

Karyotype of *Eptesicus serotinus* (Schreber, 1774) in Turkey (Mammalia: Chiroptera)

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Abstract: In order to investigate the conventional karyotype of *Eptesicus serotinus* (Schreber, 1774) in Turkey, four specimens were karyotyped. It was determined that the diploid number was $2n=50$, the number of autosomal arms was $FN=50$, the X chromosome was large submetacentric, and the Y chromosome was dot-like acrocentric and the smallest chromosome of the set. All of the autosomes were acrocentric. A secondary constriction on a medium-sized acrocentric pair was encountered in most of the metaphase spreads examined.

Key Words: *Eptesicus serotinus*, Karyotype, Turkey

Türkiye'deki *Eptesicus serotinus* (Schreber, 1774)'un Karyotipi (Mammalia: Chiroptera)

Özet: Türkiye'deki *Eptesicus serotinus* (Schreber, 1774)'un karyolojisini incelemek için dört örneğin karyotipi yapılmıştır. Diploid kromozom sayısının 50, otozomal kromozomların kol sayısının 50, X kromozomunun büyük boy submetasentrik, Y kromozomunun nokta benzeri en küçük akrosentrik kromozom olduğu tespit edilmiştir. Otozomların hepsi akrosentriktir. İncelenen metafaz plaklarının büyük bir çoğunluğunda orta boylu akrosentrik kromozom çiftinde ikincil bir boğuma rastlanmıştır.

Anahtar Sözcükler: *Eptesicus serotinus*, Karyotip, Türkiye

Introduction

In Turkey, the genus *Eptesicus* is represented by two species, *Eptesicus serotinus* and *E. bottae*. The occurrence of *E. serotinus* in Turkey has been recorded by various authors. *E. serotinus* appears to be distributed throughout Anatolia but has a patchy distribution in Turkey (1-9) (Fig. 1). It is recorded that *E. serotinus* is represented by the nominate form in Turkey (10).

This study was started as a result of catching a pregnant bat fighting with a magpie (*Pica pica*) in the garden of the Faculty of Science, University of Ankara, in June 1998.

The aim of this study was to determine the karyotype of the Turkish serotine bat, *Eptesicus serotinus*.

Materials and Methods

The four specimens karyotyped (three female and one male) were caught from Ankara in 1998. The

karyotyping was carried out according to Patton (11) and Ford and Hamerton (12). Ten slides were prepared and 10 to 30 metaphase spreads examined from each. Diploid number and the number of autosomal arms were counted and the shapes recorded. The specimens were prepared in the conventional museum type. The identification of the species was carried out according to Albayrak (8). Data were compared with those in the literature.

Results

The diploid number in the four specimens was 50 and the number of autosomal arms was also 50. The set included one subtelocentric pair and 23 medium to small acrocentric pairs. The X chromosome was large submetacentric and the Y chromosome was acrocentric. There was a secondary constriction on one of the medium acrocentric autosome pairs (Fig. 2).

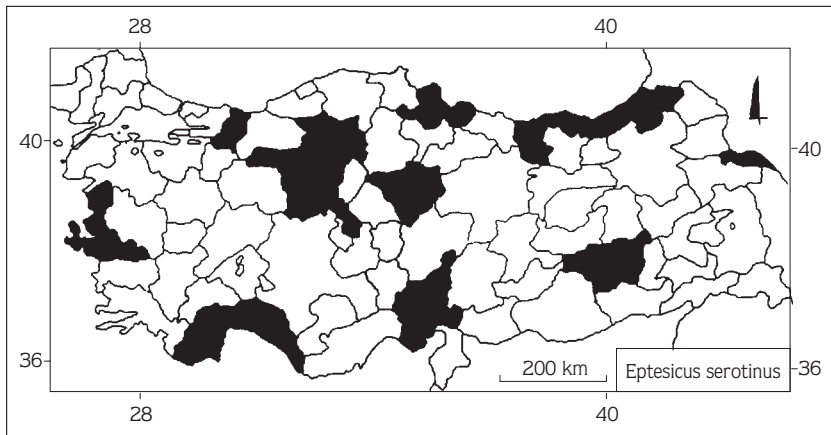


Fig. 1. The distribution of *E. serotinus* in Turkey (The areas marked refer to provinces from which the specimens were obtained by various authors).

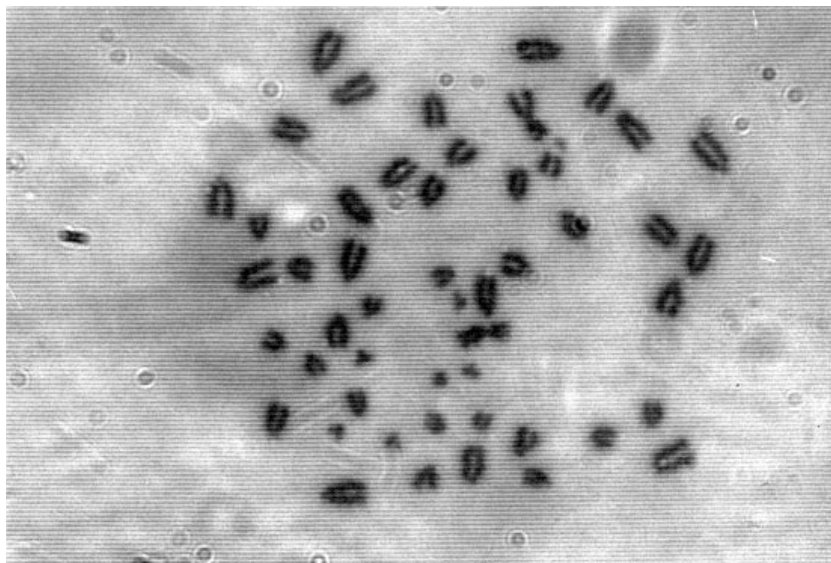
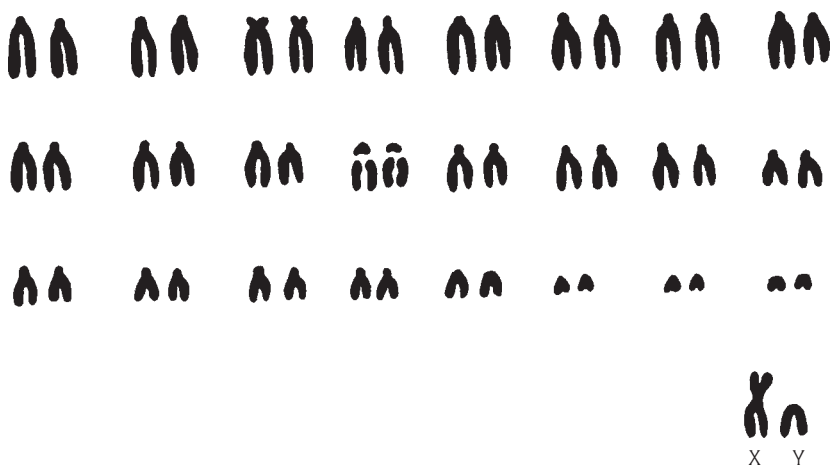


Fig. 2. Metaphase (a) and karyotype (b) of a male *Eptesicus serotinus* from Turkey.



Discussion

Baker and Patton (13), Bickham (14) and Baker and Bickham (15) studied the karyotypes of species of the genus *Eptesicus* found in North America and stated that the genus *Eptesicus* is conservative with respect to karyology.

Vorontsov et al. (16), Fedyk and Fedyk (17), Baker et al. (18), Fattajev (19), Fedyk and Ruprecht (20), Volleth (21) and Zima et al. (22) stated that the standard karyotype of *Eptesicus serotinus* is $2n=50$ and $FN=48$, whereas Zima (23) determined it to be $2n=50$, $FN=50$ (Table).

The diploid number and X and Y chromosomes in Turkish serotines are similar to those given by Baker and Patton (13), Bickham (14), Baker and Bickham (15), Vorontsov et al. (16), Baker et al. (18) and Zima et al. (22). Nevertheless, the Turkish specimens show differences with respect to the number of autosomal arms.

Zima (23) recorded the number of autosomal arms as 50, with a biarmed pair in the specimens from Czechoslovakia. Although the number of autosomal arms in this study is same as in Zima's (23) but no dot-like metacentric pair was detected. One of the biggest autosomes in the set has short arms near the centromere and is considered subtelocentric. In addition, the presence of a secondary constriction on one of the chromosome pair supports the findings in the 12th chromosome by Zima (23) and in the 15th chromosome by Volleth (21).

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Table. A comparison of the chromosomal data for *Eptesicus serotinus* (ST= subtelocentric, A= acrocentric, Dm= dot-like metacentric, Da= dot-like acrocentric).

Species or subspecies	Locality	ST	A	Dm	Da	FN	X	Y	2n
<i>E.s. turcomanus</i> (1 ♂ , 2 ♀♀)	Russia (Vorontsov et al., 1969)	-	48	-	-	48	SM	A	50
<i>E. serotinus</i>	Poland (Fedyk & Fedyk, 1970)	-	48	-	-	48	SM	SM	50
<i>E. serotinus</i> (5 ♀♀)	Tunisia (Baker et al., 1974)	-	48	-	-	48	SM	-	50
<i>E. serotinus</i> (3 ♂♂ , 3 ♀♀)	Czechoslovakia (Zima, 1978)	-	44	2	2	50	M	A	50
<i>E.s. serotinus</i>	Azarbaijan (Fattajev, 1978)	-	48	-	-	48	M	A	50
<i>E. serotinus</i>	Poland (Fedyk & Ruprecht, 1983)	-	48	-	-	48	M	M	50
<i>E. serotinus</i> (1 ♂)	Greece (Volleth, 1987)	-	48	-	-	-	-	-	50
<i>E. serotinus</i> (1 ♂)	S. Kyrgyzstan (Zima et al., 1991)	-	48	-	-	48	SM	Da	50
<i>E. s. serotinus</i> (1 ♂ , 3 ♀♀)	Turkey (This study)	2	46	-	-	50	SM	A	50

References

1. Danford C. G., Alston, E.R., On the mammals of Asia Minor. Proc. Zool. Soc., London. 1: 270-281, 1877.
2. Satunin, K. H., Über die zoographischen Grenzen das Kaukasusebiets. Mit. Kaukas. Mus., Tiflis. 8, 1912.
3. Bobrinskii, N., Kuznetsov, B., Kuzyakin, A., Mammals of U.S.S.R. Mosco Sovietskaya Nauka (In Russian), 1944.
4. Zimmermann, K., Die Wildsaugern von Kreta. Das Gesamtbild der Säuger. Kretas. Z. Säugetierk., 17: 67-72, 1953.
5. Çağlar, M., Chiropterafauna der Türkei. İ. Ü. Fen Fak. Mec. Seri B. 30 (3- 4):125-134, 1965.
6. Albayrak, İ., Researches on Bats of Ankara province (Mammalia: Chiroptera). Comm. Fas. des. Scien. De L'univ. D-Ankara, 3 (C): 1-20, 1985.
7. Albayrak, İ., Doğu Anadolu Yarasanları ve Yayılışları (Mammalia: Chiroptera). Doğa Tr. of Zoology, 14 (2): 214-228, 1990.
8. Albayrak, İ., Batı Türkiye Yarasanları ve Yayılışları (Mammalia: Chiroptera). Doğa Tr. of Zoology, 17 (2): 237-257, 1993.
9. Spitzenberger, F., The *Eptesicus* (Mammalia, Chiroptera) in Southern Anatolia. Folia Zoologica, Vienna, 43 (4): 437-454, 1994.
10. Benda P., Horacek, I., Bats (Mammalia: Chiroptera) of the Eastern Mediterranean. Part 1. Review of distribution and taxonomy of bats in Turkey. Acta Soc. Zool. Bohem, 62:255-318, 1998.
11. Patton, J. L., Chromosome studies of certain Pocket Mice, genus *Perognathus* (Rodentia: Heteromyidae), J. Mamm., 48 (1): 27-37, 1967.
12. Ford C.E., Hamerton, J.L., A colchicine, hypotonic citrate, squash sequence for mammalian chromosomes. Stain Technology, 31 (6): 247-251, 1956.
13. Baker, R. J., Patton, J. L. Karyotypes and karyotypic variation of North American Vespertilionid bats. J. Mamm., 48 (2): 270-286, 1969.
14. Bickham, J. W., Chromosomal variation and evolutionary relationships of Vespertilionid bats. J. Mamm., 60 (2): 350-363, 1979.
15. Baker, R.J., Bickham, J.W., Karyotypic evolution in Bats: evidence of extensive and conservative chromosomal evolution in closely related taxa. Systematic Zoology, 29 (3): 239-252, 1980.
16. Vorontsov, N.N., Radjabli, S.I., Volobuev, V.T., The comparative karyology of the Vespertilionid bats (Vespertilionidae Chiroptera). *The Mammals, Evolution, Karyology, Taxonomy, Fauna* (Ed. N.N. Vorontsov), 2nd all Union Mammalogical Conference, USSR Academy of Sciences, (in Russian), Moscow, 16- 21, 1969.
17. Fedyk, A., Fedyk, S., Karyotypes of some species of vespertilionid bats from Poland. Acta Theriol. 15:295-302, 1970.
18. Baker, R.J., Davis, B.L., Jordan R.G., Binous, A., Karyotypic and morphometric studies of Tunisian mammals: Bats. Mammalia, 38 (4): 695-710, 1974.
19. Fattajev, M.D., Sravnitšnaja kariologija nekotorych rukokrylych Azerbajdžana. PhD. Thesis, Institute of Zoology, AN AzSSR, Baku, 1978.
20. Fedyk, S., Ruprecht, A. L., Chromosomes of some species of vespertilionid bats I. Banding patterns of *Eptesicus serotinus* chromosomes. Acta Theriologica, 28: 159-170, 1983.
21. Volleth, M., Differences in the location of nucleolus organizer regions in European vespertilionid bats. Cytogenet. Cell. Genet., 44: 186-197, 1987.
22. Zima, J., Cervený, J., Horacek, I., Cervana, A., Prucha, K., Macholan, M., Stanislav, R. N., Standard karyology of eighteen species of bats (Rhinolophidae, Vespertilionidae, Molossidae) from Eurasia. Myotis, 29: 31-34, 1991.
23. Zima, J., Chromosome characteristics of Vespertilionidae from Czechoslovakia. Acta Sc. Nat. Brno, 12 (12): 1-38, 1978.