AFRICAN STUDBOOK

WESTERN DERBY ELAND

Taurotragus derbianus derbianus

(GRAY, 1847)

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RESERVE de FATHALA

S.P.E.F.S. s.a.r.l.

Société pour la Protection de l'Environnement et de la Faune au Sénégal

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

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under the auspices of the Western Derby Eland conservation programme
&
Society for the Protection of Environment and Fauna in Senegal

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CONSERVATION de l'ELAND de DERBY

COOPERATION REPUBLIQUE TCHEQUE - SENEGAL

CZECH UNIVERSITY OF LIFE SCIENCES IN PRAGUE

RESERVE de FATHALA

Société pour la Protection de l'Environnement et de la Faune au Sénégal

Direction des Parcs Nationaux du Sénégal

Participating organisations and institutions

Society for the Protection of Environment and Fauna in Senegal (SPEFS) founded the semi-captive Western Derby Eland conservation programme, hosting the animals in their two nature reserves and providing them with necessary protection, breeding facilities, and management.

Ministry of Environment and Protection of Nature of Senegal (MEPN) and **Directorate of National Parks in Senegal** (DPNS) provides the legislative framework and represents the government authority responsible for nature conservation in Senegal.

Institute of Tropics and Subtropics (ITS) at the **Czech University of Life Sciences Prague** (CULS) provides the Western Derby Eland conservation programme with scientific expertise in the domains of ecology, behaviour, and genetic management.

Derbianus Czech Society for African Wildlife (Derbianus CSAW) is a non-governmental organization founded at CULS to provide managing and fundraising activities for the Western Derby Eland conservation programme. Derbainus CSAW also arranges professional veterinary services for animal transport, supports the development of infrastructure in the nature reserves and provides environmental education for local people on the periphery of national parks and breeding reserves.

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Zoological Garden Prague helps with studbook data processing and provides the breeding management consultations. Prague Zoo provides also financial and technical support. In

2011, Western Derby Eland became one of the species supported by the *in situ* conservation funds called We help them survive.

Since 2012 the Western Derby Eland Conservation Programme proudly bears the brand of **WAZA (World Association of Zoos and Aquariums)**.

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Main sponsors of Western Derby Eland **conservation program and cooperating organisations:**

Preface to the volume five

The fifth volume of the African studbook for the Western Derby Eland (*Taurotragus derbianus derbianus*) reflects the main changes especially in the population characteristics. We recalculated all demographic and genetic parameters, and added the list of scientific publication concerning the Western Derby Elands and the most important results of the Czech-Senegalese cooperation.

In the supplement on CD-ROM, we provide the identification cards (ID) of newborn individuals and actualized the photos on the existing ones. Only the ID cards of living animals were included. Detailed information about Western Derby Elands in the wild as well as within the conservation programme may be found in the last four editions of the studbook.

All activities of the Czech team within the last two years of the Western Derby Eland conservation programme were realized thanks to the support given by people and institutions to the non-profit organisation Derbianus CSAW. All donations for the continuation of our work are profoundly welcome.

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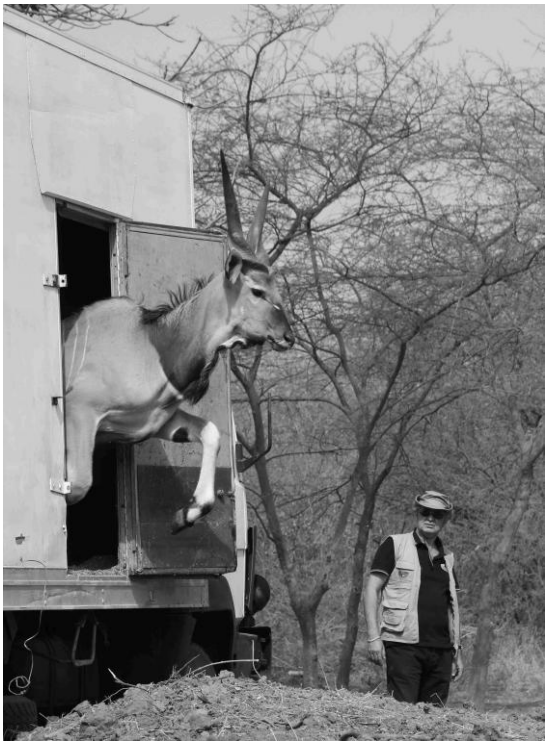
SECTION A:

Western Derby Eland

conservation programme



The release after the transport / L'animal relâché après le transport

Current status of Western Derby Eland

The Western Derby Eland (*Taurotragus derbianus derbianus*) is currently restricted to the only country in the world –Senegal. There are three important localities: 1) the Niokolo Koba National Park (NKNP) with the only confirmed wild population, 2) the Bandia Reserve and 3) the Fathala Reserve, both hosting Western Derby elands' managed semi-captive population.

The NKNP in southeastern Senegal covers 913,000 ha and is the Senegalese largest and oldest national park. Its importance as a well-preserved ecosystem of Sudanese and Sudano-Guinean savannah with extraordinary rich biodiversity concerns the entire region of West Africa. The climate is characterised by a pronounced rainy season from July to October with an annual rainfall ranging from 800 to 1,100 mm. The average monthly temperature is 25 °C from November to January and 33 °C from April to May (Tambacounda and Kédougou meteorological stations). The area of NKNP is flat with marked table hills and outcrops of by metamorphic rock and plinth in the central and eastern part. Soils are predominantly ferric luvisols, lithosols on hardpans, regosols, alluvial and hydromorphic. The flat flood-plains become inundated in the rainy season. The Gambia is the major river together with the two tributaries, the Niokolo Koba and Koulountou. The area belongs to the transition zone between the phytochoria of the Sudanian Regional Centre of Endemism and the Guinea-Congolia/Sudania transition zone (White 1983). The generalised vegetation–landscape type is Sudano-Guinean woodland–grassland mosaic (Frederiksen and Lawesson 1992). The area of NKNP supports high diversity of plant and animal species. Since 1981, NKNP is listed as World Heritage by UNESCO (UNESCO 2012). It is probably the only place in the world where the last wild population of Western Derby Eland can be found.

The Bandia Reserve is situated 65 km south-east of Dakar, Senegal (14°35' N, 17°00' W), on the south-western border of the classified forest Bandia (Forêt classée de Bandia). The rainy season lasts from July to October with mean annual precipitation of 484 mm (350.0–742.4 mm). The average temperature is 25 °C in January (middle dry season) and 30 °C in September (high rainy season). It is a flat area, intersected by the episodic Somone River, with a sandy soil, impoverished by leaching, whereas clay and salty soil occur along the river. Phytogeographically the Bandia Reserve belongs to the Sudan-Sahelian area and the original vegetation is made up of *Acacia ataxacantha- Acacia seyal* bushland. The fenced reserve contributes substantially to natural vegetation conservation (Hejcmanová *et al.* 2010). Very few game species are native in the Bandia Reserve, the majority of species is introduced from various areas of Senegal, such as African buffalo (*Syncerus caffer brachyceros*), defassa waterbuck (*Kobus ellipsiprymnus defassa*), Kob (*Kobus kob*), roan antelope (*Hippotragus equinus koba*), and from South Africa, such as giraffe (*Giraffa camelopardalis giraffa*), greater kudu (*Tragelaphus strepsiceros*), impala (*Aepyceros melampus*), and white rhino (*Ceratotherium simum*). The Bandia Reserve was the first site where the wild-captured Western Derby Elands were placed after the capture operation in 2000 and since, the site and the herd management have proved to be appropriate for their successful reproduction. The Bandia Reserve is well equipped wildlife reserve with facilities such as boma and enclosures. A total of 96 Western Derby Elands were born there (Koláčková *et al.* 2011).

The Fathala Reserve is the fenced area of the Fathala Forest (Forêt de Fathala), the main terrestrial part of the Delta du Saloum National Park (DSNP) situated on the west coast of Senegal (13°39' N, 16°30' W) near the northern border of the Gambia. Climatically the area belongs to the Sudanian zone (White 1983) with a littoral sub-humid climate with a pronounced dry season between November to May and a five months rainy season between June and October. The average annual

precipitation is 1,022 mm (1951-2000, Banjul Yundum meteorological station). Mean day temperature is 31.2°C in May and 26°C in January (Kaolack meteorological station, Niang 2001). Soils are tropical ferric luvisols and nitosols on plateaus, and weakly developed gleysols in the lower valley. The area belongs to the transition zone between phytochoria of the Sudanian region and the Guinea-Congolian/Sudanian transition zone. The area is flat with dry plateaus, passing into shallow humid valleys, such as "Mare of the Dragon". The principal aspects of the vegetation are wooded grassland, woodland, and transitional woodland on the plateaus, with *Combretum nigricans-Prosopis africana* woodland, *Bombax costatum-Pterocarpus erinaceus* woodland, *Piliostigma thonningii-Dichrostachys cinerea* thicket, in humid valleys turning into *Erythrophleum suaveolens-Dialium guineense* gallery forests (Nežerková-Hejcmanová *et al.* 2005). There is some native game such as bushbuck (*Tragelaphus scriptus*), warthog (*Phacochoerus africanus*), patas monkey (*Erythrocebus patas*); and several introduced game species from Senegal, such as African buffalo (*Syncerus caffer brachyceros*), defassa waterbuck (*Kobus ellipsiprymnus defassa*), roan antelope (*Hippotragus equinus koba*), and from South Africa, as common elands (*Taurotragus oryx*), giraffe (*Giraffa camelopardalis*), and white rhino (*Ceratotherium simum*). The Fathala Reserve is the second reserve with Western Derby Eland semi-captive population, with two breeding herds and one bachelor herd in enclosures of approximately 70 ha, 60 ha and 1,000 ha, respectively.

Breeding management of semi-captive Western Derby Eland

Conservation programme and semi-captive breeding

The critical situation of the Western Derby Eland in the wild enhanced the awareness of urgent need for a conservation action. In 2000, the first semi-captive Western Derby Eland population, unique worldwide of that subspecies, was therefore established in Senegal with a clear objective – to establish a viable population in semi-captivity (Nežerková *et al.* 2004). Thereby, a unique conservation programme was launched and has been running till present due to close coordinated cooperation of the partners.

Till present, the animals have been held under shepherd breeding management in two nature reserves, the Bandia and Fathala Reserve in western Senegal. In June 2012, the Western Derby Eland in semi-captivity formed a population of 83 living individuals. The population was divided in 5 breeding herds: three in the Bandia Reserve (Bandia 1: 5 males and 14 females, Bandia 2: 4 males and 9 females, Bandia 3: 3 males and 8 females) and two in the Fathala Reserve (Fathala 1: 2 males and 5 females, Fathala 3: 1 male, 2 females); and two bachelor herds (Bandia 4: 17 males, Fathala 2: 15 males). Among these are 57 adults (30 males, 27 females), 14 sub-adults (11 males, 3 females) and 12 calves (6 males, 6 females). Four breeding males reproduced in 2012.

Transfer of animals

The transfer of animals represents always a critical operation with high risk for animals during immobilization as well as during the proper transport in special truck. First transfers of animals were carried out in March 2006 in the Bandia and Fathala

Reserves. Since then, we have successfully transfered more than 50 individuals. The detail description of the transfer operation may be found in the third volume of the studbook.

For the moment last transfers were organised in February 2012. The second bachelor herd (17 males) was established in Bandia Reserve (Bandia 4).

All immobilisations and transports were well organised, especially due to very good cooperation with staff of the Bandia Reserve, a professional work of the veterinary and the kind permission of Authorities of National parks Administration. The transport team was very successful in transporting all the animals except the last one during only five days.

Demographic analysis

The pedigree data of the Western Derby Eland were constructed in the SPARKS (ISIS 1992) and corroborated using Population Management 2000 (PM 2000) software (Lacy and Ballou 2002; Pollak *et al.* 2002). The pedigree was made in Pedigraph (Garbe and Da 2008). Individuals alive in June 2012 and their ancestors were included in the pedigrees; individuals that died without producing any descendants were excluded from the analyses. "Founder" means "genetic founder" – wild-born individuals on the top of the pedigree, presumed to be unrelated. With regard to the exclusion of sub-adult males from breeding herds, the dominant male was assumed to be the sire of all the descendants in the main breeding herd (Bandia 1) until 2009. In 2010, we left more males in this herd in order to replace the old one. All of them are from the same genetic lineage (same mother-founder). Calves from this herd were then counted as "multiple sired".

A total of 100 offspring of the Western Derby Eland were born from 2000 to 2012 in the herds with 6 founders in special fenced areas, initially in the Bandia Reserve (Table 1). Thereby, the Western Derby Eland formed a population of 83 living

individuals (Fig. 1) bred in semi-captivity and managed progressively in 7 herds in 2 nature reserves in Senegal: the Bandia and Fathala Reserve.

Tab. 1. Demographic parameters of the Western Derby Eland in June 2012.

Variable	Males	Females
Founders	1	5
Present number of individuals *N*	47	36
Number of adults in the population	30	27
Births total	59	41
Deaths total	13	10
Generation length	6.7	6.06
Deterministic population growth rate (λ) [a]	1.31	1.17

[a] λ >1 indicate population increase

The reproduction of Western Derby Elands in the Bandia Reserve started in 2002 with 2 female calves born. Mating occurred most likely synchronously, considering that the majority of calves were born in December (54 %). Then, 20 % and 16 % of births were recorded in November and January, respectively (Fig. 2). The age structure (Fig. 4) shows an increasing number of young animals as well as the slightly biased sex ratio (still more males than females).

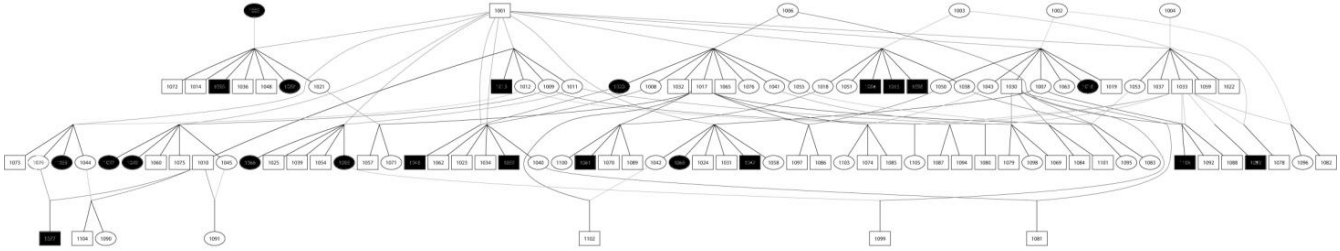


Fig. 1. Pedigree of the population of Western Derby Elands bred in semi-captivity (June 2000–June 2012). Symbols represent: squares – males; circles – females; empty symbols – living animals; black symbols – dead animals

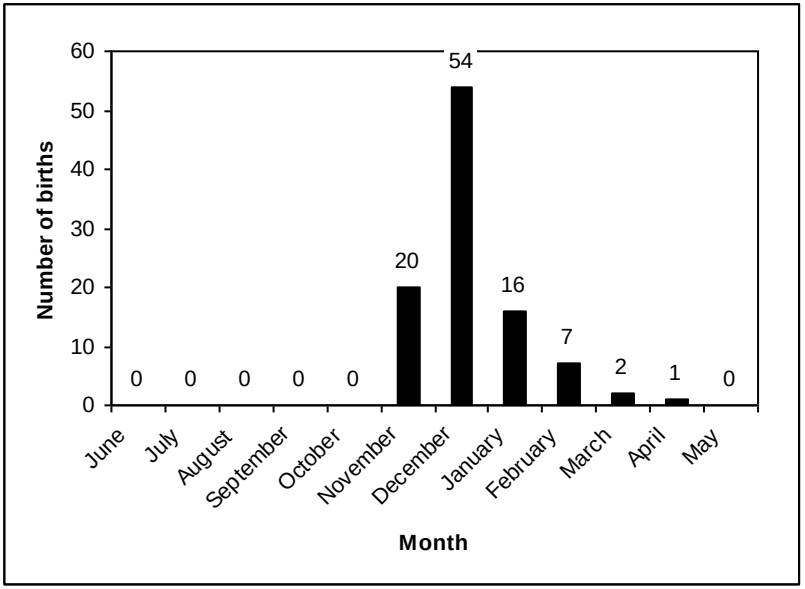


Fig. 2. Birth distributions of Western Derby Elands in the Bandia Reserve throughout the year in the period of 2002–2012.

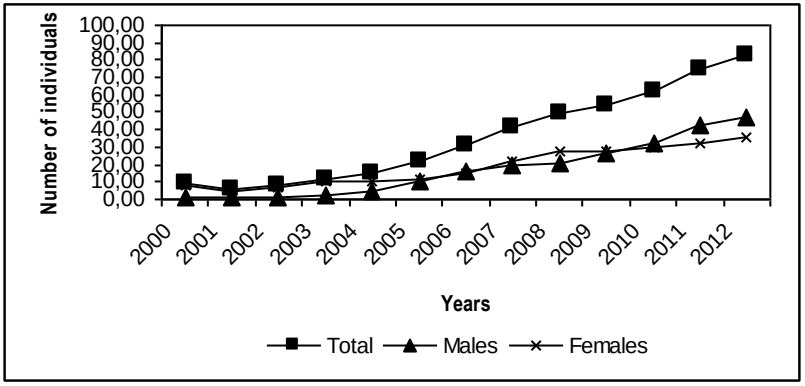


Fig. 3. Population growth rate in the semi-captive Western Derby Eland population based on the real data collected between 2000 and 2012.

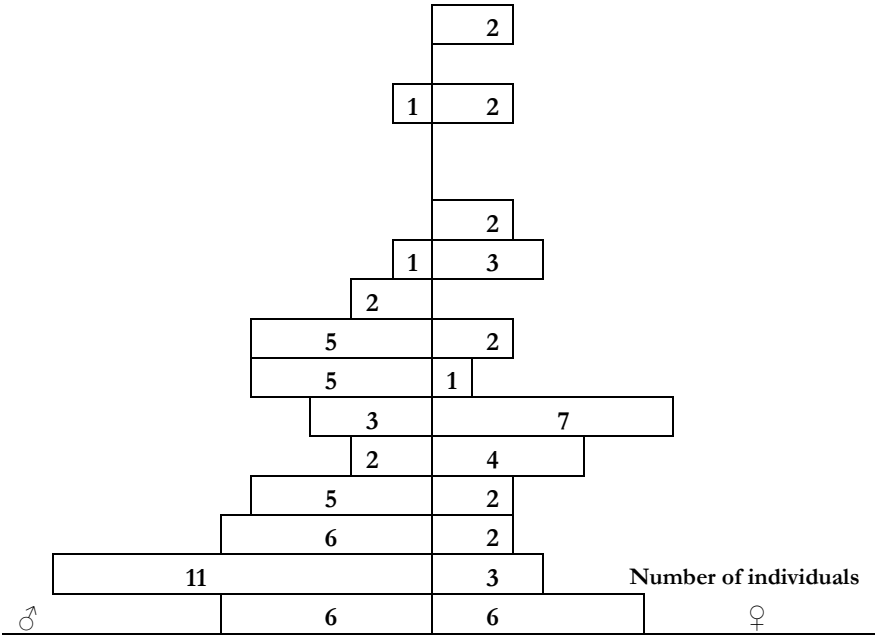


Fig. 4. Male and female age structure of the living individuals of the Western Derby Elands held in semi-captivity in June 2012. The wild-born proportion (founders) is represented by first 5 animals (1.4).

Considering that the gestation period of the Eastern subspecies (*Taurotragus derbianus gigas*) of the Derby Eland lasts on average for 265 days (with a range from 255 to 275 days) (Bro-Jørgensen 1997), the conception of our animals was assumed to take place at the end of February and in March. This was, thereafter, confirmed by accidental observations. The youngest age at conception was 16.2 months of age; however, on average it was at an age of 36 months (±9 S.D.) or 37 (±8.7 S.D.) excluding one extreme case, very high in comparison to 26.2 months in 2008. Adult female-founders gave birth for the first time at an age

of 35.07 months (±0.9 S.D.) on average. Nowadays the age of the first parturition increased to 45 months (± 9 S.D.), probably because of the breeding delay of females after their transfer to a new herd. Nowadays, when the five breeding herds are established, it seems to be crucial not to move females from herd to herd and to change breeding males instead. The youngest cow gave birth at only 25 months.

Females produced 1 offspring per year and bred with a 77 % probability each year; this ratio is also considerably lower than in 2008 when it was 88 % breeding rate. In the Bandia Reserve, the oldest cow giving birth was 15 years old and the breeding male was 13 years old, there were no older animals at this time. The two 15-year-old females were in a good condition, 13-years-old male was visibly old.

The annual calf mortality rate was 6.17 %, being still at the similar level as in the last 5 breeding seasons. The overall calf mortality was 8 % (in total 8 of 100 calves born). The mortality was higher in male offspring, representing 10.17 % of male calves and 2.44 % of female calves (7 males and 1 female calf died during the 10 breeding seasons). The calf deaths occurred during the whole breeding period, since November to March, in the age of few days or few weeks.

The annual non-calf mortality since the population stabilized (beginning in 2001) was 3.08 % (±3.36 S.D.) with an overall non-calf mortality of 17.44 % (in total 9 females and 6 males for 86 individuals). Overall non-calf mortality increased since 2008 from 8.57 %; still it is caused mainly by the increasing age of all animals. In contrast with the calf mortality, females prevailed in the non-calf mortality rate (death were often connected with reproduction (vagine prolapsus, abortus or parturition). The main period of non-calf mortality was during the top dry season till the top rainy season (60 % from June to August).

Analyses of the life table of the Western Derby Eland indicated that the deterministic annual population growth rate was 1.31 (31.37% ± 12.66 S.D.) (Fig. 3, Table 1).

Genetic analysis

The actual population size of Western Derby Elands in semi-captivity reached 83 individuals. The current effective population size was 11.89 (including correction of the unequal sex ratio). The *Ne*/*N* ratio was 0.1678. The overall (mean) effective population size has increased due to management of reproduction since 2008, from 3.71 to 5.26.

The animals in the pedigree had 84 % of known genotypes in the population. This ratio has decreased since 2009, when it reached 92 %. The decrease is caused by reproduction of animals of unknown origin, not by the unidentified relations among current animals.

The population has retained 79 % of genetic diversity (GD) from the founders. This number has been continuously increasing since 2008 as new individuals participated in reproduction under the breeding management. In addition, the overall mean level of inbreeding in the population was 0.1243, continuously decreasing from 0.1364 in 2008.

Founder genome equivalents (FGE = 2.41) and founder genomes surviving (FGS = 5.86) were low due to the overrepresentation of only one founder male (Fig. 5, Table 2). On the other hand, a significant potential GD of 92% in the population still remains. Furthermore, the retained amount of the original GD of founders is still present in the population and these can be evaluated by the proper management by mean kinship (MK) that was 0.2079 on average (Table 3).

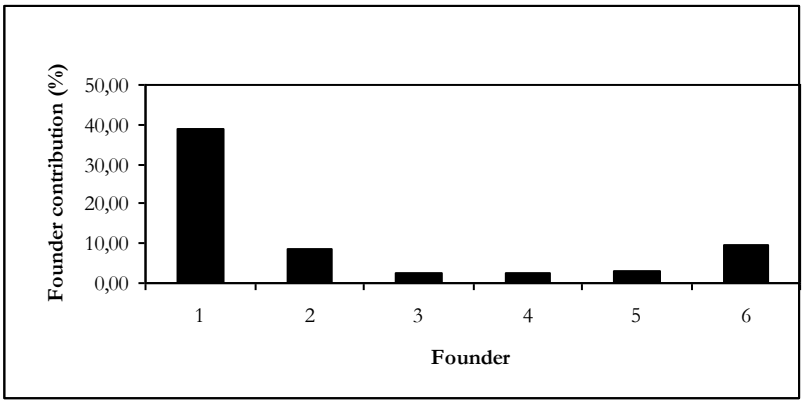


Fig. 5. Founder contributions in the semi-captive Western Derby Eland population in Senegal. Numerals on the x axis indicate particular individuals: 1 – male, 2 to 6 – females (see Table 2).

Tab. 2. Founder contributions (FC) for the genetic management of the pedigree in the semi-captive Western Derby Eland population in Senegal.

Foun-der	Sex	Age	Current FC	Founder genome surviving	Descendants	Target FC	Contri-bution
1001	M	14	0,59	1,00	72	0,17	Over
1002	F	16	0,13	1,00	27	0,17	Under
1003	F	16	0,05	0,94	9	0,16	Under
1004	F	14	0,04	0,96	6	0,16	Under
1005	F	D	0,05	0,97	7	0,17	Under
1006	F	14	0,14	0,99	30	0,17	Under

Tab. 3. Mean kinship (MK) distribution in the semi-captive Western Derby Eland population in Senegal in June 2011.

Mean kinship range		**No of individuals**	**% of population**
< 0,075	< 0,1	10	11,9
0,1618 - 0,1997	0,1 - 0,2	37	44,0
0,2026 - 0,2951	0,2 - 0,3	17	20,2
> 0,3028	> 0,3	20	23,8

The management plan for Western Derby Eland

Species Conservation Strategy Plan

The main objective of the Western Derby Eland Conservation programme for the following year is **t**o develop a global conservation strategy for the critically endangered Western Derby Eland at a workshop in Senegal in January 2013.

The strategy will closely follow the IUCN Species Conservation Strategy process (SCS), and will comprise:

1. a full status review (background to the species, habitat, threats, stakeholder analysis etc);
2. threat analysis, including indirect threats and underlying causes;
3. vision / goal (long term vision for the Western Derby Eland and the intermediate goal on the way to attaining this vision;
4. objectives (the set of measures needed to achieve the goal).

The conservation workshop will bring together all the key stakeholders involved in conservation of Western Derby Eland and its habitat. The workshop will aim to ensure survival of Western Derby Eland with the respect to all stakeholders including local communities and their rights and will help to focus public awareness on the whole ecosystem of Niokolo Koba National Park. by bringing together the Senegalese authorities (DPN), reserve operators (SPEFS), Ministry of the Environment and Protection of Nature of Senegal (MEPNBRLA), UNESCO, conservation programme managers (Derbianus CSAW), independent conservation specialist (IUCN), and scientific experts from University Cheikh Anta Diop in Dakar (UCAD), Czech University of Life Sciences in Prague and other related

stakeholders to develop the strategy. We aim to formulate a management programme for the wild and semi-captive populations to ensure the long-term survival of Western Derby Eland in its original habitat.

The conservation strategy and a full workshop report will be prepared in French and English and made available to all stakeholders in printed and electronic versions. The strategy will also set out the fundraising possibilities for implementation of the strategy.

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Activities, outputs, and financial costs of Czech team in the frame of Western Derby Eland Conservation Programme during the period 2000 - 2012

The most important output of the Czech-Senegalese cooperation was the creation and implementation of breeding management plan for the semi-captive population of Western Derby Eland in Bandia and Fathala Reserve. Realization of the specific breeding management activities was performed by members of the Czech team, coming usually two times every year from 2000 to 2012. During those stays of Czech specialists, all Western Derby Elands with the conservation programme were individually identified and inventoried. We created identification cards for all individuals, containing complete pedigree information (name, dam and sir identification, sex, date of birth) completed with photographs from left and right side. The Czech investments into the breeding management were approx. 100,000 EUR.

Since 2006, five transfers of Western Derby Elands to new herds were realized by the Czech team and especially by Dr. Jiří Váhala as an experienced and specialized veterinarian. Together with SPEFS we immobilized and transported more than 50 carefully selected elands to new enclosures. During those complicated operations also the blood samples were taken for genetic and parasitologic analyses. The Czech costs for the transport operations were approx. 60,000 EUR. Demanded by SPEFS, the Czech team participated also in very complicated transports of giraffes and other ungulates from Bandia to Fathala Reserve to enable the development of Fathala Reserve.

New enclosures for Western Derby Elands in Bandia Reserve were financed by SPEFS, the Czech team financed

construction of two enclosures in the Fathala Reserve (approx. 20,000 EUR).

The success of breeding management is visible in demographic and genetic parameters of the population: 6 founders (1 male, 5 females) wild captured in 2000 has reproduced to 80 individuals in 2012, divided into 5 breeding herds and two bachelor herds in two reserves, with mortality rates not exceeding 20 % and maintaining about 30 % population growth. The genetic diversity is still increasing due to careful management of mean kinship relations. Being carefully managed, the value of semi-captive Western Derby Eland population is enormous.

Other Czech activities were focused to the development of Fathala Reserve and to popularisation of the Western Derby Eland conservation, and nature conservation in general in the Delta du Saloum National Park, Niokolo Koba National Park and the whole Senegal. In 2008 we constructed (with personal assistance of Markéta Antonínová) permanent educational exposition, an open building with 20 information panels about nature conservation (50,000 EUR), which serves for the education of local people and visitors of Fathala Reserve and helps to promote the nature conservation on the region.

In 2009 we constructed the multipurpose building "Ecocentre Fathala". The construction was realized using Czech project documentation and with personal assistance of the team member, Jan Svitálek. The building includes among others presentation hall, laboratory, and four rooms. In following years, the building was continually equipped by SPEFS and the Czech team, including furniture and microscope (Czech investments about 120,000 EUR). The Ecocentre would serve as a base for research and education activities, as well as for the reserve management. In 2009 we also constructed the quarantine enclosure in Fathala Reserve (boma) for 12,000 EUR, and we donated the reserve by 4x4 Toyota Hilux (28,000 EUR).

The Czech team realized a lot of research activities in Bandi and Fathal Reserves, ecology and vegetation studies, feeding, reproductive and social behaviour of elands, morphology, parasitology etc. These studies helps to improve breeding management and their publication increases international prestige of both reserves for the scientific and conservationist experts. The international studbook has been published every year since 2008, in cooperation with Czech University of Life Sciences Prague and Prague Zoo, including a complete pedigree informationabout semi-captive Western Derby Eland population followed by detail demographic and genetic analyses and management recommendations. Scientific and popularizing publications contribute to the conservation of this unique animal also through the increasing number of international visitors to Senegal.

During last years we also prepared a lot of education materials for local people and we realized workshops and excursions for more than 100 teachers, guards, guides, and local authorities, as well as for more than 500 school children (total costs more than 80,000 EUR). Those activities are very important for the future survival of Western Derby Eland population, increasing the level of environmental knowledge of local people and the security in the reserves and national parks.

The scientific outputs from the Western Derby Eland conservation programme

Scientific papers

Herd structure of the giant eland (*Taurotragus derbianus derbianus*) in the Bandia Reserve, Senegal

Agricultura Tropica et Subtropica (2004) 37(1): 1-5.

Antonínová M., Nežerková P., Vincke X., Al-Ogoumrabe N.

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*).

Keywords: Giant Eland, *Taurotragus derbianus derbianus*, Bandia Reserve, small population management, conservation, endangered species

Analysis of the herbaceous undergrowth of the woody savanna in the Fathala Reserve, Delta du Saloum National Park (Senegal)

Belgian Journal of Botany (2005) 138(2): 119-128.

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ABSTRACT: We investigated the herbaceous layer in the Fathala Reserve, a fenced area in the Delta du Saloum National Park in Senegal, in order to determine the role of the undergrowth vegetation in woody savanna. We recorded 53 plant species from 19 families in 30 herb layer relevés of 5 × 5 m. Fabaceae (22%), Convolvulaceae (13%), and Poaceae (11%) were the most frequent families. On the basis of a Detrended Correspondence Analysis and a cluster analysis we distinguished 4 vegetation units in the herbaceous layer. *Andropogon gayanus* var. *bisquamulatus*, *Schizachyrium sanguineum*, and *Andropogon gayanus* (beardless, non-tufty type) were dominant in units 1, 3, and 4, respectively. Unit 2 was composed of the most ubiquitous

species. In a Canonical Correspondence Analysis, habitat type (well-drained sites, moist depressions, and seasonally inundated sites) only explained 15.9% of the undergrowth vegetation variability. We concluded that only woody plants and dominant grasses represent the forming element of woodland savanna. Herbaceous plants recorded in the Fathala Reserve do not manifest any specific requirements to environmental, and particularly soil, conditions.

Keywords: *Andropogon gayanus* var. *bisquamulatus*, *Schizachyrium sanguineum*, forest herb layer, vegetation analysis, woody savanna

A canonical correspondence analysis (CCA) of the vegetation–environment relationships in Sudanese savannah, Senegal

South African Journal of Botany (2006) 72(2): 256-262.

http://dx.doi.org/10.1016/j.sajb.2005.09.002

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ABSTRACT: The effect of environmental variables on the structure of woody vegetation within one geomorphological unit (500 ha) in Niokolo Koba National Park in Senegal was investigated. A total of 59 woody species from 25 families were recorded in 43 relevés. CanonicalCorrespondenceAnalysis (CCA) was used to evaluate the effect of soil type, topography and termitaria presence on the vegetation structure. The effects of soil type and topographical position were significant and respectively explained 15.9% and 5.2% of the species data variability. Termitaria presence was non-significant and had just a marginal influence on the vegetation structure and explained only 1.7% of the data variability. One-way ANOVA was used to evaluate the effect of soil type on total cover of particular layers. Significant

differences were revealed for low shrub (0–2 m) and tree layers (6–20 m). The low shrub layer was the best developed on the plinthitic hardpan, the best-developed tree layer occurred on granite outcrops. High shrub layer (2–6 m) did not show any dependence on the soil type. In conclusion, we found that soil type and topography were the main factors affecting woody vegetation of the locality.

Keywords: Niokolo Koba National Park, soil type, ordination, vegetation structure, West Africa

Phylogenomic study of spiral-horned antelope by cross-species chromosome painting

Chromosome Research (2008) 16(7): 935-947. doi: 10.1007/s10577-008-1250-6

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ABSTRACT: Chromosomal homologies have been established between cattle (*Bos taurus*, 2n = 60) and eight species of spiral-horned antelope, Tribe Tragelaphini: Nyala (*Tragelaphus angasii*, 2n = 55♂/56♀), Lesser kudu (*T. imberbis*, 2n = 38♂,♀), Bongo (*T. eurycerus*, 2n = 33♂/34♀), Bushbuck (*T. scriptus*, 2n = 33♂/34♀), Greater kudu (*T. strepsiceros*, 2n = 31♂/32♀),

Sitatunga (*T. spekei*, 2n = 30♂,♀) Derby eland (*Taurotragus derbianus* 2n = 31♂/32♀) and Common eland (*T. oryx* 2n = 31♂/32♀). Chromosomes involved in centric fusions in these species were identified using a complete set of cattle painting probes generated by laser microdissection. Our data support the monophyly of Tragelaphini and a clade comprising *T. scriptus*, *T. spekei*, *T. euryceros* and the eland species *T. oryx* and *T. derbianus*, findings that are largely in agreement with sequence-based molecular phylogenies. In contrast, our study suggests that the arid adaptiveness of *T. oryx* and *T. derbianus* is recent. Finally, we have identified the presence of the rob (1;29) fusion as an evolutionary marker in most of the tragelaphid species investigated. This rearrangement is associated with reproductive impairment in cattle and raises questions whether subtle distinctions in breakpoint location or differential rescue during meiosis underpin the different outcomes detected among these lineages.

Keywords: Bovidae, chromosomes, fluorescence *in-situ* hybridization, phylogeny, Tragelaphini

Diet Composition of Western Derby eland (*Taurotragus Derbianus Derbianus*) in the Dry Season in a Natural and a Managed Habitat in Senegal using Faecal Analyses

South African Journal of Wildlife Research (2010) 40(1): 27-34.

doi: http://dx.doi.org/10.3957/056.040.0105

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ABSTRACT: The dietary composition of the western Derby eland (*Taurotragus derbianus derbianus*), a critically endangered antelope, was investigated using microhistological analyses of faeces. Samples were collected in the Niokolo Koba National Park, the refuge of the last wild population, and in the Bandia wildlife reserve, where the animals foraged on natural and supplementary food. Leaves, shoots of woody plants, and fruits were the three major components at both sites. They formed 98.8% of diet volume in the wild and 77.5% in the Bandia Reserve where supplementary food reduced the consumption of natural components but maintained the total content of major components together with supplement at 99.2%. Other components such as forbs and grasses appeared in low proportions, generally below 5% of the mean volume. Leaves of *Boscia angustifolia*, *Grewia bicolor*, *Hymenocardia acida*, and *Ziziphus mauritiana*, and fruits of *Acacia* spp. and *Strychnos spinosa* were identified as part of the diet in the wild. In the Bandia Reserve, the proportions of diet components did not differ between males and females, but there were differences in consumption of supplementary food between age classes. The results indicate that in the dry season the western Derby eland behaves as a pure browser, consuming grasses in negligible amounts. Consequently, woody savanna habitat is necessary for future conservation enclosures to ensure adequate natural forage resources for animals and thus to avoid food supplementing that presents a risk of dietary shifts in animals in captivity.

Keywords: antelope, browsing, captivity, foraging ecology, natural habitat, West Africa

Exclusion of livestock grazing and wood collection in dryland savannah: an effect on long-term vegetation succession

African Journal of Ecology (2010) 48(2): 408-417.

doi: 10.1111/j.1365-2028.2009.01127.x

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ABSTRACT: Sahelian savannah faces increasing pressure from human activities, leading to its degradation. The aim of this study was to investigate the possibility of restoration of dryland savannah vegetation by the elimination of disturbance factors on the ecosystem. Is degraded dryland savannah vegetation able to be restored by means of natural succession? What is the timescale for its recovery? The study took place in the Bandia Reserve, 65 km south-east of Dakar (Senegal), a unique site with two successional stages due to the elimination of uncontrolled exploitation. The vegetation structure of 15 years (15YRS) and 5 years (5YRS) after fencing was compared with vegetation exposed to continuous livestock grazing and wood collection outside the fenced area. Calculated by redundancy analysis, a significant effect of selected areas on the cover of all species was revealed and successional stage explained more than 45% of data variability. Perennial forbs, annual forbs and perennial grasses achieved the highest cover in 5YRS, woody species in 15YRS and annual grasses in the area outside of the fenced reserve. The dominant woody species *Acacia seyal*, *A. ataxacantha*, *A. nilotica* subsp. *adstringens* and *Balanites aegyptiaca* reconstituted the dense

formation of *Acacia* bushland by means of natural succession in the 15YRS area.

Keywords: deforestation, degradation, natural succession, regeneration, Sahelian savannah, West Africa

Suckling behavior of eland antelopes (*Taurotragus* spp.) under semi-captive and farm conditions

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ABSTRACT: Mother–offspring interactions soon after parturition play a key role in the survival of mammals. We investigated the suckling behavior of semi-captive Western Derby eland (*Taurotragus derbianus derbianus*) in a 60-ha enclosure covered by dense savanna vegetation in Senegal and farmed Common eland (*T. oryx*) on an open 2-ha pasture in the Czech Republic. We hypothesized that the basic pattern of suckling bout duration and mother–offspring interactions would be similar between species, but would vary in response to the environmental conditions and breeding system. During three calving periods, we observed the suckling of 27 and 23 calves of Derby and Common elands, respectively, between the ages of 1–5 months, and the interactions between mother and calf before and during suckling. Suckling bout duration increased with the age of the calves for

both elands. However, in Derby elands we recorded longer suckling bouts in male than female calves and shorter suckling bouts in primiparous mothers than multiparous ones; no differences were found in farmed Common elands. The animals' active approach to mother–offspring contact, for example naso–anal contact, and initiation and termination of suckling, resulted in longer suckling bouts in Derby elands. The results suggest that Derby elands that range over a large enclosure with dense vegetation cover adjust their maternal behavior in compliance with potential predator risk, facing a trade-off between nursing and vigilant behavior in the wild. The suckling behavior of farmed elands, on the other hand, reflects the conditions of captivity without predators and with the small available area enabling permanent visual contact of animals.

Keywords: T*aurotragus* spp., antelope, mother–offspring interaction, maternal care, breeding management, trade-off

Population management as a tool in the recovery of the critically endangered Western Derby eland *Taurotragus derbianus* in Senegal, Africa

Wildlife Biology (2011), 17(3): 299-310.

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ABSTRACT: The critically endangered Western Derby eland *Taurotragus derbianus derbianus*, representing < 200 wild individuals, undoubtedly needs a coordinated conservation programme. To promote the survival of this subspecies, a single worldwide semi-captive population was established in Senegal in 2000, with one male and five female founders transferred from the Niokolo Koba National Park. To determine a long-term conservation strategy, we used demographic and pedigree data based on continuous monitoring of reproduction during 2000 - 2009 in breeding enclosures in the Bandia and Fathala Reserves, in conjunction with modelling software. In 2009, the semi-captive population consisted of 54 living individuals (26 males and 28 females), managed using the minimal kinship strategy. The female breeding probability was 84%, annual calf and adult mortality rates were 5.09% and 3.27%, respectively, and the annual population growth rate was 1.36. As the population grew, the animals were progressively separated into five herds within two reserves. A pedigree analysis revealed an effective population size of 6.72 and an N_e/N ratio of 0.13. The population retained 77% of the gene diversity (GD). The founder genome equivalent (FGE = 2.21) was relatively low due to the overrepresentation of one founder male. Although the mean level of inbreeding (F) reached 0.119, a significant potential GD (92%) was still retained. In this article, we predict GD development in this population in the next 100 years with the inclusion of new founders. If the whole wild population were included, we could maintain 90% of GD. As this option is not practically feasible, we present three options with the goal of maintaining 75% GD. We highly recommend capturing new founders from the remaining wild population to ensure the survival of the subspecies at least in semi-captivity, which could allow possible reinforcement of the wild population or reintroduction in the future. The semi-captive population, if appropriately constituted and genetically managed, could play a considerable role in Western Derby eland conservation.

Keywords: conservation programme, demographic structure, endangered antelope, genetic management, pedigree analysis, *Taurotragus derbianus*, West Africa

Description of a new species of *Eimeria* Schneider, 1875 (Apicomplexa: Eimeriidae) from the western Derby eland *Taurotragus derbianus derbianus* Gray (Artiodactyla: Bovidae) in Senegal

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ABSTRACT: Examination of faecal samples from semi-captive western Derby elands *Taurotragus derbianus derbianus* Gray, in the Bandia and Fathala Reserves of Senegal, revealed the presence of oöcysts of the genus *Eimeria* Schneider, 1875 that we considered to represent a new species, *Eimeria derbiani* n. sp. The new species possesses nearly ellipsoidal oöcysts (length/width ratio 1.3) with a bi-layered wall and an average size of 27.6 × 21.5 μm. *E. derbiani* possesses a micropyle covered by a micropylar cap and ovoidal, single-layered sporocysts with an average size of 14.9 × 7.7 μm, each with a Stieda body. Sporozoites of *E. derbiani* possess a large refractile body and a nucleus. Sporulation lasted for 2 days at 23°C. The new species is differentiated from the two species parasitising *Taurotragus oryx* Pallas, *E. canna* Triffitt, 1924 and *E. triffittae* Yakimoff, 1934.

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Poster displayed on page 47 (Fig. 6).

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Poster displayed on page 48(Fig. 7).

Koláčková, K., Brandl, P., Hejcmanová, P., Antonínová, M., Vymyslická, P., Žáčková, M. 2010: Ten years of the Western Derby eland (Taurotragus derbianus derbianus) conservation programme. EAZA 17th annual conference, Bussolengo, Italy, September 2010.

Poster displayed on page 49 (Fig. 8).

Koláčková, K., Brandl, P., Hejcmanová, P., Žáčková, M., Vymyslická, P., Bartůňková, L. 2011: Presence and future of Western Derby Eland. EAZA Annual Conference Montpellier, poster presentation.

Poster displayed on page 50 (Fig. 9).

Koláčková, K., Hejcmanová, P., Žáčková, M., Vymyslická, P., Brandl, P. 2011: Presence and future of Western Derby Eland. Antelope conservation in the 21st century: from diagnosis to action. London Zoological Society, 17-19th November 2011.

Zemanová, H., Bolfíková, B., Hejcmanová, P., Koláčková, K. 2011: Genetic diversity and phylogeny of the Western Derby eland (*Taurotragus derbianus derbianus*). ECM 2011 - 6th European Congress of Mammalogy. Paris, 19-23 July 2011, p. 108.

Poster displayed on page 51 (Fig. 10).

Žáčková, M., Hejcmanová, P., Vymyslická, P., Hejcman, M. 2011. Determinants of diet selection of the critically endangered Western Derby elands in the conservation breeding enclosure in the Fathala Reserve, Senegal. Abstracts, Antelope conservation in the 21st century: from diagnosis to action – ZSL symposium, London.

Poster displayed on page 52 (Fig. 11).

Žáčková, M., Hejcmanová, P., Vymyslická, P., Hejcman, M. 2011. Po čem a na čem se pasou? aneb Rozhodující činitelé v potravní selekci antilopy Derbyho. Program a abstrakty, 38th ethological conference, Kostelec nad Černými lesy, p. 117.

Fig. 6. Poster for 2nd European Conference of Conservation Biology, 2009.

Environmental education within the Western Derby eland conservation programme in Senegal

Karolína Koláčková[1,2], Pavel Brandl[2], Jan Svitálek[1], Pavla Hejcmanová[1], Markéta Antonínová[1,3]
[1]Institute of Tropics and Subtropics, Czech University of Life Sciences Prague, Czech Republic
[2]Zoological Garden Prague, Czech Republic
[3]Garamba National Park, Democratic Republic of Kongo

The success of conservation activities in developing countries is strongly connected with the involvement of local population to the conservation effort. The development project "Support to natural reserves and national parks of Senegal" is focused mainly on the conservation of the Western Derby eland (*Taurotragus derbianus derbianus*), an endangered antelope subspecies from Senegal, and related actvities include a wide spectrum of environmental education activities.

Education centre in the Fathala Reserve (2007)
- 20 information panels
- accessible for the visitors
- used for education programmes and workshops for local inhabitants, guards, guides, and teachers

Less than 200 wild Western Derby elands live in Senegal. Other 54 elands are bred in the captive breeding programme in Bandia and Fathala Reserves. That's all.

Educational programmes for children (2008 and 2009)
- 10 schools form the vicinity of the reserve
- groups of 25 children and 2 teachers
- day in the school (questionnaires, partnership with Czech schools, EAZA campaign drawing competition)
- excursion to the reserve
- educative games and materials
- totally 500 children and 40 teachers

In 2009 we will open an Education and research centre in the Fathala Reserve, a multipurpose building used as a base for the Western Derby eland conservation programme and related educational and research activities.

The project is running thanks to the cooperation of the Society for the Protection of Environment and Fauna in Senegal (SPEFS), Direction of National Parks of Senegal (DPNS) and financed by the Czech Development Cooperation through Ministry of Environment of the Czech Republic. Research activities were supported by the grant of Czech Academy of Sciences.

Fig. 7. Poster for 3rd Scientific Conference of Institut of Tropics and Subtropics, 2009.

Analysis of woody vegetation of the savanna in the Delta du Saloum National Park in Senegal

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[2] Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Czech Republic

Fig.1: Location of the studied area.

Introduction

Fathala Reserve is the enclosed terrestrial part of the Delta du Saloum National Park with the protective and partially managed regime in Senegal. A semi-captive population of the critically endangered Western giant eland (*Taurotragus derbianus derbianus*) was established there in 2006. In the frame of the Czech Aid Development Project: „Conservation and breeding of Western giant eland in Senegal" and „Support to natural reserves and national parks of Senegal" the study of woody vegetation was carried out in this unique ecosystem.

Methods

Data were collected from April to May 2008 and from September to November 2008. Three different areas of the National Park were observed. Two of them are part of the Fathala Reserve, both fenced. One area is used for tourist activities and is occupied by wildlife animals; the second one is reserved for future expansion of the Reserve, and nowadays is free of animals. The third area outside the fenced territory is exposed to livestock grazing and wood collection. The aim of the study was to identify woody plant species and to determine the coverage of woody species during the dry and wet season. The study was focused on the influence of animal's presence, burning management and location of woody plant species according to North – South orientation and distance from the sea.

Fig. 2: Western giant eland in the Fathala Reserve.

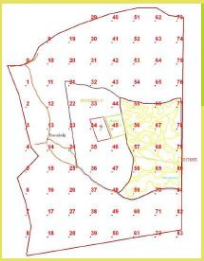

Fig. 3: Geo-referenced grid with points per 1000 m.

Using ArcGIS software a regular geo-referenced grid with points per 1000 m was defined over the investigated area. Intersect points of the 1000 m grid represented sampling plots in the field (squares with 20 meters diagonal). At each investigated plot, woody plant species composition was recorded, and the cover of woody species was visually estimated (in % of cover). For more detailed description of the plots environmental data were recorded.

Fig. 4: The Fathala Reserve in the dry season.

Fig. 5: Data collection.

Results

In total 60 woody plant species were identified. The most distributed woody species were: *Acacia ataxacantha*, *Azadirachta indica*, *Combretum glutinosum*, *Combretum nigricans*, *Combretum paniculatum*, *Danielia oliveri*, *Icacina senegalensis*, *Terminalia macroptera*. The influence of studied factors on the woody plant species coverage will be compiled by the statistical analysis carried out with CANOCO software.

Acknowledgement

The project runned thanks to the cooperation of the Society for the Protection of Environment and Fauna in Senegal (SPEFS), Direction of National Parks of Senegal (DPNS) and was financed by the Czech Development Cooperation through Ministry of Environment of the Czech Republic.

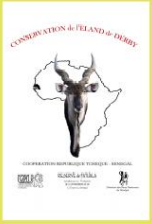

Fig. 8. Poster for EAZA Annual Conference, 2010.

Ten years of the Western Derby eland (*Taurotragus derbianus derbianus*) conservation programme

Karolína Koláčková[1], Pavel Brandl[2], Pavla Hejcmanová[3], Markéta Antonínová[4], Pavla Vymyslická[1], Magdalena Žáčková[1]

[1]Institute of Tropics and Subtropics, Czech University of Life Sciences Prague, Czech Republic
[2]Zoological Garden Prague, Czech Republic
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[4]Garamba National Park, African Parks Network, Nagero, Democratic Republic of Kongo

Less than 200 critically endangered Western Derby elands (*Taurotragus derbianus derbianus*) dwell in their last refuge in the Niokolo Koba National Park (NKNP) in Senegal. Six wild individuals (1 male and 5 females) captured in the NKNP became founders of the world-unique semi-captive population in 2000. Nowadays, sixty-two individuals form the only semi-captive population in the world in the Bandia and Fathala Reserves in Senegal.

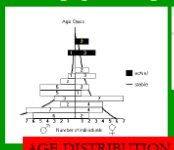
THE ONLY SEMI-CAPTIVE POPULATION **THE ONLY WILD POPULATION**

Appropriate protection and management
Only two localities
Only 6 wild founders!

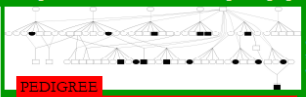
Is there any chance for a change?

Poaching
Livestock pastures
Unsatisfactory park management

Demographic and genetic parameters of the semi-captive population and its perpectives...

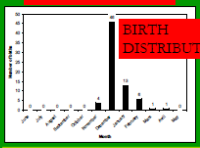


AGE DISTRIBUTION



PEDIGREE

NUMBER OF INDIVIDUALS



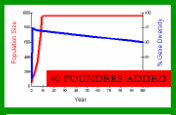
BIRTH DISTRIBUTION

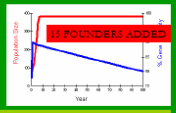
The data includes the complete history of the Western Derby eland conservation programme (2000 to 2010) and were processed by SPARKS and corroborated in Pöf 2000 software.

Actual population size	32M,30F
Births total	39M,32F
Deaths total	8M,7F
Population growth rate	33,5%
Gene diversity (GD)	78,4%
Mean inbreeding (F)	0,1162
Mean kinship (MK)	0,2159

GENE DIVERSITY PROJECTIONS

Generally a viable population should maintain at least 90 % of the original GD at the end of 100 years. Our population would drop to 69 % if no founder were added.





Remaining Western Derby elands have low chance to survive without careful management and monitoring. We emphasize the need of conservation actions directly in the Niokolo Koba National Park. Meanwhile, new founders should be captured to reinforce the only semi-captive population.

The project is running thanks to the cooperation of the Society for the Protection of Environment and Fauna in Senegal (SPEFS), Direction of National Parks of Senegal (DPNS) and was financed by the Czech Development Cooperation through Ministry of Environment of the Czech Republic. Research activities were supported by the grant of Czech Academy of Sciences.
For more information see www.giantland.com and www.derbiantwin.com .

Fig. 9. Poster for EAZA Annual Conference, 2011.

Presence and Future of Western Derby Eland

Karolína Koláčková[1], Pavel Brandl[2], Pavla Hejcmanová[1], Magdalena Žáčková[1], Pavla Vymyslická[1], Lenka Bartůňková[1]

[1]Czech University of Life Sciences Prague
[2]Prague Zoo
Authors are members of the civil society Derbianus Czech Society for African Wildlife.

Adult ♂ Adult ♀ 1-2 yrs ♂ 1-2 yrs ♀ Death individuals

Herd **Bandia 1** (established in 2000)

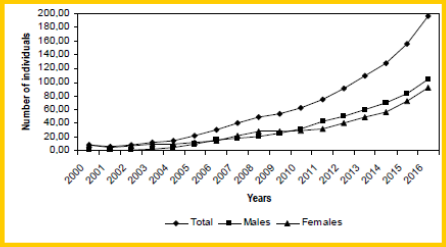
The last herds of critically endangered Western Derby Eland (*Taurotragus derbianus derbianus*) remain in the Niokolo Koba National Park in West African Senegal. One male and five females were captured there in 2000 and became founders of the semi-captive breeding programme in two fenced reserves in western Senegal. Until 2011, this back-up population has grown to 75 individuals divided into six herds.

Herd **Bandia 2** (established in 2006)

The semi-captive population within the conservation programme is properly managed using the minimizing kinship strategy. All individuals are uniquely identified by the pattern of stripes on their flanks. The demographic and genetic parameters have been published in the studbook every year since 2008.

In 2011, 13 calves were born in the Bandia Reserve and 2 in the Fathala Reserve. The deterministic annual population growth rate reached 32%. The overall mortality decreased to 18.5 %. Thanks to proper management the genetic diversity grew to 78.8 % but the inbreeding coefficient increased to 0.1255.

Herd **Bandia 3** (established in 2009)



Semi-captive population development and its prediction for the next 5 years

Herd **Fathala 1** (established in 2008)

For the survival of the Western Derby Eland the connection of the management of the wild and the semi-captive population seems to be essential. In 2012 we plan the organization of the Population and Habitat Viability Assessment Workshop in the Fathala Reserve in Senegal. The Conservation Action Plan resulting from the meeting should include the recommendations concerning the captures of new founders in the wild, selection of new localities in order to spread the conservation breeding, radio-collaring of wild individuals, and other important points.

Herd **Fathala 2** (established in 2006)

Herd **Fathala 3** (established in 2011)

Western Derby Eland conservation programme is run due to cooperation of the Society for the Protection of the Environment and Fauna of Senegal, Directorate of National Parks of Senegal, Czech University of Life Sciences Prague, and Derbianus Czech Society for African Wildlife. Conservation programme is actually supported by Prague Zoo, Pilsner Zoo, and Ostrava Zoo. We are deeply indebted to a lot of individual supporters, companies, and Czech governmental institutions. See more at: www.derbianus.cz.

Fig. 10. Poster for VI[th] European Congress of Mammalogy, 2011.

Genetic diversity and phylogeny of the Western Derby eland (*Taurotragus derbianus derbianus*)

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(2) Faculty of Science, Charles University in Prague, Czech Republic

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Figure 1: The male of the Western Derby eland (*T. d. derbianus*)

Introduction

The Western Derby eland (Fig. 1) is considered to be one of the largest antelopes in the world. It is classified as „critically endangered" (IUCN 2010 [online]). The last wild population of approximately 170 individuals (in 2006) was discovered in Niokolo Koba National Park in Senegal (Fig. 2).

Since 2000 there exists the semi-captive breeding programme in Senegal. It was established by only 6 founders (1 male, 5 females). Nowadays it numbers 76 individuals divided into 5 breeding herds (and one bachelor herd) in Bandia and Fathala reserves (Fig. 3). Inbreeding occurs in the population, so the genetic diversity evaluation is necessary.

The kinship relations in the population are determined by means of direct observation of sucking calves and their mothers. Some relation are uncertain, the microsatellite analysis should aid to solve them (Fig. 4).

The differences between subspecies were specified on the basis of morphological characters, the genetic differences are not known.

Aim of the study

The aim of this study was to evaluate the genetic diversity in the population of the Western Derby eland bred in semi-captivity, to determinate the number of alleles per locus, observed and expected heterosygosity etc.

Another aims were to revise the uncertain pedigree data discovered by direct observation and to identify the phylogenetic relationship between Western (*T. d. derbianus*) and Eastern (*T. d. gigas*) subspecies.

Figure 2: Distribution of the Giant eland (Taurotragus derbianus) (IUCN 2010 [online] - modified)

Figure 3: Locations of the Bandia and Fathala reserves and Niokolo Koba National Park (NKNP) (Koláčková et al. 2011, accepted).

Material

Sixty-one samples were obtained in the Bandia reserve from 2006 to 2011. The blood samples were obtained by the tranquillization during the transport of the animals between the breeding herds, the tissue samples were obtained from dead animals or by means of the biopsy darts.

Methods

DNA isolation was performed by DNeasy Blood and Tissue kit by Qiagen.

For the evaluation of genetic diversity and determination of kinship relations the 13 microsatellite markers of cattle, goats, sheep and other related species were used. 8 were polymorphic, 5 monomorphic (Tab. 1). The markers were tested on 10 individuals (including the 4 founders). The results of fragmentation analysis were visualised and the lengths of the alleles were estimated using the GeneMarker V1.95 Demo (Softgenetics 2010 [online]).

The phylogeny has been identified by means of the mitochondrial DNA analysis. We have sequenced 1140 bp of cytochrome *b* of the Western subspecies (*T. d. derbianus*) from Senegal and of the Eastern subspecies (*T. d. gigas*) from Zoo Los Angeles.

Preliminary results

The preliminary results indicate low number of alleles in the population. There were analysed 13 microsatellite loci, 8 are polymorphic, but only 5 have more than 2 alleles. Maximum of alleles is 4 alleles per locus (Tab. 1).

By studying the phylogeny we observed very low differencies between the populations of Western (*T. d. derbianus*) and Eastern (*T. d. gigas*) subspecies - p-distance was 0.004.

Table 1: Polymorphic loci and their alleles

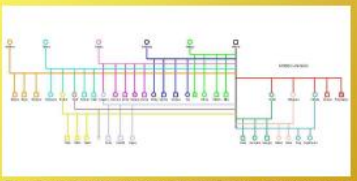

Figure 4: The part of the family tree of the Western Derby elands (*Taurotragus derbianus derbianus*) bred in semi-captivity in Bandia and Fathala reserves (actual to November 2007). □ = male, ○ = female, ? = gender unknown, × = dead individual, colours = related individuals (families) (Created in the programme GenoPro 2007)

Conclusion

According the preliminary results we can assume the low genetic diversity in the population, probably due to the low number of founders and inbreeding occurrence in the population.

Likewise, there is very low support for the genetical separation of the two subspecies.

For the management of the breeding would be good to add some „new" individuals. The benefit of this step could be also disputable, because the founders show the low polymorphism too.

This research was supported by "Derbianus Czech Society for African Wildlife" (NGO) and by the foundation "Nadační Josefa, Marie a Zdeňky Hlávkových".

Thanks belong to the Society for the Protection of Environment and Fauna in Senegal and Directorate of National Parks of Senegal too.

Fig. 11. Poster for symposium Antelope conservation in the 21st century: from diagnosis to action, 2011.

Determinants of diet selection of the critically endangered Western Derby elands in the conservation breeding enclosure in the Fathala Reserve, Senegal

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[1] Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Czech Republic
[2] Faculty of Forestry and Wood Sciences, Czech University of Life Sciences Prague, Czech Republic
zackovamagdalena@gmail.com

The aim of the study was to reveal the role of nutrients and high-quality supplement (*Acacia albida* pods) on diet selection of Western Derby elands (WDE, *Taurotragus derbianus derbianus*).

Introduction

Diet selection is a crucial mechanism for nutrient and energy intake, and consequently for animal individual's fitness. Browsers are considered concentrate selectors seeking for digestible diet rich in nitrogen with minimum of fibre. Additional feeding of such food supplement could be essential for fitness of endangered animals in conservation breeding programs.

Methods

We determined diet selectivity at plant species level by direct observation of six animals in the conservation breeding enclosure in the Fathala Reserve (Senegal) in situations with and without food supplement. 10 species of the WDE diet were analysed for nutrient content.

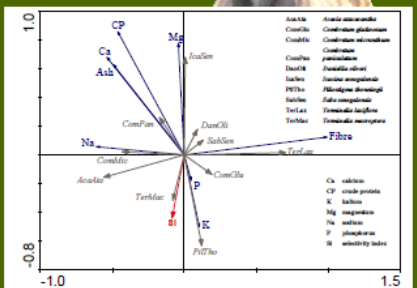

Fig. 1: PCA analysis of nutrient contents, plant species and selectivity index. 1st axis explains 79.5% of variability, 2nd axis explains 96% of variabilty.

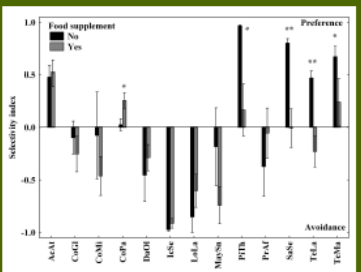

Fig. 2: Selectivity of WDE without and with offered food supplement. The error bars indicate S.E. The significant results of Students' t-test is indicated by * (P< 0.05) or ** (P<0.01).

Results

32 woody plants species were recorded in the WDE's diet. The most preferred were *Acacia ataxacantha*, *Terminalia macroptera*, and pods of *Piliostigma thonningii*; *Icacina senegalensis* was the most avoided species (Fig. 1). Supplemental food decreased selectivity for *Saba senegalensis*, *Terminalia laxiflora*, *T. macroptera* and *Piliostigma thonningii* pods, increased for *Combretum paniculatum* (Fig.2).

Why did antelopes prefer these species and why marginalized them when offered supplement? Selectivity for plant species were positively correlated with phosphorus and kalium content and negatively correlated with content of nitrogen, magnesium and calcium. No significant role of fibre content was found.

Conclusions

Diet selection is more complex mechanism, which is not driven by only two factors (nitrogen and fibre). When WDE received the food supplement both positive and negative relations to nutrients were reduced, animals spent less time foraging in favour of resting. Food supplement can be therefore used as a key managerial tool in special conservation situations.

Acknowledgement
The research was supported by project CIGA 20114204 and IGA 201421103137 of Czech University of Life Sciences, Prague. We are highly grateful to the Society for the Protection of Environment and Fauna in Senegal.

SECTION B:

The African studbook of Western Derby Eland

Karang's herd in Fathala Reserve / Troupeau de Karang dans la Réserve de Fathala

Std. #	Sex	Local name	Date of Birth	Date of Death	Sire Name	Sire #
1001	M	Niokolo	01-Jan-99			Wild
1002	F	Dalaba	01-Jan-97			Wild
1003	F	Salémata	01-Jan-97			Wild
1004	F	Bembou	01-Jan-99			Wild
1005	F	Malapa	01-Jan-99	01-Aug-11		Wild
1006	F	Tamba	01-Jan-99			Wild
1007	F	Dagana	01-Mar-02		Niokolo	1001
1008	F	Thelma	01-Apr-02		Niokolo	1001
1009	F	Ndiogoye	01-Jan-03		Niokolo	1001
1010	M	Karang	03-Jan-03		Niokolo	1001
1011	F	Guddi	05-Jan-03		Niokolo	1001
1012	F	Fathala	12-Feb-03		Niokolo	1001
1013	M	Popenguine	23-Feb-03	20-Nov-07	Niokolo	1001
1014	M	Matam	23-Nov-03		Niokolo	1001
1015	M	Sokone	29-Nov-03	20-Aug-08	Niokolo	1001
1016	F	Bayane	10-Dec-03	15-Dec-06	Niokolo	1001

Dam Name	Dam #	Site since/location	Stripes (L/R)	% Known	F	MK
	Wild	19-May-00/NKNP	16/14	100	0.000	0.2951
		20-May-00/Bandia 1				
	Wild	19-May-00/NKNP	14/13	100	0.000	0.0655
		20-May-00/Bandia 1				
	Wild	19-May-00/NKNP	14/11	100	0.000	0.0247
		20-May-00/Bandia 1				
	Wild	19-May-00/NKNP	13/13	100	0.000	0.0209
		20-May-00/Bandia 1				
	Wild	19-May-00/NKNP	15/15	100	0.000	
		20-May-00/Bandia 1				
	Wild	19-May-00/NKNP	12/13	100	0.000	0.0712
		20-May-00/Bandia 1				
Dalaba	1002	Mar-02/Bandia 1	14/13	100	0.000	0.1945
Tamba	1006	Mar-02/Bandia 1	12/14	100	0.000	0.1955
		01-Jan-03/Bandia 1	15/16	50	0.000	0.3093
		03-Jan-03/Bandia 1	13/13	50	0.000	0.3046
		22-Mar-06/Fathala 1				
		05-Jan-03/Bandia 1	14/15	50	0.000	0.3046
		12-Feb-03/Bandia 1	15/12	50	0.000	0.3084
		23-Feb-03/Bandia 1	14/14			
		18-Mar-06/Fathala 1				
Malapa	1005	23-Nov-03/Bandia 1	13/13	100	0.000	0.1627
		23-Mar-06/Fathala 1				
		08-Feb-08/Fathala 2				
Salémata	1003	29-Nov-03/Bandia 1	12/14	100	0.000	
		22-Mar-06/Fathala 1				
		08-Feb-08/Fathala 2				
Bembou	1004	10-Dec-03/Bandia 1	13/13			
		27-Mar-06/Bandia 2				

Std. #	Sex	Local name	Date of Birth	Date of Death	Sire Name	Sire #
1017	M	Toubab	31-Dec-03		Niokolo	1001
1018	F	Sindia	22-Nov-04		Niokolo	1001
1019	M	Derby	02-Dec-04		Niokolo	1001
1020	F	Tuuti	04-Dec-04	25-Nov-07	Niokolo	1001
1021	F	Minna	10-Dec-04		Niokolo	1001
1022	M	Bandia	14-Dec-04		Niokolo	1001
1023	M	Taiba	05-Jan-05		Niokolo	1001
1024	M	Doole	11-Jan-05		Niokolo	1001
1025	M	Gaaw	25-Jan-05		Niokolo	1001
1026	M	Souleye	04-Dec-05	20-Aug-08	Niokolo	1001
1027	F	Nelaw	12-Dec-05	01-Aug-09	Niokolo	1001
1028	M		18-Dec-05	25-Dec-05	Niokolo	1001

Dam Name	Dam #	Site since/location	Stripes (L/R)	% Known	F	MK
Fathala	1012	19-Dec-05/Bandia 1	13/14	75	0.500	0.3020
		11-Feb-08/Fathala 1				
Dalaba	1002	21-Dec-05/Bandia 1	15/12	100	0.000	0.1992
		19-Feb-09/Bandia 3				
Dagana	1007	22-Dec-05/Bandia 1	15/15	100	0.250	0.2486
		06-Feb-08/Fathala 1				
		08-Feb-09/Fathala 2				
Tamba	1006	23-Dec-05/Bandia 1	15/13	100	0.000	0.1869
		07-Feb-08/Fathala 1				
		08-Feb-08/Fathala 2				
Bembou	1004	24-Dec-05/Bandia 1	13/13	100	0.000	0.1618
Thelma	1008	28-Dec-05/Bandia 1	15/15	100	0.250	0.2491
		07-Feb-08/Fathala 1				
		08-Feb-08/Fathala 2				
Guddi	1011	07-Feb-06/Bandia 1	12/14	75	0.500	
		09-Feb-08/Fathala 1				
Malapa	1005	16-Dec-06/Bandia 1	13/14	100	0.000	0.1627
		02-Mar-09/Fathala 2				
Bembou	1004	18-Dec-06/Bandia 1	14/14	100	0.000	0.1618
Salémata	1003	20-Dec-06/Bandia 1	15/13	100	0.000	0.1675
		19-Feb-09/Bandia 3				
Guddi	1011	22-Dec-06/Bandia 1	14/14	75	0.500	0.3008
		02-Mar-09/Fathala 2				
Thelma	1008	24-Dec-06/Bandia 1	15/13	100	0.250	0.2510
		20-Feb-09/Bandia 3				
Tamba	1006	26-Dec-06/Bandia 1	12/14	100	0.000	0.1926
		24-Feb-09/Bandia 3				
Dagana	1007	29-Dec-06/Bandia 1	14/14	100	0.250	0.2505
		20-Feb-09/Bandia 2				

Std. #	Sex	Local name	Date of Birth	Date of Death	Sire Name	Sire #
1029	F	Foog	19-Dec-05		Niokolo	1001
1030	M	Dering	21-Dec-05		Niokolo	1001
1031	M	Deedet	22-Dec-05		Niokolo	1001
1032	M	Tukki	23-Dec-05		Niokolo	1001
1033	M	Baax	24-Dec-05		Niokolo	1001
1034	M	Tidian	28-Dec-05		Niokolo	1001
1035	F	Georgina	07-Feb-06	01-Jul-08	Niokolo	1001
1036	M	Mike	16-Dec-06		Niokolo	1001
1037	M	Bonheur	18-Dec-06		Niokolo	1001
1038	F	Sao	20-Dec-06		Niokolo	1001
1039	M	Georges	22-Dec-06		Niokolo	1001
1040	F	Tagat	24-Dec-06		Niokolo	1001
1041	F	Tendresse	26-Dec-06		Niokolo	1001
1042	F	Dagou	29-Dec-06		Niokolo	1001

Dam Name	Dam #	Site since/location	Stripes (L/R)	% Known	F	MK
Fathala	1012	19-Dec-05/Bandia 1	13/14	75	0.500	0.3020
		11-Feb-08/Fathala 1				
Dalaba	1002	21-Dec-05/Bandia 1	15/12	100	0.000	0.1992
		19-Feb-09/Bandia 3				
Dagana	1007	22-Dec-05/Bandia 1	15/15	100	0.250	0.2486
		06-Feb-08/Fathala 1				
		08-Feb-09/Fathala 2				
Tamba	1006	23-Dec-05/Bandia 1	15/13	100	0.000	0.1869
		07-Feb-08/Fathala 1				
		08-Feb-08/Fathala 2				
Bembou	1004	24-Dec-05/Bandia 1	13/13	100	0.000	0.1618
Thelma	1008	28-Dec-05/Bandia 1	15/15	100	0.250	0.2491
		07-Feb-08/Fathala 1				
		08-Feb-08/Fathala 2				
Guddi	1011	07-Feb-06/Bandia 1	12/14	75	0.500	
		09-Feb-08/Fathala 1				
Malapa	1005	16-Dec-06/Bandia 1	13/14	100	0.000	0.1627
		02-Mar-09/Fathala 2				
Bembou	1004	18-Dec-06/Bandia 1	14/14	100	0.000	0.1618
Salémata	1003	20-Dec-06/Bandia 1	15/13	100	0.000	0.1675
		19-Feb-09/Bandia 3				
Guddi	1011	22-Dec-06/Bandia 1	14/14	75	0.500	0.3008
		02-Mar-09/Fathala 2				
Thelma	1008	24-Dec-06/Bandia 1	15/13	100	0.250	0.2510
		20-Feb-09/Bandia 3				
Tamba	1006	26-Dec-06/Bandia 1	12/14	100	0.000	0.1926
		24-Feb-09/Bandia 3				
Dagana	1007	29-Dec-06/Bandia 1	14/14	100	0.250	0.2505
		20-Feb-09/Bandia 2				

Std. #	Sex	Local name	Date of Birth	Date of Death	Sire Name	Sire #
1043	F	Dewene	06-Jan-07		Niokolo	1001
1044	F	Foulamousou	09-Jan-07		Niokolo	1001
1045	F	Nane	20-Jan-07		Niokolo	1001
1046	M		25-Nov-07	26-Nov-07	Niokolo	1001
1047	M		03-Dec-07	06-Feb-08	Niokolo	1001
1048	M	Mansarinku	04-Dec-07		Niokolo	1001
1049	F	Nature	11-Dec-07	30-Jun-09	Niokolo	1001
1050	F	Didi	18-Dec-07		Niokolo	1001
1051	F	Saroudia	19-Dec-07		Niokolo	1001
1052	M		20-Dec-07	05-Mar-08	Niokolo	1001
1053	F	Bandiagara	21-Dec-07		Niokolo	1001
1054	M	Galago	15-Feb-08		Niokolo	1001
1055	F	Toubacouta	16-Feb-08		Niokolo	1001
1056	F	Fatou	18-Feb-08	30-Jun-09	Niokolo	1001
1057	M	Mango T.	04-Dec-08		Toubab	1017

Dam Name	Dam #	Site since/location	Stripes (L/R)	% Known	F	MK
Dalaba	1002	06-Jan-07/Bandia 1	12/13	100	0.000	0.1898
		20-Feb-09/Bandia 2				
Fathala	1012	09-Jan-07/Bandia 1	12/15	75	0.500	0.3046
		11-Feb-08/Fathala 1				
Ndiogoye	1009	20-Jan-07/Bandia 1	13/14	75	0.500	0.3036
		11-Feb-08/Fathala 1				
Tuuti	1020	25-Nov-07/Bandia 1				
Dagana	1007	03-Dec-07/Bandia 1	14/14			
Malapa	1005	04-Dec-07/Bandia 1	13/15	100	0.000	0.1627
		25-Feb-09/Fathala 2				
		01-May-11/Fathala 3				
Ndiogoye	1009	11-Dec-07/Bandia 1	14/14	75	0.500	
		27-Feb-09/Fathala 1				
Dalaba	1002	18-Dec-07/Bandia 1	15/13	100	0.000	0.1879
		21-Feb-09/Bandia 2				
Salémata	1003	19-Dec-07/Bandia 1	14/12	100	0.000	0.1637
		24-Feb-09/Bandia 3				
Thelma	1008	20-Dec-07/Bandia 1				
Bembou	1004	21-Dec-07/Bandia 1	11/14	100	0.000	0.1637
		27-Feb-09/Bandia 2				
Guddi	1011	15-Feb-08/Bandia 1	15/17	75	0.500	0.3008
		25-Feb-09/Fathala 2				
Tamba	1006	16-Feb-08/Bandia 1	15/14	100	0.000	0.1907
		24-Feb-09/Bandia 3				
Fathala	1012	18-Feb-08/Bandia 1	13/15	75	0.500	
		27-Feb-09/Fathala 1				
Minna	1021	04-Dec-08/Bandia 2	12/15	100	0.125	0.1919
		19-Feb-11/Fathala 2				

Std. #	Sex	Local name	Date of Birth	Date of Death	Sire Name	Sire #
1058	F	Dara	08-Dec-08		Niokolo	1001
1059	M	Bisaab	09-Dec-08		Niokolo	1001
1060	M	Nanuk	10-Dec-08		Niokolo	1001
1061	M	Sabar T.	12-Dec-08	01-Jul-11	Toubab	1017
1062	M	Toko	24-Dec-08		Niokolo	1001
1063	F	Donma	28-Dec-08		Niokolo	1001
1064	M	Soleil	31-Dec-08	01-Apr-11	Niokolo	1001
1065	M	Teranga	03-Jan-09		Niokolo	1001
1066	F	Gaanga	05-Jan-09	01-Aug-11	Niokolo	1001
1067	F	Mbalax	10-Jan-09	19-Feb-11	Niokolo	1001
1068	F		01-Dec-09	23-Dec-09	Niokolo	1001
					Baax	1033
1069	M	Triomphe D.	04-Dec-09		Dering	1030
1070	M	Salut T.	15-Dec-09		Toubab	1017
1071	F	Mirabelle T.	17-Dec-09		Toubab	1017
1072	M	Marabout	21-Dec-09		Niokolo	1001
					Baax	1033
1073	M	Fort	25-Dec-09		Niokolo	1001
					Baax	1033

Dam Name	Dam #	Site since/location	Stripes (L/R)	% Known	F	MK
Dagana	1007	08-Dec-08/Bandia 1 19-Feb-11/Fathala 3	14/14	100	0.250	0.2486
Bembou	1004	09-Dec-08/Bandia 1	13/15	100	0.000	0.1618
Ndiogoye	1009	10-Dec-08/Bandia 1 21-Feb-11/Fathala 2	13/15	75	0.500	0.3023
Sindia	1018	12-Dec-08/Bandia 2 19-Feb-11/Fathala 2	14/17	100	0.125	0.0000
Thelma	1008	24-Dec-08/Bandia 1 01-Jan-11/Bandia 2	14/13	100	0.250	0.2491
Dalaba	1002	28-Dec-08/Bandia 1 19-Feb-11/Fathala 3	11/14	100	0.000	0.1841
Salémata	1003	31-Dec-08/Bandia 1	12/12	100	0.000	
Tamba	1006	03-Jan-09/Bandia 1 21-Feb-11/Fathala 2	14/14	100	0.000	0.1869
Guddi	1011	05-Jan-09/Bandia 1 19-Feb-11/Fathala 3	14/15	75	0.500	0.0000
Malapa	1005	10-Jan-09/Bandia 1	16/15	100	0.000	
Dagana	1007	01-Dec-09/Bandia 1		50	0.000	
Tendresse	1041	04-Dec-09/Bandia 3 08-Mar-12/Bandia 4	15/14	100	0.125	0.1997
Sindia	1018	15-Dec-09/Bandia 2 07-Mar-12/Bandia 4	15/13	100	0.125	0.1933
Minna	1021	17-Dec-09/Bandia 2 17-Feb-11/Bandia 1	15/14	100	0.125	0.1919
Malapa	1005	21-Dec-09/Bandia 1 08-Mar-12/Bandia 4	15/15	50	0.000	0.0266
Fathala	1012	25-Dec-09/Bandia 1 09-Mar-12/Bandia 4	13/13	25	0.000	0.3084

Std. #	Sex	Local name	Date of Birth	Date of Death	Sire Name	Sire #
1074	M	Demba T.	27-Dec-09		Toubab	1017
1075	M	Nguekokh	31-Dec-09		Niokolo	1001
					Baax	1033
1076	F	Touba	08-Jan-10		Niokolo	1001
					Baax	1033
1077	M		15-Dec-09	15-Jan-10	Karang	1010
1078	M	Souhel	07-Nov-10		Niokolo	1001
					Baax	1033
					Bonheur	1037
1079	M	Tamtam D.	07-Nov-10		Dering	1030
1080	M	Galope	08-Nov-10	09-Mar-12	Niokolo	1001
					Baax	1033
					Bonheur	1037
1081	M	Timbre D.	09-Nov-10		Dering	1030
1082	M	Droit	11-Nov-10		Niokolo	1001
					Baax	1033
					Bonheur	1037
1083	F	Savane D.	21-Nov-10		Dering	1030
1084	M	Tamarin D.	25-Nov-10		Dering	1030
1085	M	Destin T.	07-Dec-10		Toubab	1017
1086	M	Dada T.	14-Dec-10		Toubab	1017

Dam Name	Dam #	Site since/location	Stripes (L/R)	% Known	F	MK
Dewene	1043	27-Dec-09/Bandia 2 07-Mar-12/Bandia 4	15/13	100	0.125	0.2035
Ndiogoye	1009	31-Dec-09/Bandia 1 08-Mar-12/Bandia 4	12/14	25	0.000	0.3093
Tamba	1006	08-Jan-10/Bandia 1	13/12	50	0.000	0.0750
Foog	1029	15-Dec-09/Fathala 1		62.5	0.500	
Salémata	1003	07-Nov-10/Bandia 1 10-Mar-12/Bandia 4	13/12	50	0.000	0.0285
Tendresse	1041	07-Nov-10/Bandia 3 08-Mar-12/Bandia 4	14/13	100	0.125	0.1997
Guddi	1011	08-Nov-10/Bandia 1	15/15	25	0.000	0.0000
Tagat	1040	09-Nov-10/Bandia 3 08-Mar-12/Bandia 4	15/16	100	0.188	0.2284
Dalaba	1002	11-Nov-10/Bandia 1 09-Mar-12/Bandia 4	13/14	50	0.000	0.0693
Sao	1038	21-Nov-10/Bandia 3	13/15	100	0.125	0.1871
Toubacouta	1055	25-Nov-10/Bandia 3 08-Mar-12/Bandia 4	13/15	100	0.125	0.1988
Dewene	1043	07-Dec-10/Bandia 2 07-Mar-12/Bandia 4	15/13	100	0.125	0.2035
Didi	1050	14-Dec-10/Bandia 2 07-Mar-12/Bandia 4	14/14	100	0.125	0.2026

Std. #	Sex	Local name	Date of Birth	Date of Death	Sire Name	Sire #
1087	M	Nemo	18-Dec-10		Niokolo	1001
					Baax	1033
					Bonheur	1037
1088	M	Dodo	24-Dec-10		Niokolo	1001
					Baax	1033
					Bonheur	1037
1089	M	Sindibad T.	26-Dec-10		Toubab	1017
1090	F	Feé K.	10-Jan-11		Karang	1010
1091	F	Neige K.	25-Jan-11		Karang	1010
1092	M	Titi	01-Mar-11		Niokolo	1001
					Baax	1033
					Bonheur	1037
1093	M		04-Nov-11	06-Nov-11	Niokolo	1001
					Baax	1033
					Bonheur	1037
1094	M	Dawal	07-Nov-11		Niokolo	1001
					Baax	1033
					Bonheur	1037
1095	F	Bunta	10-Nov-11		Toubab	1017
1096	F	Daraja	11-Nov-11		Niokolo	1001
					Baax	1033
					Bonheur	1037
1097	M	Daouda	14-Nov-11		Toubab	1017

Dam Name	Dam #	Site since/location	Stripes (L/R)	% Known	F	MK
Ndiogoye	1009	18-Dec-10/Bandia 1 17-Mar-12/Bandia 4	13/13	25	0.000	0.3093
Dagana	1007	24-Dec-10/Bandia 1 09-Mar-12/Bandia 4	14/15	50	0.000	0.1983
Sindia	1018	26-Dec-10/Bandia 2 07-Mar-12/Bandia 4	14/13	100	0.125	0.1933
Foulamous.	1044	10-Jan-11/Fathala 1	14/14	62.5	0.500	0.3053
Nane	1045	25-Jan-11/Fathala 1	14/14	62.5	0.500	0.3047
Tamba	1006	01-Mar-11/Bandia 1 10-Mar-12/Bandia 4	11/12	50	0.000	0.0750
unknown		04-Nov-11/Bandia 1				
Dagana	1007	07-Nov-11/Bandia 1	15/14	50		
Bandiagara	1053	10-Nov-11/Bandia 2	15/14	100	0.125	0.1905
Dalaba	1002	11-Nov-11/Bandia 1	15/15	50	0.000	0.0693
Didi	1050	14-Nov-11/Bandia 2	15/15	100	0.125	0.2026

Std. #	Sex	Local name	Date of Birth	Date of Death	Sire Name	Sire #
1098	F	Talaata	15-Nov-11		Dering	1030
1099	M	Séraphin	17-Nov-11		Dering	1030
1100	F	Sanga	19-Nov-11		Toubab	1017
1101	M	Tuur	27-Nov-11		Dering	1030
1102	M	Dakar	02-Dec-11		Toubab	1017
1103	F	Donja	03-Dec-11		Toubab	1017
1104	M	Fasoo	20-Dec-11		Karang	1010
1105	F	Farata	17-Jan-12		Niokolo	1001
					Baax	1033
					Bonheur	1037
1106	?		08-Feb-12	01-Feb-12	Niokolo	1001
					Baax	1033
					Bonheur	1037

Dam Name	Dam #	Site since/location	Stripes (L/R)	% Known	F	MK
Tendresse	1041	15-Nov-11/Bandia 3	14/14	100	0.125	0.1997
Sao	1038	17-Nov-11/Bandia 3	13/15	100	0.125	0.1871
Sindia	1018	19-Nov-11/Bandia 2	16/14	100	0.125	0.1933
Toubacouta	1055	27-Nov-11/Bandia 3	13/13	100	0.125	0.1988
Dagou	1042	02-Dec-11/Bandia 2	13/15	100	0.188	0.2334
Dewene	1043	03-Dec-11Bandia 2	14/13	100	0.125	0.2035
Foulamous.	1044	20-Dec-11/Fathala 1	15/13	62.5	0.500	0.3053
Fathala	1012	17-Jan-12/Bandia 1	16/13	25	0.000	0.3084
Tamba	1006	08-Feb-12/Bandia 1				

Explanatory note:

Std. #:	the studbook number given to the animal within the semi-captive population
Sex:	F – female, M – male
Sire/Dam:	identification of parents of the animal (the local name and the number)
Site since:	the date of transfer/capture
Location:	exact location within breeding enclosures (Bandia 1, Bandia 2, Bandia 3, Bandia 4, Fathala 1, Fathala 2, Fathala 4)
Stripes:	number of stripes on the left (L) and right (R) flank
% known:	percentage of known kinship
F:	inbreeding coefficient
MK:	mean kinship

Note explicative:

Std. #:	Registre #:	numéro donné à l'animal de la population en semi-captivité
Sex:	Sexe:	F – femelle, M – mâle
Local name	Nom local	
Date of Birth	Date du naissance	
Date of Death	Date de mort	
Sire/Dam:	Père/Mère:	identification des parents d'animal (le nom local et le numéro)
Site since:	En site dès:	la date du transfert/capture
Location:	Localité:	localité exacte parmi des enclos de reproduction (Bandia 1, Bandia 2, Bandia 3, Bandia 4 Fathala 1, Fathala 2, Fathala 3)
Stripes (L/R):	Bandes (G/D):	nombre des raies sur le flanc gauche (R) et droit (L)
% known:	% connu:	le pourcentage des relations de parenté connu
F:	F:	coefficient de la consanguinité
MK:	PM:	l'indice de parenté moyenne

SECTION C:

The identification cards of Western Derby Eland (living individuals)

This section is included in the CD-ROM version only.

Western Derby Eland calves in the Bandia Reserve / Les jeunes élands de Derby dans la Réserve de Bandia

One year he looked good, another year very old.

NIOKOLO (1999-2012)

After 12 years within the Derby Eland Conservation Programme, during the rainy season in July 2012, the only founding male left his breeding group forever.

He left here exactly 100 offspring - sons, daughters, grand sons, grand daughters. Now it is their turn to reproduce.

On behalf of the Western Derby Eland Conservation Programme

Derbianus Czech Society for African Wildlife

Version française – French version

UNIVERSITE TCHEQUE DES SCIENCES DE LA VIE DE PRAGUE

DERBIANUS CZECH SOCIETY FOR AFRICAN WILDLIFE

REGISTRE AFRICAIN

L'ÉLAND DE DERBY OCCIDENTAL

Taurotragus derbianus derbianus

(GRAY, 1847)

Éditeurs:

Karolína Koláčková **Tamara Haberová**

Pavla Vymyslická **Magdalena Žáčková**

Pavla Hejcmanová **Pavel Brandl**

Université Tchèque des Sciences de la Vie de Prague

Derbianus Czech Society for African Wildlife

Sous les auspices du programme de conservation de l'éland de Derby occidental.

&

Société pour la Protection de l'Environnement et de la Faune au Sénégal

Éditeurs

Karolína Koláčková

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Pavel Brandl

Registre africain: l'éland de Derby occidental, *Taurotragus derbianus derbianus* (Gray, 1847) / Karolína Koláčková, Tamara Haberová, Pavla Vymyslická, Magdalena Žáčková, Pavla Hejcmanová, Pavel Brandl (éditeurs), 5ème volume, Université Tchèque des Sciences de la Vie de Prague, République tchèque, 2012, 103 pp.

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La recension scientifique: RNDr. Petr H. Verner, Ph.D.

Crédits photographiques:

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Table des matières

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Organisations et institutions participantes

La Société pour la Protection de l'Environnement et de la Faune au Sénégal (SPEFS) qui a fondé le programme de conservation de l'éland de Derby occidental en semi captivité. La SPEFS héberge les animaux dans leurs deux réserves naturelles et leur fournir la protection nécessaire, les installations de reproduction et la gestion.

Le Ministère de l'Environnement et de la Protection de la Nature du Sénégal (MEPN) et la **Direction des Parcs Nationaux du Sénégal** (DPNS) fournissent le cadre législatif et représentent l'autorité gouvernementale responsable de la conservation de la nature au Sénégal.

L'Institut des Tropiques et Subtropiques (ITS) de **l'Université Tchèque des Sciences de la Vie de Prague** (UTSV) apporte au programme de conservation des élands de Derby occidentaux l'expertise scientifique dans les domaines de l'écologie, du comportement et de la gestion génétique.

Derbianus Czech Society for African Wildlife (Derbianus CSAW) est une organization non-governmentale fondé à UTSV afin d'octroyer la gestion et fund-raising des activités pour le programme de conservation des élands de Derby. CSAW organise également des services professionnels vétérinaires pour le transport des animaux, ils offrent leur support au développement de l'infrastructure dans les réserves naturelles et fournissent l'éducation environnementale à la population locale sur la péripherie des parcs nationaux et des réserves naturelles.

Le Ministère de l'Environnement de la République tchèque et le **Ministère des Affaires Etrangères** sont des institutions qui soutiennent la conservation de l'éland de Derby occidental, contribuent à la gestion de l'élevage et l'éducation environnementale, et ceci sous les auspices et avec financement

de la **Coopération au développement de la République tchèque**.

Le Parc zoologique de Prague contribue au traitement des données du présent registre, fournit les consultations sur la gestion d'élevage et participe également par son appui financière et technique au programme. En 2011, l'éland de Derby occidental est devenu l'une des espèces d'animaux soutenu par des fonds pour la „conservation *in situ*„ appelé Nous les Aidons à survivre.

Dès 2012, le Programme de conservation de l'éland de Derby occidental porte avec fierté la marque de **WAZA (World Association of Zoos and Aquariums)**.

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Pour plus d'information, voir **www.gianteland.com**

Préface au cinquième volume

Le cinquième volume du Régistre africain de l'éland de Derby eccidental (*Taurotragus derbianus derbianus*) reflète les changements principaux notamment dans les caractéristiques de la population. Nous avons récalculé tous les paramètres démographiques ainsi que génétique et nous avons actualisé les projections de la population et de la diversité génétique dans la population à longue-terme.

Dans le supplément sur le CD-ROM nous avons incorporé les fiches d'identification des nouveaux-nés et actualisé des photos des animaux. Seulement les fiches d'identification des animaux vivant ont été inclus dans le registre. L'information détaillée sur la populations de l'éland de Derby occidental en liberté ainsi que dans le programme de conservation est disponible dans les quatre éditions précedentes. Dans la version en anglais, il y a la liste complète des publications scientifiques et des contributions présentés aux conférences scientifiques issus des activités du Programme.

Toutes les activités de l'équipe tchèque de l'année passée dans le cadre du programme de conservation de l'éland de Derby ont pu été réalisées dû au soutien du public et des institutions à l'organisation non-bénéficiaire Derbianus CSAW. Toutes les donations pour la continuation de notre travail sont bienvenues avec reconnaissances.

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SECTION A:

Programme de conservation de l'éland de Derby occidental

Statut actuel de l'éland de Derby occidental

L'aire de distribution de 'éland de Derby occidental (*Taurotragus derbianus derbianus*) est actuellement limité à un seul pays du monde entier - le Sénégal. Il y a trois sites importants: 1) le parc national du Niokolo Koba (PNNK) avec l'unique population en liberté confirmée, 2) la Réserve de Bandia, et 3) la Réserve de Fathala, toutes les deux avec des animaux gerés en conditions de semi captivité.

Le PNNK est situé au Sénégal oriental couvrant 913000 ha et il est le plus grand et le plus ancien parc national au Sénégal. Son importance de l'écosystème de la savanne avec biodiversité d'une extraordinaire richesse concerne toute la région de l'Afrique de l'Ouest. Le climat est caractéristique d'une saison des pluies à partir de Juillet jusqu'à l'Octobre avec la pluviométrie annuelle de 800 - 1100 mm, et d'une saison sèche. La temperature moyenne est 25 °C de Novembre à Janvier et 33 °C en'Avril et Mai (stations météorologiques de Tambacounda et Kédougou). La surface du PNNK est généralement plate avec des rémarquables collines au sud-est du parc. Le parc est tranché par le fleuve Gambie avec deux affluants principaux, le Niokolo Koba et le

Koulountou. Le parc appartient à la zone phytogéographique soudanienne et soudano-guinéenne (White 1983). On y trouve une mosaïque de la savanne arborée et des plaines graminnées (Frederiksen et Lawesson 1992). Le parc abrite une grande diversité d'espèces de plantes et d'animaux. Le PNNK représente probablement l'unique site dans le monde entier où on peut trouver la dernière population de l'éland de Derby en liberté. Depuis 1981, le PNNK est sur la liste de l'Héritage Mondial de l'UNESCO (UNESCO 2012).

La Réserve de Bandia, creée pour la faune sauvage et le tourisme de vision, est située à 65 km au sud de Dakar, au bord de la forêt classée de Bandia. La saison sèche y dure du Juillet à l'Octobre avec la pluviométrie annuelle de 484 mm (350.0–742.4 mm). La temperature moyenne est 25 °C en Janvier (milieu de la saison sèche) et 30 °C en Septembre (pleine saison des pluies). La surface est plate tranchée par la rivière temporaire Somone. De point de vue phytogéographique la Réserve de Bandia appartient à la zone soudanno-sahélienne et la végétation originaire est formée par la savanne dominée par *Acacia ataxacantha* et *Acacia seyal*. La réserve est cloturée et contribue ainsi à la conservation de la végétation naturelle (Hejcmanová *et al.* 2010). La réserve abrite la faune sauvage, d'une part d'origine sénégalais introduit d'autres régions du Sénégal comme pour exemple buffle (*Syncerus caffer brachyceros*), defassa (*Kobus ellipsiprymnus defassa*), kob (*Kobus kob*), antilope cheval (*Hippotragus equinus koba*), mais d'autre part d'origine étranger, introduit d'Afrique du Sud comme giraffe (*Giraffa camelopardalis giraffa*), grand kudu (*Tragelaphus strepsiceros*), impala (*Aepyceros melampus*), et rhino blanc (*Ceratotherium simum*). La Réserve de Bandia était le prémier site où les élands de Derby occidentaux capturés en liberté ont été placés après l'opération de capture en 2000 et dès lors le site et la gestion de ces animaux ont été prouvé appropriés pour le succès de leurs réproduction. La Réserve de Bandia est une réserve de la faune sauvage bien équipée de l'infrastructure, boma et un réseau d'enclos. En total

96 élands de Derby occidentaux ont été y nés (Koláčková *et al.* 2011).

La Réserve de Fathala est la partie cloturée de la Forêt de Fathala dans le parc national de Delta du Saloum National Park (DSNP) situé à l'ouest de Sénégal, à la frontière avec la Gambie. Le climat est marqué par une saison des pluies (Juin - Octobre, précipitation annuelle de 1022 mm) et une saison sèche (Novembre - Mai) (Station météorologique Banjul Yundum). La temperature moyenne y est 31.2°C en Mai et 26°C en janvier (Station météorologique de Kaolack, Niang 2001). De point de vue phytogéographique le territoire appartient à la zone soudanienne et la zone de transition de Guineé-Congolais à soudanienne. La surface est plate avec une valée humide nommée "Mare of the Dragon". La végétation est formée par la savanne arborée avec formations dominantes des savannes boisées *Combretum nigricans-Prosopis africana, Bombax costatum-Pterocarpus erinaceus*, et brousailles de *Piliostigma thonningii-Dichrostachys cinerea*. Dans la vallée humide on y trouve des forêts-galeries de *Erythrophleum suaveolens-Dialium guineense* (Nežerková-Hejcmanová *et al.* 2005). La faune sauvage consiste en faune native comme guib harnaché (*Tragelaphus scriptus*), phacochère (*Phacochoerus africanus*), singe rouge (*Erythrocebus patas*) ; et plusieurs espèces introduites d'autres régions du Sénégal comme buffle (*Syncerus caffer brachyceros*), defassa (*Kobus ellipsiprymnus defassa*), antilope cheval (*Hippotragus equinus koba*), et introduites d'Afrique du Sud, pour ex. élands du Cap (*Taurotragus oryx*), giraffe (*Giraffa camelopardalis*), et rhino blanc (*Ceratotherium simum*). La Réserve de Fathala est la deuxième réserve avec une population d'élands de Derby en semi-captivité avec deux troupeaux de reproduction et un troupeau des mâles dans les enclos d'à peu près 70 ha, 60 ha et 1000 ha.

La gestion de l'élevage de l'éland de Derby occidental en semi-captivité

Programme de conservation et d'élevage en captivité

La situation critique de l'éland de Derby occidental à l'état sauvage renforce davantage la prise de conscience du besoin urgent d'une action de conservation. En 2000, la première population en semi-captivité de l'éland de Derby occidental, unique au monde de cette sous-espèce, a donc été établie au Sénégal avec un objectif clair - établir une population viable vivant en semi-captivité (Nežerková *et al.* 2004). De ce fait, un programme de conservation unique a été lancé et a fonctionné jusqu'à présent grâce à une étroite coopération coordonnée des partenaires concernés.

Jusqu'à présent, les animaux ont été capturés afin de gérer leur élevage dans deux réserves naturelles, la Réserve de Bandia et de Fathala au Sénégal. En juin 2012, l'éland de Derby de l'Ouest en semi-captivité formait une population de 83 individus vivants. La population était divisée en 5 troupeau de reproduction: trois dans la Réserve de Bandia (Bandia 1: 5 mâles, 14 femelles, Bandia 2: 4 mâles, 9 femelles, Bandia 3: 3 mâles, 8 femelles) et une dans la réserve de Fathala (Fathala 1: 2 mâle, 5 femelles, Fathala 3: 1 mâle, 2 femelles), et deux troupeaux de jeunes mâles (Fathala 2: 15 mâles, Bandia 4: 17 mâles). Parmi ceux-ci il y avait 57 adultes (30 mâles, 27 femelles), 14 sub-adultes (11 mâles, 3 femelles) et 12 jeunes (6 mâles, 6 femelles). Les quatre mâles géniteurs ont reproduit en 2012.

Transfert des animaux

Le transfert des animaux représente toujours une opération critique avec un risque élevé pour les animaux lors de l'immobilisation ainsi que pendant le transport par camion

spécial. Les premiers transferts d'animaux dans la Réserve de Bandia et de Fathala ont été effectués en mars 2006. Lors nous avons transferé avec succès plus de 50 individus. Les details sur les tranfers dont décrit dans la troisième édition du registre.

Pour l'instant, les derniers transferts ont été organisés en février 2012. Nous avons constitué le deuxième troupeau de mâles (17 mâles) dans la Réserve de Bandia (Bandia 4).

Toutes les immobilisations et transports ont été bien organisés, notamment grâce à une très bonne coopération avec le personnel de la réserve de Bandia, grâce au travail professionnel de docteur vétérinaire et grâce à l'aimable consentement des autorités des parcs nationaux. L'équipe a réussi à transferer tous les animaux, sauf un seul, pendant cinq jours.

Analyse démographique

Les données généalogiques de l'éland de Derby occidental ont été traitées par le logiciel SPARKS (ISIS 1992) et corroborées en utilisant le logiciel de la gestion de population 2000 (PM 2000) (Lacy et Ballou 2002; Pollak *et al.* 2002). L'arbre généalogique a été présenté dans Pedigraph (Garbe et Da 2008). Les individus vivant en juin 2012 et leurs ancêtres y ont été inclus, par contre, les individus qui sont morts sans produire de descendants ont été exclus de l'analyse des pertes alléliques. Le «fondateur» signifie «fondateur génétique" – individus nés sauvages placés en haut de l'arbre généalogique et présumés être sans parenté. En ce qui concerne l'exclusion des mâles sub-adultes des troupeaux reproducteurs, le mâle dominant a été supposé être le père de tous les descendants dans le principal troupeau de reproduction (Bandia 1) jusqu'à 2009. En 2010, nous avonc laissé plus mâles dans ce troupeau afin de remplacer le vieu mâles. Tous viennent de la même ligne génétique (c-à-d de la même femelle reproductrice). Les veaux de ce troupeaux sont alors considéré 'engendrés à multiple'.

Un total de 100 descendants de l'éland de Derby occidental sont nés entre 2000 et 2012 dans le troupeau avec 6 fondateurs dans une zone clôturée spéciale, initialement dans la Réserve de Bandia (Tableau 4). De ce fait, l'éland de Derby forme une population de 83 individus vivants (Fig. 12) élevés en semi-captivité et gérés progressivement en 7 troupeaux dans 2 Réserves naturelles au Sénégal: Bandia et Fathala.

Tab. 4. Paramètres démographiques de l'éland de Derby occidental en 2012.

Variable	Mâles	Femelles
Fondateurs	1	5
Nombre d'individus présents *N*	47	36
Nombre d'adultes dans la population	30	27
Total naissances	59	41
Total morts	13	10
Taux de croissance démographique (λ)[a]	6.7	6.06
Durée d'une génération	1.31	1.17

[a] $\lambda > 1$ indique l'accroissement de la population

La reproduction de l'éland de Derby occidental dans la Réserve de Bandia a commencé en 2002 avec la naissance de 2 femelles nouveau-nées. L'accouplement se produisait le plus souvent de manière synchrone, si l'on part du constat que la majorité des petits sont nés en décembre (54 %). Ensuite, 20 % et 16 % des naissances ont été enregistrées respectivement en novembre et janvier (Fig. 13). La structure par âge (Fig. 15) traduit un nombre croissant de jeunes animaux ainsi que le ratio du sèxe (il y a toujours plus de mâles que des femelles).

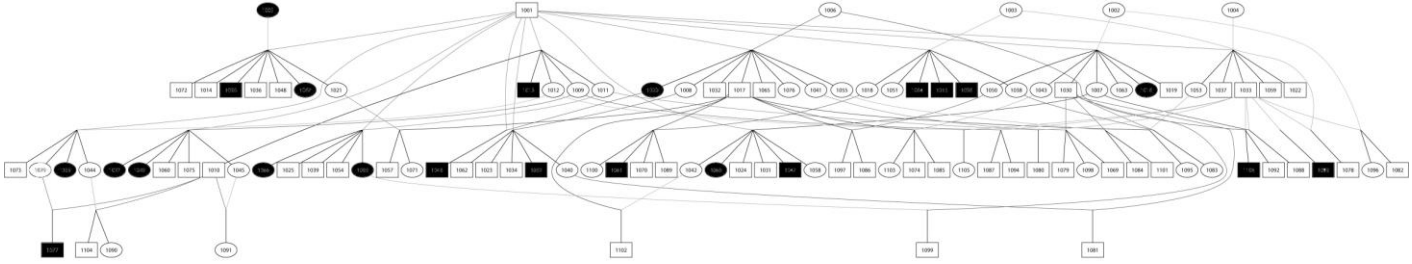

Fig. 12. Arbre généalogique de la population d'élands de Derby occidentaux élevés en semi-captivité (juin 2000-juin 2012). Explication des symboles: carrés - mâles; cercles - femelles, symboles vides - animaux vivants; symboles noirs - animaux morts.

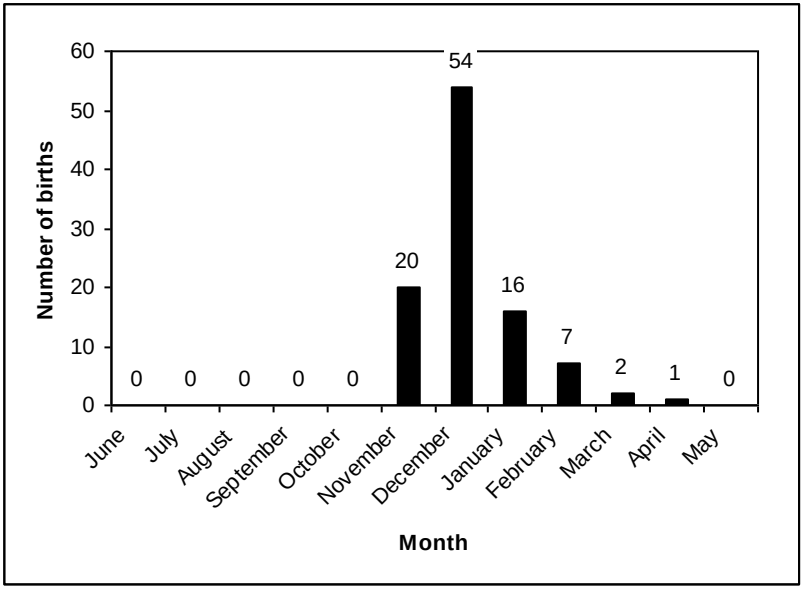

Fig. 13. Distribution des naissances de l'éland de Derby occidental dans la Réserve de Bandia tout au long d'une année entre 2002 et 2012.

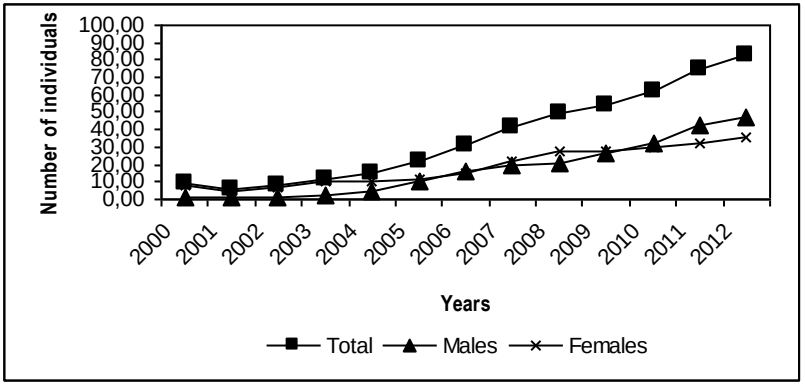

Fig. 14. Taux de croissance démographique de l'éland de Derby occidental en semi-captivité sur la base des données réelles recueillies entre 2000 et 2012.

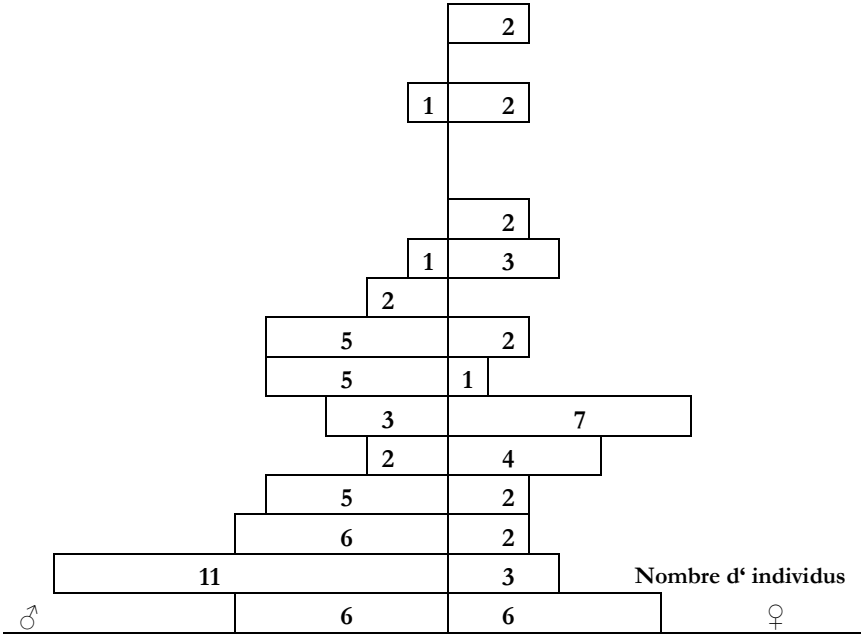

Fig. 15. Structure d'âge des mâles et femelles vivants des élands de Derby occidentaux tenus en semi-captivité en juin 2012. Les 5 premiers animaux représentent la proportion des individus nés sauvages (fondateurs).

Considérant que la période de gestation de la sous-espèce de l'éland de Derby (*Taurotragus derbianus gigas*) dure en moyenne 265 jours (entre 255 et 275 jours) (Bro-Jørgensen 1997), les animaux ont été supposés conçus à la fin de février et en mars. Ce fut, par la suite, confirmé par des observations accidentelles. Le plus jeune âge au moment de la conception était de 16,2 mois, mais en moyenne, c'était autour de 36 mois (Erreur standard (ES) : ±9) ou 37 (ES : ± 8,7), si l'on exclut un cas extrême. Les femelles adultes-fondatrices ont mis bas pour la première fois à l'âge de 35,07 mois (ES : ± 0,9) en moyenne. Aujourd'hui, l'âge de

la première parturition est passé à 45 mois (ES: ± 9), probablement en raison du retard de reproduction des femelles après leur transfert vers un nouveau troupeau. La plus jeune femelle qui a mis bas n'avait que 25 mois. Actuellement, avec cinq troupeaux de reproduction établis il paraît essentiel de ne plus bouger les femelles d'un troupeaux à l'autre et au lieu de cela de changer tout simplement les mâles.

Les femelles ont 1 petit par an et la probabilité de reproduction est de 77% chaque année. Ce taux de reproductionest considérablement plus bas qu'en 2008 avec le taux de reproduction de 88%. Dans la Réserve de Bandia, la femelle la plus âgée à avoir mis bas avait 15 ans et le mâle qui l'a fécondée avait 13 ans, mais il n'y avait pas d'animaux plus âgés à ce moment-là. Deux femelles de 15 ans sont en bonne condition, par contre le mâle de 13 ans semble assez vielli.

Le taux annuel de mortalité des veaux était de 6,17% étant toujours au niveau similair en comparaison avec les dernières 5 saisons de reproduction. La mortalité globale des faux a atteint 8% (8 veaux sur 100 nés en total). La mortalité était plus élevé pour les mâles nés, représentant 10.17% des veaux – mâles et 2.44% des veaux – femelles (7 mâles et 1 femelle sont morts pendant 10 saisons de reproduction). La période où la mortalité des veaux se passait a été pendant toute la période de mise bas depuis Novembre jusqu'au Mars, à l'age de quelques jours ou semaines.

Le taux de mortalité angel d'animaux sauf nouveaux nés à partir de 2001 quand la population s'est stabilisée a été 3.08 (ES: ±3.36) et la mortalité globale a atteint 17,44% (soit au total 9 femelles et 6 mâles de 86 individus). La mortalité totale, à l'exclusion des veaux, a augmenté depuis 2008 de 8,57%, toujours à cause de l'age augementant de tous les animaux. En comparaison avec la mortalité des veaux, la mortalité des femelles a dominé. Leur mort a été souvant liée à la reproduction (prolapsus vaginal, avortement ou mise bas). La période

principale où la mortalité des adultes se passait a été pendant la haute période sèche et la période des pluies (60% se passaient de Juin à l'Août).

Les analyses du tableau de mortalité de l'éland de Derby occidental indiquent que le taux annuel de croissance démographique (de la population) était de 1,31 (31,3% avec une ES de ± 12,6) (Fig. 14, Tableau 4).

Analyse génétique

La taille actuelle de la population d'élands de Derby occidentaux en semi-captivité atteint 83 individus. D'autre part, la taille totale effective de la population était de 11,89 (en tenant compte de la correction de la proportion inégale des sexes). Le ratio *Ne/N* était de 0,1678. La taille effective de population a augmenté grâce à la gestion de reproduction depuis 2008 de 3,71 à 5,26.

Les animaux dans leur généalogie avaient 84% de génotypes connus dans la population. Ce taux de connaissance a dimunué depuis 2009 quand il a atteint 92%. Cette baisse est causé par la reproduction des animaux sans origine connu et non par la mésconnaissance des relations actuels parmi les animaux.

La population n'a gardé que 79% de la diversité génétique (DG) de ses fondateurs. Ce taux de la diversité génétique augmentait depuis 2008 parce que les nouveaux animaux ont participé à la reproduction sous la gestion. En outre, le niveau moyen global de la consanguinité dans la population était de 0,1243, c'est-à-dire continuellement diminuant à partir de 0,1364 en 2008.

Les génomes des fondateurs équivalents (FGE = 2,41) et les génomes des fondateurs survivants (FGS = 5,86) étaient faibles en raison de la surreprésentation d'un seul mâle fondateur

(Fig. 16, Tableau 5). D'autre part, une DG potentielle significative de 92% de la population subsiste. En outre, la quantité retenue de DG originale des fondateurs est encore présente dans la population et on peut les évaluer par une gestion adéquate par la parenté moyenne (PM) qui a été en moyenne de 0,2079 (Tableau 6).

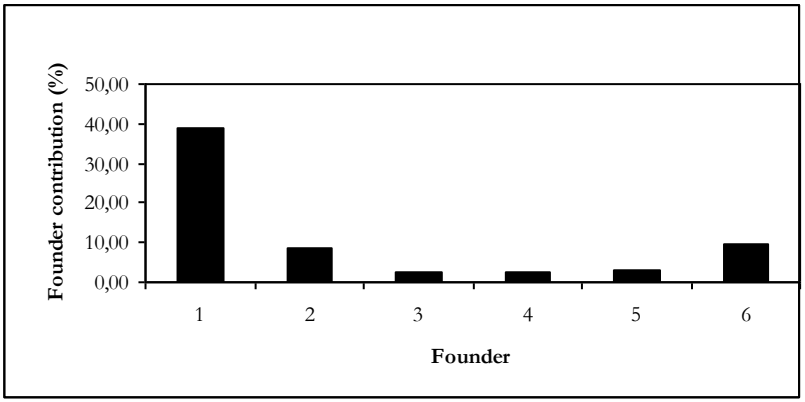

Fig. 16. La contribution des fondateurs pour la population de l'éland de Derby occidental en semi-captivité au Sénégal. Les chiffres sur l'axe x indiquent des individus particuliers: 1 - mâle, 2 à 6 - femelles (voir tableau 5).

Tab. 5. Contribution des fondateurs (CF) pour la gestion génétique de l'arbre généalogique de l'éland de Derby occidental en semi-captivité au Sénégal.

Fondateur	Sexe	Age	CF actuelle	Allèles survivants du fondateur	Descendants	Objectif de CF	Contribution
1001	M	14	0,59	1,00	72	0,17	Au-dessus
1002	F	16	0,13	1,00	27	0,17	Au-dessous
1003	F	16	0,05	0,94	9	0,16	Au-dessous
1004	F	14	0,04	0,96	6	0,16	Au-dessous
1005	F	D	0,05	0,97	7	0,17	Au-dessous
1006	F	14	0,14	0,99	30	0,17	Au-dessous

Tab. 6. Distribution de la parenté moyenne (PM) dans la population de l'éland de Derby occidental en semi-captivité au Sénégal en juin 2011.

Distribution de la parenté moyenne		Nombre d'individus	% de la population
< 0,075	< 0,1	10	11,9
0,1618 - 0,1997	0,1 - 0,2	37	44,0
0,2026 - 0,2951	0,2 - 0,3	17	20,2
> 0,3028	> 0,3	20	23,8

Le plan de gestion de l'éland de Derby occidental

Le plan de la Stratégie de Conservation de l'Espèce

L'objectif principal du Programme de Conservation de l'éland de Derby pour l'année suivante est de développer la stratégie globale de conservation pour l'éland de Derby en danger critique sur un atelier qui aura lieu au Sénégal en Janvier 2013. La stratégie suivra étroitement le procédé de Stratégie de Conservation d'Espèces (Species Conservation Strategy process, SCS) établie par l'IUCN. Il contiendra:

1. La revue complète du statut de l'espèce (son arrière-plan, habitat, menaces, analyse des intéressés, etc.)
2. L'analyse des menaces, y compris les menaces indirectes et ses raisons ;
3. La vision de long-terme pour la conservation de l'éland de Derby et un but de terme intermédiaire afin d'atteindre la vision ;
4. Les objectives comme un ensemble de mésures nécessaires afin d'atteindre le but.

L'atelier concernant la conservation assemblera tous les intéressés intégrés dans la conservation de l'éland de Derby occidental et de son habitat. L'atelier pretend à assurer la survie de l'éland de Derby occidental avec la consideration des intéressés, y compris les communautés locales et leurs droits. L'atelier aidera à orienter la conscience publique envers tout l'écosystème du parc national de Niokolo Koba en assemblant les autorités sénégalaises (DPN, Ministère de l'Environement et de la Protection de la Nature MEPNBRLA), les opérateurs privés des réserves de faune (SPEFS), l'UNESCO, les gérants du programme de conservation (Derbianus CSAW), les experts indépedants (IUCN) et les chercheurs scientifiques de l'Université Cheikh Anta Diop de Dakar (UCAD), de l'Université tchèque des Sciences de la Vie

de Prague et les autres personnes concernées dans le développement de la stratégie. Nous aspirons à formulation d'un projet de gestion pour la population en liberté ainsi qu'en semi-captivité afin d'assurer la surfe de long terme de l'éland de Derby occidental dans son milieu naturel.
La stratégie de conservation et le rapport de l'atelier seront préparés en français et en anglais et sera disponibles à tous dans une version imprimée et une électronique. La stratégie aura également l'intension d'aborder les possibilités de fundraising pour son implementation.

Références

Voir p. 27.

Compte rendu sur les activités, résultats et des moyens financiers de l'équipe tchèquedans le programme de conservation de l'éland de Derby pendant la période 2000 – 2012

Le résultat le plus important dans la coopération entre le Sénégal et la République Tchèque était la création et l'implementation du plan de gestion de la reproduction d'élands de Derby occidentaux en semi captivité dans la Réserve de Bandia et Réserve de Fathala. La réalisation des activités spécifiques concernant la reproduction des animaux a été effectué, d'un part important, par les membres de l'équipe tchèque qui sont venus pratiquement deux fois par an chaque annéee depuis 2000 à 2012. Pendant ces séjours, les coopérants

tchèques expérimentés ont identifié et inventorié tous les animaux individuels dans le programme de conservation de l'éland de Derby. Nous avons créé des fiches d'identification pour tous les individus avec l'information complète sur les relations de parenté (nom d'individu, père, mère, sexe, date de naissance), complété par les photos du côté droit et gauche de l'animal. L'investissement à la gestion de reproduction du côté tchèque était à peu près 100000 EUR.

Depuis 2006, cinq tranferts des élands de Derby à nouveaux troupeaux ont été réalisé par organisation de l'équipe tchèque avec l'assistance particulière de Dr. Vét. Jiří Váhala, expert et spécialiste à la faune sauvage. Ensemble avec SPEFS nous avons réussi à immobiliser plus que 50 élands de Derby soigneusement séléctionnés et à les transférer dans de nouveaux enclos. Pendat cettes opérations exigeantes on a prélevé également des échantillons de sang pour les analyses génétiques et parasitologiques. Les coûts d'opérations de tranferts du côté tchèque étaient à peu près 60000 EUR. A demande de SPEFS, l'équipe tchèque a assisté également aux tranports très compliqués et exigeants des giraffes et d'autres ongulés de la Réserve de Bandia à la Réserve de Fathala afin de soutenir le développement de la Réserve de Fathala.

Nouveaux enclos dans les réserves de Bandia et Fathala ont été généralement financé par SPEFS. Le côté tchèque a financé la construction de deux enclos dans la Réserve de Fathala à coût d' à peu près 20000 EUR.

Le succès de la gestion de reproduction est visible dans les paramètres démographiques et génétiques de population qui n'a eu que 6 animaux fondateurs (1 mâle, 5 femelles), capturé en 2000. Ils se sont reproduit jusqu'au nombre actuel d'animaux de 80 individus en 2012, répartis en 5 troupeaux de reproduction et 2 troupeaux de mâles dans les deux réserves. La mortalité ne dépasse pas 20 % et le taux de croissance de population est maintenu au niveau de 30 %. La diversité génétaique est toujours augementant dû à la gestion soucieuse des rélations de parenté.

Étant gerés avec soin, la valeur de la population des élands de Derby en semi captivité est énorme.

D'autres activités de l'équipe tchèque ont été orienté vers le développement de la Réserve de Fathala et à la vulgarisation de la conservation d'éland de Derby occidental et de la conservation de la nature en général dans les parc nationaux de Delta du Saloum et de Niokolo Koba, ainsi que dans tout le Sénéga. En 2008, nous avons construit, avec assistance personelle de Markéta Antonínová, une exposition éducative permanente, c'est à dire un bâtiment ouvert avec 20 panneaux éducatifs avec l'information concernant la conservation de la nature (50000 EUR) ce qui sert à l'éducation de la population locale ainsi que de tous les visiteurs de la réserve, et par conséquant contribue à la promotion de la conservation dans toute la région.

En 2009, nous avons construit, avec assistance personelle de Jan Svitálek, un bâtiment multifonctionel « Ecocentre Fathala ». Le bâtiment comprend, entre outres, une salle de présentation, un laboratoire, et quatre chambres. Pendant le temps, le bâtiment était continuellement équipé, grâce aux moyens de la SPEFS et de l'équipe tchèque, par meuble et microscope. L'investissement à l'Ecocentre Fathala de côté tchèque a atteint à peu près 120000 EUR. L'Ecocentre servira comme le centre de base pour les activités de la recherche scientifique et de l'éducation, ainsi que pour la gestion de la réserve.

En 2009, nous avons également construit un enclos de quarantine dans la Réserve de Fathala (boma) au coût de 12000 EUR, et nous avons fait un acte de donation de véhicule 4x4 Toyota Hilux pour la réserve (28000 EUR).

L'équipe tchèque a réalisé beaucoup d'activités scientifiques dans les deux réserves de Bandia et Fathala dans les domains d'écologie végétale, écologie animale, comportement social et alimentaire, reproduction, génétique, morphologie et parasitologie des élands de Derby. Toutes ces études ont le

potentiel de contriuer et/ou d'améliorer la gestion des animaux et leur publication augemente le prestige international de deux réserves pour les experts internationaux de domain de science et conservation.

L'un de plus importants résultats est le Registre africain et international qui était publié chaque année depuis 2008 en coopération avec l'Université tchèque des Sciences de la Vie à Prague et Zoo de Prague, y compris le tableau complet des rélations de parenté avec information détaillée sur les élands de Derby en semi-captivité, les analyses démographiques et génétiques et les récommendations pour la gestion prochaine de la population. Publications scientifiques et vulgarisateures contribuent à la conservation de l'unique animal d'éland de Derby occidental également par le nombre augementant des visiteurs internationaux au Sénégal.

Pendant les années passées nous avons préparé beaucoupd de matériel pour l'éducation pour la population humaine locale, en particulier pour les écoles élementaires, en nous avons effectué les atéliers et excursions pour plus de 100 instituteurs, écoguardes, guides touristiques et autorités locales. Egalement, nous avons fait venir à la réserve plus que 500 écoliers avec un programme éducatif spécifique. Le coût de ces activités a été plus que 80000 EUR. Nous considérons ces activités d'augementation du niveau de connaissances environnementales du peuple et de la sécurité dans les réserves et parcs nationaux énormément importantes et essentielles pour la survie future de l'éland de Derby occidental.

SECTION B:

Registre africain

de l´éland de Derby occidental

Voir p. 71.

SECTION C:

Les cartes d'identification de l'éland de Derby occidental (individus vivants)

Les cartes sont disponibles sur le CD.

L'exemple:

Nom scientifique: *Taurotragus derbianus derbianus*	**Numéro d'identification:** 1057
Nom: Mango T.	**Nom français:** éland de Derby
Date de naissance: 4.12.2008	**Type de naissance:** en captivité
Sexe: mâle	**Localité de naissance:** Bandia 2, SN
Père: Toubab	**Etat hybride:** non hybride
Mère: Minna	**Localité actuelle:** Bandia 2, Sénégal
Nombre des raies: côté gauche/ côté droite	12/15
D'autres caractéristiques:	

African studbook. Western Derby Eland, *Taurotragus derbianus derbianus* (Gray, 1847)

Editors: Karolína Koláčková, Tamara Haberová, Pavla Vymyslická, Magdalena Žáčková, Pavla Hejcmanová, Pavel Brandl

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