

Camera trapping confirms the persistence of Arabian Gazelles, *Gazella arabica*, in the Asir Mountains, Saudi Arabia

(Mammalia: Bovidae)

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Abstract. Arabian Gazelles, *Gazella arabica*, are increasingly threatened by hunting and habitat destruction, and since 2001 no confirmed observations have been reported from the Asir Mountains, a previously known area of occurrence. This study presents camera trapping images of Arabian Gazelles captured in Wadi Tarj, and confirms the persistence of this species in the proposed protected area for the first time since 1997. Images were analysed regarding habitat, time of day, group composition and activity of captured individuals. Moreover, the photographs were used to determine the species/subspecies of the gazelles encountered and are viewed in the light of the disputed taxonomy of Mountain/Arabian Gazelles.

Key words. Arabian Mountain Gazelles, natural population, camera trapping, Wadi Tarj, western Saudi Arabia

Introduction

Until recently, the Arabian Gazelle, *Gazella arabica* (Lichtenstein, 1827), was thought to be synonymous with its ecologically and behaviourally very similar sister species, the Mountain Gazelle, *Gazella gazella* (Pallas, 1766) which occurs in the Levant (BÄRMANN et al. 2011, LERP et al. 2012). Historically, *G. arabica* occurred continuously through the Arabian Peninsula, from the Arava Valley in southern Israel, along the Hejaz and Asir Mountains in western Saudi Arabia through Yemen and Oman, and into the UAE (SHALMON 1987, MALLON & KINGSWOOD 2001). In Saudi Arabia, since the middle of the 20th century, *G. arabica* numbers have decreased dramatically throughout their range (HABIBI 1986, THOULESS et al. 1991), and the IUCN Red List (IUCN/ASG 2009) currently ranks this species as ‘vulnerable’ (A2ad). Small relict populations of *G. arabica* occur in Al Khunfah and Harrat al Harrah Protected Areas in the north of Saudi Arabia (GREEN 1986, WACHER 1993, SEDDON et al. 1997), and on the Tihama coastal plain (MAGIN 1993, 1996, WACHER & ALAGEEL 2001a, BOUG pers. obs. in Wadi Hali, ISLAM pers. obs. 80 km south of Al Qunfidah). On the Farasan Islands a strong population of about 1000 individuals survives (CUNNINGHAM & WRONSKI 2010). From 1990 to 2007, *G. arabica* was released into two protected areas, i.e. the Ibex Reserve and the Uruq Bani Ma’arid Protected Area (WRONSKI et al. 2012a-b, ISLAM et al. 2012). Most records of natural *G. arabica* populations in Saudi Arabia originate from the western part of the country, i.e. the Asir, Sarawat and Hejaz Mountains (MAGIN 1993, 1996, AL-HAZMI & GHANDOUR 1992, MAGIN & GRETH 1994). Four *G. arabica* populations

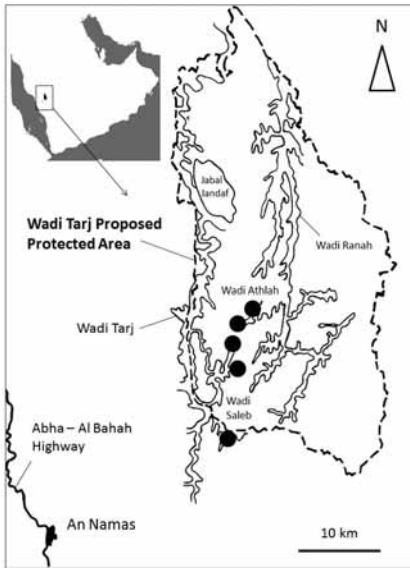


Fig. 1. Locations of camera traps (black circles) in the Wadi Tarj Proposed Protected Area, north-east of An Namas in south-western Saudi Arabia (inset).

are known from the northern Hejaz Mountains, extending from Medina up towards the Gulf of Aqaba, namely Jibal Kallab, Harrat Uwayrid, Ras Suwaihil and Jibal Dakhkhan (THOULESS et al. 1991, 1997, WACHER 2001, WACHER & ALAGEEL 1999, WACHER & STRAUSS 2000, BOUG pers. obs. near Al Farah). In the Asir and Sarawat Mountains, a number of *G. arabica* populations were reported to survive in the foothills and the eastern flanks of the Asir, where they are mostly associated with *Acacia*-lined wadis (THOULESS et al. 1991). From 1990 to 2001, several surveys have focused on a number of *G. arabica* populations in the Asir National Park and other proposed protected areas in the region, to confirm the presence or absence of gazelles or to establish rough population estimates (THOULESS et al. 1997, MAGIN 1993, 1996, WACHER & AL TOUM 1994, 1998, WACHER & ALAGEEL 2001b). No confirmed observation of *G. arabica* in the Asir Mountains has been reported since 2001. This study presents camera trapping images of *G. arabica* captured in Wadi Tarj (Asir Mountains) and confirms the persistence of this species in the proposed protected area for the first time since 1997 (MAGIN 1996, THOULESS et al. 1997).

Material and methods

The study was carried out in the Wadi Tarj Proposed Protected Area (19°30'N, 42°20'E), Asir Province, in south-western Saudi Arabia (Fig. 1). The Asir Highlands are a wedge-shaped, crystalline plateau east of the Red Sea escarpment, which extends from Yemen northwards towards the Taif - Makkah region where it finally disappears under the lava fields of northern Saudi Arabia. The plateau rises in elevation to more than 2,500 m asl, with many peaks in excess of 2,500 m, and slowly levels to the east where it terminates at the edge of the Arabian shield. The study area is dominated by plutonic and metamorphic hills with deeply incised wadis, north-east of the

Table 1. Location, habitat type, trapping period and Arabian Gazelle results obtained from five camera traps placed in Wadi Tarj, Asir Province, Saudi Arabia. Habitat types according to CHILD & GRAINGER (1990, Tab. 5.1): 17se: very rugged relief with deeply incised gorges into a hilly plateau, *Acacia seyal*, *A. asak*, *Senecio odora* riverine belt, lack of scrubby grasses; trees short and scrubby. 17he: mountains and foothills of western Asir, *A. seyal* and *Euryops arabicus*, vegetation irregular and discontinuous, grasses abundant: *Aristida shaelica*, *Hyparrhenia hirta*, *Andropogon distachyus*. – Age and sex classes: M: adult male, YM: yearling male, F: adult female, SF: subadult female, YF: yearling female.

	Location	Position	Habitat	Period	Date / Time	No.	Age, sex	Recaptures
1	Wadi Saleb	19°14'N 42°21'E	17se, 17he	20.07– 19.08.2011	29.07.2011 11:49	1	♂	–
1	Wadi Saleb	19°14'N 42°21'E	17se, 17he	20.07– 19.08.2011	04.08.2011 12:54	3	♀, SF, YF	–
1	Wadi Saleb	19°14'N 42°21'E	17se, 17he	20.07– 19.08.2011	04.08.2011 12:55	2	♂, ♀	Male as above
2	Wadi Athlah	19°22'N 42°23'E	17se, 17he	15.02– 17.03.2011	09.01.2011 08:28	1	YM	–
3	Wadi Athlah	19°20'N 42°22'E	17se, 17he	15.02– 17.03.2011	13.02.2011 09:34	2	2 ♀	–
4	Wadi Athlah	19°19'N 42°22'E	17se, 17he	15.02– 17.03.2011	26.02.2011 09:17	1	♀	Possibly as before
5	Wadi Athlah	19°22'N 42°22'E	17se, 17he	15.02– 17.03.2011	27.02.2011 14:07	1	♀	Possibly as before

town of An Namas (Fig. 1). This remote region rises between 1,300 and 1,900 m asl, is sparsely settled and was known for its persisting wildlife, including a number of large carnivores such as the Arabian Leopard (*Panthera pardus nimr*), Striped Hyaena (*Hyaena hyaena*), Caracal (*Caracal caracal*) and Arabian Wolf (*Canis lupus pallipes*) (CHILD & GRAINGER 1990, CUNNINGHAM et al. 2009). In 1990 it was proposed as a protected area (CHILD & GRAINGER 1990), but has unfortunately not been gazetted to date.

Five camera traps were placed in the Wadi Tarj Proposed Protected Area (approximately 132,200 ha), i.e. four in Wadi Athlah and one in Wadi Saleb (Fig. 1, Table 1). The vegetation in Wadi Tarj comprises a well-vegetated riverine tree community dominated by *Acacia seyal*, *A. asak*, *Ziziphus spina-christi* and *Commiphora* spp., whereas the slopes are rather sparsely vegetated and are characterized by *Dracaena serrulata* and *Euryops arabicus* (CHILD & GRAINGER 1990). Cameras were installed at five positions from 20 July to 19 August 2011 and from 15 February to 17 March 2011 (Table 1). Two types of camera traps were used, a Bushnell 2010 Trophy Cam and a Reconyx HyperFire HC500. All devices were fixed on trees at about 0.7 m above ground and the following camera settings were applied (Image size: 5 megabytes, Interval: 8 seconds, Sense Level: High, Time Stamp: On).

Additionally, we compared our camera trapping images with two primitively stuffed gazelle heads hunted in the same area (Wadi Tarj) in February 2009. Interviews were conducted with various individuals from the Wadi Tarj area (Al Mihalah Village) to ascertain the distribution and location of wildlife – especially *G. arabica* – in the area. Although these interviews were unstructured and the results treated as anecdotal, they nevertheless were deemed useful to determine the presence/absence of gazelles in the area.



Fig. 2. Adult male and adult female Arabian Gazelle captured on 4 August, 2011 in Wadi Saleb, Wadi Tarj Proposed Protected Area in the Asir Mountains of south-western Saudi Arabia.



Fig. 3. Adult female Arabian Gazelle captured on 26 February, 2011 in Wadi Atlah, Wadi Tarj Proposed Protected Area in the Asir Mountains of south-western Saudi Arabia. Note the extremely dry vegetation typical for the mountains and foothills of the western Asir.



Fig. 4. Young-adult male Arabian Gazelle captured on 9 January, 2011 in Wadi Atlah, Wadi Tarj Proposed Protected Area in the Asir Mountains of south-western Saudi Arabia. Note that the animal is feeding on the fallen pods/flowers of *Acacia asak*.

Results and discussion

Digital images of seven *G. arabica* individuals (1 adult male – probably territorial, 1 yearling male, 3 adult females, 1 subadult female and 1 yearling) were captured on camera (Table 1; Figs 2-3, 4). The adult females may have been captured repeatedly, whereas the adult male could be identified as the same individual (Table 1). In all cases they were moving (patrolling or searching for food) or feeding in the two habitat types described as being typical for the region (see Table 1). The yearling male was repeatedly captured whilst foraging on the fallen fruits/pods of *Acacia asak* (Fig. 4). Surprisingly, all the pictures were taken during daylight hours (Table 1), indicating the relative safety of the area. The group composition encountered in Wadi Saleb is typical for *G. arabica* (WALTHER et al. 1983, WRONSKI & PLATH 2010) and represents a small female group consisting of an adult female with her two latest offspring (in this case a subadult female and a yearling female). This matrilineal female group was accompanied by a territorial male monopolizing this group. In another image, two adult females socialized, probably another female with her adult daughter (or sister). The two other images show only solitary gazelles.

Most interesting is the taxonomic status of the animals captured on these images. According to GROVES (1996, 1997), two gazelle species occur sympatrically in the study area. *G. arabica cora* is said to inhabit the lower plains and wadis of western Arabia, whereas *G. erlangeri* is adapted to higher elevations of the Asir and Sarawat Mountains. Based on



Fig. 5. Provisionally stuffed Arabian Gazelle head (A front view, B lateral view), hunted in Wadi Tarj Proposed Protected Area in the Asir Mountains of south-western Saudi Arabia. Note the prominent black nose spot and the bright buff-brown body colour with a greyish tint.

morphometric analysis of skull and horns as well as phenotypic differences, cladistic analyses never associate the two taxa (GROVES 1996). The pelage colour of *G. arabica cora* is very variable, but always some shade of buff. The face-markings and flank stripe are generally well expressed, and the face-markings always show a broad, smudgy black nose spot. By contrast, *G. erlangeri* is described as much smaller and with a much darker body colour of dark grey-brown, even tending towards blackish in some individuals. The dark flank band and the face pattern are well developed. The forehead and mid-face are dull buff-brown. The images obtained during our study show clearly a reddish to buffy-brown pelage colour, with a dark flank band and well developed black nose spot, suggesting that the taxon encountered in Wadi Tarj refers to *G. arabica cora* rather than to *G. erlangeri*. Photographs (Fig. 5a-b) taken from stuffed gazelles hunted in the same area as those in this camera trapping study gave a similar impression. A dark black nose spot and flank stripe are prominent and, and the body colour is bright buff-brown rather than dark grey-brown.

In summary it should be highlighted that *G. arabica* still persists in the Asir Mountains of Saudi Arabia and despite heavy poaching (HABIBI 1986, THOULESS et al. 1991, IUCN/ASG 2009) the species is able to survive in its natural habitat.

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