

Ecology and status of the Caracal, *Caracal caracal*, in the Abbasabad Naein Reserve, Iran

by Mohammad S, Farhadinia, Hossein Akbari, Mohammad Beheshti
and Arash Sadeghi

Abstract. A Caracal survey was carried out between 2002 and 2006 in Abbasabad Reserve, which covers more than 300,000 ha in eastern Esfahan province, and which is one of the best habitats of the species. It was found to occur mainly in desert mountains and hilly terrains where rodents and hares are abundant. 80% of direct observations were made from solitary individuals, the remaining in groups of 2. Although rodents, hare and ground birds play the main role in caracal's diet in Abbasabad Reserve, it is also a serious threat to small livestock of local people. Sometimes, the Caracal tries to catch wild ungulates.

Kurzfassung. Zwischen 2002 und 2005 wurde im Schutzgebiet von Abbasabad, das sich über mehr als 300,000 ha im östlichen Teil der Provinz Isfahan erstreckt, eine Erfassung des Karakals durchgeführt. Das Gebiet ist eines der besten für die Art im Iran. Die Art wurde hauptsächlich in Wüstenbergen und in hügeligem Gelände gefunden, wo Kleinnager und Hasen häufig sind. 80% der direkten Beobachtungen beziehen sich auf Einzeltiere, der Rest auf Gruppen von zwei. Obwohl Kleinsäuger, Hasen und Bodenvogelarten die Hauptrolle in der Nahrung des Karakals im Abbasabad-Schutzgebiet spielen, ist er doch auch eine ernstzunehmende Gefahr für kleine Haustiere der lokalen Bevölkerung. Manchmal versucht der Karakal, wilde Huftiere zu reissen.

Key words. Caracal, *Caracal caracal*, Abbasabad Reserve, Iran, ecology, diet.

Introduction

Despite its wide distribution throughout the eastern half of the country and its importance as a medium-sized, yet often the largest or top predator in many habitats or specific areas, little is known on various aspects of ecology of caracal, *Caracal caracal* Schreber, 1776 in Iran. According to ETEMAD (1985), the Iranian caracals are believed to be belonged to subspecies *C. c. schmitzi* Matschie, 1812. The Abbasabad Reserve is supposed to be one of the best habitats of the species in the country and it seems that the animal possesses the highest abundance of felids in the area (FARHADINIA et al. 2006). However, there is no basic information on the ecology of caracal resulted from Iranian researches inside the species' habitats in the country.

As a part of a broader investigation on felids of Abbasabad Reserve, the present research is the first document on the caracal from Iran which can be used as a baseline for more investigations, particularly inside the habitats around the farmlands where caracal depredation on small stock is a problem.

Study area

As one of the latest Reserves in the country, Abbasabad has been officially under protection since 2005 as a Hunting Prohibited Area. The area is located 180 kilometers eastward from the city of Naein in eastern half of Esfahan province, central Iran with more than 300,000 hectares. Abbasabad is composed of rolling mountains extended from west to east with vast plains surrounded the mountainous terrains. The southern lowland flat plains are the buffer around the area's mountains extending to a few reserves in south. The elevation ranges from 703 to 2451 m a.s.l. with average annual rainfall around 106 mm (range between 79 to 157 mm). With an average annual temperature of around 18.9°C, Abbasabad is considered as a desert area with dry desert climate (ESFAHAN UNIVERSITY OF TECHNOLOGY 2003). Most of the area is covered with representatives of halophyte and xerophyte plants, mainly from families *Salsolacea*, *Chenopodiacea* and *Rosacea*. According to the ESFAHAN BUREAU OF NATURAL RESOURCES (2000), Abbasabad is dominantly covered with *Artemisia* spp. with *Caligonum* and *Haloxylon* trees on sand plains and *Pishtacia* and *Zygophyllum* on foothills and mountains as well as *Tamarix* along the dried watercourses.

Methods

The present survey has been conducted between November 2002 and August 2006 in search for caracal as well as other felids, including Asiatic Cheetah *Acinonyx jubatus venaticus*, Persian Leopard *Panthera pardus saxicolor* and Sand Cat *Felis margarita*. Due to difficult access to whole of the area, a majority of field efforts were concentrated to the western half of the area which is supposed to have higher security to conduct a camera trapping survey as well.

As the first step, a basic distribution map was prepared on the basis of direct observations by game wardens and local people using Arcview ver3.2 (Fig. 1). Then, the distribution area was searched for more evidences of the caracal and its prey species. We never recorded any track to be belonged to the caracals, because it seems that it could be similar to other small felids as well. Meanwhile, due to lack of access to any laboratory equipments, scat identification was done only based on shape and size. Since the species is considered to possess the highest density of felids in the area, we recorded segmented scats with elongated tip and average maximum diameter less than 20 mm to belong to the Caracal. However, being conservative to use this method, we recorded limited number of samples. The scat samples were macroscopically analysed in the field based on hair, claw, feather and bone remains. Ultimately, we applied 2 to 4 camera traps inside the verified caracal habitats, mainly along the trails and dried watercourses on more than 20 points for periods of 1 week to 2 months.

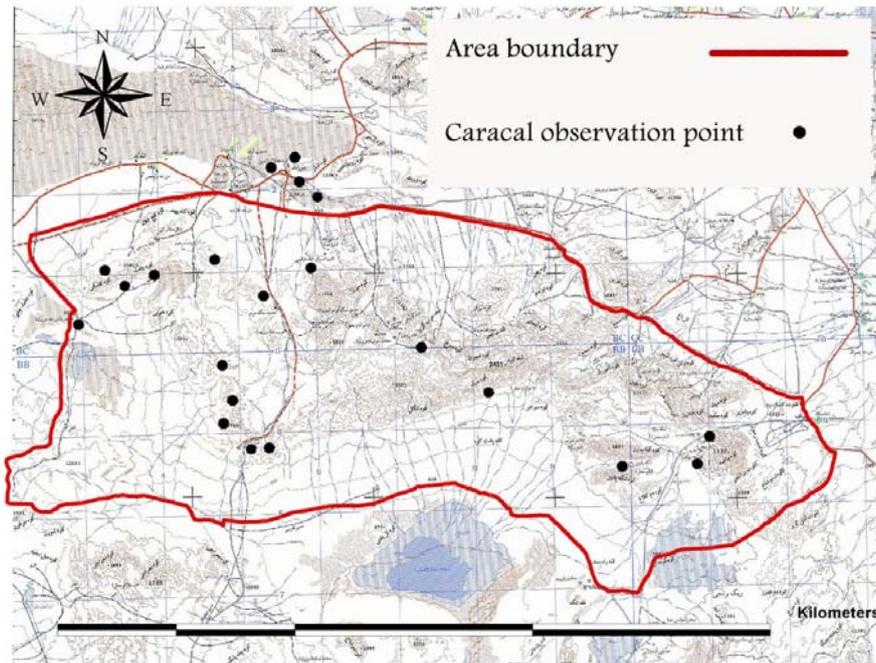


Fig. 1. Caracal observation points in Abbasabad Reserve according to records by the Iranian Cheetah Society 2006.

Results and discussion

The Caracal is well-known among local people with names such as *black-eared cat*, *tufted eared cat* or *secretive cheetah* and even sometimes may be mistaken with the Cheetah, which is sympatric throughout most of its ranges in Abbasabad. As a result of 400 camera nights inside the area, a total of 7 images have been captured during 3 different events from the caracals (Fig. 1) as well as Wolf, *Canis lupus*, Common Fox, *Vulpes vulpes*, Blanford's fox, *Vulpes cana*, Golden Jackal, *Canis aureus*, Jebeer Gazelle, *Gazella bennettii*, Wild Sheep, *Ovis orientalis*, Wild Goat, *Capra aegagrus*, Cape Hare, *Lepus capensis*, Brandt's Hedgehog, *Paraechinus hypomelas*, Monitor Lizard, *Varanus griseus*, Houbara Bustard, *Chlamydotis undulate* and Western Rock Nuthatch *Sitta neumayer*.

A total of 20 direct observations have been made by us or verified through interviewing with 25 local people, including game wardens, hunters, herders, etc. inside the area and a live caracal which was captured by the game wardens was investigated. Also, an active caracal den was found near the village of Choupanan.

The animals have been seen mainly in the early morning or late afternoon, but sometimes have been sighted during mid-day in cooler months. According to AVENANT & NEL (1998), Caracal activity is affected more by ambient temperature than photoperiod. In Abbasabad, out of 20 direct observations, they were mostly alone (80% of observations) and rarely, they

were in pair, as mentioned by SUNQUIST & SUNQUIST (2002) that they are solitary hunters, but there are some records of two adults moving together.

According to ETEMAD (1985), the Caracals give birth usually to 2 to 3 cubs in spring. During this survey, no evidence of the time of the Caracals' birth was found; however, based on the fetuses of dead Golden Jackals killed in road incident, it is probably peaked in April. Also, only one sighting of 2 cubs has been made at a den near Choupanan village. It is reported that 3 young cubs have been seen in companion of a mother in Bahram-e-Gour Protected Area in July 2006 (ESLAMI, pers. comm.) and in Kavir National Park, 2 adults were sighted in companion of 4 cubs (ADIBI, pers. comm.). According to BERNARD & STUART (1987), the mean litter size was 2.2 for captive animals and wild killed pregnant females carried between one and three fetuses in South Africa.

In November 2005, a live female caracal was found in Moshajjareh (N54 05 11 & E33 27 10) with an injury in its forelimb, so captured by the game wardens. However, the animal died after one day without consuming any food in captivity. The cause of death could not be found. Its slender body weighed less than 9.3 kg with empty stomach and half-full bladder, while HEPTNER & SLUDSKII (1992) stated 8 to 12.7 kilograms (n=7) for Caracals in Turkmenistan. Despite of expecting to have good amount of fat under the belly skin, among the intestine and around the kidneys in cold month, there was strangely no fat tissue. Also, the upper pre-molar 1 was absent as stated by ETEMAD (1985) as a characteristic of caracals. Its kidneys weighed 10 to 15 g.

Most of observations were made among desert mountains and hilly terrains which are considered to be suitable habitats for rodents and hares. The species has never been seen in flat plains of the area, just a few times along the roads which seems to be transitional individuals switching between hilly habitats. HEPTNER & SLUDSKII (1992) stated that regarding micro-habitat preference, it is typically associated with either well-vegetated or rocky areas which provide cover for hunting as well as shelter.

It seems that based on a limited number of scats and direct observations, rodents play a main role in caracal's diet. Abbasabad Reserve is a suitable habitat for rodents with abundant burrows throughout the plain hilly habitats. The following species have been identified in the area: House Mouse, *Mus musculus*, Persian Jird, *Meriones persicus*, Great Gerbil, *Rhombomys opimus*, Small Five-toed Jerboa *Allactaga elater*, and Blanford's Jerboa, *Jaculus blanfordi*. Camera trap results show that there is a population of Brandt's Hedgehog, *Paraechinus hypomelas*, and good number of Cape Hare, *Lepus capensis*. Energy calculations showed that rodents were more important as prey for Caracals and up to 70% of the daily metabolizable energy in this species was obtained from rodents, which are generally viewed as pests, and their importance to the small carnivore community is overlooked (MUKHERJEE et al. 2004). Birds, particularly those who spend mainly on the ground such as both common species of Chukar, *Alectoris chukar*, and See-see Partridges, *Ammoperdix griseogularis*, as well as Houbara Bustard, *Chlamydotis undulata*, and sandgrouse, *Pterocles* spp. are potential sources of food, particularly the first three who all occur inside the caracal's habitat.

When visiting a Caracal den among *Haloxylon* trees on sand dunes with three entrances on the ground (Fig. 2), the skin of a domestic goat as well as remains of house hens were found around the den. On the basis of interviews with local people, the animal is a regular visitor to small stocks inside the village and even, sometimes they kill domestic goats and their lambs inside their corals. However, domestic birds are the main losses of local people to the Caracals in Abbasabad.



Fig. 2. Entrance of a Caracal den in Abbasabad Reserve, 17 August 2006 (Photo: A. SADEGHI)

As reported for Arabian Caracals by VAN HEEZIK & SEDDON (1998), in very arid environments the caracals cover larger areas because prey abundance is low. According to FARHADINIA et al (2006), there are three species of ungulates in Abbasabad, including Jebeer Gazelle (50 to 100 individuals), Wild Sheep (less than 600 individuals) and Wild Goat (less than 1000 individuals). The Caracal has the highest range overlap with Wild Sheep, because they both occur in lower elevations and hilly terrains. So, it seems that they maybe the highest possible victims for Caracal. The Gazelles graze mainly in southern flat plains where is usually avoided by Caracals and refer to the marginal hilly terrains to drink water when may become susceptible to the Caracal predation. In September 2005, a Caracal was observed to chase a Jebeer Gazelle on the way to the waterhole. VAN HEEZIK & SEDDON (1998) reported that Caracals were seen at gazelle carcasses twice and they even fed on camels. Regarding good abundance of rodents and hare, it is likely that they comprise most of the caracal's diet. As well, they provide part of their food needs by catching birds. On the other hand, local livestock, particularly small stock are suffering from Caracal depredation. Sometimes, it catches them through hiding among bushes which is the origin of one its local name as "the secretive cheetah".

As a fully protected species by law in Iran, the caracal is the most abundant species of Felidae in Abbasabad which is mainly relied on small mammals and birds. However, killing small livestock has brought the animal into serious conflict with local people, who sometimes make efforts to eradicate it. However, local people generally believe it is difficult to capture the smart caracals using baits or traps, as mentioned by DRAGESCO-JOFFE (1993), too. The animal has never been recorded to be killed on road incidents and it seems that there is no severe poaching pressure on the species as well. In sum, the animal has a viable population inside vast range of Abbasabad Reserve, but in low density due to low productivity of the desert habitat.

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References

- AVENANT, N. L. & J. A. J. NEL (1998): Home range use, activity, and density of caracal in relation to prey density. – *African Journal of Ecology* 36: 347–359.
- BERNARD, R. T. F. & C. T. STUART (1987): Reproduction of caracal *Felis caracal* from the cape province of South Africa. *South African Journal of Zoology* 22: 177–183.
- DRAGESCO-JOFFE, A. (1993): *La vie sauvage au Sahara*. – Paris.
- ESFAHAN BUREAU OF NATURAL RESOURCES (2004): *Flora of Abbasabad*. – Iranian Ministry of Agriculture, 120 pp.
- ESFAHAN UNIVERSITY OF TECHNOLOGY (2003): *Abbasabad climate report*. – Esfahan, 170 pp.
- ETEMAD, E. (1985) *Mammals of Iran*. 2nd Volume. – Iranian Department of the Environment.
- FARHADINIA, M., M. BEHESHTI & A. SADEGHI (2006): Identification of cheetah habitats in Abbasabad Naein Reserve. – Iranian Cheetah Society (ICS), 150 pp.
- HEZIK, Y. M. VAN & P. J. SEDDON (1998): Range size and habitat use of an adult male caracal in northern Saudi Arabia. – *Journal of Arid Environments* 40: 109–112.
- HEPTNER, V. G. & A. A. SLUDSKI (1992): *Mammals of the Soviet Union*. Vol. 2, Part 2. Carnivora. English Translation by R. S. HOFFMANN. – Smithsonian Institution Libraries, Washington, D.C.
- MUKHERJEE, S., S. P. GOYAL, A. J. T. JOHNSINGH & M. R. P. LEITE-PITMAN (2004): The importance of rodents in the diet of jungle cat (*Felis chaus*), caracal (*Caracal caracal*) and golden jackal (*Canis aureus*) in Sariska Tiger Reserve, Rajasthan, India. – *Journal of Zoology*, London, 262: 405–411.
- SUNQUIST, M. & F. SUNQUIST (2002): *Wild cats of the world*. – University of Chicago Press, Ltd., London.

Authors' addresses: Mohammad S. Farhadinia, Mohammad Beheshti and Arash Sadeghi, Iranian Cheetah Society (ICS), P.O. Box 14155-8549, Tehran, Iran. – Hossein Akbari, Abbasabad Reserve, Esfahan Provincial Department of the Environment, Naein, Iran. – Email contact: msfarhadinia@iraniancheetah.org.