Zoology in the Middle East

ISSN: 0939-7140 (Print) 2326-2680 (Online) Journal homepage: http://www.tandfonline.com/loi/tzme20

Status of the Arabian Gazelle, Gazella arabica (Mammalia: Bovidae), in Dhofar, Oman

Hadi Al Hikmani, Said Zabanoot, Talah Al Shahari, Nasser Zabanoot, Khalid Al Hikmani & Andrew Spalton

To cite this article: Hadi Al Hikmani, Said Zabanoot, Talah Al Shahari, Nasser Zabanoot, Khalid Al Hikmani & Andrew Spalton (2015) Status of the Arabian Gazelle, Gazella arabica (Mammalia: Bovidae), in Dhofar, Oman, Zoology in the Middle East, 61:4, 295-299, DOI: 10.1080/09397140.2015.1101905

To link to this article: http://dx.doi.org/10.1080/09397140.2015.1101905

Zoology in the Middle East, 2015
Vol. 61, No. 4, 295–299, http://dx.doi.org/10.1080/09397140.2015.1101905

Taylor & Francis
Taylor & Francis Group

Status of the Arabian Gazelle, *Gazella arabica* (Mammalia: Bovidae), in Dhofar, Oman

Hadi Al Hikmani[a]*, Said Zabanoot[a], Talah Al Shahari[a], Nasser Zabanoot[a], Khalid Al Hikmani[a] and Andrew Spalton[b]

[a]*Office for Conservation of the Environment, Diwan of Royal Court, Muscat, Oman;* [b]*Office of the Minister, Diwan of Royal Court, Muscat, Oman*

(Received 30 May 2015; accepted 11 September 2015; first published online 8 October 2015)

The Arabian Gazelle, *Gazella arabica*, was once widely distributed in Oman, but its population decreased through illegal hunting and capture of the species. It is now found in small, isolated populations in the country, but little is known about the size and dynamics of these populations. In November 2014 we conducted a survey to estimate the density and size of two populations in the Dhofar region, one in the foothills of Jabal Samhan and the other in the Nejd. Population densities were found to be 0.33 animals/km^2 at Jabal Samhan and 0.28 animals/km^2 in Nejd. The total population size for the two areas combined was extrapolated to be 1,737 animals.

Keywords: Arabian Gazelle; population size; density; Dhofar; Nejd; Jabal Samhan

Introduction

The Arabian Gazelle, *Gazella arabica* (Lichtenstein, 1827), previously known as the Mountain Gazelle, *Gazella gazella* (Pallas, 1766), is one of Oman's five wild ungulate species. Apart from the sand dunes of the Empty Quarter and the monsoon-influenced areas of the Dhofar Mountains, the Arabian Gazelle was once widely distributed throughout the country (Insall, 2001). However, decades of heavy poaching have diminished the species not just in Oman, but throughout its entire range in the Arabian Peninsula (Nader, 1989; Cunningham & Wronski, 2011).

The species may once have been found in Musandam, in the far north of Oman (McGregor, Spalton, Al Hikmani & Hammer, 2007), but today is likely to be locally extinct. Elsewhere in the north of Oman there are stable populations in the Ras As Shagar Protected Area (Office for Conservation of the Environment, unpubl. data) and As Saleel Natural Park (Steven Ross, pers. comm., 15 June, 2015). However, outside these reserves the gazelle has disappeared from areas such as the Batinah, where it was once widespread (Harrison & Bates, 1991), but small numbers of individuals remain in the foothills of the Al Hajar mountains. The Al Wusta or Central Region (including the Jiddat al-Harasis) once supported Oman's largest population of the Arabian Gazelle (approximately 15,000 in 1998; Fisher, 1999). However illegal capture and hunting have greatly reduced the population in the last 20 years (Insall, 2001; Strauss, Al Kharousi, & Spalton, 2009). Today only a small remnant population of a few hundred individuals survives in the Al Wusta Wildlife Reserve**.**

In Dhofar, the Arabian Gazelle once occurred throughout the arid areas including the northern foothills (the 'Nejd') of the Dhofar Mountains, the gravel plains that run north to the sand-seas of the Empty Quarter, the southern coastal plain and the plateau

*Corresponding author. Email: hadihikmani@gmail.com

of the arid Jabal Samhan (Harrison & Bates, 1991). However, the Arabian Gazelle was never reported from the monsoon habitats of Jabal Al Qamar and Jabal Al Qara (Spalton & Hikmani, 2014). Today, as a consequence of illegal hunting and capture, it has disappeared from most areas of Dhofar although small numbers remain in the Nejd and on the southern coastal plain, particularly between Mirbat and Sadah (Spalton & Hikmani, 2014).

Field surveys were therefore conducted in 2014 to assess the populations that were known to remain in the Nejd and the foothills of Jabal Samhan. The principal objective of the surveys was to provide relatively precise and accurate estimates of the numbers and density of Arabian Gazelles in the two areas, using a technique that could be executed within a reasonable time and at a reasonable cost. It was also important that the survey was sufficiently robust that it could be repeated as part of a long-term monitoring of the species. Finally, the results would help the responsible authorities to plan and implement a national conservation strategy for the Arabian Gazelle.

Material and methods

Study area. Two study areas where the Arabian Gazelle was known still to occur were selected for the 2014 census, i.e., to the north and to the south of the Dhofar Mountains. The northern census area is located in the Nejd (10,117 km^2) and comprises the northward-flowing wadis draining from the mountains. The area is bounded by the Empty Quarter to the north, the Dhofar Mountain chain to the south, the Salalah-Muscat road to the east and the Oman-Yemen border to the west (Fig. 1). The southern census area comprises 778 km^2 of the Jabal Samhan foothills between Mirbat and Sadah. It is bounded by the Jabal Samhan escarpment to the north and east and the Arabian Sea to the south (Fig. 1). Open *Acacia*-scrub and shallow, sparsely vegetated dry gravel wadi beds dominate both study areas.

Data Collection. Using Google Earth Pro we designed nine sampling areas for the Nejd and a single large sampling area for Jabal Samhan. Due to differences in habitat features, we divided the Nejd sampling areas into prime habitat and secondary habitat. The northward-flowing wadis of Ghadun, Amat, Gharah, Satum, Aydam and Harwib, where *Acacia* species dominate, were considered as prime habitat whereas open gravel plains with little vegetation were considered as secondary habitat. Following available tracks we conducted a transect survey in each wadi of the prime habitat and three in the secondary habitat. Transect length was between 5 km and 70 km. In Jabal Samhan we drove a total of 210 km.

Surveys were carried out between 7 a.m. and 1 p.m. during late November 2014 by two persons i.e. a driver-observer and observer-recorder, using a 4x4 vehicle and applying a conventional road strip count methodology (Bothma, 2002). This method is considered to be the most practical for rangers and conservation managers to determine changes in the population size of gazelles (Wronski, 2013). Gazelle numbers were recorded and total population sizes for each area were estimated by extrapolating actual sightings, using the formula $N = nH/h$, whereby n is the number of animals actually seen during a count, H is the size of the total survey area and h is the size of the sampled area (Bothma, 2002; Wronski, 2013). The size of the sample areas (h) was determined by multiplying the length of the transect by its width, which was fixed at 750 m each side of the vehicle for this study. Finally, gazelle densities (individuals/km^2) for each study area and/or habitat type were calculated.

Results

A total of 273 Arabian Gazelles was recorded during the November 2014 surveys, with 168 animals in the Nejd and 105 in Jabal Samhan census area (Table 1). The highest number of gazelle sightings was recorded in the Nejd prime habitat but the highest gazelle density was estimated for the Jabal Samhan foothills (0.33 animals/km^2; Table 1).

In the Nejd, Wadi Amat and Wadi Satum had the highest gazelle density estimates (Table 2), whereas the lowest were in Wadi Aydam and Wadi Harwib. Nevertheless, the

Table 1. Numbers of Arabian Gazelle, density and total population estimates for Jabal Samhan foothills and Nejd area in November 2014.

Location	Total area (km^2)	Area surveyed (km^2)	Gazelle numbers	Density (animals per km^2)	Total Population estimates
Samhan Foothills	778	315	105	0.33	259
Nejd (prime habitat)	4998	585.5	162	0.28	1383
Nejd (secondary habitat)	5119	324.4	6	0.018	95

Table 2. Estimated number of Arabian Gazelle and densities for six census areas in the Nejd prime habitat in November 2014

	Area size (km^2)	Number of gazelles	Density (animals per km^2)
Wadi Ghadun	170	45	0.26
Wadi Amat	76	26	0.34
Wadi Gharah	83	23	0.28
Wadi Satum	175	57	0.32
Wadi Aydam	44.6	6	0.13
Wadi Harwib	36.9	5	0.14

lowest estimate of gazelle density was found in the Nejd secondary habitat (0.018 km^2) where only six gazelles were sighted (Table 2).

The total population estimate of Arabian Gazelles for the two study areas, including both prime and secondary habitat, was 1,737 gazelles.

Discussion

The first surveys of the Arabian Gazelle populations in Dhofar show that the species still persists in good numbers in some areas of its former range. Higher gazelle densities were present in the Nejd areas which experience less human activity (e.g., Wadis Amat, Satum and Gharah) compared to those wadis with permanent human settlements (e.g., Wadis Harwib and Aydam, Table 2).

The gazelle density in Jabal Samhan foothills was overall higher than that established in the prime habitat of the Nejd. The situation in Jabal Samhan is exceptional, as the Arabian Gazelle seems to benefit from being close to human settlements. We suggest that the presence of people throughout this area makes it difficult for illegal hunting, in contrast to the Nejd where settlements are much smaller and scattered, allowing illegal hunting to remain unnoticed. For example, most hunting cases in Jabal Samhan occur during the monsoon season (July–September) when the inhabitants of the foothills move to the plains west of Mirbat and to the plateau east of Tawi Atair.

The observed low number and density in the secondary habitat of the Nejd (open gravel plains) indicates that this habitat is less suitable for gazelles, which seem to

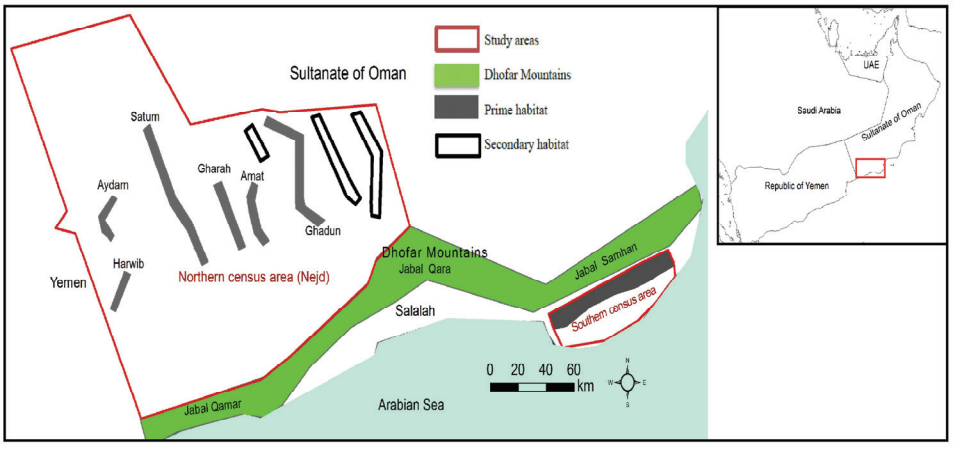

Figure 1. Location of the study areas and survey sites for the 2014 Arabian Gazelle census in the Dhofar region of Oman. The inset map shows the position of the study areas within Oman.

prefer areas with more vegetation cover and particularly *Acacia* trees on which they are known to browse. *Acacia* trees also provide vital shade in this largely waterless area and may, to some extent, enable gazelles to hide from hunters. However as reported by Spalton & Hikmani (2014), gazelles avoid the very heavily vegetated slopes and hills of the monsoon affected Jabal Qara and Jabal Qamar, and indeed it is likely that these lush habitats were never part of the range of this species, which is adapted to arid land. This observation is supported by the fact that, unlike elsewhere in Oman and throughout Arabia where the gazelle is praised for its beauty, it rarely appears in the poetry and folklore of the Jibbali people of Dhofar.

Overall, the observed densities in both study areas are encouraging. This is particularly true regarding the density in central Oman (Al Wusta Wildlife Reserve) which was recently estimated at 0.22 animals/km^2 (Strauss et al., 2009), compared to our estimates of 0.33 animals/km^2 and 0.28 animals/km^2 for the two census areas. However, it should be noted that Strauss et al. (2009) were reporting on a gazelle population that had been decimated by widespread poaching since 1996. Our study areas, particularly the Nejd, are more difficult to access and have been exposed to low levels of illegal hunting. However, in the Nejd this may soon change as quarrying and oil exploration is resulting in a greater access to these relatively remote areas.

Since the recent renaming of the gazelles of the Arabian region (Lerp, Wronski, Butynski, & Plath, 2013), their status on the IUCN Red List of Threatened Species has not been reassessed (IUCN, 2008). However, the populations of all gazelle species in the Arabian Peninsula are declining (IUCN, 2008) and the Arabian Gazelle is likely to be listed at least as 'Vulnerable'. In Oman it has been granted protection but illegal hunting still occurs and, with new threats arising, the population is even more in jeopardy. While law enforcement needs to be strengthened, effective population monitoring and awareness programs are vital to ensure the conservation of the species. In Dhofar in particular, the Arabian Gazelle is an important prey species of the critically endangered Arabian Leopard, *Panthera pardus nimr* (Spalton et al., 2006). Thus any further diminution of the gazelle population will also impact negatively on the survival of the leopard in Dhofar, and specifically in the Nejd where a small number of leopards continues to survive (Spalton & Hikmani, 2014).

Acknowledgements

We would like to thank the staff of the Office for Conservation of the Environment, Diwan of Royal Court, in particular the Director General and his deputy, for their invaluable support for our work. We would also like to thank Amar Zabanoot, Rams Zabanoot and Musallam Al Mashaikhi for their help during the surveys, and an anonymous reviewer for his comments on this manuscript.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Reference

Bothma, J. du P. (2002): *Game Ranch Management*. Pretoria: Van Schaik.

Cunningham, P. L., & Wronski, T. (2011): Twenty years of monitoring of the vulnerable Farasan gazelle *Gazella gazella farasani* on the Farasan Islands, Saudi Arabia: an overview. *Oryx*, 45, 50–55.

Fisher, M. (1999): The conservation status of the terrestrial mammals of Oman: a preliminary Red List. pp. 109–127. In: M. Fisher, S. A. Ghazanfar, & J. A. Spalton (Eds.), *The Natural History of Oman: A Festschrift for Michael Gallagher*. Leiden: Backhuys Publishers.

Harrison D. L., & Bates P. J. J. (1991): *Mammals of Arabia. 2nd Edition*. Sevenoaks: Harrison Zoological Museum Publication.

Insall, D. H. (2001): Oman. pp. 67–73. In: D. P. Mallon & S. C. Kingswood (Eds.), *Global survey and regional action plans – Antelopes, Part 4: North Africa, the Middle East, and Asia*. Gland: IUCN.

IUCN (2008). *The IUCN Red List of Threatened Species*. [Version 2015.2]. Retrieved from www.iucnredlist.org [accessed on 30 June 2015].

Lerp, H., Wronski, T., Butynski, T. M., & Plath, M. (2013): Speciation of Arabian Gazelles. pp. 59–82. In: M. Pawel (Ed.), *Speciation: Natural Processes, Genetics and Biodiversity*. New York: Hauppauge.

McGregor, T., Spalton, A., Al Hikmani, H., & Hammer, M. (2007): *Status of the Arabian leopard* (*Panthera pardus nimr*) *in the mountains of the Musandam Peninsula, Sultanate of Oman*. Expedition Report. Retrieved from Biosphere Expeditions: http://www.biosphere-expeditions.org/images/stories/pdfs/reports/report-oman0607.pdf.

Nader, I. A. (1989): Rare and endangered mammals of Saudi Arabia. pp. 220–233. In: A. H. Abuzinada, P. D. Goriup, & I. A. Nader (Eds.), *Wildlife Conservation and Development in Saudi Arabia*. Riyadh: National Commission for Wildlife Conservation and Development.

Spalton, A., & Al Hikmani, H. (2014): *The Arabian Leopards of Oman*. London: Stacey International.

Spalton, J. A., Al Hikmani, H., Al Jahdhami, M., Ibrahim, A., Bait Said, A., & Willis, D. (2006): Status of the Arabian leopard *Panthera pardus nimr* in the Sultanate of Oman. *Cat News Special Issue, 1,* 26–32.

Strauss, M., Al Kharousi, Y., & Spalton, A. (2009): Status of the gazelle population in the Arabian Oryx Sanctuary of Oman. *Wildlife Middle East News*, *3(4),* 5.

Wronski, T. (2013): Population development of Arabian Gazelles, *Gazella arabica*, on the Farasan Islands, Saudi Arabia. *Zoology in the Middle East*, 59, 189–195.