

Bats of the middle and upper Kızılırmak regions, Central Anatolia, Turkey (Chiroptera)

Netopýři oblasti středního a horního Kizilirmaku, střední Anatólie, Turecko (Chiroptera)

Ahmet KARATAŞ¹ & Mustafa SÖZEN²

¹ Department of Biology, Faculty of Science-Arts, Niğde University, TR–51100 Niğde, Turkey; rousettus@hotmail.com

² Department of Biology, Faculty of Science-Arts, Zonguldak Karaelmas University; TR–67100 Incivez-Zonguldak, Turkey; spalaxtr@hotmail.com

received on 11 July 2006

Abstract. In this study, we found 15 bat species in the middle and upper Kızılırmak regions of central Anatolia. Four of these species were new for this region, while four previously recorded species were not found. Our new results raise the total number of species recorded in these subregions to 19. The taxonomic position of *Plecotus* bats, which is under discussion recently, was evaluated and *P. teneriffae* was recorded under its correct name for the first time in this region. Among the provinces in the area, Niğde and Kayseri have more bat species than the others by 11 species.

INTRODUCTION

The Central Anatolian region, one of seven geographic regions of Turkey, is divided into four subregions. Two of these, the middle and upper Kızılırmak subregions are situated in the eastern part of the region. There are the following provinces in these subregions: Çankırı, Kayseri, Kırıkkale, Kırşehir, Nevşehir, Niğde, Sivas, and Yozgat (Fig. 1). The area has a xeric continental climate. Bat species recorded in this region have been reviewed by BENDA & HORÁČEK (1998), who also added some new species for this region. According to BENDA & HORÁČEK (1998), 15 bat species have been found in this region. However, individuals of *Plecotus auritus* and *P. austriacus* recorded in these areas are under discussion and may actually belong to other species of the genus (see SPITZENBERGER et al. 2006). This study is a part of a large project on bat fauna of Turkey.

MATERIAL AND METHODS

In total, 102 specimens were captured using mist net or hand net in the middle and upper Kızılırmak subregions of central Anatolia in 1994–2006. 38 individuals were released after measuring. The voucher samples were prepared in a standard way, the skins, skulls and bacula were deposited in the Mammal Collection of the Department of Zoology, Niğde University, Turkey (ZDNU).

RECORDS

We recorded altogether 15 bat species in the middle and upper Kızılırmak subregions of central Anatolia (Table 1).

Rhinolophus ferrumequinum (Schreber, 1774)

Kayseri: İncesu, Kirkinler Cave, 22 May 2005: 1 female (ZDNU 2005/35) (leg. O. KIZILCIK); Sarmıcın Dere vicinity, 20 May 2005: 1 male (ZDNU 2005/36) (leg. O. KIZILCIK). – **Nevşehir:** Avanos, Karakaya vicinity (ancient rocky settlement), 5 August 1997: 1 ad. female (ZDNU 1997/01), Avanos, between Sarılar and Özkonak, Hemdionun Cave, 19 September 2001: 3 ad. females (ZDNU 2001/224–226). – **Niğde:** Gümüşler, Epcik Cave, 13 October 2001: 1 ad. female (ZDNU 2002/174); near Gebere Dam Lakelet (1411 m), 21–22 July 2005: 1 ad. female (lact.) (released); 23–24 July 2005: 1 ad. female (lact.) (ZDNU 2005/66), 1 ad. female (lact.) (released); Ulukışla, Çiftehan, Maden Village, mines, 17 June 2002: 1 ad. male (ZDNU 2002/41). – **Sivas:** Akıncılar, Deliklitaş Cave, 9 September 2004: 1 ad. male (leg. R. BILGİN & A. KARATAŞ) (ZDNU 2004/346), 1 ind. (obs.); Hâfik, Koşutdere Village (mines), 31 July 2003: 1 ad. ind. (mummy) (ZDNU 2003/52). – **Yozgat:** Hacıbekir Farm, ruins of Çeşka Castle, 12 April 2002: 1 ad. female (ZDNU 2002/22) (leg. H. C. ÖZTEKİN); Darıcı Village, 17 July 2001: 1 ad. male (ZDNU 2001/81) (leg. H. C. ÖZTEKİN).

Rhinolophus hipposideros (Bechstein, 1800)

Kayseri: Yeşilhisar, Soğanlı, 7 July 2001: 4 ad. females (ZDNU 2001/39–42) (leg. Y. KARAKAYA). – **Niğde:** Gümüşler, Epcik Cave, 13 October 2001: 1 ad. male (ZDNU 2002/175); Çamardı, Akpınar Alabalık Fishfarm, 10 September 2006: 1 ad. male (ZDNU 2006/93), ca. 10 ad. ind. (obs.); Ulukışla, Gümüş Village (cave), May 1996: 1 ind. (obs.); – **Sivas:** Hâfik, 3–4 km NW, Yıkılğan vicinity, 10 August 2003: 1 ad. male (ZDNU 2003/51).

Myotis myotis (Borkhausen, 1797)

Kayseri: Kocasinan, Kuşçu, Sariağıl Cave, 12 July 2001: 1 ad. female (ZDNU 2001/52) (cf. KARATAŞ et al. 2003); Melikgazi, 2 km NW of Gürpınar, 13 July 2001: 1 ad. male (ZDNU 2002/81); Bünyan, Karadayı Village, Karatay Hanı Caravanserai, 19 September 2002: 1 ad. male (ZDNU 2002/132); Talas, Başakpınar Örenyeri vicinity, 13 July 2001: 1 ad. male (ZDNU 2001/65). – **Nevşehir:** Avanos, between Sarılar and Özkonak, Hemdionun Cave, 19 September 2001: 1 ad. male, 1 ad. female (ZDNU 2001/227, 228); Gülşehir, Açıksaray, Açıksaray Ruins (ca. 1150 m), 28 August 2001: 1 ad. female (ZDNU 2001/147); Hacıbektaş, Kütükçü Village, 28 August 2001: 1 ad. female (ZDNU 2001/146); Kozaklı, Kaşkışla Village (cave), 28 August 2001: 1 ad. male, 1 ad. female (ZDNU 2001/148, 152). – **Niğde:** Gümüşler, Epcik Cave, 28 May 2001: 1 pregnant female (measured); 29 July 2002: 2 ad. males (ZDNU 2002/103, 110); Uluğağaç Village, Uluğağaç Dam Lakelet (artificial cave), 2 May 1996: 1 ad. female (ZDNU 1996/40); Ulukışla, Öküz Mehmet Paşa Caravanserai, 15 August 1999: 2 ad. males (ZDNU 1999/32–33). – **Yozgat:** Yozgat (center), 26 May 2002: 1 ad. male (ZDNU 2002/31).

Myotis blythii (Tomes, 1857)

Kayseri: Kocasinan, Kuşçu, Sariağıl Cave, 12 July 2001: 1 ad. male, 1 ad. female (ZDNU 2001/53, 60) (cf. KARATAŞ et al. 2003). – **Niğde:** near Gebere Dam Lakelet (1411 m), 21–22 July 2005: 1 ad. male (ZDNU 2005/61); Aşlama (artificial cave), 21 April 2001: 1 ad. male (ZDNU 2001/17); Çamardı, Çukurbağ Village, Ecemiş Stream (ca. 1445 m), 14–15 August 2005: 1 male (net. Ş. ÖZKURT & A. KARATAŞ) (ZDNU 2005/89); Ulukışla, Öküz Mehmet Paşa Caravanserai, 15 August 1999: 1 ad. male (ZDNU 1999/31). – **Yozgat:** Şefaati, Armağan Village, 15 July 2001: 1 ad. male (ZDNU 2001/82) (leg. H. C. ÖZTEKİN).

Myotis aurascens Kusjakin, 1935

Niğde: N. U. Campus, Milli Piyango Hostel, 6 May 2003: 1 ad. female (ZDNU 2003/06).

***Myotis brandtii* (Eversmann, 1845)**

Yozgat: Hacibekir Farm, Çeşka Castle ruins, 12 April 2002: 1 ad. female (ZDNU 2002/23) (leg. H. C. ÖZTEKİN) (cf. BENDA & KARATAŞ 2005).

***Eptesicus serotinus* (Schreber, 1774)**

Niğde: near Gebere Dam Lakelet (1411 m), 23–24 July 2005: 2 ad. males (ZDNU 2005/70, 71); 1 ad. male, 1 sad. female (released); 12–13 August 2006: 1 ad. male (released).

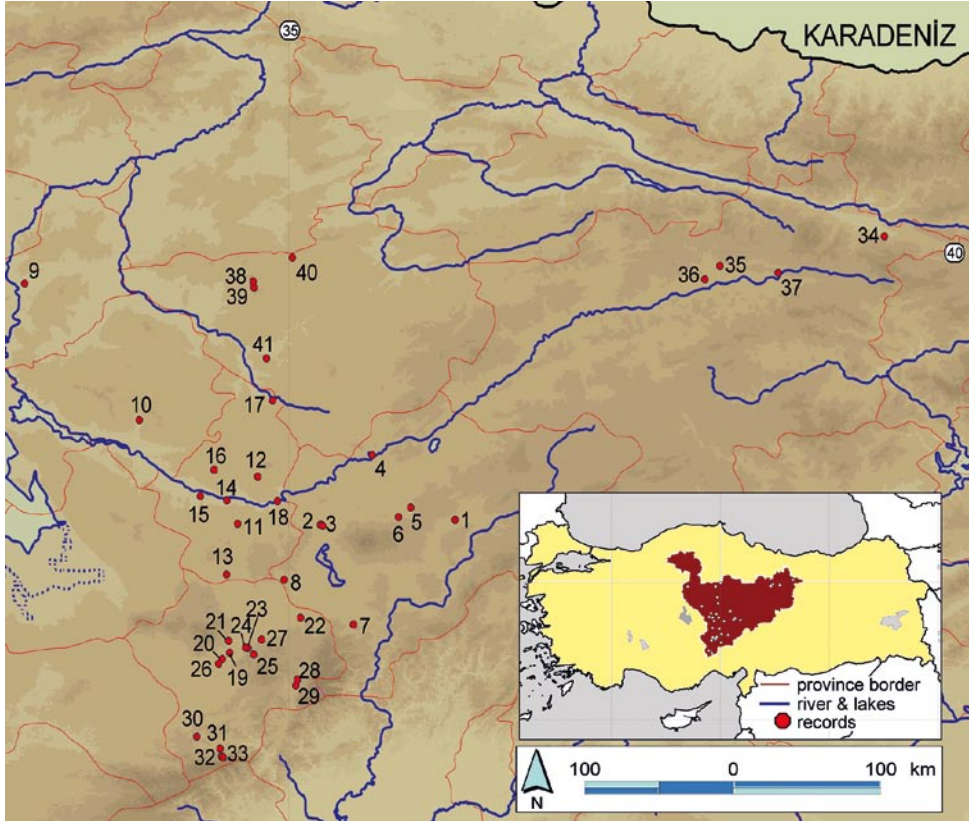


Fig. 1. Map of the area under study.

Obr. 1. Mapa studovaného území.

Legend / legenda: **Kayseri:** 1. Bünyan, Karadayı, 2. İncesu, Kırkinler Cave, 3. Sarnıcındere, 4. Kocasinan, Kuşçu, 5. Melikgazi, Gürpınar, 6. Talas, Başakpınar, 7. Yahyalı, 8. Yeşilhisar, Soğanlı; **Kırkkale:** 9. Kırkkale (centrum); **Kırşehir:** 10. Kırşehir (centrum); **Nevşehir:** 11. Nevşehir (centrum), 12. Avanos, Hemdionun Cave, 13. Derinkuyu, Suvermez, 14. Gülşehir, Açısaray, 15. Tozköy, 16. Hacibektaş, Kütükcü, 17. Kozaklı, Kaşkılla, 18. Ürgüp, Sarıhıdır; **Niğde:** 19. Niğde (centrum), Kayabaşı, 20. Niğde University Campus, 21. Gebere Dam, 22. Aşlama, 23. Gümüşler Monastery, 24. Gümüşler, Eski Gümüş, 25. Gümüşler, Epcik Cave, 26. Sazlıca, Akkaya Dam, 27. Uluğağaç, 28a. Çamardı, Çukurbağ, 28b. Akpınar Fishfarm, 29. Ulukişla, 30. Gümüş, 31. Maden, 32. Bolkar mines; **Sivas:** 33. Akıncılar, 34. Hâfik, Koşutdere, 35. Hâfik, Yıkılğan, 36. Zâra; **Yozgat:** 37. Yozgat (centrum), 38. Çeşka Castle, 39. Darıcı, 40. Şefaatli, Armağan.

***Myotis capaccinii* (Bonaparte, 1837)**

Kayseri: Kocasinan, Kuşçu, Sariağıl Cave, 12 July 2001: a maternity colony of ca. 200 ind. (obs.); 3 ad. males (ZDNU 2001/61–63) (cf. KARATAŞ et al. 2003). – **Nevşehir:** Gülşehir, Tozköy Airport (leg. H. BİLGEN), 22 September 2003: 1 ad. male (ZDNU 2003/108); Ürgüp, Sarıhıdır Village, Armutludelik (a tunnel near Kızılırmak River) (890 m), 6 September 2004: 1 ad. male (ZDNU 2004/344), 2 ind. from a colony of ca. 20–30 ind. (released).

***Pipistrellus pipistrellus* (Schreber, 1774) s. l.**

Kırıkkale: Kırıkkale (centrum), Gürler Quarter (house), 7 November 2003: 1 ad. male (ZDNU 2003/138) (leg. H. YURTSEVEN). – **Kırşehir:** Kırşehir (centrum), 9 October 2004: 1 male (ZDNU 2004/363); 1 male, 2 females (leg. Ş. ÖZKURT) (released). – **Nevşehir:** Nevşehir (centrum) (house), 12 November 2003: 1 ad. female (leg. H. BİLGEN) (ZDNU 2003/137). – **Niğde:** Kayabaşı Quarter, 1996: 1 ad. cf. female (ZDNU 55/1996); June 2001: 1 ind.; near Gebere Dam Lakelet (1411 m), 21–22 July 2005: 1 ad. male (ZDNU 2005/62), 1 ad. male (released); 23–24 July 2005: 2 ad. males (released); Aşlama (house), 21 April 2001: 1 ad. female (ZDNU 2001/17); 2 ind. (deposited in Ankara Univ.); Sazlıca, near Akkaya Dam Lakelet; spring 2002: net. 2 ad. males (released); Ulukışla, Çiftahan, Maden Village (house), 23 May 2001: 1 sex ? (ZDNU 2001/17), 1 male (deposited in Ankara Univ.), a colony of 20–30 ind. (obs.).

***Pipistrellus kuhlii* (Kuhl, 1817)**

Kayseri: ca. 2 km N of Yahyalı, a stream along road to Develi, 14–15 July 2001: net 2 ad. males.

***Hypsugo savii* (Bonaparte, 1837)**

Niğde: near Gebere Dam Lakelet (1411 m), 23–24 July 2005: 3 ad. males (ZDNU 2005/67–69); 12–13 August 2005: 2 ad. females (net. A. KARATAŞ & Ş. ÖZKURT) (ZDNU 2005/83–84); 13–14 August 2005: 1 ad. female (net. A. KARATAŞ & Ş. ÖZKURT) (ZDNU 2005/87).

***Plecotus macrobullaris* Kuzjakin, 1965**

Kayseri: Bünyan, Karadayı Village, Karatay Hanı Caravanserai, 19 September 2002: 1 ad. female (ZDNU 2002/133); Talas, Başakpınar, Örenyeri, 13 July 2001: 1 ad. male (ZDNU 2001/64; as *P. auritus* in KARATAŞ et al. 2003). – **Nevşehir:** Derinkuyu, Suvermez, 15 June 2002: 1 ad. male (ZDNU 2002/40); – **Niğde:** Gümüşler, Eski Gümüş (house under construction), August 1999: a colony of 10–15 ind. (obs.); Gümüşler Monastery, 20 July 1996: 1 ad. male, 2 ad. females (ZDNU 42–44/1996; as *P. auritus* in KARATAŞ et al. 2003); Ulukışla, Çiftahan, Maden Village, Bolkar mines, snow tunnels, 27 June 2001: 1 ad. male (coll. A. KARATAŞ & K. ÜNSAL; as *P. auritus* in KARATAŞ et al. 2003). – **Sivas:** Hâfik, 3–4 km NW, Yıkılğan vicinity, 10 August 2003: 1 ad. female, 1 ad. male (ZDNU 2003/53–54), 1 ad. female (released).

***Plecotus teneriffae* Barrett-Hamilton, 1907**

Kayseri: Melikgazi, 2 km NW of Gürpınar, 13 July 2001: 1 ad. male, 1 ad. female (ZDNU 2001/69, 70; as *P. austriacus* in KARATAŞ et al. 2003); Yeşilhisar, Soğanlı, Eski Soğanlı, Ballık vicinity, 06 July 2001: 3 juv. males, 2 ad. females (lact.) (ZDNU 2001/49–51, 72, 80; leg. Y. KARAKAYA; as *P. austriacus* in KARATAŞ et al. 2003). – **Niğde:** N. U. Campus, Milli Piyango Hostel (leg. N. İPEK), 28 September 2003: 1 ad. female (ZDNU 2003/101).

***Miniopterus schreibersii* (Kuhl, 1817)**

Kayseri: Kocasinan, Kuşçu, Sariağıl Cave, 12 July 2001: a maternity colony of ca. 300 ind. (obs.); 2 males, 4 females (ZDNU 2001/54–59) (cf. KARATAŞ & SÖZEN 2004). – **Nevşehir:** Ürgüp, Sarıhıdır Village, Armutludelik (tunnel) (890 m), 6 September 2004: 1 ad. male (ZDNU 2004/341), 9 ind. from a colony of ca. 200 ind. (released) (cf. KARATAŞ & SÖZEN 2004). – **Niğde:** N. U. Campus, 22 September 2003: 1 male (found dead) (ZDNU) (cf. KARATAŞ & SÖZEN 2004); near Gebere Dam Lakelet (1411 m), 23–24 July

Table 1. List of bat species recorded in the study area; + literature records (see BENDA & HORÁČEK 1998, SPITZENBERGER et al. 2006); * first recorded; ** previously recorded under different names

Tab. 1. Přehled druhů netopýrů nalezených ve studovaném území; + publikované nálezy (viz BENDA & HORÁČEK 1998, SPITZENBERGER et al. 2006); * nalezen poprvé; ** původně hlášen pod odlišným jménem

species \ district	Çankırı	Kayseri	Kırıkkale	Kırşehir	Nevşehir	Niğde	Sivas	Yozgat
<i>Rhinolophus ferrumequinum</i>	+	*	+	+	*	*	+	*
<i>Rhinolophus hipposideros</i>	+	*	–	–	–	+	*	–
<i>Rhinolophus euryale</i>	–	–	–	–	–	–	+	–
<i>Rhinolophus mehelyi</i>	–	–	+	+	–	–	–	–
<i>Myotis blythii</i>	+	*	–	+	+	+	+	+
<i>Myotis myotis</i>	–	*	–	+	+	+	–	*
<i>Myotis capaccinii</i>	–	*	–	–	*	–	–	–
<i>Myotis aurascens</i>	–	–	–	–	–	*	–	–
<i>Myotis brandtii</i>	–	–	–	–	–	–	–	*
<i>Myotis mystacinus</i> s. l.	+	–	–	–	–	–	–	–
<i>Eptesicus serotinus</i>	+	+	–	–	–	*	+	+
<i>Hypsugo savii</i>	–	–	–	–	–	*	–	–
<i>Pipistrellus kuhlii</i>	–	+	–	–	–	–	–	–
<i>Pipistrellus pipistrellus</i> s. l.	+	–	*	*	+	*	–	–
<i>Plecotus macrobullaris</i>	–	**	–	–	**	**	*	–
<i>Plecotus teneriffae</i>	–	**	–	–	–	*	–	–
<i>Barbastella</i> cf. <i>barbastellus</i>	–	–	–	–	+	–	–	–
<i>Miniopterus schreibersii</i>	–	*	–	–	*	+	–	–
<i>Tadarida teniotis</i>	–	+	–	–	–	–	+	–
total	6	11	3	5	8	11	7	5

2005: 1 ad. female (lact.) (ZDNU 2005/43); Gümüşler, Epcik Cave, 12 August 1999: 1 sad. male, 1 sad. & 1 ad. females (ZDNU 1999/28–30); 29 July 2002: 2 ad. males, 4 ad. females (ZDNU 2002/104–109), 3 males, 6 females (released) (cf. KARATAŞ & SÖZEN 2004).

***Tadarida teniotis* (Rafinesque, 1814)**

Sivas: Zâra, 9–10 August 2003: min. 20–50 ind. (obs.).

RESULTS AND DISCUSSION

Rhinolophus ferrumequinum is the most frequently recorded species in Turkey and has been recorded in all eight provinces in the study area. Another abundant species is *Myotis blythii* which has been recorded in seven provinces in the study area but not in the Kırşehir province (cf. BENDA & HORÁČEK 1998).

We did not find *Myotis mystacinus* s. l. which was recorded at the Devrez River (Çankırı: Ilgaz) by VON HELVERSEN (1989). BENDA & TSYTSULINA (2000) and BENDA & KARATAŞ (2005) revised the *mystacinus* group and stated that this record might be incorrect and most likely pertained to *M. aurascens*. According to these studies, *M. mystacinus* s. str. is very rare in Anatolia. The closest record to the study area was made near Kızılcahamam which is situated close to the northeastern part of the area (BENDA & KARATAŞ 2005).

Table 2. Comparison of occurrence of bat species in Turkey with respect to geographic regions (Central Anatolia is divided into two subregions, the eastern part [= the area under study] and the western parts)
 Tab. 2. Srovnání výskytu netopýřích druhů v Turecku podle zeměpisných oblastí (střední Anatólie je rozdělena na dvě podoblasti, východní [= studované území] a západní)

species \ region	Mediterranean	Aegean	Marmara	Black Sea	E Anatolia	SE Anatolia	CW Anatolia	CE Anatolia
<i>Rousettus aegyptiacus</i>	1	0	0	0	0	0	0	0
<i>Taphozous nudiventris</i>	0	0	0	0	0	1	0	0
<i>Rhinolophus ferrumequinum</i>	1	1	1	1	1	1	1	1
<i>Rhinolophus hipposideros</i>	1	1	1	1	1	1	1	1
<i>Rhinolophus euryale</i>	1	1	1	1	1?	1	1?	0
<i>Rhinolophus blasii</i>	1	1	1	1	0	0	0	0
<i>Rhinolophus mehelyi</i>	1	1	1	1	1	1	1	1
<i>Myotis bechsteinii</i>	1	0	1	1	0	0	0	0
<i>Myotis myotis</i>	1	1	1	1	1	1	1	1
<i>Myotis blythii</i>	1	1	1	1	1	1	1	1
<i>Myotis nattereri</i>	1	1	1	1	1	1	0	0
<i>Myotis emarginatus</i>	1	1	1	1	0	1	0	0
<i>Myotis mystacinus</i>	1?	1?	1	1	1?	1?	1	1?
<i>Myotis aurascens</i>	1	1	0	1	1	0	1	1
<i>Myotis nipalensis</i>	0	0	0	0	1	0	0	0
<i>Myotis brandtii</i>	0	0	0	1	0	0	0	1
<i>Myotis capaccinii</i>	1	1	1	1	1	1	0	1
<i>Myotis daubentonii</i>	0	0	1	1	0	0	0	0
<i>Nyctalus noctula</i>	1	0	1	0	0	1	0	0
<i>Nyctalus leisleri</i>	1	0	1	1	0	0	0	0
<i>Nyctalus lasiopterus</i>	0	0	1	1	0	0	0	0
<i>Eptesicus serotinus</i>	1	1	1	1	1	1	1	1
<i>Eptesicus bottae</i>	1	1	0	0	0	1	0	0
<i>Vespertilio murinus</i>	0	0	0	1	1	1	0	0
<i>Pipistrellus pipistrellus</i>	1	1	1	1	1	1	1	1
<i>Pipistrellus pygmaeus</i>	0	0	1	0	0	0	0	0
<i>Pipistrellus kuhlii</i>	1	?	1	1	1	1	0	1
<i>Pipistrellus nathusii</i>	1	0	1	0	1	0	0	0
<i>Hypsugo savii</i>	1	1	1	1	1	1	1	1
<i>Plecotus auritus</i>	0	0	1	1	?	0	0	0
<i>Plecotus macrobullaris</i>	0	0	0	1	1	0	1	1
<i>Plecotus austriacus</i>	0	0	1	0	0	0	0	0
<i>Plecotus teneriffae</i>	1	1	0	0	0	0	1	1
<i>Barbastella barbastellus</i>	0	0	1	1	0	0	0	0
<i>Barbastella cf. barbastellus</i>	0	0	0	0	0	1	0	1
<i>Otonycteris hemprichii</i>	0	0	0	0	0	1	0	0
<i>Miniopterus schreibersii</i>	1	1	1	1	1	1	1	1
<i>Tadarida teniotis</i>	1	1	1	1	1	1	1	1

BENDA & HORÁČEK (1998) recorded *Barbastella cf. barbastellus* near Ürgüp (Nevşehir), however, they released the specimen without examining it in detail. It is not clear whether this bat was the boreal *B. barbastellus* or the steppe *B. leucomelas*. The Ürgüp area is a steppe region and so it is most likely that it was *B. leucomelas*.

Moreover, *Rhinolophus euryale* recorded at Zâra (Sivas), and *R. mehelyi* from Keskin (Kırıkkale) and from the Seyfe Lake (Kırşehir) (see BENDA & HORÁČEK 1998) were not found by us in these regions.

On the other hand, *Myotis brandtii*, which had been recorded only in Rize in Turkey, was recorded surprisingly in the steppe Yozgat province (cf. BENDA & KARATAŞ 2005). *Hypsugo savii*, *Myotis aurascens*, *M. capaccinii* and *Plecotus teneriffae* were also recorded for the first time in the study area.

Additional specimens of *M. capaccinii* collected in the study area clearly show that this species is present not only in the Mediterranean (Akdeniz) and Marmara regions but also in suitable habitats along the Kızılırmak River in central Anatolia.

Previously, western Palaearctic bats of the genus *Plecotus* had been included in *P. auritus* and *P. austriacus*. Similarly, *Plecotus* in central Anatolia had been considered to be *P. auritus* and *P. austriacus* (see BENDA & HORÁČEK 1998, KARATAŞ et al. 2003). The genus *Plecotus* has been recently revised by SPITZENBERGER et al. (2006) and some new species have been described (see SPITZENBERGER et al. 2001, 2002, 2006, BENDA et al. 2004, JUSTE et al. 2004). After that, the taxonomic position of *Plecotus* bats in central Anatolia became controversial. According to SPITZENBERGER et al. (2006), the species present in central Anatolia is *P. macrobullaris* (Fig. 2), while *P. auritus* may have a limited distribution area in the eastern Black Sea (Karadeniz) region and *P. austriacus* in Turkish Thrace. Moreover, according to DNA analysis of the specimens from Karaman, which is situated in the southeastern part of the study area, *P. teneriffae* is also found in the area (JUSTE et al. 2004).



Fig. 2. *Plecotus macrobullaris* in a artificial cave at Talas, Başakpınar (Kayseri Prov.).

Obr. 2. Podobnost východní části střední Anatólie podle fauny netopýřů.

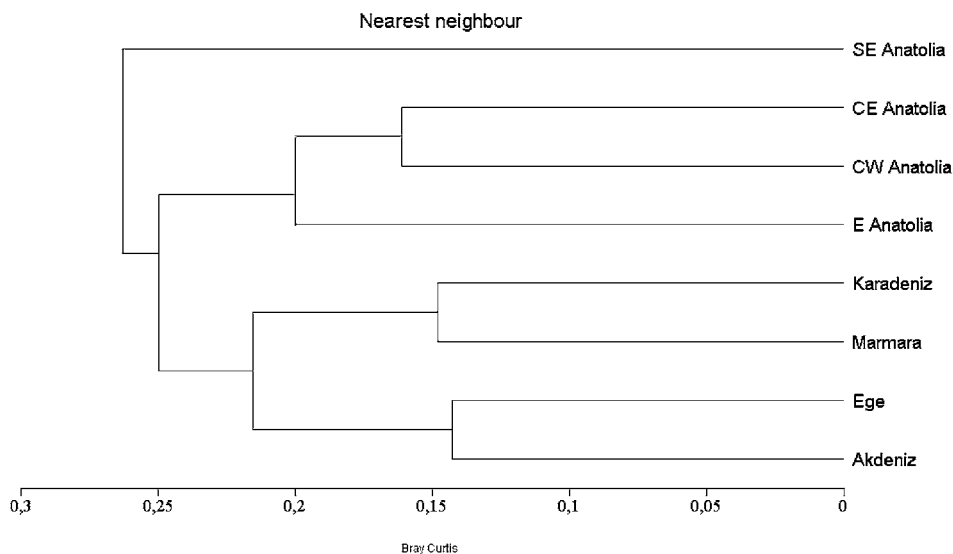


Fig. 3. Relationship of the eastern part of Central Anatolia with respect to bat fauna.
Obr. 3. Podobnost východní části střední Anatólie podle fauny netopýřů.

This study shows that 3 of 5 Turkish bat families (60%), 9 of 14 genera (64%), and 19 of 37 species (51.4%) are present in this area (Table 2). According to the analysis using the MVSP 3.1 software (Multivariate Statistical Package, Kovach Computing Services), the species diversity of the eastern part of Central Anatolia mostly resembles that of the western part of the region. It seems that the area shows zoogeographic affinity with Eastern Anatolia (Fig. 3). The results of the present study are consistent with those given by BENDA & HORÁČEK (1998).

Based on the data on distribution of bats and the above mentioned analysis, the following four zoogeographic zones can be distinguished in Turkey.

1. **Mediterranean (Akdeniz) zone:** Akdeniz, Ege regions (except for the inner side), western part of the Marmara region with Mediterranean climate;
2. **Central Anatolian steppe zone:** eastern part of Ege, Central Anatolia, Eastern and South-eastern Anatolia (except for lowlands near the Syrian border) with continental climate;
3. **Black Sea (Karadeniz) boreal zone:** east of Marmara, Karadeniz, Erzurum and Kars plateau of Eastern Anatolia with very humid climate;
4. **Southeastern Anatolian eremial zone:** lowlands along the Syrian border.

SOUHRN

V uvedeném přehledu předkládáme nálezy 15 druhů netopýřů v oblasti středního a horního toku řeky Kizilirmak ve střední Anatólii (Turecko). Čtyři z těchto druhů (*Myotis capaccinii*, *M. auraszens*, *M. brandtii*, *Hypsugo savii*) byly nalezeny v uvedeném regionu poprvé, zatímco čtyři další druhy netopýřů zaznamenané dříve nalezeny nebyly. Předložené výsledky zvýšily známý počet netopýřů oblasti na 19. Taxonomická pozice netopýřů rodu *Plecotus*, která je v současné době širěji diskutována, byla vyhodnocena

i ve studovaném regionu; nalezen byl druh *P. teneriffae* a poprvé tak zaznamenán z regionu pod tímto jménem. Z osmi provincií (vilájetů) střední Anatólie dvě vykazují bohatší faunu netopyřů (11 druhů), Niğde a Kayseri.

ACKNOWLEDGEMENTS

We wish to thank M. AK, H. BAŞTÜRK, S. BAŞTÜRK, H. BILGEN, Dr. R. BİLGİN, K. DOĞAN, N. İPEK, H. KARAKAYA, Y. KARAKAYA, Dr. Ay. KARATAŞ, O. KIZILCIK, Ş. ÖZKURT, H. C. ÖZTEKİN, F. TELLİ, K. ÜNSAL, M. A. YIĞIT, and H. YURTSEVEN for their help with collecting data and material. A part of this study was supported by the Research Fund of Niğde University (Nr. 01/FEB/023). We dedicate this study to the memory of the Late Res. Assist. Kuddusi ÜNSAL.

REFERENCES

- BENDA P. & HORÁČEK I., 1998: Bats (Mammalia: Chiroptera) of the Eastern Mediterranean. Part 1. Review of distribution and taxonomy of bats in Turkey. *Acta Soc. Zool. Bohem.*, **62**: 255–313.
- BENDA P. & KARATAŞ A., 2005: On some Mediterranean populations of bats of the *Myotis mystacinus* morpho-group (Chiroptera: Vespertilionidae). *Lynx, n. s.*, **36**: 9–38.
- BENDA P. & TSYTSULINA K., 2000: Taxonomic revision of *Myotis mystacinus* group (Mammalia: Chiroptera) in the Western Palearctic. *Acta Soc. Zool. Bohem.*, **64**: 331–398.
- BENDA P., KIEFER A., HANÁK V. & VEITH M., 2004: Systematic status of African populations of long-eared bats, genus *Plecotus* (Mammalia: Chiroptera). *Folia Zool.*, **53**, Monograph 1: 1–48.
- VON HELVERSEN O., 1989: New records of bats (Chiroptera) from Turkey. *Zool. Middle East*, **3**: 5–18.
- JUSTE J., IBÁÑEZ C., MUÑOZ J., TRUJILLO D., BENDA P., KARATAŞ A. & RUEDI M., 2004: Mitochondrial phylogeography of the Long-eared bats (*Plecotus*) in the Mediterranean Palearctic and Atlantic Islands. *Mol. Phylogenet. Evol.*, **31**: 1114–1126.
- KARATAŞ A. & SÖZEN M., 2004: Contributions to karyology, distribution and taxonomic status of the Long-winged bat, *Miniopterus schreibersii* (Chiroptera: Vespertilionidae), in Turkey. *Zool. Middle East*, **33**: 51–64.
- KARATAŞ A., BENDA P., TOPRAK, F. & KARAKAYA H., 2003: New and significant records of *Myotis capaccinii* (Chiroptera: Vespertilionidae) from Turkey, with some data on its biology. *Lynx, n. s.*, **34**: 39–46.
- SPITZENBERGER F., PIÁLEK J. & HARING E., 2001: Systematics of the genus *Plecotus* (Mammalia, Vespertilionidae) in Austria based on morphometric and molecular investigations. *Folia Zool.*, **50**: 161–172.
- SPITZENBERGER F., HARING E. & TVRTKOVIĆ N., 2002: *Plecotus microdontus* (Mammalia, Vespertilionidae), a new bat species from Austria. *Natura Croatica*, **11**: 1–18.
- SPITZENBERGER F., STRELKOV P. P., WINKLER H. & HARING E., 2006: A preliminary revision of the genus *Plecotus* (Chiroptera, Vespertilionidae) based on genetic and morphological results. *Zool. Scripta*, **35**: 187–230.