

Regional Rundown

West Africa

The role of Senegal in the recovery of the Sahelo-Saharan antelope species: the case of the reintroduction of Dorcas Gazelle, Teresa Abáigar ^{1*}, Babacar Youm ², Marius Niaga ², Conrad Ensenyat ³ and Mar Cano ¹

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Abstract. During the last 25 years Senegal made a significant effort to recover the three sahelian species which disappeared from its sahelian region: the scimitar-horned oryx (*Oryx dammah*), the mhorr gazelle (*Gazella dama mhorr*) and the dorcas gazelle (*G. dorcas*). With this purpose, the Senegalese government created two fauna reserves: the Guembeul Reserve and the Ferlo North Reserve. The mhorr gazelle was reintroduced in 1984 and the scimitar-horned oryx in 1999. The reintroduction of dorcas gazelles started in April 2007 with a project conceived to be carried out in three phases: phase 1) translocation of 20 gazelles (6.14) from the captive global population living in several zoological institutions in Europe to the Guembeul Reserve, phase 2) acclimation to the new environmental and management conditions and growing of population under genetic control, and phase 3) translocation of part of the gazelles from the Guembeul Special Fauna Reserve to the North Ferlo Fauna Reserve and genetic reinforcement of the reintroduced population. After 14 months of the reintroduction, the gazelles are well adapted to the new conditions and now number 31 gazelles (9.22). To assure the success of the reintroduction project, other actions related with training and education of local people were carried out.

Keywords. Conservation, Dorcas Gazelle, *Gazella dorcas*, Reintroduction, Sahelo-Saharan antelopes, Senegal

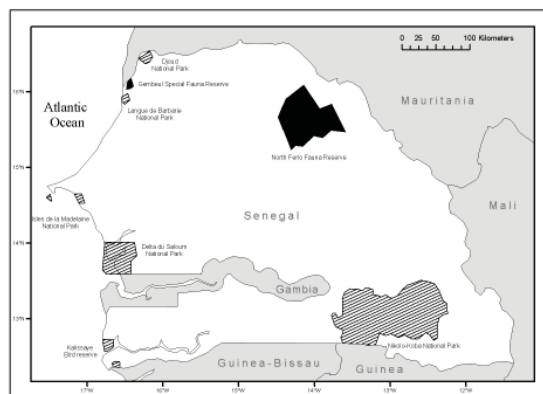
The Sahelo-Saharan antelopes in Senegal. An introduction

The six mammal species commonly known as Sahelo-Saharan antelopes (SSA) are acutely suffering the consequences of human habitat degradation and overexploitation; as a result, one of the species, the scimitar-horned oryx *Oryx dammah* is extinct in the wild, two of them are at the limit of extinction (addax *Addax nasomaculatus* and dama gazelle *Gazella dama*), other two are categorized as "Endangered" (slender-horned gazelle *Gazella leptoceros* and Cuvier's gazelle *Gazella cuvieri*) and the last one, dorcas gazelle *Gazella dorcas*, is listed as Vulnerable (IUCN Red List 2007).

The Sahel has played an important role for the maintenance and survival of three of these species, oryx and mhorr and dorcas gazelles. This is because, although their distribution is not limited to the Sahelian habitat, this area is occupied during their migration periods, when herds look for food and shelter. Therefore, not so

long ago, the presence of these antelope used to be quite common in Senegal, Mauritania, Mali, Niger, Burkina-Faso, Chad and Sudan (see details of the distribution of these species in UNEP/CMS 2005).

The Republic of Senegal (see Figure 1) occupies an area of 196,192 km² distributed in 14 administrative regions. It is a very flat country whose highest altitude is 498 m in the south east (Fouta-Djallon). It comprises three biogeographic regions well differentiated in climate, vegetation and predominant fauna.



Roughly described, these are: 1) the Sahelian region, occupying the northern third of the country, with forests of different species of acacia (*Acacia raddiana*, *A. senegal*, *A. albida*, *A. seyal*), baobabs (*Adansonia digitata*), *Balanites aegyptiaca* and *Ziziphus mauritiana*, 2) the Sudanese savannah that extends over the central plains and the southeast, which is dominated by *Khaya senegalensis*, *Pterocarpus erinaceus*, *Parkia biglobosa*, *Borassus aethiopicum*, and *Oxytenanthera abyssinica* and 3) the sub Guinean savannah in the southwest represented by *Parinari excelsa*, *Chlorophora regia* and *Elaeis guineensis*. There are also smaller ecosystems mediated by the topography and water regime; in particular, the forest of *Acacia nilotica* in the valley of the Senegal River and mangroves (*Rhizophora racemosa*) in the Saloum and Casamance estuaries (Ndiaye 2000; Jebali 2008).

During the last 25 years Senegal has made a significant effort to recover the three SSA species which disappeared from its Sahelian region at different times. The scimitar-horned oryx disappeared before 1914 (Sournia and Dupuy 1990). The mhorr and dorcas gazelles were occasional visitors to the Sahel zone; DMG until 1972-1973 (Poulet 1972), but there is not a precise date of extinction for dorcas gazelle (Sournia and Dupuy, 1990). The first conservation actions taken were the establishment of two fauna reserves in the Sahelian region: the Guembeul Special Fauna Reserve and the North Ferlo Fauna Reserve (Figure 1).

The Guembeul Special Fauna Reserve (GR) was created on May 30 1983 with a clear vocation to serve as a place for animal acclimation during the first phases of reintroduction projects and to carry out environmental awareness tasks. With a surface area of 720 ha, the GR is located 10 kms southeast of the city of Saint Louis. Due to its proximity to Djoudj National Park, it is also an important site for many species of migratory aquatic birds at it is included in the list of Ramsar sites since 1986; since 2005, the site belongs to the transboundary biosphere reserve of Delta of the Senegal River

(UNESCO-MAB www.unesco.org/mabdb/br/brdir/directory).

The North Ferlo Fauna Reserve (FR) was created by a presidential decree on March 21 1972 to protect the Sahelian fauna in northern Senegal and to serve as a final destination for SSA reintroduced in Senegal. It is located in northeast Senegal and extends over 487000 ha. The climate is Sahelian modulated by the continental character of the zone. Among other conservation actions undertaken through the Natural Park Management Direction (DPN), the Senegalese Ministry of the Environment and Protection of Nature has, created a sanctuary in Katané. In 2001 a 440 ha enclosure was put up in Katané for the reintroduction of SSA no longer in Senegal.

Senegal was a pioneer in the reintroduction of SSA in Western Africa. In 1984, the GR received the first reintroduction of mhorr gazelle (*Gazella dama mhorr*) with 7 gazelles (2.5) born in captivity at the Parque de Rescate de la Fauna Sahariana (PRFS) (EEZA, CSIC, Almería, Spain) and donated by the Spanish National Research Council (CSIC) (Cano et al. 1993). In 1999, a group of 8 (3.5) oryx was donated by the Israeli Wildlife Authority, and 2 (0.2) more by the Zoo of Vincennes (France) in 2002 (Ba and Clark 2002; Clark 2002; Jebali 2008). At present 15 mhorr gazelles and 40 oryx are living in the GR. In view of the success and growth of both mhorr gazelle and oryx populations in the GR, in January 2003, 9 mhorr gazelles and 8 oryx were transported from the GR to the FR where they seem to have adapted well. At present 11 mhorr gazelles and 42 oryx are living in the Katané enclosure.

The reintroduction of dorcas gazelle.

The last SSA reintroduced in Senegal was the Saharawi dorcas gazelle, *Gazella dorcas neglecta*.



On April 10 2007, 20 dorcas gazelles (6.14) were transferred from the PRFS to the GR, thus initiating the project for the reintroduction of this species in Senegal, where it had disappeared during the seventies (Sournia and Dupuy

1990). The group of 20 dorcas gazelles was selected from the global population managed *ex situ* within the European Captive Breeding Programme (EEP/EAZA). The animals reintroduced were selected following genetic, demographic and behavioural criteria and came from the following institutions: Madrid Zoo, Barcelona Zoo, Núcleo Zoológico “Coronel Duyos” (Nueva de Llanes, Asturias), OASYS-Tabernas Desert Thematic Park (Almería), Marwell Zoological Park (UK) and the PRFS.

The dorcas gazelle reintroduction project was conceived to be carried out in three stages: 1) selection, preparation and transfer of animals to the GR; 2) acclimation to the new environmental conditions and controlled reproduction in the GR; and 3) translocation of dorcas gazelles from the GR to the FR. The reintroduction was made following the recommendations of the ASG/SSC/IUCN.

One month before their transfer to Senegal, the gazelles from other centres were concentrated at the PRFS. After forming two herds from the groups of selected reproductive females, each animal was marked with a unique identification code and the health tests required and export permits (CITES) were completed. This initial grouping of individuals allows the establishment of relationships and ties that form the group’s social structure.

As for the transportation, each animal was captured with a net and placed into an individual crate. During this operation they were given a special treatment to protect them from stress (trilafon©) and possible complications derived from immobilisation while travelling. The gazelles were transported by plane (Hercules-130) in a direct flight of 6 hours from Almería (Spain) to St. Louis (Senegal). Upon arrival at the GR, the 20 gazelles were released in three groups in the three acclimation enclosures of 2500 m² each as follows: two reproductive groups (1.6 and 1.8) and a group of 4 adult males. After 14 months in the GR, the gazelles seem to be well adapted to the new climatological and management conditions.

In the PRFS dorcas gazelles were fed with barley, commercial pellets for livestock and alfalfa; moreover, mineral are supplied in salt blocks; water was provided *ad libitum*. When the gazelles were taken to the GR their diet was changed, progressively reducing the amount of barley until its disappearance and substituting alfalfa with peanut straw; water and minerals were also provided *ad libitum*. Female social behaviour in the reproductive groups did not vary substantially with respect to their social organisation in the PRFS. Each female kept its rank in the hierarchy except the oldest one (10 years old), who decreased its rank and isolated from the rest of the group. As the enclosures in the GR were larger than those in the PRFS, gazelle flight distance to human approach increased with time. In order to maintain genetic variability, the reproductive males were changed in each reproductive period. Every time a calf was born it is identified. During the period April 2007-June 2008 there were 16 births, female biased (5.11), and 5 deaths (1 adult male death by an infectious process, 2 adult females by trauma and 2 offspring). By August 2008, the number of DG in the GR is 31 (9.22) (Figure 2), distributed as follows: a reproductive group of 12 gazelles (1 adult male, 4 adult females, 7 youngsters); a second reproductive group with 12 gazelles (8 adult females and 4 youngsters), a bachelor group of 3 males, and 4 isolated adult males.

As the first phases of the reintroduction of dorcas gazelle in Senegal were successful, a third phase has started, in which most of the gazelles will be transported to Katané enclosure in the FR; while the rest of gazelles will be kept as a breeding stock in the GR; the surplus of this group will be regularly transferred to the FR.

Also related to the dorcas gazelle reintroduction project, other actions have been carried out: a training course on management and conservation of endangered species addressed to the curators of the GR and the FR; an “ecomuseum” or visitors’ centre has been built and equipped in the GR, which hosts a permanent exposition of the local ecosystem and conservation projects carried out in the institution.

With this successful reintroduction of dorcas gazelle, Senegal has recovered its three autochthonous SSA, which became extinct not so long ago. Now efforts should be addressed to provide wider protected areas where these antelopes can freely settle and reproduce, allowing them to reach population sizes large enough to assure their genetic and ecological viability.

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References

- Ba D, Clark B (2001) Antelope programs in Senegal. Paper presented at the 2nd Annual Sahelo Saharan Interest Group Meeting, Almería, Spain May 9-10, 2001.
- Cano M, Abaigar T, Vericad, JR (1993) Establishment of a group of Dama Gazelles (*Gazella dama mhorr*) for reintroduction in Senegal. International. Zoo Yearbook 32: 98-107.
- Clark B (2002) Oryx dammah have achieved a second filial generation birth. Paper presented at the 3th Annual Sahelo Saharan Interest Group Meeting, Bratislava, Slovakia May 20-22
- IUCN (2007) IUCN Red List of Threatened Species. <http://www.iucnredlist.org>
- Jebali A (2008) Déclin de la faune sahélo-saharienne et tentative de réintroduction d'antilopes dans des habitats restaurés: cas de l'oryx algazelle (*Oryx dammah*) et de la gazelle dama (*Gazella dama mhorr*) dans la Réserve de Faune de Ferlo Nord (Sénégal). Dissertation, Muséum National d'Histoire Naturelle, Paris
- Ndiaye P (2000) Végétation et faune. In : Atlas du Sénégal. Les Éditions J.A. Paris, France
- Poulet AR (1972) Recherches écologiques sur une savane sahélienne du Ferlo septentrional, Sénégal: les mammifères. La Terre et la Vie 26 : 440-472
- Sournia G Dupuy AR (1990) Chapter 7: Senegal. In: East R (ed) Antelopes. Global survey and regional action plans. Part 3. West and Central Africa. Gland, IUCN. pp29-32



Southern Africa

Giant sable antelope rescue and translocation, by Pedro Vaz Pinto.

Background

When the rediscovery of the giant sable antelope in Cangandala NP, supported by trap camera photographs, was announced in 2005, few people could predict the frustration and uncertainty that soon followed. As the photographic record expanded and began to be critically analyzed, a shocking and unexpected reality became evident: the last surviving sable herd in Cangandala lacked a breeding bull and cows were producing hybrid calves with a roan antelope bull.

Over the last three years we witnessed the helpless decline of this breeding group, as three young sable males were pushed away by the roan bull, and the ageing females continued to produce hybrid calves. Since 2005, no pure sable offspring was recorded, and we found the remains of one sable female – presumably due to old age. In the meantime, a hybrid calf had been born approximately every six months, and ironically roan numbers had increased and threatened to replace the last sable group in Cangandala. The hybrids seem to be infertile as no female hybrids have been recorded with calves.

In 2008, we failed to complete a planned capture operation because of the last minute cancellation by the contracted Namibian capture operator. By early 2009 the situation was totally desperate, and this population without intervention, was doomed to extinction. We had no sable bull in the park, and we were down to less than ten old cows, and similar number of hybrids, including two hybrid bulls. The territorial roan bull was still present in the area occupied by the cows.

The Luando Strict Reserve is the only other protected area where the giant sable is known to occur. Being more than 10 times larger (828,000 ha versus 63,000 of Cangandala) and with prime miombo mosaic habitat, it has long been the stronghold for this subspecies and assumed to be the reservoir from which animals could be found to repopulate Cangandala if necessary. However, the results from camera traps installed in the reserve over the last two years, gave disappointing results. The trap cameras often recorded roan, but no sable, while poaching in the area seemed to be out of control. By mid-2009 we had identified a few promising areas for sable, but we had still failed to localize a sable herd, less alone bulls.



photo provided by Pedro Vas Pinto