
(*Tatera indica* Hardwicke, 1807)

*

(// : // :)

(*Tatera indica* Hardwicke, 1807)

()

T

(PCA)

(MANOVA)

T. indica

(*Tatera indica* Hardwicke, 1807)

Goyal &)

(Gosh, 1993

(Yiğit *et al.*, 2001)

(Harrison & Bates, 1991)

(Nowak & Paradiso, 1983 Goyal & Ghosh, 1993)

Khaje &)

Meshkani, 2010; Ashrafzadeh *et al.*, 2007; Yiğit *et al.*, 2001; Harrison & Bates, 1991; Etemad, (1976

Corbet, 1978; Corbet & Hill, 1991;)

Harrison & Bates, 1991; Alderton, 1996; Wilson (& Reeder, 2005

Lay,)

(Misonne, 1959 1967

Khaje & Meshkani, 2010;)

Mirshamsi *et al.*, 2007; Darvish *et al.*, 2006; Meshkani Khaje (Ashrafzadeh *et al.*, 2007 (2010)

(Molur *et al.*, 2005)

(2008) IUCN

T. indica

(Kryštufek *et al.*, 2008)

(LC)

(2007)

Mirshamsi

Molur *et al.*)

(*al.*, 2005

(Yiğit *et al.*, 2001)

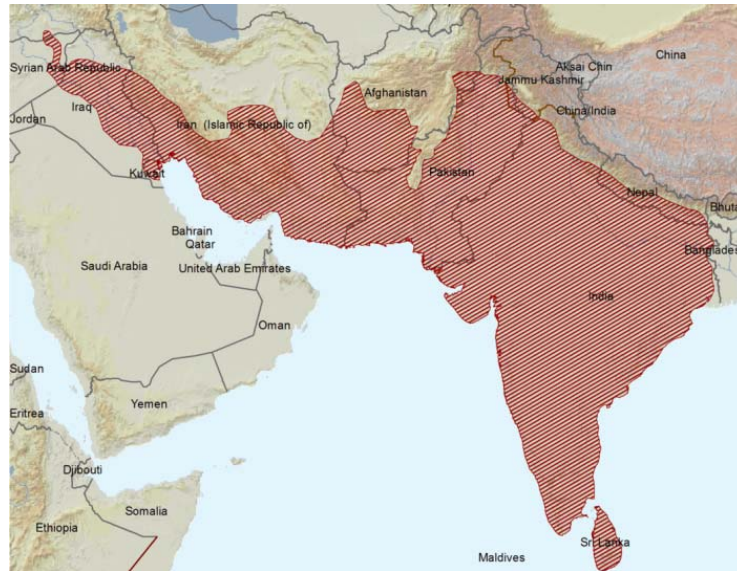
T. indica (1991) Bates Harrison

Mumtaz,)

(Rana *et al.*, 1970 1989

¹ Indian Gerbil
² Least Concern

T. indica



(Kryštufek et al., 2008) *T. indica*

(*Amygdalus scoparia*)

(*Juniperus excelsa*)

(*Acacia* spp.)

(*Convolvulus* spp.)

(*Pistacia atlantica*)

(*Prosopis* spp.)

(*Euphorbia* spp.)

()

(Nadjafi Tireh –Shabankareh et al., 2007)

Ashrafzadeh et al., 2010; Ashrafzadeh et al.,)

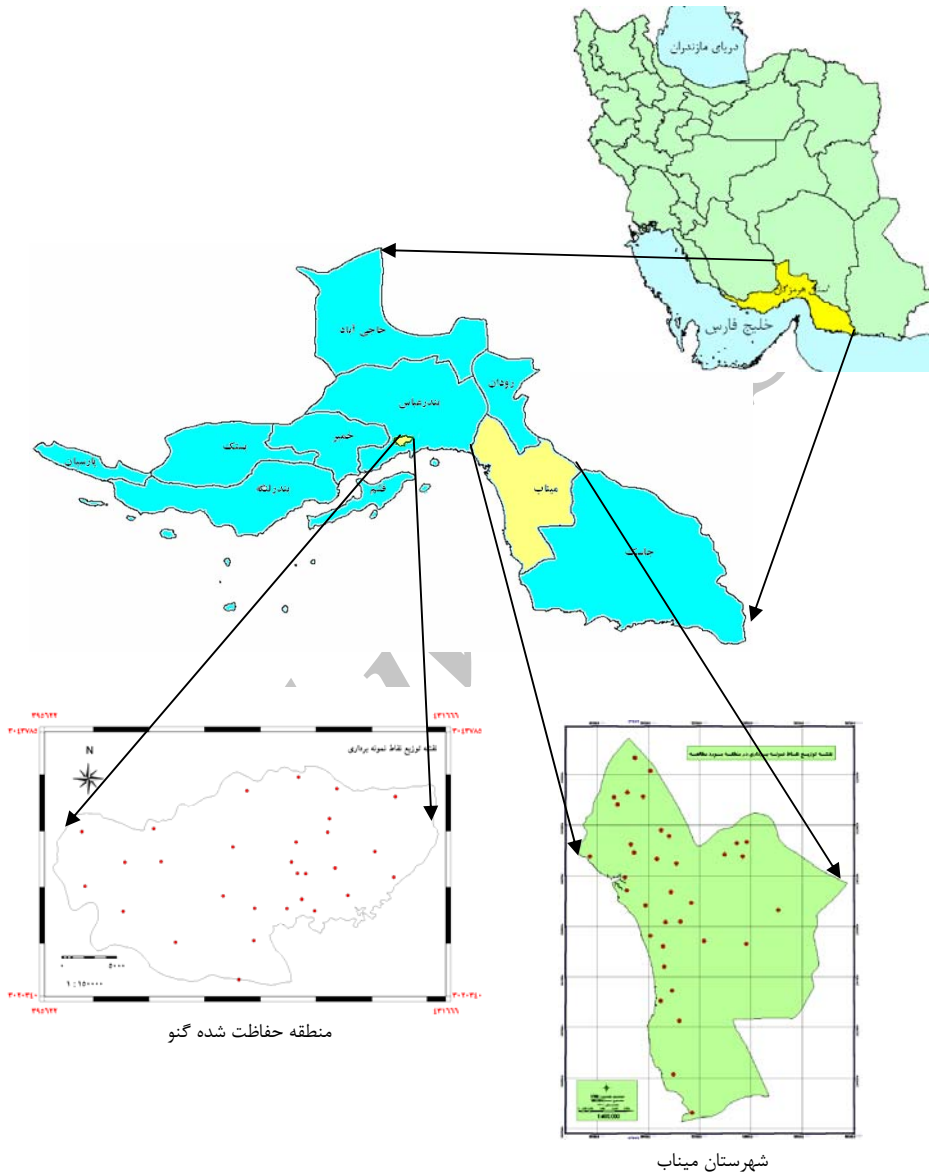
(2007; Zehzad & Madjnoonian, 1997

)

Haloxylon sp. *Hammada* sp. *Salsola* sp.

Convolvulus *Cymbopogon* sp. *Zygophyllum* sp.

(*Haloxyton ommodertron*) (sp. . *Haloxyton* sp. sp.
(*Salsola* sp.) (*Zygophyllum eurypterum*) (*Euphorbia larica*)
Ziziphus spina -) (*Calotropis procera*)
Acacia) (*Prosopis* spp.) (*christi*)



() (W_{gr})
 (OL) :
 (ZW) (CL)
 (CW) (LW) × ×)
 (LD) (LN)) ()
 (LPF) (× × × ×)
 (WTB) (LTB)
 (UCH)
 (LCH)
 (WR) (HS)
 (LM)

Mirshamsi et al., 2007 Khaje & Meshkani, 2010)
 Moradi & Kivanc, 2003 Ashrafzadeh et al., 2007 Lee, 1997; Cunningham & Moors,)
 () (YiĜit et al., 2001) (1987

Excel SPSS 11.5
 Harrison
 (1976) Etemad (1978) Corbet (1991) Bates
 T

Moradi & Kivanc, 2003 Mirshamsi et al., 2007)
 (Momenzadeh et al., 2001
 (HBL) :
 (HFL) (EL) (TL)
 T

⁴ Kolmogorov- Smironov
⁵ Independent Sample T-Test

¹ Sherman Trap
² Locally Made Trap
³ Havahart Trap

...

Acacia-)

Hammada-)

(Ziziphus-Prosopis

(Salsola-Gymnocarpus

Khaje & Meshkani, 2010; Ashrafzadeh et al.,)

(2007

T. indica

T

(MANOVA)

(PCA)

T

(TL)

(HBL)

(EL)

T. indica

(p<0.01 p<0.05)

(HFL)

(W_{gr})

(p>0.05)

CL OL

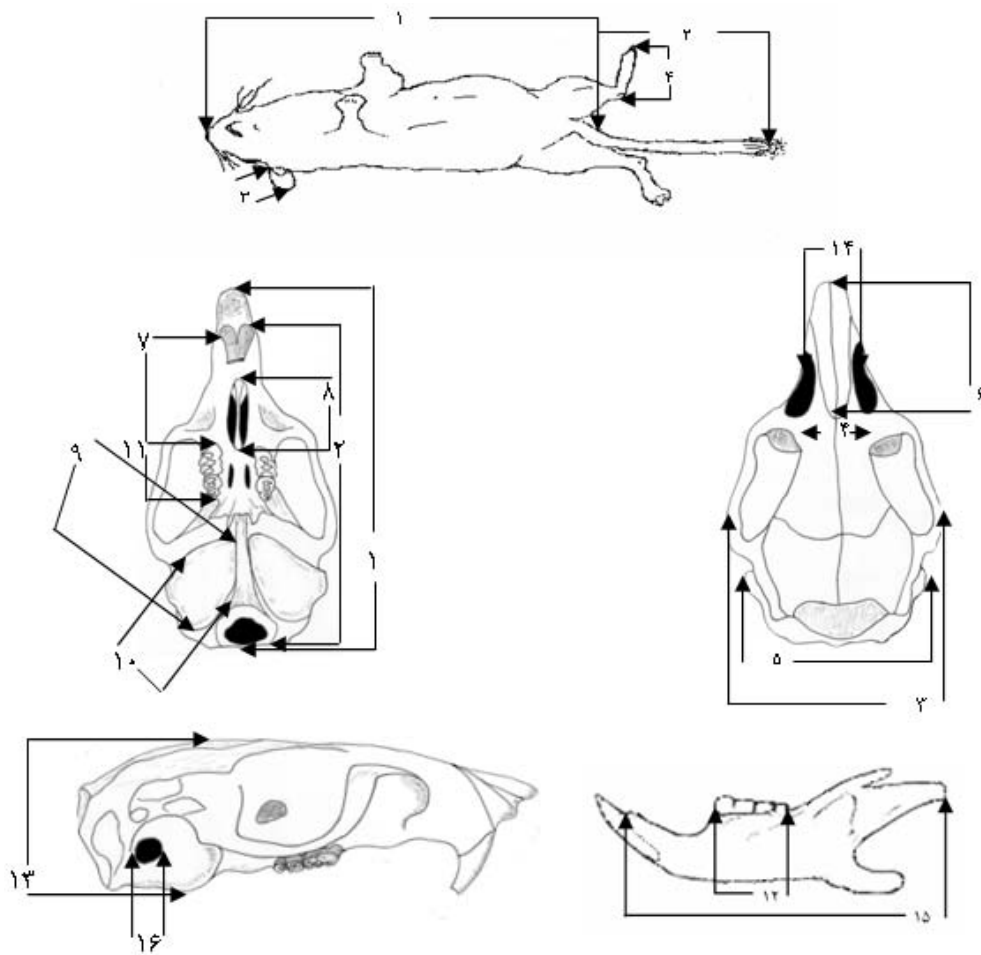
WR WTB LTB LPF LD CW LW ZW

(p<0.001 p<0.01 p<0.05)

LM HS LCH UCH LN

(p>0.05)

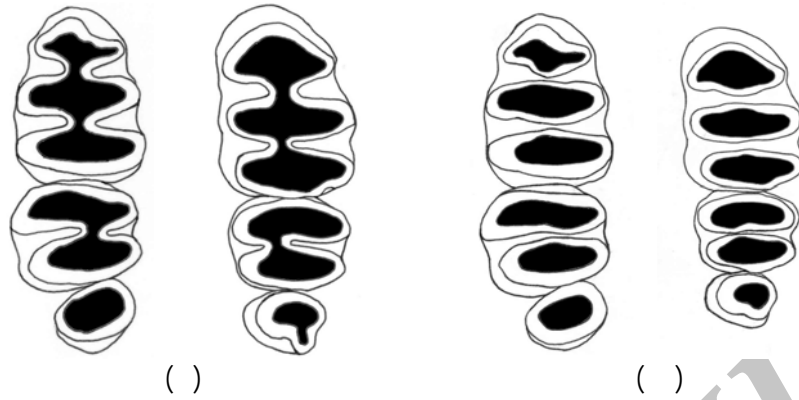
¹ Principle Component Analysis



(*T. indica*)



() *T. indica*



T. indica

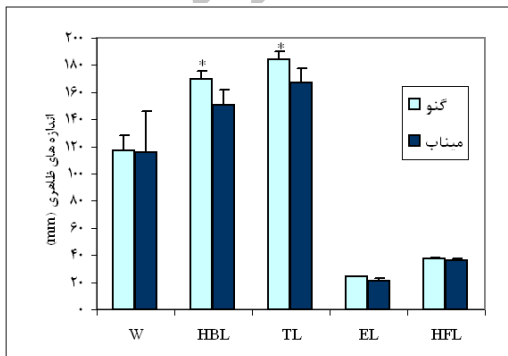
T. indica

MANOVA

($p < 0.001$)

LM CL

()



T. indica

(HFL/HBL)

($p < 0.01$)

EL/HBL W/HBL TL/HBL

()

($p > 0.05$)

HFL/HBL W/HBL TL/HBL

EL/HBL

CW/HBL LW/HBL ZW/HBL CL/HBL

WTB/HBL LTB/HBL LD/HBL LN/HBL

WR/HB HS/HBL LCH/HBL UCH/HBL

LM/HBL

($p < 0.001$ $p < 0.01$ $p < 0.05$)

LPF/HBL OL/HBL

($p > 0.05$)

()

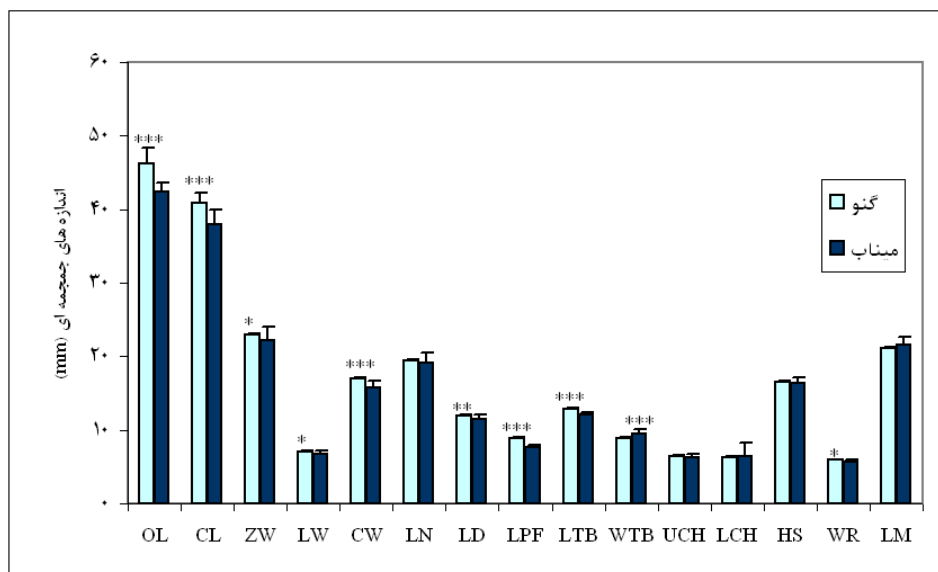
LPF/HBL

	<i>T. indica</i>				(mm)			
HBL	/	/	/	/	/	/	/	/
TL	/	/	/	/	/	/	/	/
HFL	/	/	/	/	/	/	/	/
EL	/	/	/	/	/	/	/	/
W _g	/	/	/	/	/	/	/	/
OL	/	/	/	/	/	/	/	/
CL	/	/	/	/	/	/	/	/
ZW	/	/	/	/	/	/	/	/
LW	/	/	/	/	/	/	/	/
CW	/	/	/	/	/	/	/	/
LN	/	/	/	/	/	/	/	/
LD	/	/	/	/	/	/	/	/
LPF	/	/	/	/	/	/	/	/
LTB	/	/	/	/	/	/	/	/
WTB	/	/	/	/	/	/	/	/
UCH	/	/	/	/	/	/	/	/
LCH	/	/	/	/	/	/	/	/
HS	/	/	/	/	/	/	/	/
WR	/	/	/	/	/	/	/	/
LM	/	/	/	/	/	/	/	/

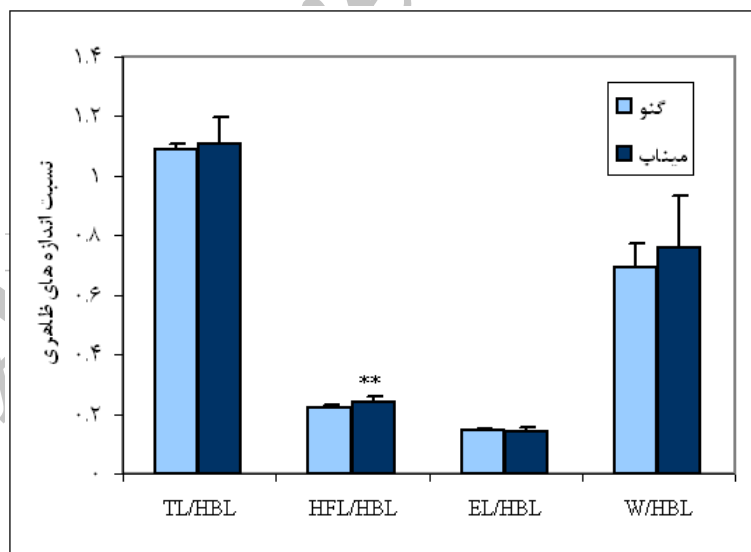
...

T. indica

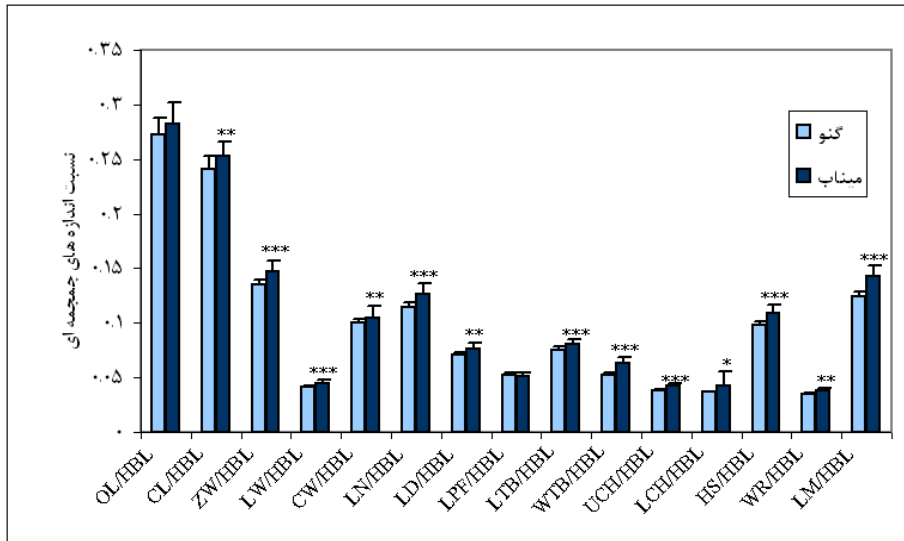
TL/HBL	/	/	/	/	/	/	/	/
HFL/HBL	/	/	/	/	/	/	/	/
EL/HBL	/	/	/	/	/	/	/	/
W _g /HBL	/	/	/	/	/	/	/	/
OL/HBL	/	/	/	/	/	/	/	/
CL/HBL	/	/	/	/	/	/	/	/
ZW/HBL	/	/	/	/	/	/	/	/
LW/HBL	/	/	/	/	/	/	/	/
CW/HBL	/	/	/	/	/	/	/	/
LN/HBL	/	/	/	/	/	/	/	/
LD/HBL	/	/	/	/	/	/	/	/
LPF/HBL	/	/	/	/	/	/	/	/
LTB/HBL	/	/	/	/	/	/	/	/
WTB/HBL	/	/	/	/	/	/	/	/
UCH/HBL	/	/	/	/	/	/	/	/
LCH/HBL	/	/	/	/	/	/	/	/
HS/HBL	/	/	/	/	/	/	/	/
WR/HBL	/	/	/	/	/	/	/	/
LM/HBL	/	/	/	/	/	/	/	/



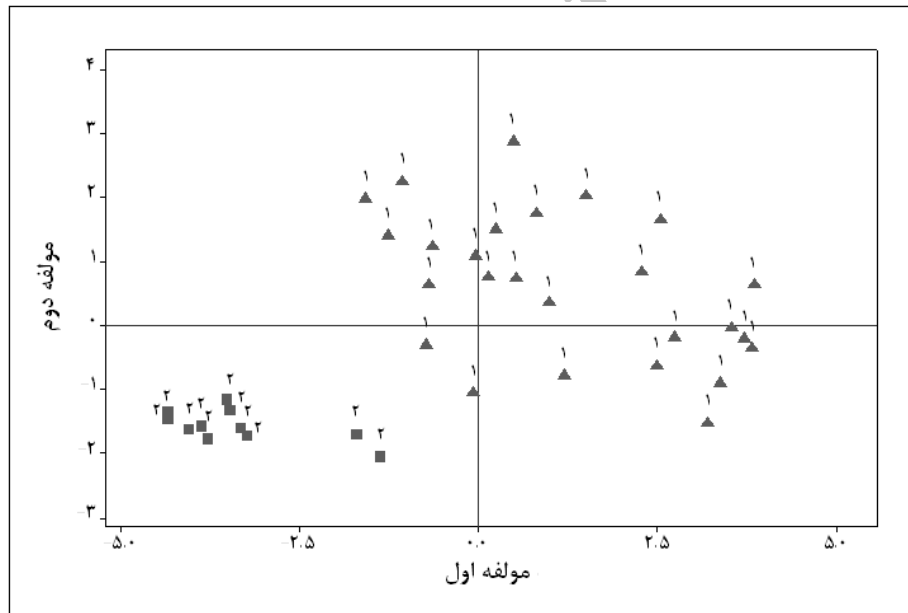
T. indica



T. indica



T. indica



(:)

Khaje & Meshkani,)
 2010; Harrison & Bates, 1991; Etemad, 1976;
 (*T. indica*) (Misonne, 1959

(1959) Misonne (1967) Lay

(2001) Yigit (2005)

Molur

- (Yigit *et al.*, 2001) Khaje & Meshkani, 2010;)
Ashrafzadeh *et al.*, 2007; Yiğit *et al.*, 2001;
Harrison & Bates, 1991; Etemad, 1976; Misonne,
(1959
- (Mirshamsi *et al.*, 2007) () *T. indica*
- (Mirshamsi *et al.*, 2007) () Khaje
(2010) Meshkani
- (2010) Meshkani Khaje ()
(2007) Mirshamsi ()
T. indica ()

References

- Alderton, D. 1996. Rodents of the World. Blanford Publishers, New York, 192p.
- Ashrafzadeh, M.R., M. Karami, and J. Darvish. 2007. A Study on Morphology and Morphometry of Subfamily of Gerbillinae (Rodentia: Muridae) in Geno Biosphere Reserve, Hormozgan Province. Iranian Journal of Biology, 20(1): 110-121. (in Persian)
- Ashrafzadeh, M.R., M. Karami and J. Darvish. 2010. A Study on the Correlation of Diversity and Abundance of Rodents with the Vegetation and Elevation in Geno Biosphere Reserve, Hormozgan Province. Journal of Natural Environment, 63(1):1-13. (in Persian).
- Corbet, G.B. 1978. The Mammals of the Palearctic Region: A Taxonomic Review. British Museum National History London, Cornell University Press, 314p.
- Corbet, G.B. and J.E. Hill. 1991. A World List of Mammalian Species. Third edition, Natural History Museum Publications, 243p.
- Cunningham, D.M. and P.J. Moors. 1987. A Guide to the Identification and Collection of Newzealand Rodents. Occasional Publication, Wildlife Service, Second Edition, Departement of Internal Affairs, Wellington, 4:18p.
- Darvish, J., R. Siah sarvie, O. Mirshamsi, N. Kayvanfar, N. Hashemi and F. Sadeghie Shakib. 2006. Diversity of the rodents of northeastern Iran. Iranian Journal of Animal Biosystematics, 2: 57-76.
- Etemad, E. 1976. The Mammals of Iran: Rodentia. Department of the Environment Press, Tehran, 289p. (in Persian)
- Goyal, S.P. and P.K. Ghosh. 1993. Burrow Structure of 2 Gerbil Species of Thar Desert, India. Acta Theriol, 38: 453-456.

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- Harrison, D.L. and P.J.J. Bates. 1991. The Mammals of Arabia. Second Edition, Harrison Zoology Museum publication, Kent, 354p.
 - Khaje, A. and J. Meshkani. 2010. A Study of Interspecies Variations of Indian Jerbil, *Tatera indica* Hardwicke, 1807 (Muridae, Rodentia) in Eastern Border of Iran. Pakistan Journal of Biological Sciences, 13(2): 59-65.
 - Kryštufek, B., G. Shenbrot, M. Sozen and S. Molur. 2008. *Tatera indica*. In: IUCN, 2010, IUCN Red List of Threatened Species, Version 2010, Retrieved from www.iucnredlist.org.
 - Lay D.M. 1967. A Study of the Mammals of Iran Resulting from the Street Expedition of 1962–63. Fieldiana, Zoology, 54: 1–282.
 - Lee, L.L. 1997. Effectiveness of Live Traps and Snap Traps in Trapping Small Mammals in Kinmen. Acta Zoologica Taiwanica, 8 (2): 79-85.
 - Mirshamsi, O., J. Darvish and N. Kayvanfar. 2007. A Preliminary Study on Indian Gerbils, *Tatera indica* Hardwicke, 1807 at Population Level in Eastern and Southern Parts of Iran (Rodentia: Muridae). Iranian Journal of Animal Biosystematics, 3(1): 49-61.
 - Misonne, X. 1959. Analyse Zoogeographique des Mammiferes de l'Iran. Bruxelles, Memoires d'Institut Royal des Sciences Naturelles de Belgique, Deuxieme Serie, 59:157p. (in French)
 - Molur, S., C. Srinivasulu, B. Srinivasulu, S. Walker, P.O. Nameer and L. Ravikumar. 2005. Status of Non-volant Small Mammals: Conservation Assessment and Management Plan. workshop report, Zoo Outreach Organisation/CBSG-South Asia, Comibatore, India, 618p.
 - Momenzadeh, M., J. Darvish, F. Tutunian and M. Sarmad. 2001. A Study for Ages of Irania and Libyan Gerds and its Relation with Cranial characters, Proceedings of the 10th Conference of Iran Biology, University of Shiraz.
 - Moradi, M. and E. Kivanc. 2003. A Study on the Morphology, Karyology and Distribution of *Ellobius* Fisher, 1814 (Mammalia: Rodentia) in Iran. Turk Journal of Zoology, 27: 281-292.
 - Mumtaz, A. 1989. Seasonal and Age Specific Variations in Body Weight and Cranial Measurements of Indian Gerbil (*Tatera indica*). University of Agriculture, Faisalabad, Pakistan, 86p.
 - Nadjafi, Tireh –Shabankareh, K., A. Jalili, N. Khorasani, Z. Jamzad, and Y. Asri. 2007. Flora, Life forms and Chorotypes of Plants in the Genu Protected Area, Hormozgan province (Iran). Pajouhesh & Sazandegi, 69: 50-62
 - Nowak, R.M. and J.L. Paradiso. 1983. Walker's Mammals of the World. Fourth Edition, John Hoplins University Press, Baltimore and London, 1362p.
 - Rana, B.D., I. Rarkash and A.P. Jain. 1970. Morphological Variation in *Tatera Indica* Hardwicke, 1807, Inhabiting Two Types on Indian Desert Habitats. Acta Theriol, 15: 459-464.
 - Wilson, E., and M. Reader. 2005. Mammal Species of the World, A Taxonomic and Geographic Reference. Thierd Edition, Johns Hopkins University Press, 2142p.
 - Yiğit, N., E. Çolak, R. Verimli, Ş. Özkurt and M. Sözen. 2001. A Study on the Distribution, Morphology and Karyology of *Tatera indica* (Hardwicke, 1807) (Mammalia: Rodentia) in Turkey. Turk Journal of Zoology, 25: 65- 70.
 - Zehzad, B. and H. Madjnoonian. 1997. Geno Protected Area (Biosphere Reserve). Shahid Beheshti University Press, Research Bureau, Tehran, 70p. (in Persian).

Intraspecific Variations Within *Tatera indica* Hardwicke, 1807 (Rodentia: Muridae) Populations in Hormozgan Province, Iran

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Abstract

In this study, 52 specimens of adult Indian Gerbil (*Tatera indica*) were collected by live traps (Sherman traps, Havahart Traps and Locally made traps) from range of different habitats of two localities, Geno Protected Area (or Geno Biosphere Reserve) and Minab County, Hormozgan Province. At first, external, cranial and dental characters were measured and then the ratio of measured characters to head, and body lengths were calculated. All measurements and ratios were represented by the descriptive statistics. The results of Independent Sample T-Test showed that there are no significant differences between sexes. Furthermore, in order to show variation between samples and the significance of external and cranial variables, Independent Sample T-test was performed. Results of T-test showed that morphometric characteristics of the Indian gerbil populations in these regions are slightly different. Moreover, analysis showed that in Geno protected area population, 13 from 20 characters are significantly different than those in Minab population. The results from the PCA and MANOVA served to differentiate populations from mentioned regions based on the morphometric characteristics. In general, findings of the present study confirm the presence of significant morphological differences among populations of two studied regions.

Keywords: *Tatera indica*, Morphometric differences, Minab, Geno protected area, Hormozgan province.

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