



Notes on habitat affinities of the Hotson's Jerboa *Allactaga hotsoni* Thomas, 1920 (Rodentia: Dipodidae) from Isfahan province, Iran

Mansureh Khalatbari^{1*}, Morteza Naderi²

¹*Department of Environment, Payame Noor university (PNU), P.O.Box 19395-4697, Tehran, Iran

²Department of Environmental Sciences, Faculty of Agriculture and Natural Sciences, Arak University, Arak 38156-8-8349, Iran

*email: mansooreh.khalatbary@yahoo.com

Received: 15 September 2017 / Revised: 27 October 2017 / Accepted: 8 November 2017 / Published online: 27 February 2017. Ministry of Sciences, Research and Technology, Arak University, Iran.

Abstract

We could recorded Hotson's Jerboa in Isfahan Province where is located in the central part of Iran. Totally five specimens of *Allactaga hotsoni* were captured in Isfahan province, which had not previously recorded in that province. Previously this species was reported from the south of the Iran, Baluchistan province and later from Yazd and Khorasan Razavi provinces. Morphological and cranial measurement had showed no significant differences between these specimens and those reported by the other investigators. Investigation of habitat association of *A. hotsoni* in this new locality had been showed that bare soil percent cover and the presence of *Hamada salicornica* mostly affect its habitat use.

Keywords: Hotsons' Jerboa, Isfahan province, Iran, Habitat use.

Introduction

Hotson's Jerboa, *A. hotsoni* Thomas, 1920 (Fig. 1) was recorded in Sistan & Baluchistan province and subsequently in Kavir National Park, near Varamin (Brown 1980) Later other investigators could record this Jerboa from

central and northern parts of Iran. For example Darvish *et al.* (2006) recorded *A. hotsoni* from Yazd province where is located nearly in central parts of the country and Khorasan Razavi province, located at the east north of Iran (Fig. 2).



Figure 1. Hotson's Jerboa from new recorded locality, Chupanan, Isfahan province (Photo by Naderi, 2011)

Brown (1980) reported that *A. hotsoni* presence is tied with barren areas. Naderi *et al.* (2011) describe the effect of vegetation and soil conditions on burrow structure and site selection of Iranian jerboa. They reported that bare soil presence and *Anabasis aphylla* vegetation type are the most affecting parameters in Iranian jerboa's habitat use. They inferred that the adaptational value of preferring bare soil cover most likely results from the possibility for better and faster entering to the burrows.

Material and methods

Study area

During intensive sampling from May to July 2011 we can record Hotson's Jerboa from arid steppe habitat located 5 km orth of Chupanan, Isfahan Province (33°35'N and 54°27'E). The

study area usually has the least rainfall in comparing to other urban and rural areas of the Isfahan province since there is no recorded rainfall during June to September. The mean annual precipitation in the study area is less than 100 mm. (Institute of Weather & Climatology, Isfahan 2011).



Figure 2. Recorded localities for Hotson's Jerboa: Sistan and Baluchistan (Kont), Varamin in Tehran province, Khorasan Razavi, Yazd and new recorded site, Chupanan in Isfahan province.

Morphological and cranial measurements

Four standard external characters were measured including hind foot length, ear length, tail length, total body length. Measured cranial characteristics were Condylbasal length (CBL), Zygomatic length (ZL), Length of bullae (LBU), length of maxillary tooth row (LMT), Braincase width (BCW), Interorbital breadth (INB), Mastoid breadth (MB). Cranial factors were measured using digital caliper accurate to the nearest 0.05 mm. External characteristics were measured with ruler accurate to the nearest millimeter.

Habitat variables measurement

The microhabitat variables were measured in 23 presence and 35 random plots. The random plots were selected randomly in different directions. Each observation point was recorded by GPS and the habitat variables were recorded during daylight. A 10×10 m square area surrounding the presence and random absence points was plotted and microhabitat variables such as Bare soil percent cover (BSC), Cobble percent cover (COB), Total vegetation percent cover (TVEG). Vegetation

species in each plot were recorded too). The arithmetic mean of the measurements of each variable was considered as the value of the variable for the presence and absence plots. Non-parametric Mann–Whitney U Test as well as independent T student test was used to examine differences in microhabitat variables between observation and random plots.

Results and Discussion

Habitat characteristics: The recorded habitat (Fig. 3) was located in 5 km north of Chupanan, Isfahan Province (33°35'N and 54°27'E). The vegetation comprises different bush and shrub species such as *Atriplex sp.*, *Artemisia siberi*, *Peganum harmala*, *Atraphaxis spinosa*, *Haloxylon sp.*, *Calligonum comosum*, *Hamada salicornica*, *Zygophyllum sp.* and *Tamarix sp.* Some predator species such as Red fox (*Vulpes vulpes*), Jackal (*Canis aureus*), Sand fox (*Vulpes vulpes*) and Sand cat (*Felis margarita*) was observed in the study area too. The altitude is approximately 950 m above sea level and the climate is markedly seasonal with a dry and harsh season from May to October. The physiognomy of the habitat presented a total woody and non-woody plant cover. Totally 23 individuals were observed that five of them were captured and their morphological variables were measured and compared with information presented for other Hotson's Jerboa localities in central parts of Iran (Table 1).

Table 1. External and Cranial characters of *A. hotsoni* from Chupanan and its comparison with other recorded sites in different provinces, data for Yazd and Khorasan Razavi provinces adopted from Darvish *et al.* (2006)

Characters (mm)	(Chupana) (N=5)	(Yazd) (N=2)	(Khorasan Razavi)
Ear length	42	44	40 (1)
Head and body length	106	115	116 (1)
Tail length	220	198.5	180 (1)
Hind foot length	52	59	50 (1)
CBL	29.6	28.4	27.15 (2)
ZL	13.7	13.47	13.1 (2)
LBU	8.81	8.57	8.54 (2)
LMT	5.11	5.33	5.13 (2)
BCW	16.35	16.27	15.48 (2)
MB	17.89	18.25	16.73 (2)
INB	9.12	9.10	9.20 (2)

Table 2. Comparison of habitat parameters at observation and random plots. The acronyms have been described in the text.

Variable (%)	Observation plots N=12 Mean (SE)	Random plots (N=35) Mean (SE)	Mann-Whitney U Test	
			Z	P
BSC	80 (2.32)	52 (1.71)	-2.14	<0.001
COB	11 (0.89)	15 (0.87)	-0.18	0.48
TVEG	9 (0.68)	33 (1.86)	-1.98	<0.05



Figure 3. Habitat of *A. hotsoni* in Chupanan, Isfahan province (Photo by Naderi, 2011)

Total vegetation cover was significantly lower in the observation plots. These results are in agreement with previous studies about some Jerboas. For example the highest density of the adaptational value of selecting unvegetated areas for activation times most likely results from the possibility for better and faster entering to the burrows (Brown 1980).

Iranian jerboa burrows was recorded in bare soil habitat type and the probability of the event occurring (individuals presence) increased as bare soil cover increased (Naderi *et al.* 2011).

So we can say that Hotson's jerboa similar to other Jerboas is a microhabitat specialist and relies primarily on structural characteristics of its environment to select sites for habitat utilization.

Acknowledgment

Special thanks to Hossein Akbari, the head of Naein Department of the Environment for his kind attention during field trips. Special thanks to Mohammadreza Halvani, for his devoted cooperation in sampling.

References

- Brown R.E. 1980. Rodents of the Kavir National Park, Iran. *Mammalia* 44(1): 89-96.
- Darvish, J., Mirshamsi kh. O., Siah sarvie, R., Javidkar, M. 2006. New Records of the Hotson's Jerboa *Allactaga hotsoni*, Thomas, 1920 (Rodentia: Dipodidae) from Khorasan and Yazd Provinces, Iran. *Journal of Sciences, Islamic Republic of Iran* 17(4): 303-307.
- Naderi, G.h., Hemami M.R., Mohammadi. S. 2011. Investigation of habitat preferences of Iranian jerboa, *Allactaga firouzi* Womochel, 1978. *Mammalia* 75:181-184.