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Short communication

Karyology of some bat species (Chiroptera: Rhinolophidae, Molossidae) from Turkey

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Up to now, 37 species of bats were recorded from Turkey (Benda and Horáček 1998; Horáček et al. 2000; Spitzenberger et al. 2003; Dietz et al. 2005). The family Rhinolophidae is represented by five species and the Molossidae by one species, and none of them has yet been karyotyped from Turkey. In addition to traditional taxonomical studies of morphological characteristics, karyological comparisons can also provide very useful data on phylogenetic and taxonomic problems (Volleth et al. 2001). Therefore, the aim of this study is to investigate karyological characteristics of *Rhinolophus ferrumequinum*, *R. hipposideros* and *Tadarida teniotis* from Turkey. Some new distributional records are also added.

Bat specimens were captured by use of mist- and hand-nets at seven localities in Turkey between 2001 and 2004 (Fig. 1). They were examined with respect to karyological characteristics. Localities and sample size of animals were examined as follows: *R. ferrumequinum*: Karabük: Yenice, 1 ♂, 2 ♀; Zonguldak: Sofular Village, 2 ♂;–*R. hipposideros*: Karabük: Yenice, 1 ♂; Zonguldak: Sofular Village, 1 ♂, 1 ♀;–*T. teniotis*: Adıyaman: Kâhta, Göksu Stream, 1 ♂, 1 ♀; Aksaray: Selime, 1 ♀; Konya: Derebucak, near Çamlık, 1 ♀; Sinop: Ayancık, İnaltı Village, 1 ♀; Trabzon: Maçka, Meryemana Monastery, 1 ♀.

Conventional stained chromosomes of specimens were examined according to standard procedures. The diploid number of chromosomes (2*n*), the fundamental number of chromosomal arms (NF) and the number of autosomal arms (NFa) along with metacentrics, submetacentrics, subtelocentrics and acrocentrics were determined by examining the photographs of about 20–30 metaphase cells of each animal. All specimens were skinned according to the standard museum type, and their skins, skulls and karyotype preparations are deposited at the Department of Biology, Niğde University.

Rhinolophus ferrumequinum (Schreber, 1774)

This species is widely distributed in Turkey and the karyotype of specimens from Yenice (Karabük) and Sofular (Zonguldak) was composed of 58 chromosomes (2*n*). The number of autosomal arms (NFa) is 60, the fundamental number (NF) is 64. The X chromosome is the largest submetacentric and the Y chromosome is dot-like acrocentric. The autosomal set can be divided into two groups: two pairs of meta/submetacentric, 26 pairs of acrocentric (Fig. 2).

Rhinolophus ferrumequinum has been karyotyped in many countries in Europe, Asia

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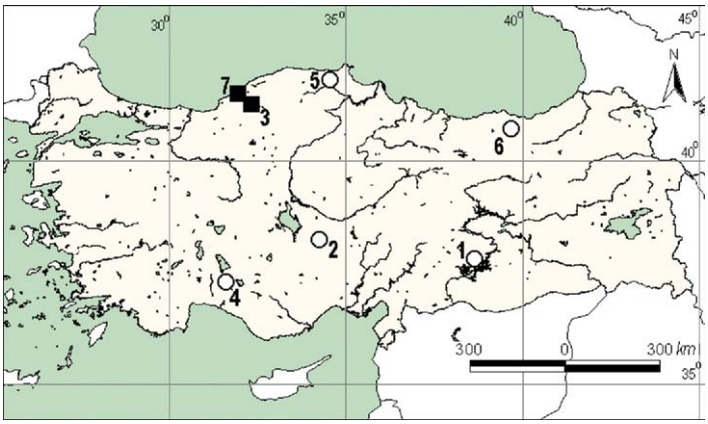

Fig. 1. Map of localities studied in Turkey. 1. Kâhta (Adıyaman), 2. Selime (Aksaray), 3. Yenice (Karabük), 4. Çamlık (Konya), 5. Ayancık (Sinop), 6. Maçka (Trabzon), 7. Sofular (Zonguldak). *Rhinolophus ferrumequinum* and *R. hipposideros* (■), *Tadarida teniotis* (o).

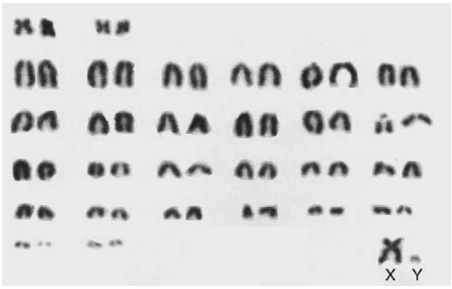

Fig. 2. Karyotype of a male *R. ferrumequinum* from Sofular (Zonguldak) ($2n = 58$, NFa = 60).

and Africa (Table 1). In all populations analysed the $2n$ value is 58. Only the NFa value shows variation from 56 to 64 based on the differences in the number of bi-armed autosomal chromosomes. The karyotype of Turkish population, $2n = 58$ and NFa = 60, is the most common form (Table 1).

Rhinolophus hipposideros (Bechstein, 1800)

Rhinolophus hipposideros is also widely distributed in Turkey and specimens from Yenice (Karabük) and Sofular (Zonguldak) were studied here. The karyotype was determined as $2n = 54$, NF = 64, and NFa = 60. The X chromosome is medium-sized submetacentric, and the Y chromosome is dot-like acrocentric. The autosomal set consists of four pairs of metacentric and 22 pairs of acrocentric (Fig. 3).

The karyotype of *R. hipposideros* is more diverse than that of *R. ferrumequinum*. The $2n$ value of *R. hipposideros* varies between 54 and 62, and NFa 58 and 60 (Table 1). The karyotyped Turkish population, $2n = 54$ and NFa = 60, is different from all populations given in Table 1. This difference is due to one additional small-sized pair of metacentric that may result from a fusion of two acrocentric pairs.

Tadarida teniotis (Rafinesque, 1814)

The karyotype of the species was $2n = 48$, NF = 82. Since the animal karyotyped was a female, the sex chromosomes could not be determined (Fig. 4).

The karyotypes of *T. teniotis* listed in Table 1 have the same $2n$ value (48), but, different NFa values (76–80). The karyotype from Turkey is consistent only with Arroyo-Nombela et al. (1986), but different from others on the basis of chromosome morphology. *Tadarida teniotis* has been recorded from Ağrı, Artvin, Erzurum, and Şanlıurfa by captured specimens (Benda and Horáček 1998), by subfossil remains from Antalya (Corbet and Morris 1967), and by owl pellets from Hatay (Obuch 1994) in Turkey.