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## Distribution Update

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# Arabian wolf distribution update from Saudi Arabia

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## Abstract

A review of unpublished reports (grey literature) has confirmed the presence, and persistence, of grey wolves *Canis lupus pallipes* from at least 13 protected or proposed protected areas in Saudi Arabia indicating the value of synthesising and publishing such data. Although wolves are still declining in Saudi Arabia, various factors including wolves' habituation to humans, scavenging omnivorous behaviour, high reproductive rate, large home ranges, long daily movements and long distance dispersal may contribute to their persistence and even re-establishment in protected areas and other sparsely inhabited locations.

## Introduction

Since the first Arabian wolf records from northern and central Saudi Arabia (Blunt 1881, Doughty 1888), their actual distribution has been sketchy with wolves never viewed as being very common throughout their range

(Green 1986). Although widespread throughout Saudi Arabia (Harrison and Bates 1991, Nader 1990, Nader 1996) most earlier publications indicate wolves either from the mountainous south western Asir, northern rocky areas bordering Jordan or the central areas around Riyadh (e.g. Cheesman and Hinton 1924, Morrison-Scott 1939, Bromage 1954, Nader and Büttiker 1980 and Gasperetti et al. 1986). Being an understudied species, Arabian wolves are probably more widespread than currently documented. Globally the grey wolf is listed as *Least Concern* (LC) with a stable population trend (Mech and Boitani 2008) and is listed in Appendix II of CITES (CITES 2008).

The status of wolves in Saudi Arabia is difficult to determine due to a lack of research and systematic census, although estimated numbers of between 500 and 600 (Mech and Boitani 2004) and 600 and 700 (Nader 1996) animals have been published. The only official census in Saudi Arabia to date was conducted during late 1999 and early 2000 by Sinibaldi et al. (2000) who concluded that the overall numbers might be higher than those published

by Nader (1996) albeit still in a decreasing trend.

In addition, very little is known about the presence of wolves in protected areas throughout Saudi Arabia, with Child and Grainger (1990) providing some information in a system plan for protected areas. The aim of this paper is to update the distribution of the Arabian wolf in Saudi Arabia and some protected areas by providing recent locations and data from unpublished field reports difficult to access from outside Saudi Arabia.

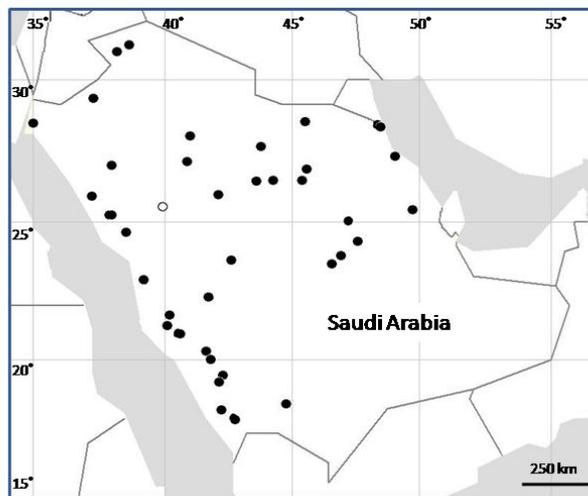
## Methods

Data were collected through a search on the literature published from Saudi Arabia including unpublished reports (grey literature) by various authors, samples collected from the wild and stored for genetic analysis at the King Khalid Wildlife Research Centre (KKWRC) and recent (2008/2009) sightings by the authors.

Although other earlier authors (e.g. Al Basri 1987, Child and Grainger 1990, Seddon and Khan 1996) include wolves from various protected areas throughout Saudi Arabia this report contributes recent evidence – i.e. sightings, dead specimens, tracks, scats and carcasses showing evidence of wolf feeding – for protected areas, proposed protected areas and biosphere reserves and partner agencies for which there were no reports of wolves or only referred to anecdotal evidence.

## Results

This paper confirms an additional 64 confirmed wolf sightings (i.e. live, dead, tracks, prey) since 1999 (Figure 1) with the most recent sighting being of a female captured in a box trap on 15 November 2009 approximately 30km north of Riyadh in central Saudi Arabia (P.L. Cunningham, unpublished data).



**Figure 1.** Map of Saudi Arabia indicating previously unpublished records of wolves from Saudi Arabia. Records (●) are based on voucher specimens kept at KKWRC for genetic analysis. All specimens (n = 64) were collected by KKWRC or NCWCD (National Commission for Wildlife Conservation and Development, Saudi Arabia) staff members between 1999 and 2009. One record (○) indicates the second wolf sighting in Saudi Arabia made by Doughty in 1888.

Of the 31 existing terrestrial protected areas (15 protected by the National Commission for Wildlife Conservation and Development and 16 by partner organisations) (Llewellyn, in press) the unpublished literature confirmed the presence/persistence of wolves from 11 of the 15 protected areas with supporting evidence for two other areas recommended for protected area status (i.e. Wadi Tarj and Wadi Turbah) (Table 1).

## Discussion

The Arabian wolf, against the odds, tenaciously survives throughout much of its original distribution range in Saudi Arabia. A lack of herding of domestic livestock and abundant and ubiquitous refuse in Saudi Arabia may also have contributed to the wolf's successful persistence as they may achieve densities in relation to the available food source (White et al. 2008). They suffer greatly from persecution with "hanging trees" – sites (often trees) traditionally used to display wolves (as well as other predators such as striped hyaena *Hyaena hyaena*, caracal *Felis caracal* and leopard *Panthera pardus*) – testament to their encounters



**Figure 2.** Arabian wolf killed and displayed in a "hanging tree" in western Saudi Arabia.

with humans (Nader and Büttiker 1980, pers. obs.) (Figure 2). Notwithstanding this persecution they are still viewed as numerous in certain inhospitable mountainous areas by Bedouin who often lose domestic stock to wolf predation (Sinibaldi et al. 2000). Harsh mountainous areas elsewhere – e.g. Mongolia – have higher densities of wolves and seem to offer wolves a continued refuge (Kaczensky et al. 2008). In a recent survey in the western Asir (An Namas/Bisha area) a relatively high encounter rate of 0.12 wolf carcasses per km (Cunningham et al. 2009) was noticed. Elsewhere, they are expected at lower densities and anecdotal evidence suggests that they are highly mobile seasonally in Saudi Arabia (S. Shah, pers. comm.). The importance of establishing and maintaining protected areas (including active enforcement thereof) in the mountainous areas of Saudi Arabia would not only benefit wolves, but also other species (e.g. ibex *Capra nubiana*, and mountain gazelle *Gazella gazella*) facing a tentative existence.

Wolves may be able to re-establish in areas where active persecution is limited such as in certain protected areas, as recently confirmed from the Ibex Reserve (approximately 180km south of Riyadh) in central Saudi Arabia (Wronski and Macasero 2008), with fresh tracks also found in the Mahazat as-Sayd protected area (approximately 700km west of Riyadh) in central western Saudi Arabia after rains and calving of sand gazelle *G. subgutturosa marica* (P.L. Cunningham, unpublished data). Although their distribution is not continuous (Mendelssohn 1983) such re-establishments could be supported by large home range size – e.g. 22 to 60km<sup>2</sup> (Afik and Alkon 1983, Hefner and Geffen 1999), long daily movements – e.g. 10.5km maximum straight line (Afik and Alkon 1983) together with long distance dispersals – e.g. 50 and 200km (Hefner and Geffen 1999) as reported from Israel.

The greatest threat to wolves in Saudi Arabia is still similar to that stated by Mendelssohn (1983) i.e. increased human population and inevitable conflict leading to active persecution, transferable canid related diseases (e.g. rabies) and better veterinary care of free ranging domestic stock thus limiting carcasses for scavenging and predation. On the other hand, wolves have become habituated to humans (Hefner and Geffen 1999) and being opportunist-

istic omnivorous foragers (Biquand et al. 1994, Hefner and Geffen 1999) with a high reproductive rate (Furley 1985) may ensure their

survival in an otherwise marginal environment.

**Table 1.** Protected areas in Saudi Arabia with confirmed presence/evidence of wolves.

Protected Areas	Evidence	Source
Al-Jandaliyah	-	-
Al Khunfah	Prey	Thouless & Tatwany (1989)
At-Taysiyah	-	-
At Tubaiq	Tracks	Wacher & Strauss (2000)
Farasan Islands	-	-
Harrat al Harrah	Live sighting	Green (1986), Wacher (1993)
Harrat 'Uwayrid	Anecdotal	Child & Grainger (1990)
Ibex Reserve	Faeces, tracks, prey	Wronski & Macasero (2008)
Jabal Shada	Anecdotal	Child & Grainger (1990)
Mahazat as-Sayd	Tracks	Cunningham (unpub. data)
Majami' al-Hadb	Anecdotal	Child & Grainger (1990), Llewellyn (in press)
Nafud al-'Urayq	-	-
Raydah	Anecdotal	Llewellyn (in press)
Saja Umm ar-Rimth	Dead specimen	Sher Shah (2007)
Uruq Bani M'Arid	Anecdotal	Al Basri et al. (1987)
<b>Others</b>		
Al-Haraman ash-Sharifan	Anecdotal	Llewellyn (in press)
Haram of Makkah	Anecdotal	Llewellyn (in press)
Harrat Khaybar/Wadi Hadiyah	Anecdotal	Llewellyn (in press)
Himma Al-Azahirah	Anecdotal	Llewellyn (in press)
Himma Al-Fawqa'	Anecdotal	Llewellyn (in press)
Himma Al Humayd	Anecdotal	Llewellyn (in press)
Jabal Aja'	Anecdotal	Llewellyn (in press)
Jabal Batharah/Wadi Turabah	Anecdotal	Gasperetti et al. (1985), Child & Grainger (1990), Biquand et al. (1994)
Jabal Uthrub/ Al-Balas	Anecdotal	Llewellyn (in press)
Jibal Qaraqir	Anecdotal	Llewellyn (in press)
Majami' al-Hadb (extension)	Anecdotal	Llewellyn (in press)
Wadi 'Iya' Ballasmar	Anecdotal	Llewellyn (in press)
Wadi Lajb/Jabal Al-Qahar	Anecdotal	Llewellyn (in press)
Wadi Tarj/Jabal Jandaf	Dead specimens	Cunningham et al. (2009)

Anecdotal = no evidence of wolves provided - only mentioned wolves from these areas.

Prey = evidence of prey killed by wolves.

Others = Partner Agencies, priority proposed Protected Areas & proposed Biosphere Reserves (NCWCD & partner agencies)

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