

A Study of The Taxonomy and Karyology of *Meriones persicus* (Blanford, 1875) (Mammalia: Rodentia) In Turkey

Nuri YIĞIT, Ercüment ÇOLAK

Department of Biology, Faculty of Science, University of Ankara, 06100 Beşevler, Ankara-TURKEY

Received: 20.10.1998

Abstract: In this study, three live specimens captured around Oltu (Erzurum) were examined in terms of their morphological and karyological features. The diploid number of the chromosomes was $2n= 42$, the fundamental number $FN= 78$ and the number of autosomal arms was $FNa= 74$. The X and Y chromosomes were both submetacentric in *M. persicus*. It was determined that the small white supraorbital spot found between the eyes and ears of the pelage, as well as karyological traits, distinguish *Meriones persicus* from *Meriones tristrami*. On the basis of morphological similarity, it was concluded that these taxa were sibling species.

Key Words: *Meriones persicus*, karyology, taxonomy, Turkey

Türkiye'deki *Meriones persicus* (Blanford, 1875) (Mammalia: Rodentia)'un Taksonomisi ve Karyolojisi Üzerine Bir Çalışma

Özet: Bu çalışmada, Oltu (Erzurum)'dan yakalanan 3 örnek morfolojik ve karyolojik olarak değerlendirildi. *Meriones persicus*'ta diploid kromozom sayısının ($2n$) 42, temel kromozom sayısının (FN) 78, otosomal kromozomların kol sayısının (FNa) 74 olduğu, X ve Y kromozomlarının ise submetasentrik olduğu saptandı. Göz ile kulak arasında bulunan küçük beyaz benek ve karyolojik karakterler *Meriones persicus*'u *Meriones tristrami*'den ayırdığı belirlendi. Morfolojik karakterlerdeki benzerliğe dayanarak bu taksonlar gerçek sibling türler olarak dikkate alındı.

Anahtar Sözcükler: *Meriones persicus*, karyoloji, taksonomi, Türkiye

Introduction

Meriones persicus (Blanford, 1875) is distributed in Iraq, Iran and Transcaucasia (1, 2, 3, 4). Five species (*M. tristrami*, *M. libycus*, *M. vinogradovi*, *M. crassus*, *M. meridianus*) of jirds belonging to the genus *Meriones* have been recorded from Turkey (3, 5, 6, 7, 8). The northeast of Turkey has also been included in the ranging area of a sixth species (*M. persicus*), although no specimens have been provided (3, 9). Harrison and Bates (9) indicated a general locality in Turkey for *M. persicus* without giving specific references. The aim of the present study was to confirm occurrence of *M. persicus* in Turkey and contribute to the rodent fauna of Turkey.

Materials and Methods

In this study, we examined three live – specimens captured from Oltu (Erzurum) (Fig. 1). Four external measurements (mm) and the weight (g) were taken from karyotyped specimens in the laboratory. Phallus, baculum and karyotype preparations were performed in

accordance with Lidicker (10) and Ford and Hamerton (11) respectively. A total of 20 slides were prepared for each specimens, and well-spread metaphase cells from each preparation were analysed, and twenty-one measurements were taken from each skull and they were evaluated along with six external and two bacula measurements. The diploid number of chromosomes ($2n$), the fundamental number (FN) and the number of autosomal arms (FNa) were determined by examining photograph of the slides. The measurements of twenty-one characters were taken from each skull and they were evaluated along with six external and two baculum measurements. The skin, skulls and karyotype preparations were deposited with the Faculty of Science, University of Ankara.

Results

Meriones (Parameriones) *persicus* Blanford, 1875

1875. *Gerbillus persicus* Blanford, Ann. Mag. nat Hist., 16 : 312.

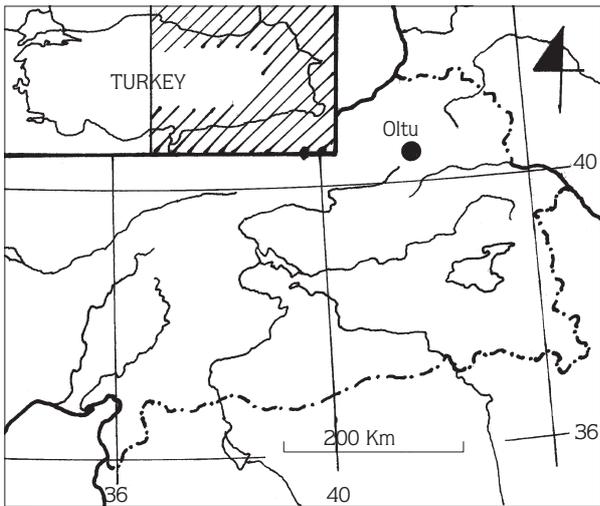


Figure 1. Recorded locality (●) of *M. persicus* from Oltu/Erzurum

Type locality: Kohrud, 150 miles north of Isfahan, Iran.

Habitat: This species lives in mountainous steppe and digs burrows in soft soily- slopes around Oltu (Fig. 1). In this habitat, in spite of occurring many grain fields, we determined that this jird does not make burrows in these cultivated fields, and generally rarely inhabits the slopes around the grain fields.

External characteristics: In the male, the dorsal colour, especially on the median line, is tawny brown, and the check and flanks are lighter than the median line. The inner and outer surfaces of the ears are hirsute with tiny short pale grey hairs. There is a marked and distinctive white spot between the eye and ear (supraorbital spot). The tail is bicoloured, dorsally the same as the dorsal pelage, and ventrally white and tawny brown. The proximal half of the tail is slightly grizzled with black, and there is a well-marked terminal crest on the tip. The dorsal aspect of limbs and feet are white, and the soles of the hind feet are completely bare. The line of demarcation on the flanks and cheek is distinct. The ventral pelage is pure white. In contrast to the dorsal colour of the males, it is dark brown, becoming lighter towards the flanks in the female. The other external characteristics of the female are the same as the in the male. The external characters are given in Table 1.

Cranial characteristics: The skull is slender and has a well-marked elongated rostrum. The anterior tip of the nasal bones project beyond the incisors. The brain case is not smooth: it is rounded and slopes down posteriorly at

the level of the parietal and interparietal bones. The median line of the supraoccipital bone is posteriorly mostly behind the point of the skull. The anterior rim of each auditory meatus does not come into contact with the posterior root of the zygoma. The bony downgrowth from the tympanic bone conceals the bodies of the ossicles in the meatus. The suprameatal triangle is small and closed posteriorly. The other characteristics of the skull exhibit the peculiarities of the genus *Meriones*.

Phallus and baculum: The phallus is in the shape of a stick with no distinctive features. The baculum consists of a distal and proximal baculum. The distal consists the three cartilaginous parts, usually deformed during the preparation process, and the proximal baculum is composed of the Os part. The Os baculum, i. e., the proximal baculum, is composed of a pentagonal base and a stick-shaped shaft (Fig. 2). The dimensions of the base and the proximal baculum are given in Table 1.

Karyology: We karyotyped three specimens from Oltu (Erzurum) (Fig.1). *M. persicus* has karyological values of $2n: 42$, $FN: 78$ and $FNa: 74$. The autosomal set contains 19 pairs meta - submetacentric and 3 pairs acrocentrics. chromosomes. Both sex chromosomes are submetacentric but the Y chromosomes is smaller than the X chromosome (Fig. 3, 4).



Figure 2. Os baculum of *M. persicus* (dorsal view) x15.

Characteristics (mm)	Specimen Numbers		
	2294 male	2295 male	2296 male
Total length	303	329	354
Head and Body length	149	164	164
Tail length	154	165	190
Hind foot length	41	44	45
Ear length	25	25	27
Weight (gr.)	90	122	111
T x 100 / HB	103.3	100.6	115.8
Zygomatic breadth	21.7	23.0	22.7
Interorbital constriction	7.4	7.2	7.3
Condylbasal length	37.4	39.6	40.8
Occipito - nasal length	41.7	43.4	44.4
Basal length	35.1	37.9	38.4
Nasal length	16.3	17.8	18.2
Mastoid width	13.2	13.0	13.9
Braincase width	17.4	17.9	17.7
Diestema length	11.5	12.7	13.4
Palatal length	19.0	20.3	20.5
Foramen incisivum length	7.7	7.9	7.4
Length of tympanic bullae	11.8	12.6	13.6
Mandible length	22.9	23.5	24.6
Maxillary tooth row	6.1	6.6	6.3
M ¹ length	2.9	2.6	2.6
M ² length	1.8	1.6	1.6
M ³ length	0.9	0.8	0.8
Mandibular tooth row	6.4	6.6	6.6
M ₁ length	2.4	2.6	2.6
M ₂ length	1.6	1.6	1.8
M ₃ length	0.9	0.9	0.8
Length of baculum	-	4.4	4.4
Width of baculum base	-	2.1	2.6

Table 1. The external and cranial measurements of three adult specimens of *Meriones persicus* from Oltu/Erzurum (T: Total length, HB: Head and Body).

Discussion

This study confirms the distribution given for *M. persicus* in eastern Turkey by Neuhäuser (3) and Harrison and Bates (9). The colour description about *M. persicus* of Neuhäuser (3) and Harrison and Bates (9) was generally found to be consistent with our findings, but these authors did not mention the variations on the dorsal pelage. The present study shows that there can be

significant variations in dorsal colour. Biometrical comparisons could not be made because of the insufficient specimen numbers in both the present study and in other published papers, but the tail length given by Vinogradov and Argyropula (4) is longer than that in Turkish specimens. When the most recently published papers (7, 8) on the genus *Meriones* from Turkey is considered, it can be seen that *M. persicus* in sympatry

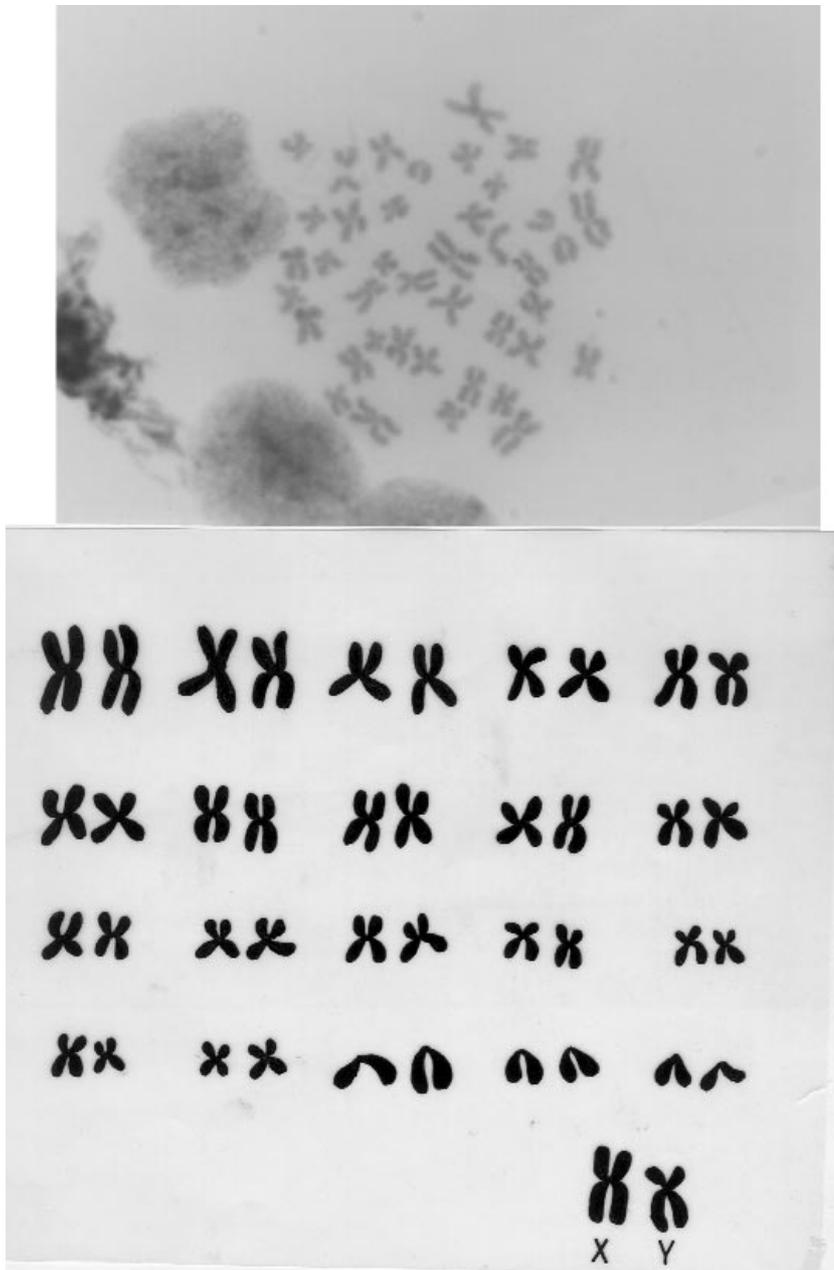


Figure 3. The karyotype of a male *M. persicus* from Oltu/Erzurum



Figure 4. The karyotype of a female *M. persicus* from Oltu/Erzurum



with *M. tristrami*, *M. vinogradovi* and *M. meridianus* in north east Turkey and it is clearly distinguishable from *M. vinogradovi* and *M. meridianus* by its external cranial traits, whereas it shows extreme morphological similarities to *M. tristrami*. The main morphological difference between these two species is the white supraorbital spot in *M. persicus*, while this white spot completely covers the area around the eyes in *M. tristrami*. In addition, when the proximal baculum and the karyotype of *M. persicus* were compared with the baculum and the karyotype given by Kefelioğlu (7) and Yiğit et al. (8) for *M. tristrami*, it was seen that

morphological, bacular, and karyotypic characteristic also distinguish *M. persicus* from *M. tristrami*. Because of these very fine morphological differences, *M. persicus* and *M. tristrami* were identified as sibling species. The karyotype of *M. persicus* from Turkey is similar to that described by Vorontsov and Korobitsina (12) and Benazzou et al. (13), but different from that given by Matthey (14), who reported that the diploid number and the fundamental number of chromosomes were 42 and 74 respectively. These findings support the proposal that the diploid number of chromosomes is stable in *M. persicus* populations.

References

1. Hatt, R. T., Mammals of Iraq. Miscellaneous Publ. Mus. Zool. Univ. Mich., 1959.
2. Lay, D. M., A study of the mammals of Iran. Fieldiana Zool. 54, 1 - 282., 1967.
3. Neuhäuser, G., Die Muriden von Kleinasien. Z. Säugetierk. 11: 161 - 236, 1936.
4. Vinogradov, B. S., Argyropulo, A. I., Fauna of the USSR mammals. Key to the rodents. Moscow : Leningrad Publ., 1941.
5. Misonne, X., Mammiferes de la Turquie Sub - orientale et du nord de la Syrie. Mammalia 21: 53 - 57, 1957.
6. Thomas, O., Notes on Gerbils referred to as the genus *Meriones*, with descriptions of new species and subspecies. Ann. Mag. nat. Hist. 3, 263 - 273, 1919.
7. Kefelioğlu, H., Türkiye *Meriones tristrami* Thomas, 1892 (Mammalia: Rodentia) lerinin Taksonomik Durumu ve Karyolojik Özellikleri. Tr. J. of Zoology 21(1): 57 - 62, 1997.
8. Yiğit, N., Kıvanç, E., and Çolak, E., Türkiye'deki *Meriones Illiger*, 1811 (Mammalia: Rodentia) Türlerinin Teşhis Karakterleri ve Yayılışı. Tr. J. of Zoology 21(4): 361 - 374, 1997.
9. Harrison, D. L., and Bates, P. J. J., The Mammals of Arabia. Sec. ed. Kent: Harrison Zoological Museum Publication. 1991.
10. Lidicker, W. Z., A phylogeny of new Guinea Rodent Genera based on phallic morphology. J. Mammology 49(4): 610 - 643, 1968.
11. Ford, G. E. and Hamerton, J. L., A colchicine hypotonic - citrate, squash squence for mammalian chromosomes. Stain Tech. 31: 247 - 254, 1956.
12. Vorontsov, N. N., and Korobitsina, K. V., Materials on a comparative karyology of Gerbillinae. Tziologiya 12, 152 - 157., 1970.
13. Benazzou, T., Viegas - Pequlgnot, E., Petter, F., and Dutrillax, B., Phylogenie chromosomique de quatre especes de *Meriones* (Rongeur, Gerbillidae). Ann. Genet. 25, 19 -24.,1982.
14. Matthey, R., Cytologie et taxonomie du genre *Meriones* Illiger (Rodentia - Muridae - Gerbillinae). Säugetierkd. Mitt. 5, 145 - 150., 1957.