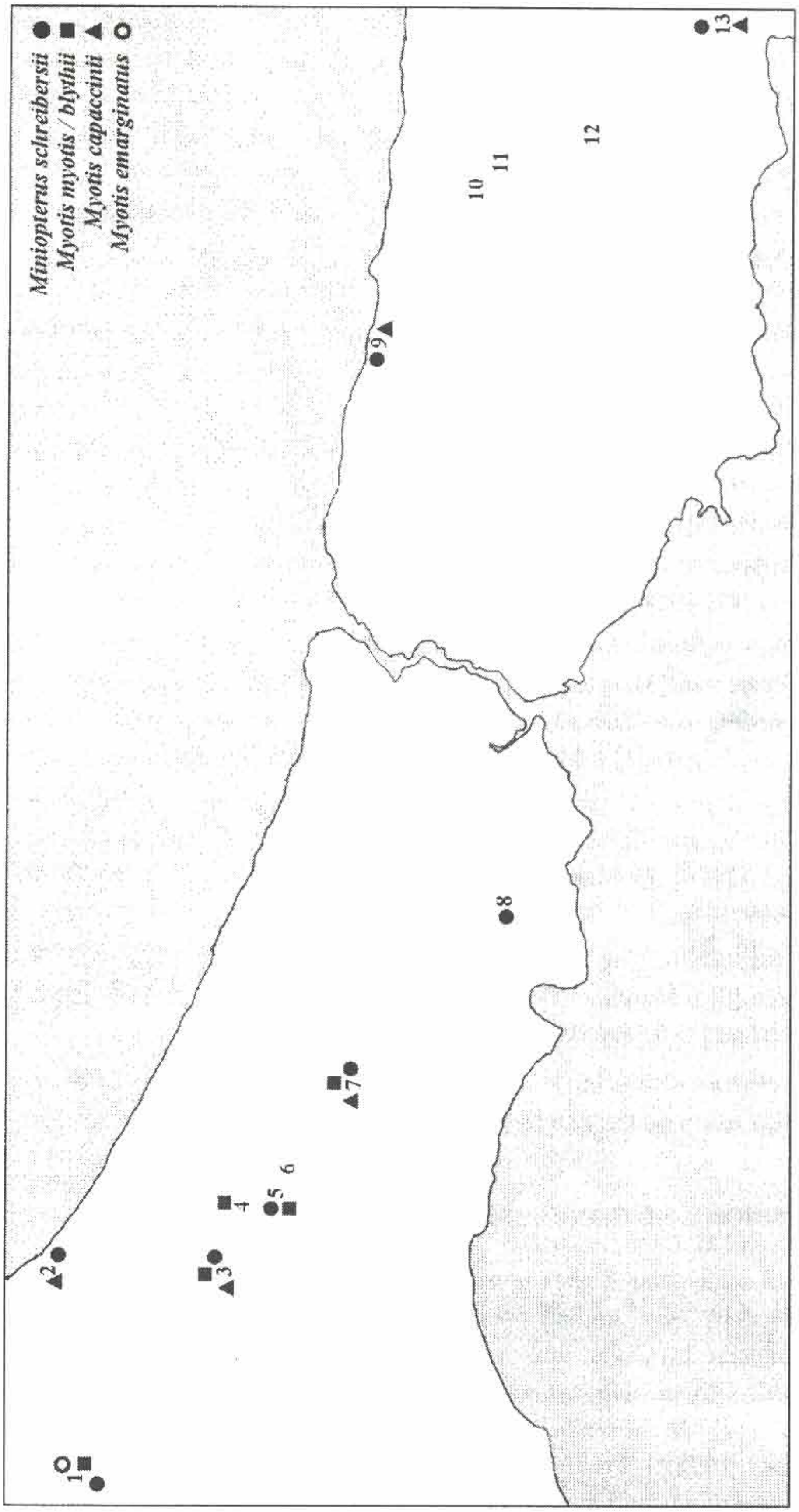


Figure 3. Records of *M. schreibersii*, *M. emarginatus*, *M. capaccinii* and *M. myotis / blythii* in the Çatalca-Kocaeli region. Caves' identification: (1) Horataşı, (2) Çilingoz, (3) Yaylacık, (4) Gümüşpınar, (5) Kocakuyu, (6) İkigöz, (7) Gökçeli, (8) Yarımburgaz, (9) Sofular, (10) İnkese, (11) Yukarıkışla, (12) Deliklibent, and (13) Gökçeören.

(Geoffroy, 1806), *Myotis capaccinii* (Bonaparte, 1837), *Myotis myotis*, and *Myotis blythii*. In addition, one accidental species of foliage dwelling bats, *Myotis mystacinus* (Kuhl, 1817) was captured by a handnet inside a cave. Distribution of the species in the Çatalca-Kocaeli region is shown in Figs. 2 and 3. In the following section, a value in square parenthesis refers to the number of individuals encountered in a particular cave.

R. euryale (Fig. 2). Çilingoz [2500] 17 July 1999, Deliklibent [1] 20 May 1999, Gökçeali [40] 7 May 1999, Gökçeören [115] 6 March and [21] 31 July 1999, Horataşı [60] 4 May and [42] 28 July 1999, İkigöz [14] 20 July 1999, İnkese [135] 21 March and [500] 10 July 1999, Sofular [2] 11 Mar and [500] 1 July 1999, Yukarıkışla [25] 17 June 1999.

R. ferrumequinum (Fig. 2). Deliklibent [11] 20 May 1999, Gökçeören [3] 6 March and [50] 31 July 1999, Horataşı [1] 4 May and [2] 28 July 1999, İnkese [255] 21 March 1999, Kocakuyu [27] 13 March 1999, Sofular [1] 11 March and [520] 1 July 1999, Yarımburgaz [1] 6 May 1999, Yaylacık [13] 25 March 1999.

R. hipposideros (Fig. 2). Gökçeören [1] 6 March 1999, İnkese [3] 21 March 1999, Kocakuyu [27] 13 March 1999, Sofular [4] 11 Mar 1999, Yarımburgaz [1] 6 May 1999.

M. schreibersii (Fig. 3). Çilingoz [2000] 17 July 1999, Gökçeali [1530] 7 May 1999, Gökçeören [310] 6 March and [4] 31 July 1999, Horataşı [620] 4 May and [660] 28 July 1999, Kocakuyu [1450] 13 March and [50] 7 July 1999, Sofular [300] 1 July 1999, Yarımburgaz [1] 6 May 1999, Yaylacık [1400] 25 March and [1400] 5 July 1999.

Large *Myotis* (*M. myotis* and *M. blythii* species, Fig. 3). Gökçeali [2200] 7 May 1999, Gümüşpınar [2] 20 July 1999, Horataşı [425] 4 May and [440] 28 July 1999, Kocakuyu [2100] 13 March and [400] 7 July 1999, Yaylacık [6] 25 March and [200] 5 July 1999,

M. capaccinii (Fig. 3). Çilingoz [350] 17 July 1999, Gökçeali [60] 7 May 1999, Gökçeören [5] 6 March and [17] 31 July 1999, Sofular [3] 11 May 1999, Yaylacık [150] 25 March and [1] 5 July 1999.

M. emarginatus (Fig. 3). Horataşı [7] 4 May and [1] 28 July 1999.

M. mystacinus. İkigöz [1] 20 July 1999.

DISCUSSION AND CONCLUSIONS

Out of 13 underground sites investigated here, only three caves (Yarımburgaz, Sofular, and Gökçeali) were studied previously. The previous records from the Yarımburgaz cave, collected by Çağlar and dated between 1954 and 1962, pointed to the presence of *R. euryale*, *Rhinolophus mehelyi* Matschei, 1901, *Rhinolophus blasii* Peters, 1866, *M. capaccinii*, *M. schreibersii*, *M. myotis* and *M. blythii* (as cited in BENDA and HORAČEK 1998). Presently, we encountered three species: *M. schreibersii*, *R. ferrumequinum*, and *R. hipposideros* - each of them being represented by only a single

individual (6 May 1999). A change is most probably caused by the rapid urbanisation in the locality of the cave.

In the Sofular cave, *R. ferrumequinum*, *R. hipposideros*, *R. euryale* and *M. schreibersii* were recorded in 1955 by Strinati (as cited in BENDA and HORAČEK 1998) and *M. capaccinii* was recorded in 1987 by ALBAYRAK (1993). All these species were seen during our survey.

In the Gökçeali cave, Çağlar, Kahmann and Spitzenberger, reported the presence of *M. schreibersii*, *M. myotis*, *M. blythii*, and *R. mehelyi* in the early 1960s (as cited in BENDA and HORAČEK 1998). All these species, but *R. mehelyi*, were present during our visit. In addition, *R. euryale* and *M. capaccinii* were also recorded.

R. hipposideros was recorded in the Çatalca region (European side) for the first time, although it was known to be present in northwestern and eastern regions of Turkey (BENDA and HORAČEK 1998). Also the record of *M. mystacinus* is the first one in the study area. In contrary to the 1960's records (BENDA and HORAČEK 1998), *R. blasii* was not encountered during our study. It is possible, however, that some individuals could be hidden within the clusters of *R. euryale* (PAUNOVIC and STAMENKOVIC 1998).

Unfortunately, despite new data, we still know very little about bats' distribution in the region and almost nothing about their population dynamics. Unless more effort is directed toward monitoring bats in the region, fast human population growth and rapid urbanisation can outpace any conservation efforts.

ACKNOWLEDGMENTS

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