

A Study on the Distribution, Morphology and Karyology of *Tatera indica* (Hardwicke, 1807) (Mammalia: Rodentia) in Turkey

Nuri YİĞİT, Ercüment ÇOLAK, Reyhan VERİMLİ

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

Şakir ÖZKURT

Department of Biology, Education Faculty of Kırşehir, Gazi University, Kırşehir-TURKEY

Mustafa SÖZEN

Department of Biology, Faculty of Arts and Sciences Zonguldak Karaelmas University, 67100 İncivez, Zonguldak-TURKEY

Received: 27.01.2000

Abstract : The Habitat, external and cranial morphologies, and karyotype of Turkish specimens of *Tatera indica* are described for the first time with this study. It was determined that *Tatera indica* was located in uncultivated arid and semi-arid habitat in southeastern Turkey. Its external and cranial characteristics are consistent with those detailed in published papers. The karyotype of *Tatera indica* is composed of $2n = 68$, $NF = 84$ and $NFa = 80$.

Key Words: Morphology, karyology, *Tatera indica*, Turkey

Türkiye'deki *Tatera indica* (Hardwicke, 1807) (Mammalia: Rodentia)'nın Yayılışı, Morfolojisi ve Karyotipi Üzerine Bir Çalışma

Özet : *Tatera indica*'nın Türkiye örneklerinin habitatu, dış ve kafatası morfolojisi ve karyolojisi bu çalışmayla ilk kez tanımlandı. *Tatera indica* Güneydoğu Anadolu'da tarım alanları dışındaki kurak ve yarı kurak bir habitattan kaydedildi. Türün eksternal ve kafatası özellikleri daha önce yapılmış tanımlamalara uyumludur. *Tatera indica*'nın karyotipi $2n = 68$, $NF = 84$ ve $NFa = 80$ 'den oluşmaktadır.

Anahtar Sözcükler: Morfoloji, karyoloji, *Tatera indica*, Türkiye

Introduction

Tatera indica ranges from northern Arabia throughout the Indomalayan region (1, 2). This species commonly known as the Indian gerbil, was first recorded from southeastern Turkey by Misonne (3). The aim of this study was to contribute to knowledge of the morphological and karyological characteristics of *T. indica*, and also provide comparative materials for further investigations.

Materials and Methods

In a survey of southeastern Turkey, we captured 5 live adult specimens of *T. indica* (1 male, 4 females) from Ceylanpınar in June 1999 (Fig. 1). These specimens were karyotyped based on the technique of Ford and Hamerton (4). The diploid number of chromosomes ($2n$), the total number of chromosomal arms (NF) and the number of

autosomal arms (NFa) were determined by examining photographs of metaphase cells. External and cranial measurements (mm) as well as weight measurements (g) were taken from each specimen in the laboratory. The largest claw was included in the hind foot measurement. The skins, skulls and karyotype preparations of the specimens were deposited in the Faculty of Science, University of Ankara.

Results and Discussions

Field observations: although we conducted field studies throughout southeastern Turkey, specimens of the Indian gerbil were caught in only one locality, near the border of Syria (Fig 1). This shows that the population density of *T. indica* is low, and that this species is confined to a single locality in southeastern Turkey. This species was not found in cultivated areas. It seems that *T. indica*

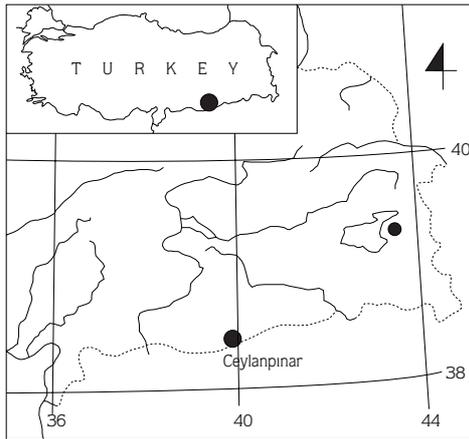


Figure 1. Recorded locality of *Tatera indica* from Ceylanpinar (●) in Southeastern Turkey

prefers uncultivated arid and semi-arid habitats with soft soil and dry river slopes. The burrow of *T. indica* has 2-3 entrances 10-13 cm in diameter. According to our field observations, this species is nocturnal, and establishes small colonies in its territory. We determined that the nocturnal activities of *Tatera indica* result in wide pathways among burrows in the ground.

External and cranial characteristics: *Tatera indica* the Indian gerbil, is a more robust species than any member of the subfamily Gerbillinae in Turkey. The maximum total length in our specimens was 480 mm, and the tail was about equal to the length of the head and body (Table 1). In general, the dorsal fur varies from fawn yellowish to tawny brown, extending from the nasal tip to the posterior part of the body. The hairs have black tips and are ash-grey basally and yellowish medianly; this gives a speckled appearance to the pelage. The cheeks and flanks are dirty white. Distinct white hairs with black tips border the eyes. Other coloration characteristics are the same as those in the description given by Harrison and Bates (1).

The skull is robust, and the occipito-nasal length is greater than that in species of the genus *Meriones* (*M. tristrami*, *M. crassus*, *M. persicus*, *M. vinogradovi*) recorded in Turkey, but its suprameatal triangle is markedly smaller than in these species (5, 6, 7). The posterior tip of the supraoccipital is not apparent in the dorsal view of the skull, and the posterior outline of the tympanic bullae does not project beyond the occiput. The tympanic bullae are relatively small (Fig. 2). The cranial measurements are given in Table 1. Generally, our

Table 1. External and cranial measurements and weights of five adult specimens of *T. indica*. (Nr: specimen number, F: female, M: male)

Measurements (mm)	Specimen	Specimen	Specimen	Specimen	Specimen
	Nr. 3018 F	Nr. 3030 F	Nr. 3058 M	Nr. 3109 F	Nr. 3139 F
Total length	396	368	405	480	395
Tail length	195	181	195	195	198
Hind foot length	49	45	48	59	49
Ear length	30	28	27	30	30
Weight (g)	258	200	270	260	245
Zygomatic breadth	27.2	25	26.1	26.9	26
Interorbital constriction	7.8	7.1	7.7	7.9	7.0
Condylbasal length	46	43.3	45	47	43.9
Occipitonasal length	49.1	45.7	48.3	50	46.3
Basal length	44	40.8	42.6	44.5	41
Nasal length	21.7	19	21.2	22.3	20.4
Mastoid breadth	15.5	13.4	14	15	14.9
Occipital width	18.5	16.7	17.2	17.8	17.4
Diastema length	14.6	13.1	14.1	14.7	13
Palatal length	23.7	22	23	24.2	21.7
Incisiva foramina	9.4	8.5	9.3	9.2	8.2
Mandible length	28.2	25	26.5	27.9	26.9
Upper molar alveolar	8.4	7.6	7.9	8.7	7.9
Lower molar alveolar	8.2	7.9	7.9	8.4	7.9

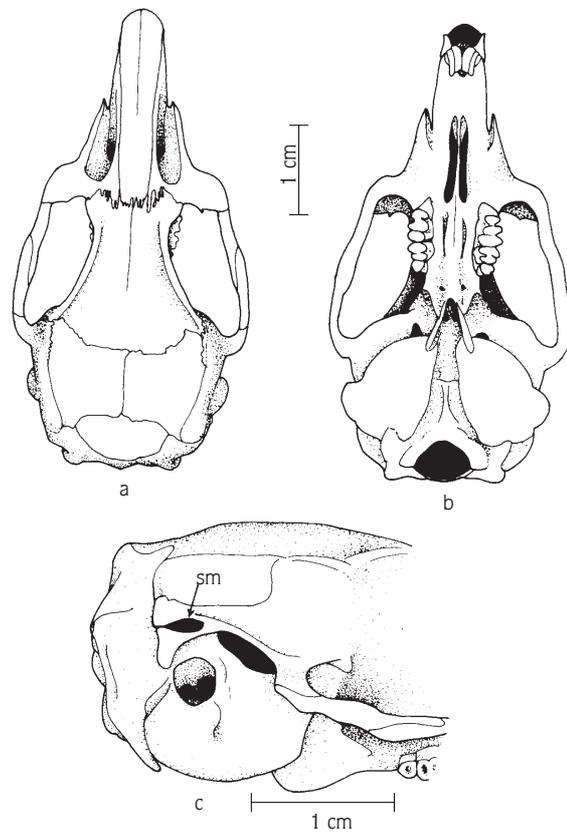


Figure 2. Skull of *Tatera indica*. a: dorsal, b: ventral, c: lateral, d: mandible. sm: suprameatal triangle.

findings regarding the cranial characteristics of *Tatera indica* are consistent with the descriptions given by Harrison and Bates (1).

Phallus and baculum: the phallus is in the shape of a stick and covered by small spines becoming gradually larger towards the posterior base. There is a V-shaped protrusion on the dorsal side of the phallus, and a distinct rounded process on the ventral base of the phallus (Fig. 3). The baculum consists of distal and proximal parts. The distal part consists of a trifold cartilagenous process. The proximal part is composed of os part. The os baculum is composed of a pentagonal base and a stick-shaped shaft. There is a well-marked concavity on the ventral and dorsal surfaces of the base (Fig. 4.)

Karyology: we karyotyped five specimens (1 male, 4 females) from Ceylanpınar. *T. indica* has $2n= 68$, $NF= 84$ and $NFa= 80$. The autosomal set contains 7 pairs of bi-armed and 26 pairs of acrocentric chromosomes. The large X chromosome is metacentric, and the Y chromosome is acrocentric. (Fig. 5). Matthey (8) reported that $2n = 72$, and $NF = 80$ in *T. indica*. In contrast, Rao et al (9), Yoshida (10) and Aswanthanyana and Manjunatha (11) stated that $2n = 68$ in the Indian gerbil. Aswanthanyana and Manjunatha (11) also reported that NF varies from 80 to 86 in the

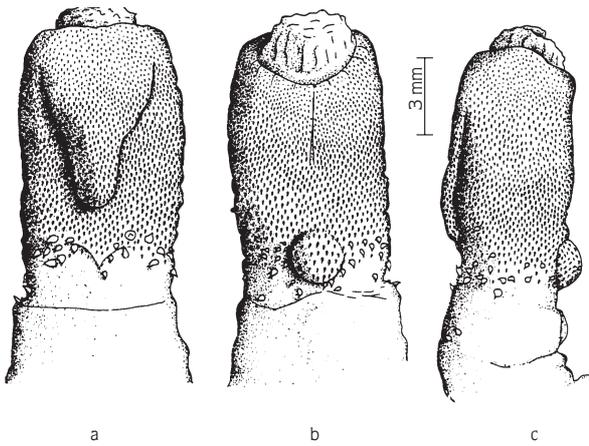


Figure 3. Phallus of *T. indica*, a: dorsal, b: ventral, c: lateral

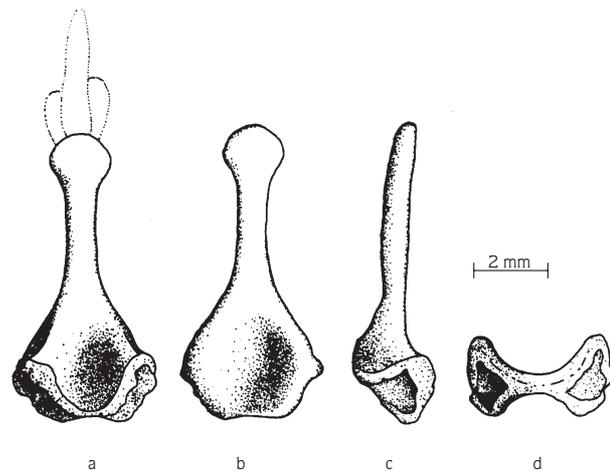


Figure 4. Baculum of *T. indica*, a: dorsal, b: ventral, c: lateral, d: basal view

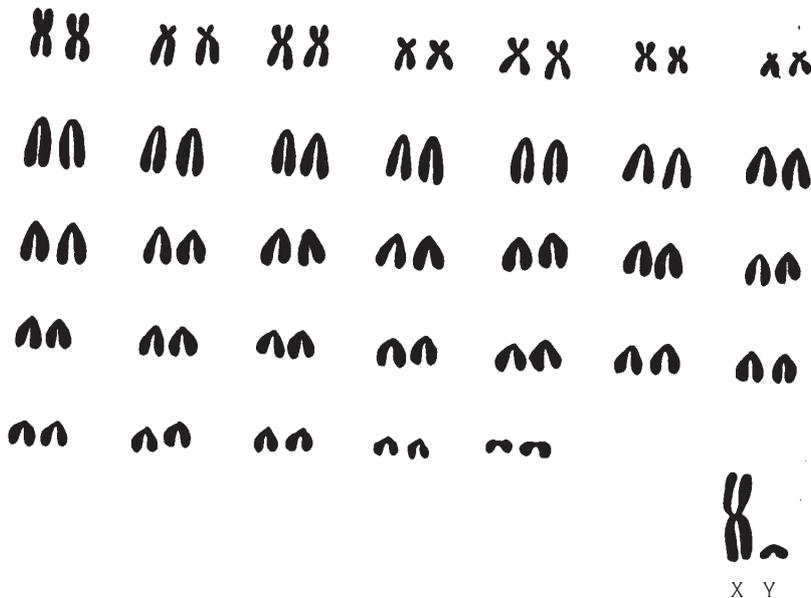


Figure 5. The karyotype of *T. indica* (male). $2n: 68$, $NF: 84$, $NFa: 80$.

Indian populations of this species. They also reported that $2n$ is stable among their populations. According to Yoshida (10), *T. indica* has a karyotype of $2n=68$, containing 25 acrocentrics and 8 bi-armed autosomal pairs, and the X chromosome is large and metacentric, while the Y chromosome is acrocentric. Rao et al (9) give

NF= 84 and NFa= 80 for *T. indica cuverii*. These findings are the same as those in this paper. In addition, our results for the diploid chromosome number of this species are consistent with the findings given by the authors above, and also support the presence of NF polymorphism in the populations of *T. indica*.

References

1. Harrison, D. L. and Bates, P. J. J., The Mammals of Arabia. 2nd. Ed., Harrison Zool. Mus. Publ., Kent. 1991.
2. Corbet, G. B. and Hill, J. E., The mammals of the Indomalayan region: A systematic review. Natural History Museum Publ., Oxford Univ. Press. 1992.
3. Misonne, X., Mammifères de la Turquie Sub-orientale et du nord de la Syrie. Mammalia 21: 53-67. 1957.
4. Ford, G. E. and Hamerton, J. L., A colchicine hypotonic-citrate squash squence for mammalian chromosomes. Stain Tech. 31: 247-254. 1956.
5. Yiğit, N., Kivanç, E. and Çolak, E., On the taxonomic status of *Meriones tristrami* Thomas, 1892 (Rodentia: Gerbillinae) in Turkey. Zoolgy in the Middle East, 16: 19-30. 1998a.
6. Yiğit, N., Kivanç, E. and Çolak, E., Contribution to taxonomy and karyology of *Meriones meridianus* (Pallas, 1773) and *Meriones crassus* Sundevall, 1842 (Rodentia: Gerbillinae) from Turkey. Z. Saugetierkd. 63: 311-314. 1998b.
7. Yiğit, N. and Çolak, E., A study of the taxonomy and karyology of *Meriones persicus* (Blanford, 1875) (Mammalia: Rodentia) in Turkey. Tr. J. of Zoology, 23: 269-274. 1999.
8. Matthey, R., Les chromosomes des Muridae. Revision critique et matériaux pour servir à l'histoire de l'évolution chromosomique chez les rongeurs. Rev. suisse Zool., 60: 225-283. 1953.
9. Rao, S. R. V., Shah, V. C. and Seshadri, C., Studies on Rodent Chromosomes III. The somatic chromosomes of the Indian gerbil, *Tatera indica cuverii* (Waterhouse). Cytologia, 33: 447-481. 1968.
10. Yoshida, T. H., Chromosome polymorphism of the large naked-soled gerbil, *Tatera indica*. Jpn J. Genet. 56: 241-248. 1981.
11. Aswanthanyana, N. V. and Manjunatha, K. R., Studies on the chromosomes of the genus *Tatera*. A preliminary report on the occurrence of autosomal polymorphism in the Indian gerbil, *Tatera indica hardwickei* (Gray). Mammalian Chromosomes Newsl., 22: 52-53. 1981.