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Contribution to the Knowledge of *Pipistrellus pipistrellus* (Schreber, 1774) (Chiroptera: Vespertilionidae) from Diyarbakir Province-Turkey

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Abstract: In this study, the morphological and karyological peculiarities of six (4 ♂♂, 2 ♀♀) specimens of *Pipistrellus pipistrellus* collected from Diyarbakir province were examined. The external and cranial measurements and weights of the specimens were taken and also the field notes were recorded. The diploid chromosome number of the specimens was 2n = 42, fundamental chromosome number was NF = 52 and autosomal chromosome number was NFa = 48. The X chromosome was large submetacentric and Y chromosome was small acrocentric. The external and cranial measurements and karyological and morphological peculiarities were compared with previously published accounts. The results revealed that the subspecies of *P. p. pipistrellus* distributed in this region.

Key words: Karyology, morphology, *Pipistrellus pipistrellus*, chiroptera

INTRODUCTION

The species of genus *Pipistrellus* Kaup, 1829 is widely distributed in Turkey (Osborn, 1963; Albayrak, 1987, 1990, 1993, 1995; Helversen, 1989) and comprises four species: *P. pipistrellus* (Schreber, 1774) *P. nathusii* (Keyserling and Blasius, 1839) *P. kuhlii* (Kuhl, 1817) and *P. pygmeaus* (Leach, 1825) (Horacek *et al*., 2000; Dietz and Helversen, 2004). However, *P. pipistrellus* is one of the most common bat species in Turkey, the records of this species is less in arid areas of the Central and Eastern Anatolia than the coastal regions (Benda and Horacek, 1998). It is emphasized that this species gave birth to early in July by catching a pregnant female in last of June (Helversen, 1989).

Albayrak (1987) gives approximate distribution map of the subspecies of *P. pipistrellus*. *P. p. pipistrellus* covers the whole Western, Middle and Northeast Turkey while *P. p. aladdin* Thomas, 1905 distributed in the most eastern part of Turkey and there is a wide gap between these species demonstrated as a transition area by the author. Steiner and Gaisler (1994) described that a considerable part of Turkish territory is probably inhabited by populations referable to *P. p. mediterraneus*.

Karyological analysis provided important information for evaluation of the systematic status and phylogenetic diversification of bats (Zima, 2000). Zima *et al*. (1987) reported that the intraspecific chromosomal variation among the small mammals is the rule rather than the exception and described that these variations are 12.3% for Palaearctic region and 2.8% for European bats.

The diploid chromosome number of *P. pipistrellus* is reported as 2n = 44 (Zima, 1978; Karatas *et al*. 2004) and 2n = 42 (Bovey, 1949; Capanna and Civitelli, 1970) in Turkey. Examinations of the chromosomes have been reported for most of the populations of *P. pipistrellus* from various geographic regions, especially from the Asian part of the range of this species, are therefore highly desirable (Zima,1978).

In the present study, it is aimed to contribute to our knowledge of the morphology and karyology of *P. pipistrellus* in Turkey.

MATERIALS AND METHODS

We examined six specimens (4 ♂♂, 2 ♀♀) collected from Diyarbakir province (Fig. 1). These specimens were identified *P. pipistrellus* on the basis of the morphological features described by Dietz and Helversen (2004). The specimens were capturing by hand net from the roof of the buildings. The external and cranial measurements (mm) and weights (g) of the specimens were taken and their sexual signs were determined. Chromosomal examination was made by standard direct treatment of bone marrow cells and the diploid chromosome number (2n), fundamental number of chromosomal arms (NF) and

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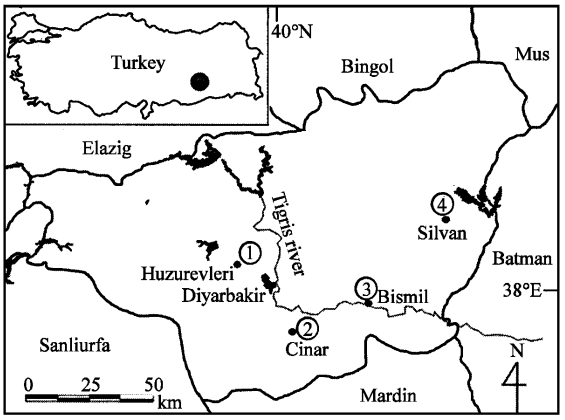

Fig. 1: The collecting localities of *P. pipistrellus*: 1. Huzurevleri (1 ♂♂); 2. Çinar (2 ♂♂); 3. Bismil (1♀♀, 1♂♂) and 4. Silvan (1 ♀♀)

number of autosomal arms (NFa) were determined according to the centromere positions. The cranial measurements were taken from each specimen by a calliper with accuracy of up to 0.1 mm according to Freeman (1981). The skins and skulls of the specimens are deposited in Biology department, Science and Art Faculty, University of Dicle.

RESULTS

The specimens of *P. pipistrellus* are small (70.1-72.4-75.8) and the wings are relatively narrow, only the extreme tip of the tail projects from the interfemoral membrane. The legs are short (10.8 -11.3-11.9 mm) and the feet are small. The pelage is fuzzy and dorsal colour is dark brownish. The ears are small and far away from each other. The membranes of the wings and tail are thin. Tragus attains maximum width below middle, is constricted towards tip and almost half the height of the ears. The external measurements are given in Table 1.

The rostrum is narrower than the braincase and tapered anteriorly. Zygomatic arches are thick and moderately expanded through the sides (except one specimen). Styloid process is well developed and palatal foramina extended to the level of M^3. Compared with skull size, the tympanic bulla is well developed and the hole of the foramen magnum is quite wide. The mandible is more robust and coronoid process revealed as a thin spine (Fig. 2).

The upper first premolar (Pm^1) is very small, displaced inwards from the tooth row and not visible from the side. It is contact with the canine. Pm^2 is bigger than Pm^1 and has two cusps. The height of the upper canine is 2.4-2.5-2.9 mm, while the lower is 1.4-1.6-1.8 mm.

Table 1: The external and cranial measurements (mm) and weights (g) of *P. pipistrellus* (n: specimen numbers, X: mean and SD: standard deviation)

Characters	n	Range	X±SD
Weight	6	6.0-11.0	8.14 ± 1.68
Total length	6	70.1-75.8	72.40±2.40
Head and body length	6	42.8-46.4	44.80±1.43
Ear length	6	9.8-12.0	10.70±0.79
Tail length	6	26.0-29.4	27.60±1.44
Tragus length	6	4.7-5.4	5.06±0.25
Tibia length	6	10.8-11.9	11.30±0.37
Forearm length	6	29.6-33.4	31.40±1.31
Greatest skull length	4	12.5-13.8	13.20±0.61
Upper toothrow length	5	4.6-4.9	4.78±0.13
Condy. incisive length	4	11.8-12.9	12.30±0.54
Upper canine length	5	2.4-2.9	2.59±0.21
Braincase height	4	6.1-6.7	6.30±0.23
Interorbital breadth	6	3.4-3.7	3.53±0.12
Braincase breadth	5	6.3-6.8	6.56±0.21
Rostral length	4	8.2-9.3	8.85±0.47
Zygomatic width	6	8.6-8.7	8.63±0.05
Lower canine length	6	1.4-1.8	1.64±0.14
Lower toothrow length	6	5.3-5.9	5.67±0.26
Mandible length	6	8.9-10.0	9.57±0.43
Mandible height	6	2.9-3.2	3.00±0.13

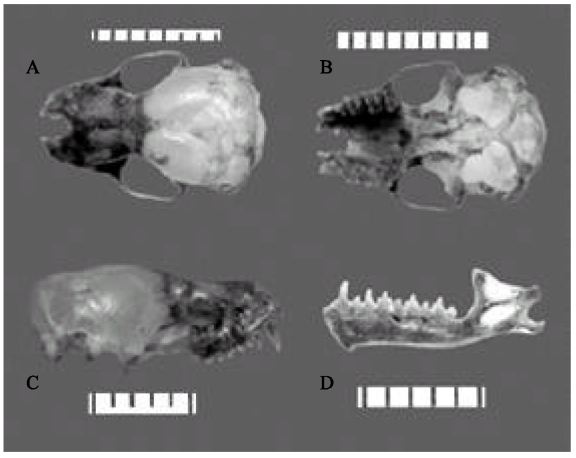

Fig. 2: The skull of *P. pipistrellus* (Diyarbakir-Bismil; No: 284, ♂♂). (A) Dorsal, (B) Ventral, (C) Lateral and (D) Mandible

The first upper incisive is bicuspid and external cusp length is twice as internal cusp. Second incisive is relatively small and has only one cusp. All of the molars have more cusps. M^1 is slightly narrower than M^2. The length of the upper tooth row is 4.6-4.8-4.9 mm. The lower incisive, in similar heights, are smaller than the upper and the lower premolar is seen clearly from the side. The length of the lower tooth row is 5.3-5.7-5.9 mm. The cranial measurements of Diyarbakir specimens are given in Table 1.

In all the specimens of *P. pipistrellus* from Diyarbakir province, that we examined the diploid chromosome number (2n) and the fundamental autosomal arm number

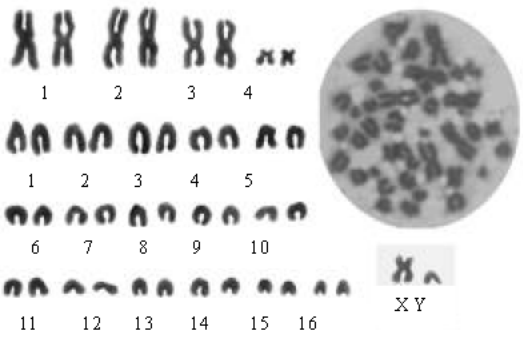

Fig. 3: The karyotype and metaphase plate of *P. pipistrellus* (Diyarbakir-Huzurevleri; No: 395, ♂♂)

(NF) were 42 and 52, respectively. Karyotype consisted of three pairs of large metacentric, one pair of small metacentric and sixteen pairs of acrocentric chromosomes. The X chromosome is medium metacentric, while the Y chromosome is small and acrocentric (Fig. 3).

DISCUSSION

The existence of Pm^1, a distinguishable character between the species of genus *Pipistrellus* and *Eptesicus* which described by Harrison and Bates (1991) is the same as on the material examined by us. Ognev (1962) described that tragus, attains maximum width below middle, is constricted towards tip and never of clavately form; wings are short and broad; metacarpal bone of third digit almost equal to that of fifth; flying membrane attached to external side of foot at base of digit and forearm usually not longer than 36 mm. Accordingly these peculiarities are similar in Diyarbakir specimens. Ears and face not usually dark black and tip of the ears narrowly rounded which described by Dietz and Helversen (2004) is the same with our material. There is no white band at the side of the wing membrane in our specimens as recorded by Karataş (1996) and also the cranial measurements of Diyarbakir specimens are similar with Albayrak (1990) and Karataş (1996)'s results.

The peculiarities of the species *P. pipistrellus* given by Dietz and Helversen (2004) (smaller species; FA < 34.6 mm; first upper premolar displaced inside of the toothrow; P^4 and C^1 are not directly in contact; second upper incisor is shorter than the lower cusp of the first upper incisor; no hair on the underside of the tail membrane along the tibia and the penis is dark grey to greyish-brown) is the same as on the material examined by us.

The karyotype of Diyarbakir specimens is the same with the results of some authors (Bovey, 1949; Capanna and Civitelli, 1966, 1970) but it is different with Karataş *et al.* (2004) and Zima (1978)'s results. The karyotype of the nominate subspecies was described for the first time by Bovey (1949) as 2n = 42, in Switzerland. It consists of four large metacentric, seventeen acrocentric pairs and Nfa = 48. Our results agrees with that of Bovey (1949) as for the diploid number 2n = 42.

Comparing with the previous accounts, Diyarbakir specimens of *P. pipistrellus* is distinguished from the other Pipistrelles (2n = 44 for *P. nathusii* and *P. kuhlii*, 2n = 42 for *P. pipistrellus*) by the diploid chromosome number (Bovey, 1949; Capanna and Civitelli, 1966).

CONCLUSION

It is revealed that the diploid chromosome number of *P. pipistrellus* examined by us showed differences with the authors which described 2n = 44. And also it is revealed that the subspecies of *P. p. pipistrellus* is distributed in this region that reported as a transition area by Albayrak (1987).

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