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# A preliminary study on Indian Gerbils, *Tatera indica* Hardwicke, 1807 at population level in eastern and southern parts of Iran (Rodentia: Muridae)

OMID MIRSHAMSI*; JAMSHID DARVISH, AND NASRIN KAYVANFAR

**Rodentology Research Department, Faculty of Science, Ferdowsi University, 91775-1436, Mashhad, Iran.*

There is little known about the systematics and population structure of Indian gerbils (*Tatera indica*) in Iran. In the present study six populations of *T.indica* from different localities of Iran were compared according to morphology, morphometry and karyological studies to determine the status of these populations at the sub specific level. The univariate, bivariate and multivariate statistical analyses of four external and 18 cranial morphometric characters in *Tatera indica* (Rodentia: Muridae) were performed using 84 specimens collected from widely scattered geographical localities.The results of MANCOVA showed that there are no significant differences between sexes. In order to show variation between samples and the significance of cranial variables CDA and PCA analyses were carried out using log-transformed data. The results of CDA analysis indicated discrimination between samples. The results of the univariate and multivariate analysis showed that the morphometric characteristics of the Indian gerbil populations in Iran are slightly different. Also, the results of the GM analysis showed two major phonetic groups which indicates separation of the northern and the southern populations. Karyological results showed that 2N=68 and NFa=80 in all karyotyped specimens which are similar to findings of previous authors. There are not any variations in 2N and NFa of the studied specimens. On the basis of the CDA, PCA and GM analyses there are two main phenetic groups in these populations which might be related to the sub-specific condition of them. However, due to methodological problems, other techniques such as molecular studies must be applied for determination of true status of these groups.

**Key Words:** *Tatera indica*, Indian Gerbil, Morphometric analyses, Morphology, Geometric Morphometrics, karyology, subspecies

## INTRODUCTION

The gerbils of the genus *Tatera* Lataste, 1802 (Rodentia: Gerbillinae) are widespread in the sandy plains, grasslands and savannas of the sub-saharan Africa, Near East, Middle East and the Indo-Pakistan subcontinent. They are also common in the cultivated areas, where they nowadays cause considerable agricultural damage (Colangelo, et al, 2005). This genus is generally considered to be more primitive phylogenetically and less specialized (Roberts, 1997).

On the basis of the last taxonomic revisions 12 species listed in this genus, 11 of which occur in Africa (*T.afra, T.brantsii, T.bohemi, T.guineae, T.inclusa, T.vicina, T.kempi, T.leucogaster, T.nigricauda, T.phillipsi and T.robusta*) and only one species in Asia (*T. indica*) (Corbet, 1978; Corbet and Hill, 1991).. It is proposed that on the basis of morphological characters the only Asian species, *T.indica*, can be

***CORRESPONDING AUTHOR:** mirshams@ferdowsi.um.ac.ir 


**FIG. 1.** - Sampling localities.

considered as *Tatera* sensu stricto and consequently all of the African species were placed in one genus , *Gerbilliscus* Thomas, 1897. Chevert and Dobigny (2005) showed that based on genomic DNA data, *Tatera* is a polyphyletic taxon. The taxonomy of this genus highly debated, with the major controversies on the status of the only Asiatic *Tatera* species. The results of his studies clearly showed that the African and Asian *Tatera* are not monophyletic. Therefore, *T.indica* is a taxonomically difficult taxon and the relationship of this species with the African species is one of the most problematic points in this taxon. Therefore it is generally accepted that a revision of this genus is very much required (Colangelo et al., 2005).

In this study, external and cranial morphometric characters and dental patterns between populations from different geographic localities in Iran were compared. The univariate and multivariate statistical analyses (Principal component and canonical discriminant analyses) were performed to assess the overall differentiation between populations.

## MATERIAL AND METHODS

In total, 84 specimens of *Tatera indica* collected from different localities of Khorasan, Sistan & Baluchistan, Fars and Bushire provinces. Specimens were collected using various live and snap traps from widely scattered localities (Fig.1). All specimens were deposited and housed in the Zoological museum of Ferdowsi University of Mashhad and Rodentology Research Department (ZMFUM).

The following standard external measurements (in mm) taken from the museum database or by author: tail Length (T); Head and body length (HB); hind foot length (HF) and ear length (EL). 18 cranial and dental measurements (in mm) were used including: Condylobasal length (CBL) from the occipital condyles to the anterior edge of incisor; length of the nasals (LN); occipitonasal length(OL); width of tympanic bullae(WB); length of tympanic bullae(LB); auditory meatus diameter(AMD); length of mandible(LM); height of mandible(HM); width of mandible(WM); width of zygomatic arch (WZ); Width of palatine(WP); width of braincase(WBC); length of diastema(LD); length of anterior palatine foramina (LAPF); upper cheek teeth(UCT); lower cheek teeth(LCT); height of skull (HS); width of rostrum(WR); interorbital constriction(IC); diameter of orbit (DO).

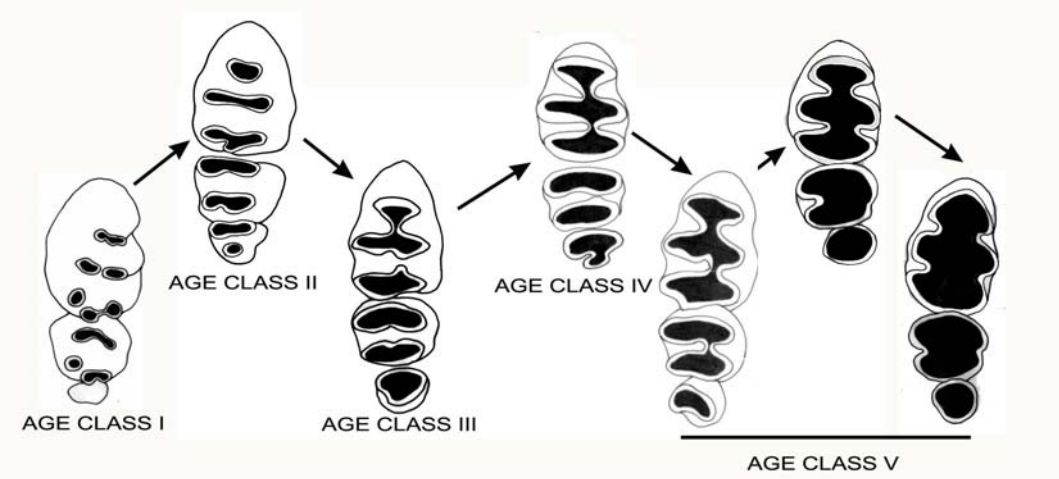


**FIG. 2. -** Age variations of the upper molars in *Tatera indica.*

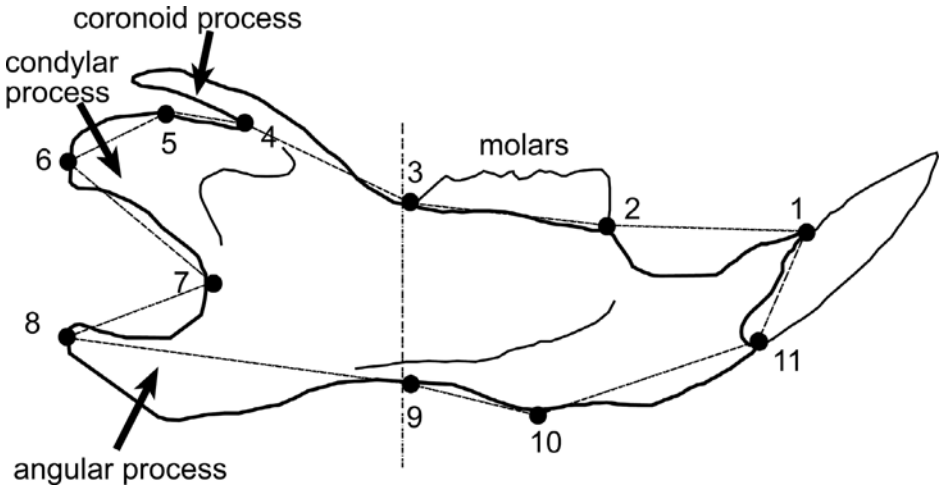


**FIG. 3. -** Position of landmarks around each hemimandible used in GM analysis.

All measurements were made using digital calipers accurate to 0.05 and a NIKON measuring microscope MM-40 to the nearest 0.001 mm. Dental patterns of mandibular and maxillary tooth rows were drawn using a drawing tube connecting to a stereomicroscope (Olympus SZH-10). The age of all specimens was determined from the pattern of tooth rows. Specimens were classified into five age classes from younger to older following Peter (1956) (Fig. 2).

The univariate, bivariate and multivariate statistical analyses were conducted on a PC using SPSS ver.13, PAST and NTSYS. In order to determine the differences between sexes, the data were tested with multivariate covariance analysis (MANCOVA) with CBL as covariate for cranial variables as covariate using GLM procedure of SPSS. In this procedure the effects of covariates with factor (sex) can be included. The results of MANCOVA revealed that there are no significant differences between sexes (Wilk's lambda=0.642; F=0.201; p=0.88). Therefore, specimens of both sexes were combined in subsequent analyses.

In order to determine the pattern of geographic variation and differences in shape and relative values, Principles Component Analysis (PCA) based on the correlation matrix of log-transformed caranial variables was performed with the PCA procedure of PAST. The missing values in the PCA

analysis have been replaced by the variable means for each population. Also, in order to showing discrimination between populations, canonical discriminant analysis (CDA) of log transformed data using Mahalanobis distance was carried out with the CLASSIFY procedure of SPSS. External variables have been excluded from the PCA and CDA analyses, because of many missing values for these variables and minor interobserver methodological differences. Finally, cluster analysis was carried out using PAST based on mean of the variables for each sample.

Very preliminary results of a pilot study of exploration of variation of mandible proportions in the *T.indica* by means of GM methods are presented here. The main task of the present study is to show possibilities of GM in such kind of investigations.

Mandibles of the Indian Gerbils collected from different localities of Eastern and southern parts of Iran were used to study of intraspecific variations in *T.indica* based on Geometric Morphometrics methodology. The left and right hemimandibles were separarted at the mandibular symphysis. The right hemimandibles were placed on a glass slide to prepare digital images. Specimen digitized images were prepared using a two-dimensional video based data capture system that included a CCD camera connected to a computer. The images were optimized using ImageJ software. Landmarks were obtained using a digitizing computer program tpsDig and analyzed by the geometric morphometric computer programs such as tpsREGR and tpsRELW (Rholf 1993, 1998a, b, c and 2001) (Fig.3).

Live trapped specimens were transferred to the Ferdowsi University where chromosome metaphases were obtained from bone marrow. Chromosome spreads from the femoral and tibial bone marrow cells of the one hour vinblastin-treated specimens were prepared by flame drying method. Metaphases were stained by the Giemsa standard method (pH=7, 00). About 20 metaphase spreads from each animal were examined at x100 magnification and photographed using a CCD camera connected to a computer. The karyotype was determined on the basis of five well-prepared metaphase spreads. The results were compared according to variations in 2N and NFa values.

## RESULTS

### Genus *Tatera*, Lataste 1882
### Type Species: Dipus indicus, Hardwicke

**GEOGRAPHIC RANGE:**

India, from Punjab and Sind south through the peninsula, to Ceylon, east to Bengal. Persia, Mesopotamia, Syria, Arabia, Africa, south to Sahara; Gambia, Nigeria, East Congo, Angola, Abyssinia, Somalia, Kenya, Uganda, Tanganyika, Sudan, South-West Africa, and generally throughout south Africa. *T. indica* was distributed in South and Eastern parts of Iran (Fig, 1)

**DIAGNOSIS OF *T.INDICA***

The Dorsal fur varies between yellowish to tawny brown; cheeks and flanks dirty white; occipitonasal length greater than that of *Meriones* spp.; supramental triangle smaller than *Meriones* spp.; the bullae relatively small; the posterior outline of bullae not project beyond occipit. Tail color dark above and below, and pale at the sides; tail with a well-marked tuft; the size is rather large (up to 187 mm).

**STATISTICAL ANALYSES**

On the basis of dental patterns of the upper molars five basic patterns were recognized which show the age variations. Therefore, we could predict the age of these rodents according to their dental patterns (Fig. 2). Analysis of variance revealed no differences between specimens in all age classes based on CBL means as overall size variable of the skull. Therefore, specimens of all age groups were combined in consequent statistical analyses. The sample size, mean, standard deviation, minimum and maximum values for cranial variables of different samples are given in table 1.

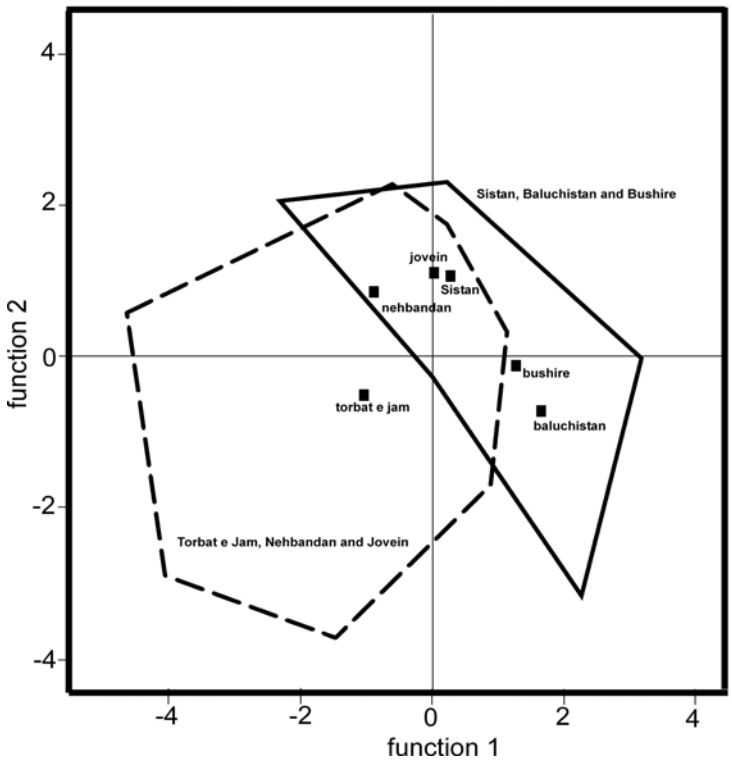


**FIG.4. -** Plots of Canonical discriminant functions 1 against 2 in different samples of *Tatera indica.*

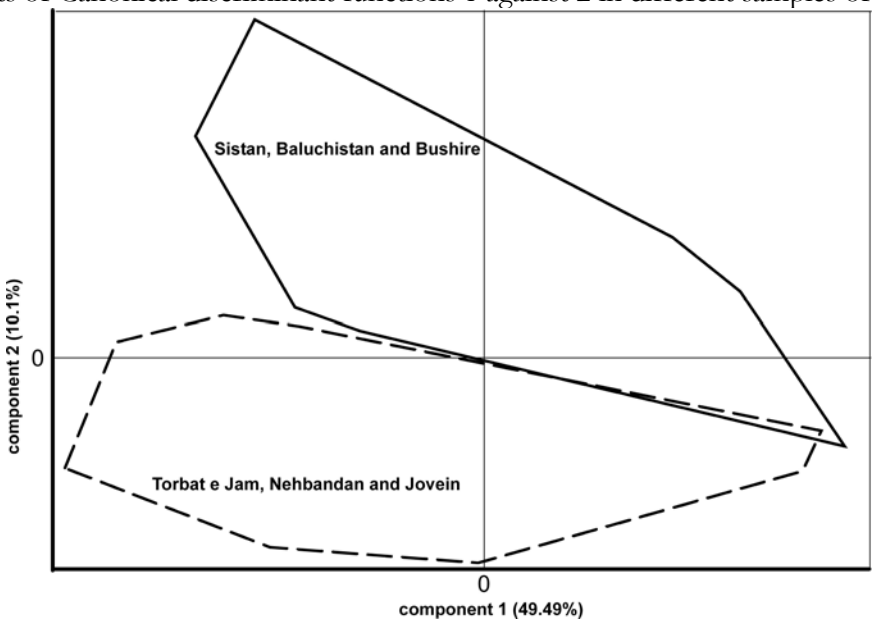


**FIG.5. -** Plots of Principal Components 1 against 2 based on the correlation matrix in different samples of *T.indica*, showing the separation of two main phenetic groups.

The CDA of the specimens from different populations revealed discrimination between samples. On the basis of this stepwise method WP, LB, ICT, HS, IC, LM entered to the analysis. Standardized canonical discriminant functions for these variables are given in table 2. IC and LM made large negative and positive contributions, respectively to component 1. Comparison of group centroids revealed that Torbat and Nehbandan populations had negative scores on component 1

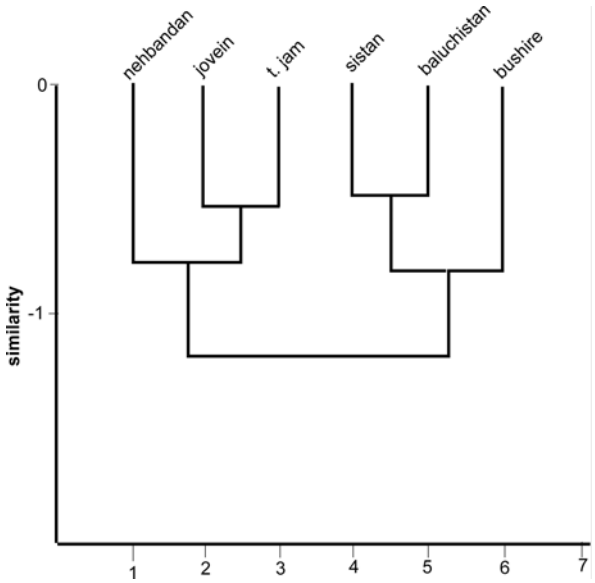


**FIG.6. -** The dendrogram resulted from cluster analysis based on Euclidean distance. There are two main clusters in dendrogram.

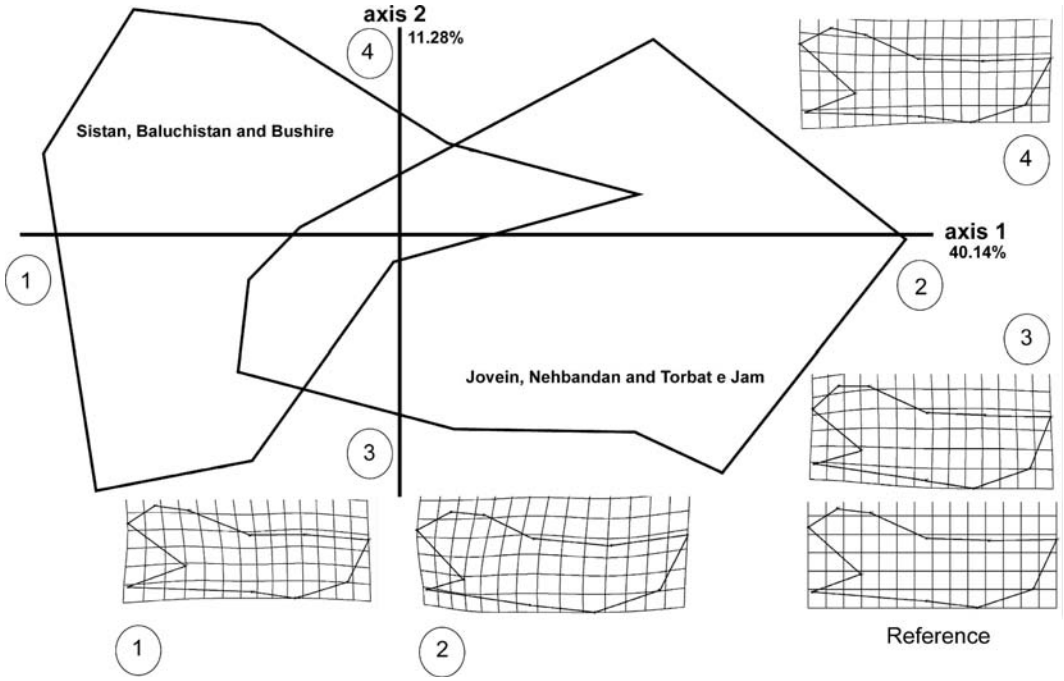


**FIG. 7. -** Relative Warps Analysis using landmark data from labial side of mandible. The Consensus shape is also presented.

whereas, Torbat, Baluchistan and Bushire populations had negative scores on the component 2 (Table 3 ). Therefore, Torbat, Nehbandan and Jovein populations were well discriminated using component 1 from Sistan, Bushire and Baluchistan (Fig.4).

In PCA the first three principal component axis explained 49.9%, 10.10% and 6.13% of the total variation, respectively. In the first axis all variables showed a positive loading. In the second axis WZ, UCT, ICT, WR and IC had relatively large positive loadings. In the third axis WP, LD, LAPF,

**TABLE 2.-** Standardized Canonical Discriminant Function Coefficient.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **WP** | -0.064 | -1.163 | 0.911 | 0.537 | 0.068 |
| **LB** | 0.437 | -0.407 | -1.072 | -0.359 | 0.807 |
| **ICT** | -0.558 | 0.502 | -0.265 | 0.720 | 0.307 |
| **HS** | 0.414 | 0.889 | 0.104 | 0.045 | -0.243 |
| **IC** | -0.688 | 0.543 | 0.461 | -1.029 | 0.292 |
| **LM** | 0.739 | 0.220 | 0.272 | 0.519 | -0.177 |

See Text for Abbreviation of variables.

**TABLE 3.-** Canonical Discriminant Analysis Functions at Group Centroids.

| Locality | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Torbat** | - 1.094 | - 0.488 | - 0.051 | - 0.015 | 0.039 |
| **Jovein** | 0.035 | 1.135 | - 1.369 | 0.629 | - 0.076 |
| **Nehbandan** | - 0.966 | 0.830 | 0.963 | 0.049 | - 0.572 |
| **Sistan** | 0.302 | 1.031 | 0.184 | - 0.334 | 0.111 |
| **Baloochistan** | 1.645 | - 0.728 | - 0.240 | - 0.195 | - 0.095 |
| **Booshehr** | 1.141 | - 0.135 | 0.937 | 0.809 | 0.140 |

**TABLE.4. -** Consensus configuration.

| LM | X | Y |
|---|---|---|
| 1 | 0.46547 | 0.05771 |
| 2 | 0.23778 | 0.05444 |
| 3 | 0.02859 | 0.06172 |
| 4 | -0.15991 | 0.14453 |
| 5 | -0.27075 | 0.15794 |
| 6 | -0.36886 | 0.09709 |
| 7 | -0.19089 | -0.05515 |
| 8 | -0.35550 | -0.11184 |
| 9 | 0.02816 | -0.14123 |
| 10 | 0.19848 | -0.16349 |
| 11 | 0.38743 | -0.10171 |

UCT, ICT, AMD, LM and HM had positive loadings. Individual scores for the first and second (PC1 and PC2) principal component variables are plotted in Fig.5.The resulted dendrogram based on Euclidean distance showed that there are two main clusters including Torbat, Jovein and Nehbandan in the first cluster and Sistan, Baluchistan and Bushire in the Second cluster (Fig.6).

**GEOMETRIC MORPHOMETRICS**

The analysis of complete set of landmarks (Fig.3) by the Thin-Plate Spline (TPS) method indicates that percentage of total variance explained by relative warps analysis decreases from the 1st to the 18th. 40.14 percent of total variance is explained by the RW1 and 11.28 percent of total variance is explained by RW2 (Fig.7). The Analysis of landmark data from labial side of the mandible shows two main phenetic groups which reflects the geographical distribution and subspecific status of *T.indica* in the south and east of Iran. The resulted scatterplot form relative warps analysis using

TPSrelw program shows a distinction between Jovein, Nehbandan, Torbat-e-Jam and Bushire, Sistan, Baluchistan (Fig.7). The results of the landmark data analysis of labial side of mandible confirm the results of the multivariate morphometric statistical analyses. Visualization of transformation in mandible shape along the RW1 and RW2 were presented in the Fig.7. Consensus configuration, variances at each landmark, relative contribution of each landmark and singular values for relative warps are given in tables 4 – 6.

**TABLE. 5. -** Variances at each landmark for aligned specimens.

| I | $S^2x$ | $S^2y$ | $S^2$ |
|---|---|---|---|
| 1 | 0.2208 | 0.0035 | 0.2243 |
| 2 | 0.0577 | 0.0031 | 0.0607 |
| 3 | 0.0010 | 0.0039 | 0.0049 |
| 4 | 0.0261 | 0.0213 | 0.0474 |
| 5 | 0.0748 | 0.0255 | 0.1003 |
| 6 | 0.1387 | 0.0097 | 0.1484 |
| 7 | 0.0373 | 0.0031 | 0.0404 |
| 8 | 0.1289 | 0.0129 | 0.1418 |
| 8 | 0.1289 | 0.0129 | 0.1418 |
| 9 | 0.0011 | 0.0204 | 0.0214 |
| 10 | 0.0403 | 0.0273 | 0.0675 |
| 11 | 0.1530 | 0.0106 | 0.1636 |

**TABLE.6. -** Relative contribution of each landmark (from R"t matrix).

| LM# | SS |
|---|---|
| 1 | 0.01409 |
| 2 | 0.03403 |
| 3 | 0.07100 |
| 4 | 0.20190 |
| 5 | 0.31511 |
| 6 | 0.11781 |
| 7 | 0.05392 |
| 8 | 0.02364 |
| 9 | 0.06274 |
| 10 | 0.06838 |
| 11 | 0.03737 |

**KARYOLOGY**

2N=68, NFa=80. The autosomal set contains 7 pairs of metacenteric and 26 pairs of acrocenteric chromosomes. The X chromosomes were large-sized metacenterics and the Y chromosome was acrocenteric. The chromosome spreads and morphology of chromosomes was presented in Fig. 8. There are not any significant differences in 2N between populations.

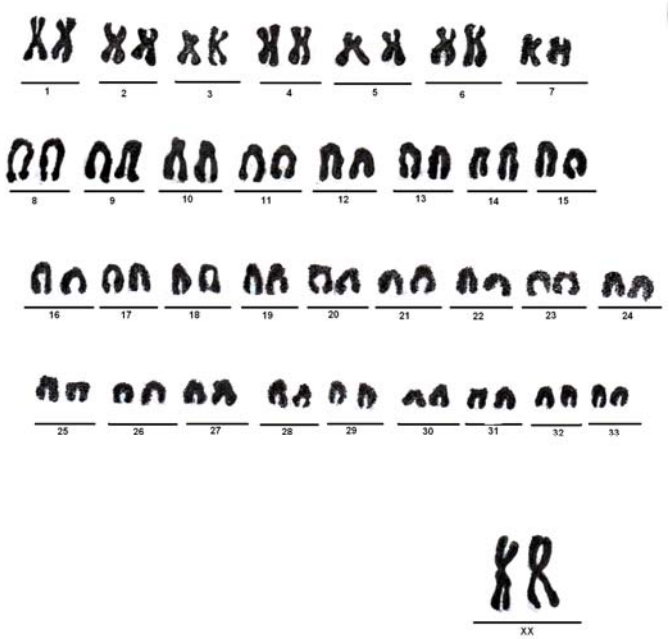

**FIG.8. -** Karyotype of a female *T.indica.*

## DISCUSSION

Local populations are nature's real building blocks. When they do not differ consistently from other (usually more or less adjacent) populations, the whole series form a single subspecies or species. At the level of species or subspecies character complexes commonly varying. For example measurements, details of colors, or more rarely facial patterns or colors of soft parts are varying at these levels. In most widespread species one or more of these complexes does vary geographically, forming more or less well-defined subspecies. There may also be areas where there are variations. Such variable populations should not be arbitrarily squeezed into one or another of the truly distinct subspecies (Phillips, 1982). The basis for the description of a subspecies is character differences, as seen in representatives (usually specimens) of that population and thus adequate material in the form of a good series of specimens is mandatory (O`Neill, 1982). But understanding the subspecific structure of a species directly depends on complete field studies. Therefore, one must refine subspecies with far better materials leaving less room for doubts. Recognizing the populations as different subspecies reflects the different geological and phylogeographical histories of them. Thus, the subspecies should be connected to an evolutionary unit. If we consider a subspecies as an evolutionary unit, its usefulness of subspecies concept is greatly enhanced. This means that some breaks in gene flow between populations are responsible for the differentiation between populations as subspecies. According to Ellerman (1948), *Tatera indica* consist of several subspecies and four of which occur in Iran including: *T.indica persica* in Sistan; *T.indica scansa* in Kerman; *T.indica monticola* in Mala-Mir (70km NE of Ahvaz) and *T.indica bailwardi* in Khuzestan. However, according to Missone (1959), there are two subspecies in Iran *T.indica indica* in Sistan and *T.indica teaniura* in Kerman and western parts of Iran. But the results of the present study show that there is discrimination between the northern and southern populations of *T.indica* in Iran (Fig.4-6).

These findings might be reflecting the different histories and origins of the two separated groups. Probably, the populations of Indian gerbils in the eastern parts of Iran have two different origins and must not be considered as a single continuum. The separation of two different groups may be related to presence of two semi-species or sibling species. In order to resolve the problematic status of eastern populations we recommend that some additional experiments such as molecular and

cytogenetic (C and G-Banding) studies be carried out. Different authors have reported various 2N and NFa form *T.indica*. Matthey (1953) reported that 2n = 72, and NF = 80 in *T. indica*. In contrast, Rao et al (1968), Yoshida (1981) and Aswanthanaryana and Manjunatha (1981) stated that 2n = 68. Aswanthanaryana and Manjunatha (1981) also reported that NF varies between 80 and 86 in the Indian populations of this species. They also reported that 2n is stable among their populations. According to Yoshida (1981), *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.

The results of the analyses indicate that morphometric characteristics of the populations of *Tatera indica* in Iran slightly different. The relative values of WP, LN, LAPF, HS, WR, AMD, WM and HM were greater in the Bushire population than the other populations. Also, the relative values of CBL, WZ, UCT, DO, and IC were greater in Sistan population. The larger values of LN, LD and WR may reflect more developed incisors in Bushire population. Since, DO, WZ, IC and CBL reflect the overall length and width of the skull; the Sistan population has larger and broader skulls than the other populations. The larger LB and WB in Baluchistan population may be related to the large ear; also it may reflect different ecological characteristics of this population.

The PCA showed slight difference in overall size in Bushire sample in comparison with the other samples (Component 1) (Fig.4). Also, there are differences in shape factor between Torbat, Jovein, Nehbandan and Sistan, Baluchistan, Bushire. This discrimination between samples has been shown in the results of cluster and CDA analyses (Fig.5).

Chevret and Dobigny (2005) have rejected the monophyly of the genus *Tatera* according to molecular studies. According to their study, the African *Tatera* is more closely related to Gerbillurus than to *Desmodillus* and *T.indica*. Their results clearly show that the African and Asian *Tatera* are not monophyletic, with the Gerbillurus clade being closer to the African *Tatera*, and *Desmodillus* being closer to this group than *T. indica*. The monophyly of the African *Tatera* and *Gerbillurus* lineages, to the exclusion of the Indian *Tatera* has already been suggested by previous morphological, chromosomal and DNA/DNA hybridization surveys (Chevret and Dobigny 2005).

According to molecular dating methods some dispersal events have occurred during the mid-miocene and it is possible that the ancestor of *T.indica* lineage dispersed to Asia (Chevert and Dobigny 2005). In this case the evolution of the remaining taxa all occurred in Africa. However, it has been proposed that many of the murid lineages originated in Asia and subsequently migrated to Africa, where they differentiated (Chevert and Dobigny 2005). It was also suggested that most of migrations between these two continents from the mid-Miocene through the Pliocene occurred mainly from Asia towards Africa whereas the opposite dispersal pattern is less frequent. It seems that mammalian migrations were mostly from Asia to Africa rather than from Africa to Asia during the Miocene and Pliocene periods (Chevert and Dobigny, 2005; Cox, 2000). However, gerbilline rodents provide an opposite pattern with several migration events from Africa and towards Asia during the same periods of time. Therefore, *T.indica* has been originated from Africa and it has been migrated to Asia through some land bridges between Africa and Asia. This species distributed in the western parts of Iran towards Syria, Turkey and Iraq and it has been probably distributed to the Iranian Plateau through the southwestern penetration zones.

**ACKNOWLEDGMENT**

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**TABLE 1-** Cranial measurements (mm) of *Tatera indica* from different populations.

| | Torbat - e - Jam | | | | | Nehbandan | | | | | Jovein | | | | | Sistan | | | | | Baluchistan | | | | | Bushire | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | SD | Min | Max | N | Mean | SD | Min | Max | N | Mean | Sd | Min | Max | N | Mean | Sd | Min | Max | N | Mean | Sd | Min | Max | N | Mean | Sd | Min | Max |
| **OL** | 27 | 38.48 | 5.76 | 28.60 | 47.35 | 3 | 38.16 | 3.65 | 35.20 | 42.25 | 4 | 38.37 | 3.18 | 35.95 | 43.05 | 12 | 43.25 | 1.71 | 40.30 | 46.45 | 13 | 41.05 | 3.63 | 31.20 | 45.65 | 5 | 42.74 | 2.16 | 39.90 | 45.75 |
| **CBL** | 26 | 34.68 | 5.54 | 26.70 | 44.05 | 3 | 34.03 | 2.95 | 31.55 | 37.30 | 5 | 35.28 | 3.31 | 32.45 | 39.25 | 12 | 39.53 | 1.79 | 36.70 | 42.45 | 11 | 38.01 | 2.49 | 34.15 | 42.20 | 5 | 39.51 | 2.45 | 36.65 | 43.25 |
| **WZ** | 20 | 21.20 | 2.75 | 16.60 | 25.55 | 3 | 19.01 | 0.14 | 18.85 | 19.10 | 3 | 20.66 | 1.70 | 18.70 | 21.75 | 11 | 21.95 | 2.63 | 14.80 | 25.10 | 13 | 21.01 | 2.50 | 16.15 | 24.15 | 4 | 20.42 | 3.06 | 16.10 | 22.90 |
| **WP** | 32 | 3.58 | 0.71 | 1.80 | 5.45 | 4 | 3.50 | 0.44 | 3.20 | 4.15 | 6 | 2.97 | 0.44 | 2.55 | 3.65 | 17 | 3.60 | 0.68 | 2.35 | 4.75 | 16 | 3.70 | 0.63 | 2.40 | 4.45 | 6 | 4.29 | 0.45 | 3.85 | 5.00 |
| **WBC** | 27 | 16.89 | 0.87 | 15.00 | 18.40 | 4 | 15.57 | 2.67 | 11.90 | 18.20 | 5 | 17.32 | 0.60 | 16.60 | 18.00 | 13 | 17.15 | 1.73 | 11.85 | 18.30 | 14 | 17.02 | 1.72 | 12.00 | 19.10 | 7 | 17.25 | 0.60 | 16.30 | 17.90 |
| **LN** | 32 | 15.47 | 3.13 | 10.90 | 21.20 | 4 | 15.02 | 3.17 | 11.75 | 18.95 | 5 | 16.18 | 1.67 | 14.40 | 18.40 | 17 | 17.10 | 2.51 | 12.50 | 20.00 | 14 | 16.65 | 2.62 | 11.15 | 20.55 | 5 | 18.32 | 1.21 | 16.55 | 19.65 |
| **LD** | 33 | 9.68 | 1.96 | 6.70 | 13.10 | 4 | 11.82 | 4.89 | 8.65 | 19.05 | 6 | 9.67 | 1.20 | 8.60 | 11.25 | 17 | 10.58 | 2.00 | 6.85 | 13.30 | 16 | 10.77 | 1.61 | 7.10 | 13.25 | 6 | 11.83 | 0.88 | 10.40 | 13.15 |
| **LAPF** | 33 | 6.28 | 1.32 | 3.80 | 8.90 | 4 | 6.11 | 0.24 | 5.75 | 6.30 | 6 | 6.71 | 0.77 | 5.80 | 7.85 | 15 | 6.77 | 1.20 | 4.60 | 8.25 | 16 | 6.86 | 1.06 | 4.65 | 8.35 | 6 | 7.60 | 0.64 | 6.90 | 8.60 |
| **LB** | 31 | 10.56 | 1.21 | 8.20 | 12.60 | 3 | 9.96 | 0.62 | 9.25 | 10.35 | 5 | 10.83 | 0.66 | 10.25 | 11.55 | 14 | 11.12 | 0.93 | 8.90 | 12.30 | 15 | 11.51 | 0.81 | 9.35 | 12.50 | 7 | 11.35 | 0.65 | 10.60 | 12.55 |
| **WB** | 31 | 7.10 | 0.71 | 5.90 | 8.45 | 3 | 7.16 | 0.28 | 6.85 | 7.40 | 5 | 7.40 | 0.43 | 6.95 | 8.00 | 14 | 7.65 | 0.54 | 6.85 | 8.75 | 15 | 7.76 | 0.65 | 6.40 | 8.80 | 7 | 7.57 | 0.48 | 7.05 | 8.40 |
| **UCT** | 33 | 6.66 | 0.39 | 6.05 | 7.40 | 4 | 6.62 | 0.11 | 6.50 | 6.75 | 6 | 6.78 | 0.41 | 6.20 | 7.35 | 18 | 6.97 | 0.40 | 5.90 | 7.75 | 16 | 6.42 | 0.61 | 5.05 | 7.15 | 7 | 6.76 | 0.30 | 6.35 | 7.20 |
| **LCT** | 26 | 6.43 | 0.40 | 5.55 | 7.25 | 4 | 6.43 | 0.31 | 6.05 | 6.70 | 5 | 6.59 | 0.25 | 6.20 | 6.85 | 18 | 6.36 | 0.34 | 5.55 | 6.85 | 16 | 5.95 | 0.45 | 4.90 | 6.35 | 7 | 6.35 | 0.24 | 6.15 | 6.70 |
| **HS** | 23 | 15.42 | 2.14 | 11.30 | 18.85 | 3 | 16.35 | 0.79 | 15.75 | 17.25 | 5 | 16.33 | 0.91 | 15.30 | 17.30 | 14 | 17.45 | 1.28 | 14.85 | 19.25 | 14 | 16.78 | 1.23 | 13.80 | 18.65 | 5 | 17.52 | 0.67 | 16.55 | 18.40 |
| **WR** | 32 | 5.62 | 0.72 | 4.70 | 7.05 | 4 | 5.72 | 0.52 | 5.35 | 6.50 | 6 | 5.33 | 0.27 | 5.00 | 5.70 | 17 | 5.72 | 0.61 | 4.50 | 6.65 | 16 | 5.51 | 0.47 | 4.50 | 6.20 | 6 | 5.91 | 0.31 | 5.35 | 6.20 |
| **AMD** | 31 | 2.45 | 0.15 | 2.10 | 2.80 | 3 | 2.63 | 0.20 | 2.40 | 2.80 | 5 | 2.67 | 0.16 | 2.45 | 2.85 | 14 | 2.51 | 0.19 | 2.25 | 2.80 | 14 | 2.63 | 0.17 | 2.40 | 2.90 | 7 | 3.03 | 1.15 | 2.50 | 5.65 |
| **DO** | 26 | 14.16 | 2.13 | 10.20 | 17.25 | 4 | 13.40 | 0.71 | 12.90 | 14.45 | 5 | 14.67 | 1.40 | 13.40 | 16.30 | 13 | 15.64 | 1.47 | 11.95 | 17.40 | 13 | 14.43 | 2.01 | 11.60 | 16.60 | 5 | 14.51 | 2.45 | 10.30 | 16.55 |
| **IC** | 32 | 6.77 | 0.63 | 5.95 | 8.35 | 4 | 6.98 | 0.30 | 6.65 | 7.35 | 6 | 6.46 | 0.27 | 6.05 | 6.90 | 17 | 7.12 | 0.62 | 6.20 | 8.75 | 14 | 6.62 | 0.41 | 5.80 | 7.30 | 7 | 6.97 | 0.35 | 6.50 | 7.60 |
| **WM** | 25 | 17.21 | 3.13 | 11.15 | 22.50 | 4 | 18.37 | 1.57 | 17.25 | 20.70 | 5 | 18.64 | 1.74 | 16.75 | 20.70 | 17 | 20.21 | 2.50 | 15.35 | 24.35 | 15 | 20.50 | 1.84 | 15.65 | 23.25 | 7 | 22.51 | 3.05 | 20.50 | 29.15 |
| **HM** | 26 | 8.72 | 1.67 | 6.20 | 12.25 | 4 | 8.30 | 0.49 | 7.85 | 9.00 | 5 | 8.44 | 0.80 | 7.60 | 9.45 | 17 | 9.55 | 1.57 | 6.10 | 11.45 | 15 | 9.81 | 1.53 | 6.55 | 12.25 | 7 | 10.47 | 0.68 | 9.85 | 11.75 |

**این صفحه سفید است**

**شروع مقاله بعدی از صفحه ۶۳**