

Short Communication

Confirmation of the survival of the Critically Endangered dama gazelle *Gazella dama* in south Tamesna, Mali

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Abstract In February 2005 a survey confirmed the existence of Critically Endangered dama gazelle *Gazella dama* in south Tamesna, eastern Mali. Two zones, covering an area of 1,775 km², were systematically surveyed. Seven gazelles were seen and evidence was found of 18 additional individuals, giving an estimated density of 0.047 gazelles km⁻². The dama gazelles are taking refuge in places where it is difficult to drive because of a strongly-marked relief and the presence of grassy tussocks. Preliminary genetic analysis of faeces indicates that these gazelles belong to the subspecies

Gazella dama dama. These populations are of particular importance for the conservation of the dama gazelle, and an aerial survey has been planned to confirm the terrestrial observations. The government of Mali has, however, already decided to create three protected areas in Tamesna for the conservation of the dama gazelle and Vulnerable dorcas gazelle *Gazella dorcas*.

Keywords Critically Endangered, dama gazelle, *Gazella dama*, Mali, Sahel, Tamesna.

The dama gazelle *Gazella dama* was once one of the most numerous and widespread Sahelo-Saharan gazelles but is now categorized as Critically Endangered on the IUCN Red List (IUCN, 2006) and listed on Appendix I of both CITES (CITES, 2006) and the Convention on Migratory Species (CMS, 2006). Currently, a total of a few hundred dama gazelles are believed to survive in the wild in Algeria, Chad, Mali, Niger, Sudan and possibly Libya (Newby, 2003).

The species' former range included the southern Saharan massifs of the Adrar des Ifoghas in eastern Mali (Devillers & Devillers-Terschuren, 1999), which borders the plain of Tamesna. In 2003 and 2004 local people indicated to the local wildlife services in north-eastern Mali that dama gazelles were still present in up to 10 separate locations in south Tamesna. However, no

direct observations of dama gazelles were made during the subsequent investigations carried out in the area by the local wildlife services (A. Ag Sid'Ahmed, pers. obs.)

To verify these observations two zones, located north of Ménaka in the Gao region, c. 1,500 km east of Bamako, were identified using the geographic coordinates of the dama gazelle observations made in 2003 and 2004 (Fig. 1). A survey of these zones was carried out during the dry season, from 10 to 15 February 2005. We used a predefined systematic sampling pattern with each zone surveyed from two vehicles, one 300 m behind the other, along west-east oriented transects that were 8 km apart (six 25-km transects in zone 1; four 30-km transects in zone 2). Transects were divided into 5-km long and 1-km wide sections. The total 1,775 km² areas of zones 1 and 2 were equivalent to 205 and 150 sections, respectively, of which 30 were sampled in zone 1 and 24 in zone 2. Habitat descriptor variables were noted at the end of each section.

Direct observations and signs (spoor and droppings identified in the field by skilled local hunters/poachers working with the survey team) of dama gazelle presence were geo-referenced. Samples of dung pellets were collected, geo-referenced and preserved in 60% ethanol for genetic analysis. From the observations of dama gazelles and their spoor we calculated the percentage of sections without observations, mean number of groups per section, mean group size, and number of gazelles per km (Lamarque & Stahl, 2003). We assumed that each set of spoor that could not have been observed

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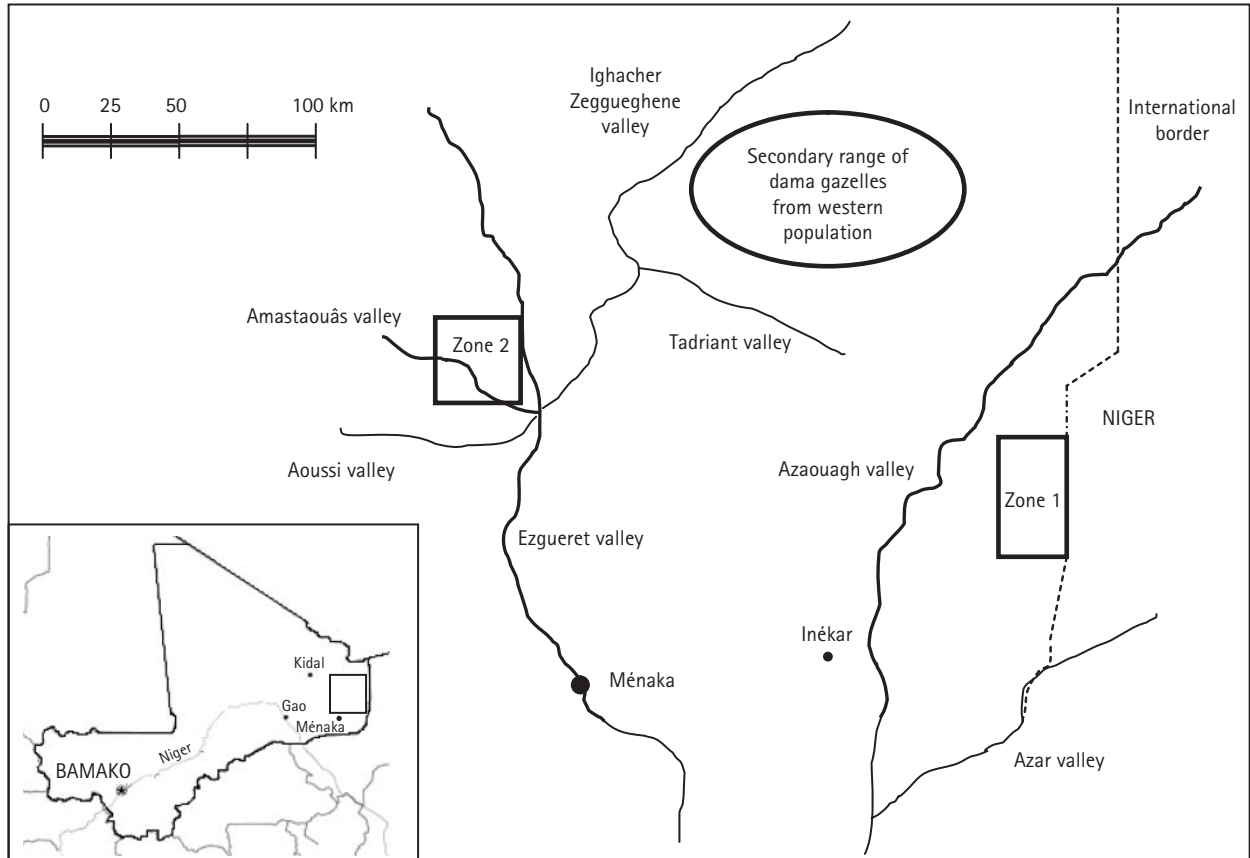


Fig. 1 Locations of the two surveyed zones in the Tamesna region of Mali and of the secondary range apparently used by the western population (see text for further details). The inset indicates the location of the main figure in eastern Mali.

previously (given the distance, the direction of the track and/or the number of individuals of the group) represented one individual. It is likely that this led to an underestimation as on several occasions the spoor recorded as one individual had clearly been made by several animals.

Seven dama gazelles were seen in zone 1 and none in zone 2. Eighteen additional individuals were identified from spoor (12 in zone 1 and 6 in zone 2 including the tracks of a young individual). Our estimate of the dama gazelle population in the two zones, obtained by multiplying the mean number of observations per

section by the total number of sections in each zone, is c. 170 individuals (Table 1).

Initial genetic analyses of the droppings indicate that the dama gazelles of south Tamesna belong to the same subspecies (*G. dama dama*) and the same original population as those from Chad, several hundred km to the east (K. Hundertmark, pers. comm.).

The habitat descriptor variables suggested that the gazelles' preferred habitat in the surveyed areas has the following characteristics: an uneven relief, sandy soil, grasses (such as *Panicum turgidum*) forming patches and/or tussocks often associated with wild melon

Table 1 Number of observations of dama gazelles in the surveyed sections (5 * 1 km) of the two survey zones in Tamesna (Fig. 1), with an estimate of the total number of gazelles in each zone.

Zone	Total no. of sections	No. of sections sampled	No. of gazelle ¹	Mean no. of gazelle per section (estimated variance)	Estimated no. of gazelle (variance, SE) ²
1	205	30	19	0.6333 (2.7230)	130 (3256.24, 57.06)
2	150	24	6	0.2500 (0.5435)	38 (427.99, 20.69)

¹Includes both direct observations and signs (see text for details)

²Obtained from total no. of sections * mean number of gazelles per section

Citrullus colocynthis, scattered trees (especially *Acacia* spp.), and no pastoral activities (the presence of camels without herders being considered without effect on the gazelles). This indicates that dama gazelles are taking refuge in places where it is difficult to drive because of a strongly-marked relief and the presence of grassy tussocks.

In corroboration of the results of our survey, further information on the distribution and movements of dama gazelles was provided by local people in 2003 (Nouveaux Horizons, 2003) indicating that there are two small populations of dama gazelle in Tamesna: (1) An eastern population north of the commune of Inékar, between the valleys of Azaouagh and Azar. This area corresponds to the north of our zone 1. (2) A western population with a main range, used for most of the year, located between the valleys of Ezgueret, Amastouâs and Aoussi (corresponding in part to our zone 2), and a secondary range, mainly used at the end of the rainy season, between the Ighacher Zeggueghene and Tadriant valleys (Fig. 1). Dama gazelles from the western population apparently migrate to northern Tamesna via the secondary range during the rainy season (from July onwards). The total area used by these two populations of dama gazelles is c. 17,500 km².

There have been five other recent surveys of dama gazelles, in Niger and Chad, but other than one of the surveys carried out in Niger (Claro, 2004), the methodologies used were different from ours and the results are not therefore strictly comparable. However, a comparison of the results of all surveys (Table 2) allows some general conclusions to be drawn: (1) In all

areas surveyed the number of dama gazelles recorded was very low. (2) The gazelles observed are concentrated in small areas (i.e. the percentage of survey sections without gazelles was high). (3) The size of all observed gazelle groups was small (mean for all observations 2.47 (range 1-5)). (4) The number of gazelles per km was <0.05 in all surveys. (5) Our zone 1 survey area is a region of particular importance compared to the areas of the other surveys, with the highest density of gazelles.

The results of this field work and the data collected with the help of local people confirm the survival of at least two populations of dama gazelles in the Tamesna region of eastern Mali. These populations are of particular importance for the conservation of this Critically Endangered species, and an aerial survey has been planned to confirm the terrestrial observations. The government of Mali has, however, already decided to create three protected areas in Tamesna for the conservation of the dama gazelle and the Vulnerable dorcas gazelle *Gazella dorcas*.

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Table 2 Comparison of six separate dama gazelle surveys in which individuals were observed in Mali, Niger and Chad, with the locations of the surveys and the year of survey.

	Mali		Niger		Chad	
	Zone 1 (2005)	Termit (2002)	Termit (2002)	RNNAT (2002) ¹	Manga (2001)	Central (2001)
No. of transect sections (5 * 1 km) ²	30	343	51	147	78.4	132.5
Total no. of groups	2	6	1	2	6	2
Total no. of individuals	7	18	5	2	11	4
% of sections without gazelles	93.33	98.25	98.04	98.64	93.35	98.1
Mean no. of groups per section	0.067	0.017	0.020	0.014	0.076	0.015
Mean group size (range)	3.5 (2-5)	3 (1-5)	5	1 (1-1)	1.83 (1-2)	2 (1-3)
Gazelles km ⁻¹	0.047	0.010	0.020	0.003	0.039	0.006
Source	This study	Claro, 2004	Wacher <i>et al.</i> , 2004	Wacher <i>et al.</i> , 2004	Wacher <i>et al.</i> , 2004; Monfort <i>et al.</i> , 2004	Wacher <i>et al.</i> , 2004; Monfort <i>et al.</i> , 2004

¹RNNAT, Air-Ténére Natural National Reserve (Réserve Naturelle Nationale de l'Air-Ténére)

²For surveys other than this study the transect sections have been standardized here to 5 * 1 km sections for comparative purposes

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Biographical sketches

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