

HERD STRUCTURE OF THE GIANT ELAND (*TAUROTRAGUS DERBIANUS DERBIANUS*) IN THE BANDIA RESERVE, SENEGAL

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Abstract

The western subspecies of the Giant Eland (*Taurotragus derbianus derbianus*) is at the point of extinction. The last secure population lives in the Niokolo Koba National park (eastern Senegal) in number of 100-150 individuals. The Society for Protection of Environment and Wildlife in Senegal (SPEFS) in cooperation with Direction of National Parks of Senegal and Czech University of Agriculture in Prague conducts the Giant Eland conservation program in Senegal. The first captive breeding group in the World was established in the Bandia Reserve.

An original herd comprised one male and five females in May 2000. The herd structure of total number of 17 individuals consisted of 6 adults, 2 sub-adults, 5 young and 4 calves in April 2004. The identification of each animal was carried out by direct observations, recording of particular characteristics of animals, and with the help of photos. The identification cards for each individual in particular were established upon recordings. The identification brings basic data for the creation of studbook and for establishment of second breeding group. In respect to necessity of shepherd "genetic management" against inbreeding depression based on the knowledge of individual animals, the study has significantly contributed to the long-term conservation of the gene pool of the endangered western subspecies of the Giant Eland (*Taurotragus derbianus derbianus*).

Key words: Giant Eland; *Taurotragus derbianus derbianus*; Bandia Reserve; small population management; conservation; endangered species

INTRODUCTION

The Giant Eland (*Taurotragus derbianus derbianus* GRAY 1847) is an endangered species of antelope and the only secure population lives in the Niokolo Koba National Park in eastern Senegal (Kingdon, 2003). The population was estimated to 100 – 150 individuals (Galat *et al.*, 1992; Hájek *et Verner*, 2000). In general, current population decreases and even species extinctions appear to be caused either directly or indirectly by human activities (Magin *et al.*, 1994). Therefore, habitat protection and the elimination uncontrolled poaching are obviously major premises in protection of the endangered species. Moreover, the Conservation Breeding Specialist Group from the Species Survival Commission of IUCN recommends establishing breeding groups of endangered species and efficient conservation programs before the populations in the wild reach their threshold of viability (IUCN, 1987).

The Society for Protection of Environment and Wildlife (SPEFS) in cooperation with Direction of National Parks and Czech University of Agriculture in Prague conducts the conservation program of the Giant Eland in Senegal. Hereby the first breeding group was established in the Bandia Reserve.

Nevertheless, the breeding of small population in captivity implies problems of inbreeding depression and loss of genetic diversity (Primack, 2000). They reduce reproduction and survival in the short term and diminish the capacity of populations to evolve in response to environmental change in the long term. A shepherd

"genetic management" based on the knowledge of individual animals registered in studbooks permits to effectively plane the strategy of the animal breeding (Kůs, 2000).

The aim of our study was to identify each individual and kinship of the captive Giant eland in the Bandia Reserve and to prepare that way basic data for the creation of the studbook. Results will enable to create the second breeding group and will contribute to the long-term conservation of the gene pool of the endangered western subspecies of the Giant Eland (*Taurotragus derbianus derbianus*).

MATERIAL AND METHODS

Study area

The Bandia Reserve is situated 65 km south of Dakar, at longitude W 17°00' and latitude N 14°35'. The Reserve was created on the south-western boundary of the 'Classified Forest Bandia' by the Society for Protection of Environment and Wildlife in Senegal (SPEFS). The Bandia Reserve is a fenced area for the purpose of the safari-tourism and for to contribute to the protection of environment and wildlife conservation at the same time. The extent of the reserve was 460 ha at the creation in 1990, later it was extended to 650 ha and it has approximately 1500 ha at present.

The Reserve receives an annual rainfall of between 350 and 742, 4 mm in last 10 years. Two distinguished seasons characterize the climate: dry season (from November to April) and rainy season (from July to

October). The temperature differs in seasons: the average temperature in January (cold dry season) is 25°C, and then continuously increases till rainy season. Temperature reaches its maximum in August (37°C). After rains, temperature minima range between 15°C and 20°C. The average air humidity is 49, 21% (minima 10-20% in April-June, maxima in August-September). The Reserve lies on the Rio de Oro Basin consisting of the Precambrian basement complex overlain with marine sediments and continental intercalaire of upper Eocene and Miocene Age. The relief is flat, on clay-loam saline, gravel sand and limy sand soils. The temporary water flow Somone passes through the Reserve. Three artificial watering holes were built up. The biggest one receives its water supply from the Somone River in the rainy season. In addition, a drill hole was dug in January 2000 for to assure water for animals during dry season.

The area belongs into phytochorion of the Sudanian regional centre of endemism (White, 1983). The vegetation type of *Acacia ataxacantha*-*Acacia seyal* bushland is predominantly found in the study area (Lawesson, 1995). The dominant tree species are *Adansonia digitata*, *Azadirachta indica* a *Eucalyptus alba*. The shrub layer includes 5 species of *Acacia* with dominant *Acacia seyal*, furthermore *Balanites aegyptiaca*, *Combretum micranthum*, *Feretia apodantera*, *Grewia bicolor*, *Tamarindus indica*, and *Ziziphus mauritiana*. The presence of *Tamarix senegalensis* indicates a salt content in soil in the bed of Somone. The herb layer is constituted by more than 50 species. The dominant species are *Achyranthes aspera*, *Brachiaria distichophylla*, *Cassia tora*, *Sesbania sesban*, etc. (Al-Ogoumrabe, 2002). The vegetation within the Reserve shows different stages of succession corresponding to the time since fencing. The vegetation in area fenced at creation of the Reserve in 1990 is well regenerated with dominant *Acacia seyal*, while vegetation in area fenced 5 years later shows first stage of succession with dominant *Calotropis procera*. The vegetation outside the Reserve is hardly damaged by overgrazing with no tree and shrub regeneration.

Twenty two animal species were introduced to the fenced area; eleven of them originate in Senegal, especially in the Niokolo Koba National Park. First animals were introduced in 1991. The animals coming from South Africa were introduced since 1997. The large game occurring in the Reserve includes African buffalo (*Syncerus caffer*), common eland (*Taurotragus oryx*), gemsbok (*Oryx gazella gazella*), giraffe (*Giraffa camelopardalis*), greater kudu (*Tragelaphus strepsiceros*), impala (*Aepyceros melampus*), kob (*Kobus kob*), roan antelope (*Hippotragus equinus*), warthog (*Phacochoerus aethiopicus*), white rhinoceros (*Ceratotherium simum*), etc. In 2000, the critically endangered Western Giant Eland (*Taurotragus derbianus derbianus*) was introduced to the Reserve for purpose to its preservation. Regarding to the fact that only the Eastern Giant Eland (*T. d. gigas*) is bred in

world zoos till now, the breeding group in the Bandia Reserve represents the first breeding experience with the Western subspecies.

Herd structure

The original breeding herd of the Giant Eland (*Taurotragus derbianus derbianus*) in Bandia consists of 6 animals - one male and five females. Three females were adult and two females and the male sub-adult at the time. They were captured in the Niokolo Koba National Park in May 2000 and transported to the Bandia Reserve. First, the animals were placed into the point of quarantine (30 x 15 m) and they were released in the special enclosure (25 ha) separated from other species in the rest of the Reserve in August 2000. Later, the enclosure was extended to 31 ha and the area is called "Lord Derby's Eland breeding camp".

Methods

Direct observation was the basic used method for identification of individual animals. The observations were carried out in July (1 week) and December (5 days) 2003 in the "Lord Derby's Eland breeding camp". The animals were active in the morning, at midday and in late afternoon. A special observation point hidden by branches was established for observation at the distance of 20-35 m from the artificial feed trough. The animals came to feed there at midday and in late afternoon, or we followed them by car in the enclosure.

To identify the individual animals we focused on each animal in particular. We recorded numbers and forms of stripes on both right and left flank, characteristics on horns, ears, face or flanks and body size. We used drawings of stripes, photos from both sides, and we completed all data about individuals. Determination of kinship was carried out by observations of calves and their interactions with adult females as sucking, lying up, and nursing behavior.

We took pictures of each animal from both right and left sides. Pictures were used for identification of individuals by morphological characteristics and for creating identification cards.

RESULTS

The population of captive Giant Eland in Bandia Reserve comprised 17 individuals in December 2003. Its structure consisted of 6 adults, 2 sub-adults, 5 young and 4 calves. Two sub-adults females were born in March and April 2002, respectively. Three females and two males were born since February to May 2003. Two calves were born in November 2003, one in December 2003 and one in April 2004, respectively. Kinship of these calves to females was identified according to observed sucking and their joint separation from the herd for lying up. Each individual was identified on base of their particular characteristics (Fig.1) and

individual identification cards were conceived for each animal in particular.

The identification card includes basic data about animal: identification number, scientific and French name, house name, date of birth, sex, birth type, birth location, hybrid status, sire, dam, and number of strips on left and right flank (Tab. 1). Identification card includes also the photo from both right and left sides of animal (Fig.1 and 2 / Plate I).

CONCLUSION

We identified each individual of the Giant Eland (*Taurotragus derbianus derbianus*) in the Bandia Reserve. The identification cards constitute basic data about the unique captive breeding group of the western subspecies in the world and will be used for creation of the studbook. It will have an important place in the management of population and planning of breed strategy. It was not possible to determine all relationships among animals. It is highly recommended to complete the unknown kinship relations in the population, especially mothers of sub-adults females from 2002 and young animals from 2003 by DNA analysis.

Retention of genetic variation in population of endangered species is a pre-requisite for their future survival. Thus the only perspective for the conservation of endangered Giant Eland is creation of the second breeding group of unrelated animals in the Fathala Reserve, and to ensure an unrelated male in particular.

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REFERENCES

- AL-OGOUMRABE, N. 2002: Les aires protégées au Sénégal: étude du cas de la Réserve de faune de Bandia: adaptation des animaux sauvages introduits et aspect socio-économique. Thèse UCAD EISMV Dakar, N°7, pp. 193.
- GALAT, G., BENOIT, M., CHEVILLOTTE, M., DIOP, A., DUPLANTIER, I. 1992: Dénombrement de la grande faune du parc national Niokolo Koba, Sénégal 1990 – 1991. DPN – Orstom, 54 pp.
- HÁJEK, I., VERNER, P.H. 2000: Aerial census of big game in Niokolo-National Park and Falemé Region in Eastern Senegal. Proceed. 3rd All Africa Conference on Animal Production, Alexandria, 5-9 November 2000.
- IUCN, 1987: Prise de position de l'UICN sur l'Élevage en Captivité. 22e réunion du Conseil de l'UICN, SSC/IUCN, Gland, Switzerland.
- KINGDON, J. 2003: The Kingdon Field Guide to African Mammals. A@C Black Publisher Ltd., London, 476 pp.
- KŮS, E. 2000: Mezinárodní symposium na záchranu koně Přewalského. In: Gazella 27, 2000. ZOO Praha.
- LAWESSON, J.E. 1995: Study of woody flora and vegetation in Senegal. *Opera Botanica*, 125, Kopenhagen, 172 pp.
- MAGIN, C.D., JOHNSON, T.D., GROOMBRIDGE, B., JENKINS, M., SMITH, H. 1994: Species extinctions, endangerment and captive breeding. In: Olney, P.J.S. Mace, G.M. and Feistner, A.T.C. eds., 1994: Creative Conservation: Interactive management of wild and captive animals, pp. 3-31. London, Chapman & Hall.
- PRIMACK, R.B. 2000: A primer of Conservation Biology. Boston University, Sinauer Associates, Inc. Publisher, Sunderland, Massachusetts, U.S.A.
- WHITE, F., 1983: The vegetation of Africa. A descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map. Natural Resources research 20. UNESCO, Paris.

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Tab.1: Basic data about the captive herd of Giant Eland (*T.d.d.*) in Bandia Reserve

No.	Identification number	House name	Date of birth	Sex	Birth type	Birth location	Hybrid status	Sir	Dam	Number of strips on flank
										right / left
1	00-0M	Niokolo	1998	male	wild	PNNK	Not a hybrid	Unknown	Unknown	12 / 14
2	00-1F	Malapa	1997	female	wild	PNNK	Not a hybrid	Unknown	Unknown	15 / 15
3	00-2F	Salémata	1999	female	wild	PNNK	Not a hybrid	Unknown	Unknown	11 / 14
4	00-3F	Dalaba	1997	female	wild	PNNK	Not a hybrid	Unknown	Unknown	13 / 14
5	00-4F	Tamba	1997	female	wild	PNNK	Not a hybrid	Unknown	Unknown	13 / 12
6	00-5F	Bembou	1999	female	wild	PNNK	Not a hybrid	Unknown	Unknown	13 / 13
7	02-6F	Thelma	2002	female	captive	Bandia Res.	Not a hybrid	Niokolo	Unknown	14 / 12
8	02-7F	Dagana	2002	female	captive	Bandia Res.	Not a hybrid	Niokolo	Unknown	13 / 14
9	03-8F		2003	female	captive	Bandia Res.	Not a hybrid	Niokolo	Unknown	12 / 15
10	03-9F		2003	female	captive	Bandia Res.	Not a hybrid	Niokolo	Unknown	16 / 14
11	03-10F		2003	female	captive	Bandia Res.	Not a hybrid	Niokolo	Unknown	15 / 15
12	03-11M		2003	male	captive	Bandia Res.	Not a hybrid	Niokolo	Unknown	14 / 14
13	03-12M		2003	male	captive	Bandia Res.	Not a hybrid	Niokolo	Unknown	12 / 11
14	03-13M	Matam	23.11.2003	male	captive	Bandia Res.	Not a hybrid	Niokolo	Malapa	14 / 14
15	03-14M	Sokone	29.11.2003	male	captive	Bandia Res.	Not a hybrid	Niokolo	Salémata	14 / 12
16	03-15F	Dayane	10.12. 2003	female	captive	Bandia Res.	Not a hybrid	Niokolo	Dalaba	13 / 13
17	03-16M	Toubab	3.3.2004	male	captive	Bandia Res.	Not a hybrid	Niokolo	Tamba	12 / 14

PLATE I

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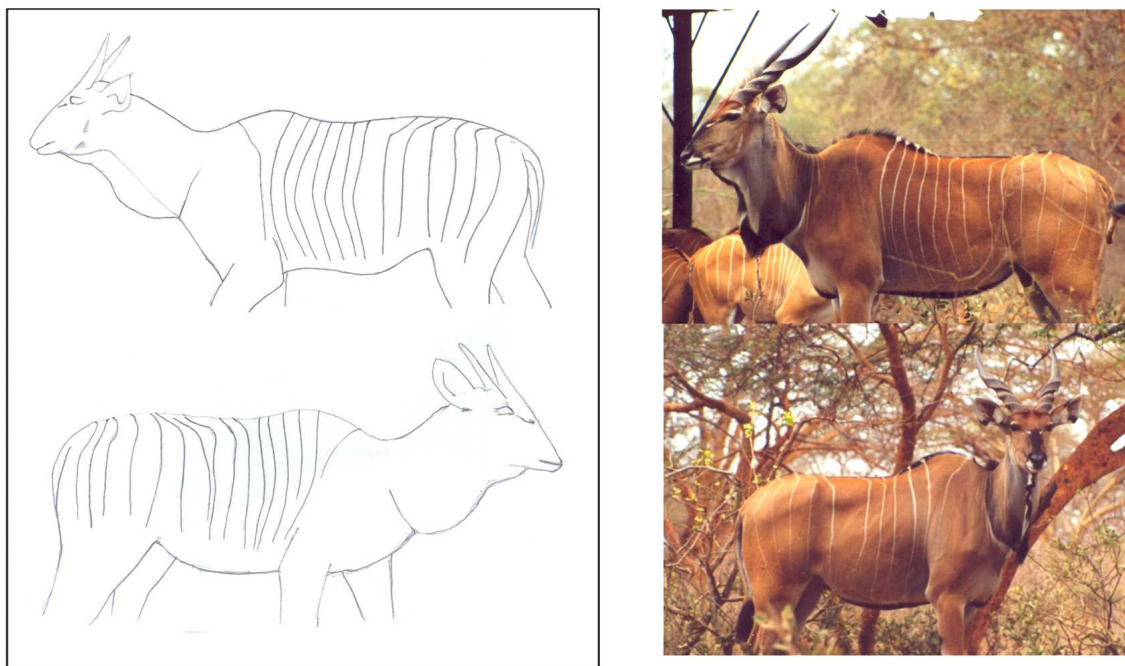


Fig. 1: Drawings and photos of particular forms of stripes on flanks. Young female 03-9F on left (Drawing: M. Antonínová) , adult female 00-2F on right (Photo: X. Vincke)



Fig. 2: Two calves of Giant Eland born in November 2003 (Photo: P. Nežerková)