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IN THIS ISSUE

ASG NEWS
- The *Gnusletter* struggling to become self-supporting 1
- Antelope Survey Part I now being printed 2
- ASG meeting in Bulawayo 2
- Highlights of the Harare wildlife symposium 3
- The revised *Red List of African Mammals* 3
- Ungulate symposium at Texas A&M 4

ANTELOPE NEWS 4
- Giant sable in Zaïre 4
- Roosevelt sable surviving in northeastern Tanzania 4
- *Captive Breeding* : 4
- ISIS list of antelopes 4
- Studbook for *Gazella cuvieri* 4
- Derby eland 5
- Bovid taxonomy, population genetics, and conservation: a new electrophoresis lab opens in Nairobi 5

REGIONAL RUNDOWN 7
- Nigeria: Arthur Green 7
- Ghana: antelope checklist received 7
- Mali: a major wildlife utilization project 7
- Algeria: an Algerian proposes to study Cuvier's gazelle 8
- Sudan: Saudi-Arabian royal hunting ground 8
- South Africa: oribi conservation project in Natal 9
- Angola: UNITA overruns giant sable national park 10

GNUSLETTER TO STAND ON OWN FOUR FEET

Beginning with this issue, the ASG *Gnusletter* will be entirely produced in and mailed from Peterborough. Furthermore, IUCN expects the *Gnusletter* to be self-supporting from now on. A tall order, that, considering that the circulation has grown to 180, of which 94 are complimentary: 54 ASG members and 40 copies for IUCN in-house circulation. That leaves only 76 (supposedly)paid subscriptions which, at the rate of $5.00 per year, adds up to only $380. Postage alone for this issuewill come to about $120, out of a total estimated cost of $185. Rather than raise the subscription rate, I plan to seek institutional support. Meanwhile, true to the notice in the last *Gnusletter*, only those non-ASG members who have paid the 1988 subscription fee will continue to receive it. As of this writing (before reproducing and posting this issue), the ASG account contains $77.

ASG NEWS

ANTELOPE SURVEY PART 1 NOW BEING PRINTED

ASG MEMBERS TO RECEIVE COMPLIMENTARY AND DISCOUNT COPIES

Parturition of Part 1 of the Antelope Survey is imminent. A thousand copies are being printed, and every ASG member will receive one complimentary copy, Simon Stuart writes (in lit. to Rod East, 7 Dec. 87). Those listed as authors of the different chapters will each receive five (several key contributors will get 10) free copies, and in addition can purchase extra copies at half-price: US $10. However, to take advantage of this bargain, authors will have to let Simon know how many half-price copies they want by the end of January.

ASG MEETING IN BULAWAYO

The Bulawayo meeting of the Antelope Specialist Group of 4–5 October closely followed the program and itinerary printed in the September, 1987 Gnusletter. Six members and six guests took part, namely members J. L. Anderson, R. East, R. D. Estes, J. C. Hillman, M. Stanley Price, V. J. Wilson, and guests M. J. Woodford, Chairman, Veterinary Specialist Group, A. C. Heringa, Department of Nature Conservation, Wageningen Agricultural University, and Urbain Belemsobgo, Chief of the Wildlife Conservation Service, both from Burkina Faso; E. Feron (France), A. Lartiges, Office National de la Chasse, Paris; and Simon Stuart, SSC Programme Officer.

All the arrangements were made by Vivian Wilson who, with the support of his wife, Paddy, and sons, Kevin and Barry, and the office staff of the Chipangali Wildlife Trust, looked after us extremely well and kept everything running on schedule. Most of the first (unseasonably cold: as low as 8°C) day was spent in spectacular Matopos National Park, followed by a late-afternoon tour of Chipangali. Begun in 1973 as a Wildlife Orphanage, the Wilsons have turned Chipangali into a major zoological park, with extensive collections of mammals, birds, and reptiles. It is also one of the best-managed zoos and breeding centers for rare animals that I have ever seen. Among the rare mammals that regularly breed there are the wild dog (*Lycaon pictus)*, brown hyena (*Hyaena brunnea)*, and caracal (*Felis caracal*). The Duiker Research and Breeding Center, established here in connection with Wilson's Pan-African Duiker Survey, is already breeding blue and has for years bred gray duikers (*Cephalophus monticola* and *Sylvicapra grimmia*); they will be followed by rare species captured during field surveys in the equatorial rain forest.

The climax of the day's events was a *braii fleiss* (barbecue, the first of a series attended during our 12 days in Zimbabwe). at Chipangali. There we met Trustees and other friends of the Chipangali Wildlife Trust, which underwrote all the expenses of feeding and transporting ASG members and guests.

The ASG meeting began on Monday at 09.00 and lasted until mid-afternoon. Discussion centered around the subjects listed in the agenda published in the last Gnusletter. Simon Stuart took the minutes on his laptop computer.

1. Rod East presented a progress report on the Antelope Survey.

2. What tangible results can be expected from the survey, and what can the ASG do to promote implementation of the Regional Action Plans?

3. The need to integrate ASG action plans and recommendations with those of other specialist groups.

4. What should the ASG's main functions be once the antelope survey is published?

5. How can the Antelope Survey and Regional Action Plans be improved, updated, expanded, and aligned with the goals of national conservation agencies?

In addition, the role and responsibility of the *Gnusletter* was discussed. The participants agreed that it is readable and useful. However, several members emphasized the need for discretion when quoting letters from ASG members or anyone else, to ensure that confidential and sensitive information would not be disclosed.* When the problem of making the Gnusletter self-supporting was raised, Simon Stuart asked and received approval of the idea of advertising subscriptions in the AAZPA Newsletter.

**N.B. Editorial discretion* is *exercised when the editor perceives that information is sensitive, in deciding what to publish and what to leave out, and whether or not the author's identity should be revealed. (For instance, see the story under Sudan.in this issue) . And informants may rest assured that iany communication which is marked confidential will not be disclosed. Ed.*

RESOLUTIONS

The participants in the meeting passed the following resolutions.

1. The Antelope Specialist Group should identify specific projects in antelope conservation for activation by the group.*

2. Apart from promoting existing, specific projects, the ASG should take the lead in promoting studies aimed at elucidating the ecological niche and conservation needs of threatened, as yet poorly known species such as Cuvier's, slender-horned, Speke's,and dama gazelles (*Gazella cuvieri, G. leptoceros, G.3 spekei, and G. dama*), the dibatag (*Ammodorcas clarkei*), the beira (*Dorcatragus megalotis*), Abbott's, Jentink's, Ader's, and zebra duikers (*Cephalophus spadix, C. jentinki, C. adersi, and C. zebra*), and the hirola (*Damaliscus hunteri*).

3. There should be three regional subgroups of the ASG in sub-Saharan Africa, following the geographical regions identified in the Action Plans, which will promote implementation of the Regional Action Plans for antelope conservation by:

(a) bringing priorities for antelope conservation within each region to the attention of national conservation authorities;

(b) recommending practical solutions and providing technical help where requested;

(c) continuing to monitor the status of antelopes within the region and to provide updated information to the ASG data bank;

(d) monitoring the success of attempts to conserve and utilize antelopes;

(e) publicizing and obtaining funds for specific ASG projects.

4. There should be a wildlife management advisory group which integrates the action plans of all IUCN/SSC specialist groups for the whole of sub-Saharan Af-

rica and promotes their implementation. This group should have a small core of full-time, salaried staff, for which funds will have to be raised. This is the most cost-effective approach and avoids duplication of effort by individual specialist groups.

5. The ASG should actively seek more members who are nationals of countries where antelopes occur and who are actively involved in the management of natural resources.

6. Now that compilation of the sub-Saharan Africa section of the Antelope Survey is well advanced, efforts should be made to complete a network of North African and Asian ASG members and informants.

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*(1) The following projects were identified for eastern and southern Africa:

•Vivian Wilson's Pan-African duiker survey;

•Conservation of the hirola (*Damaliscus hunteri*) in Kenya/Somalia (including possible introduction of a breeding herd to Galana Ranch);

•Conservation — including possible captive breeding — of the giant sable (*Hippotragus niger variani*); (see story under Angola);

•Support for conservation of Swayne's hartebeest (*Alcelaphus buselaphus swaynei*) in the Senkelle Sanctuary, Ethiopia.

•Improvement of the conservation status of the Shimba Hills National Reserve, in order to safeguard the last sable antelopes in Kenya. (See story below about Roosevelt sable in Tanzania.)

HIGHLIGHTS OF THE WILDLIFE SYMPOSIUM

The week-long International Symposium and Conference on Wildlife Management in Sub-Saharan Africa, held at the huge, luxurious Harare Hilton, attracted some 178 participants from most of the African states, government and non-government organizations of Europe and the U. S. that have an interest in wildlife utilization. The following UN, intergovernmental, and international non-governmental organizations were represented: FAO, UNESCO, UNEP, CITES, OAU, EEC, SADCC, World Bank, AWF, IUCN, CIC, and WWF-US.

Organized by Bertrand des Clers, president of the International Foundation for Conservation of Game (IGF), on the initiative of the Tropical Game Commission of the International Council for Game and Wildlife Conservation, the symposium theme was the economic benefits and the contribution to rural development that can be realized through the sustainable exploitation of African wildlife. The justification for the symposium was that the socio-economic values of wildlife are generally overlooked in government economic-development plans. Thus, the economic value of the wildlife that was consumed as food in Ivory Coast in 1985 has been estimated at >US$100 million.

Zimbabwe was clearly the best available venue for this symposium, for next to South Africa (representatives of which were unfortunately not invited), the economic potential of wildlife has been developed far more here than in any other African state. Apart from the fact that 12.5% of Zimbabwe's land is reserved for wildlife, a 1986 law giving landowners ownership of the wildlife on their property has created such a demand for game species among (mostly European) farmers and ranchers that Zimbabwe's wildlife may soon regain much of its former range. Mixed livestock and wildlife ranching is considered particularly profitable, but the greatest source of foreign exchange is big-game hunting by foreign sportsmen. Thus, American hunters who come on a three-week safari spend an estimated $19,000 for the privilege, plus another $5000 for mounting and shipment home of their trophies. While the restocking boom lasts, the demand for popular trophy species is so great that landowners can make a lot of money by breeding popular game species for sale at auction. Bids for a sable bull, for example, may go as high as $6000.

The relevance of such wildlife utilization programs to the many African countries where very little land is in private ownership is debatable. However, the Zimbabwe Government's awareness of the economic value of wildlife, which is estimated to have potential earnings of $200 million a year, may serve to stimulate the interest of other African governments in the value of their own wildlife resources. And Zimbabwe is loaded with experts in every area of wildlife research and management (especially the Department of National Parks and Wildlife Management [DNPWM]) who could help other countries develop these resources.

With some 67 participants, Zimbabwe dominated the Symposium. Particularly interesting presentations were made by W. Nduku & D. Cumming, Deputy Director DNPWM: "The ecological advantages of African wildlife utilization;" G. Pangeti & A. Graham (DNPWM): "International influences on national wildlife policies and terms of trade;" R. Martin, DNPWM: "Evolving new institutions ('Campfire') and other pilot programs;" R. Martin and D. Cumming: "Adaptive wildlife management modelling—including presentation on Zimbabwe examples;" K. Muir-Leresche, University of Zimbabwe Agriculture Faculty: "Marketing wildlife products and services;" C. Style, Buffalo Range Ranch: "The economics of game-ranching in multiple land-use;" M.Townsend, Chairman of the Wildlife Producers Association: "Zimbabwe's experience in managing wildlife for the benefit of the national economy and conservation;" J. Hutton, National Papers: spoke about crocodile and ostrich farming.

Speaker after speaker, from all countries and organizations, kept harping on one theme: to have a place in the future of African countries, wildlife will have to compete economically with other forms of land use. The challenge for conservationists is to develop national conservation strategies that will make wildlife utilization an economically attractive form of land use.

THE RED LIST OF AFRICAN MAMMALS

A grant from the David Shepherd Foundation has enabled the Conservation Monitoring Centre to revise the *IUCN Red List of Threatened Animals*—hopefully in time for the IUCN General Assembly–next month. ASG member Jane Williamson has been instrumental in preparing a separate publication on threatened antelopes of Africa and Asia. At her request, Rod East has contributed a 4900-word overview chapter, entitled Conservation of

antelopes in sub-Saharan Africa.

Judging from a draft chapter on the slender-horned gazelle (*Gazella leptoceros)* , the Conservation Monitoring Centre's publication will contain a lot of detailed, valuable information on the 29 most threatened antelopes. In a covering note, Rod writes, "...the data sheets which Jane Williamson has sent to me..include much more historical information than the Antelope Survey...I think you will agree that Jane W. is doing a thorough job. In my opinion, the CMC book...is largely complementary to the Antelope Survey, since they are focusing on threatened antelopes (mainly in N. Africa and the Middle East), whereas we are initially concentrating on sub-Saharan Africa. When we come to the final part of the Antelope Survey (N. Africa and Asia), Jane's data sheets will provide a good basis for us to update."

UNGULATE SYMPOSIUM

An International Ungulate Behavior and Management Conference will be held at Texas A&M University, College Station, Texas on May 23-26. A follow-up of the 1971 Calgary Symposium, it is intended as a tribute to Fritz Walther, who taught at A&M until his retirement several years ago. The organizer is Dr. Elizabeth Cary Mungall, a former student of Walther's who has studied the blackbuck. Those interested in presenting papers should contact Dr. Mungall at 342 Double Tree Drive, Lewisville, TX 75067, as soon as possible.

In addition to contributing a paper, I have been asked to hold a roundtable on the work of the ASG. I hope to see some of you there.

ANTELOPE NEWS

ARE THERE PERCHANCE GIANT SABLE IN ZAïRE?

While preparing a data sheet on the giant sable for the CITES Identification Manual, Peter Dollinger (Office vétérinaire fédéral;. 3097 Liebefeld-Bern) came across Schouteden's (1945. De Zoogdieren van Belgisch Congo en van Ruanda-Urundi. *Ann Mus. Congo Belge* 3(2):169-332) suggestion that *Hippotragus niger variani* might occur in Zaïre's Shaba Province, a notion that keeps resurfacing despite the absence of tangible evidence. The possibility became more intriguing when he discovered that fullmounts at the Basle Natural History Museum, purportedly of *H. n. niger*, which looked very different from the *H. n. niger* displayed in the Basle Zoo and other European zoos, had been collected in 1932 in Western Shaba Province by a Swiss citizen living in Mutshatsa.

Dollinger sent me a color slide of the mounted specimens, asking if I believe they could be *variani*.. Although the male's horns look as big as a giant sable's, the facial markings are not shown clearly enough for me to confirm his opinion that they correspond to various illustrations of giant sable. What is clear is that they are not *H. n. niger*, which occurs south of the Zambesi. As these animals were shot some 700 km east of the giant sable's known range, most likely they are *H. n. kirkii*.

ROOSEVELT SABLE

In the same letter (12 Nov 1987), Dollinger reports the existence of a herd of *H. n. roosevelti* near Tanga in the coastal hinterland of Tanzania. "Recently an old friend of mine came to see me in my office. He is General Manager of a Swiss firm which owns a large farm in northeast Tanzania. He told me that they have a fairly good population of sable antelopes on their farm. Perhaps the situation of *Hippotragus niger roosevelti* is not as bad as assumed in *Gnusletter* of May, 1987.

When more information is received from the farm manager, the details of this very encouraging news will be carried in the *Gnusletter*.

CAPTIVE BREEDING

ISIS LIST OF ANTELOPES

Nate Flesness, Director of the International Species Inventory System, has sent summary data of the 51 species of antelopes that were present in the collections of the 240 facilities in 18 countries that participate in the ISIS system, as of 30 June 1987. The ISIS data base now contains information about 75,000 individual specimens (mainly mammals and birds), including sex, birth date, parentage/provenance, move history, death date and circumstances. Coverage is most complete for North America. Some 30 European institutions now participate, Australasian and Asian collections are joining in some numbers, but no mention is made of any African institutions. Chipangali (see under ASG Zimbabwe meeting, above) is certainly a major captive-breeding facility, and the 40 different species of antelopes in the Pretoria National Zoological Park were mentioned in the May, 1986 *Gnusletter*.

STUDBOOK FOR *GAZELLA CUVIERI*

Juan Escos, who has been working with the Cuvier's or Edmi gazelle since 1980 at Spain's Estacíon Experimental de Zonas Aridas, has submitted a proposal to the SSC Steering Committee to manage a new international studbook for this endangered species. His proposal has been "strongly recommended" by P. J. S. Olney, International Studbook Coordinator and Editor of *International Zoo Yearbook*. Excerpts from the accompanying "Introduction for the compilation of the international studbook of the Cuvier's gazelle" are reprinted below.

"The Estacíon...has kept a small population of this species since 1975. The first animals were collected by Dr. Valverde in the Ex-Spanish Sahara (a captive population in the Oued Draa Valley near to Tan-Tan). For several reasons...since then the wild population has been increasingly endangered. Almería has been the first place where this species has been bred successfully in captivity."

"Cuvier's gazelle has been considered to be a subspecies of the mountain gazelle...However other authors gave it specific status and did not consider it closely related to *G. gazella* .

"The general distribution of this species includes the mountain regions of Morocco, Algeria, and Tunisia...Although it seems that some animals survive in these three countries, the population has decreased considerably.

"In Morocco Mr. [Chris] Loggers is studying the distribution and status of this species [see May 1986 *Gnusletter*]. Cuvier's gazelle is fully protected and...concentrated in the more inaccessible mountainous areas. However their

numbers are decreasing due to hunting; trapping, and habitat degradation mainly due to overgrazing...A lot of areas have been given over to fast-growing pine plantations. Data since 1970 delineate five separate zones of concentration: the Rif Mountains south and west of Nador, the Central Plateau near Ouimes, the eastern High Atlas Mountains near Rich, the western High Atlas Mountains south of Essaouira (Mogador) to the Anti Atlas junction, and the Anti Atlas Mts. from Biogra to Goulmine to Foum Zguid. All sightings were of isolated, small groups usually less than 15 animals.

"Gene flow probably exists only between the western end of the High Atlas Mts. and the High Atlas Mts. groups; the other populations are quite disjunct ...

"The highest concentrations are in the Anti Atlas Mts., away from large population centers, beginning near Biougra and curving around the Presaharan slope to Foum Zguid...

"IUCN (Hirsch 1982) suggested reintroducing Cuvier's along with dorcas and dama gazelles, into the proposed Park Massa south of Agadir.

"In Algeria the distribution of this species is being studied by Mr. [de] Smet. [Also see research proposal below under Algeria.]. The species is legally protected and the Secretariat Etat des Eaux et Forêts et de la Mise en Valeur des Terres is making strenuous efforts to protect the species both inside and outside the State Forests. The following areas in particular are protected: Djenel Nadouz Forest, Djebel Oum et Touadjine in Saida and the Hunting Reserve of Mergueb. In 1982 Smet counted a minimum population of 250-300 animals, and there were probably about 500 in total (Smet in Red Data Book, in press)..."

"In 1980, the population in Tunisia was said to be increasing in the Djebel Chambi region and in 1973 the population was estimated at 100 (Red Data Book, in press).

"The species everywhere has retreated in the face of increased human persecution and destruction of woodland for pasturage and agriculture...; thus being largely reduced to small scattered groups in inaccessible areas.

"The Estacíon Experimental de Zonas Aridas in Almería...is following a careful project for the breeding and maintenance of this species as part of a long-term conservation plan."

DERBY ELAND

The Cincinatti Zoo is breeding Derby eland with considerable success. Steve Romo, Curator of Mammals, sent photos of a new calf and part of the zoo's herd. The bull's horns are so big and thick they remind me of a markhor goat. Steve writes (24 Oct. 87), "The male calf was born on September 23. The two other females we have should have calves by the end of the year. The female that gave birth bred again 24 days after giving birth. Hopefully we can manage the giant eland well and keep them a lot longer than zoos have done in the past. Pretoria is in need of new blood [see May, 1986 *Gnusletter*] and I hope some new blood can be provided from here or L. A. in the future." (According to the ISIS abstract of 30 Jun 87, the Cincinatti adults were all wild-born.)

BOVID TAXONOMY

An allozyme electrophoresis laboratory has been established in a new wing of the National Museums of Kenya, which is "dedicated to population genetic problems that are relevant to wildlife conservation." It may also become a major center for systematic studies of the African Bovidae.

While visiting Nairobi on the way home from the Zimbabwe meetings, I met Drs. Pieter Kat and Nick Georgiadis, saw the lab, and the first results of two projects on bovid genetics they are pursuing. Pieter, who received his training at Johns Hopkins University, set up the lab in Nairobi. Nick is a Kenyan who is also doing field work on Sam McNaughton's grasslands ecology project at the Serengeti Wildlife Research Centre, on a Postdoctoral Research Associateship from the University of Rochester. He is well-placed to collect tissue and blood samples (which he immediately freezes in liquid nitrogen) for analysis in Nairobi. Below are excerpts from two proposals prepared by Georgiadis: "Evolution and genetic variation in African bovids;" and by Georgiadis and Kat: "Conserving genetic variation in fragmented wildlife populations, using information gathered from intact populations."

"" While temperate zone Artiodactyls are dominated by species in the family Cervidae, not one cervid species exists among over 70 bovid species in sub-Saharan Africa. Despite these figures, we know of only two reports of genetic variation in African bovids (impala; Osterhoff et al 1972, and springbok; Robinson et al 1978), both from southern Africa, both from single populations, and only a few serum proteins were studied. Therefore, comparisons of genetic patterns cannot be made between temperate and tropical populations of large herbivores. Further, African bovid systematics has never been formally based on genetic data, and virtually nothing is known of levels of genetic variation in their populations, or of the degree of population genetic subdivision. The lack of analytical facilities, and restrictions against importing to developed countries samples that may be contaminated by exotic diseases, have caused this conspicuous gap. I propose to study the phylogeny of 7 African bovid species, and population structure of wildebeest in East Africa, using allozyme electrophoresis.

Conservation Genetics

"Population genetic studies of African bovids have important applications for conservation. As wildlife populations throughout the world are fragmented and eroded by man, the maintenance of genetic diversity in those populations will become the most important long-term problem in large mammal conservation (Schonewald-Cox *et al* 1983; Soule 1986). This is because, in populations of less than about 500 individuals (Reed *et al* 1986), genetic diversity is lost through genetic drift faster than it is replenished by mutation and immigration. The result is a diminished capacity to respond to evolutionary challenges by adaptation, and increased inbreeding. While recent advances in population genetics have heightened our awareness of the severity of the problem, (e.g. O'Brien *et al* 1987), current understanding of genetic processes in wildlife populations is inadequate to answer the problems that face conservationists:

•What are the minimum levels of genetic variation that should be main-

tained in managed populations?

•To what extent are local populations adapted to local conditions and what are the genetic effects of translocating individuals or populations from one place to another?

•To what extent are genetic distances between populations related to morphological, ecological and behavioral differences between those populations?

•What are the characteristics that predispose some species to require more intensive genetic management than others?

•Does loss of adapted traits in captivity jeopardize successful reintroduction to the wild?

"A much better understanding of large mammal population genetic processes under natural conditions will be required to answer these questions.

"The establishment of analytical facilities at the National Museum of Kenya has provided the opportunity for rapid and fundamental advances in conservation genetics, mainly because of the local abundance of large mammal communities under near-natural conditions. Bovids in particular are ideal subjects for research because they are abundant, diverse, relatively easy to sample, exhibit a range of population sizes and management histories and their ecology and behavior are well known.

Objectives

1. To refine allozyme electrophoresis techniques on African bovids by studying the phylogeny of the 7 dominant bovid species that are sympatric in the Serengeti ecosystem (wildebeest, topi, hartebeest, Thomson's gazelle, Grant's gazelle, buffalo, and impala—goats will be used as an outgroup).

To test the null hypotheses that:

2. genetic distances between the Serengeti wildebeest populations (western race) and the Kitengela, Amboseli and Tarangire populations (eastern race) are zero;

3. genetic distances between the migratory wildebeest population, and 'resident' populations in the Mara and Serengeti, are zero;

4. morphological distances between populations of wildebeest are correlated with genetic distances between the same populations.

Methods

Sample collection. Samples for the pilot study (objective1) have been...completed...

Sample sizes. Four individuals per species will be used for the pilot phylogenetic study (objective 1). A minimum of 50/population will be used for population comparisons (objectives 2, 3).

Electrophoresis...Starch gels will be used, and at least 35 presumptive loci will be screened for variability using well-known techniques (Richardson *et al* 1986).

Morphological traits. Twelve external measurements will be taken systematically on each animal sampled, and its age, sex and condition recorded.

Analyses. Phylogeny will be derived using Hennigian analysis. The proportion of loci that are polymorphic, and heterozygosity per locus will be calculated for each population. Several estimators of genetic distance (e. g. Nei's, Roger's, Morton's) between populations will be derived using dedicated software. Chi^{2}tests will be used to test allele frequency differences between populations, and for departures from Hardy Weinburg equilibria. Morphological data will be analyzed using multivariate techniques.

Interdisciplinary Collaboration and Future Development

"Bovid disease research is an obvious partner of genetic studies, because both require blood and tissue samples. Indeed, collaboration with, for example, vets at the Kabete Veterinary Laboratories will greatly increase opportunities, and justification, for sample collection. Sampling in Kenya must be approved by, and coordinated through, the Kenya Wildlife Department and National Parks. Reciprocal sharing of samples collected in Tanzania with vets from the Tanzanian Livestock Research Organization, who are studying rinderpest in a variety of species, is already planned.

"Plans are also underway to upgrade facilities in Nairobi for DNA analyses, in collaboration with Drs. Alan Templeton and John Patton of Washington University in St. Louis, USA, among others. Such facilities will provide Kenyans with the opportunity to learn and use modern genetic techniques. It is no exaggeration to state that the National Museum's lab could become an internationally prominent centre for applied population genetic studies.

Feasibility

"To demonstrate that the work is feasible, I have collected samples from 7 species...in the family Bovidae, and giraffe...Results (table 1) were generally consistent with current classifications..., which are based wholly on morphological traits, but with two exceptions. First, domestic goats (...subfamily Caprinae)

Table 2. Percent of isozyme electromorphs that each pair of species hold in common.

Species	Goat	Wilde-beest	Harte-beest	Topi	Impala	Grant's gazelle	Thomson's gazelle
Wildebeest	42.9						
Hartebeest	57.1	71.4					
Topi	64.3	64.3	85.7				
Impala	0.0	7.1	0.0	0.0			
Grant's gazelle	57.1	50.0	57.1	64.3	14.3		
Thomson's gazelle	71.4	42.9	50.0	57.1	28.6	71.4	
Giraffe	30.8	30.8	30.8	30.8	30.8	23.1	23.1

were unexpectedly similar to Thomson's gazelle. Second, [the] impala was radically distant from all other species, even more so than was [the] giraffe (table 1). The evolutionary status of [the] impala is controversial. It has been classified in three subfamilies—Alcelaphinae..., Reduncinae..., andwith theAntilopinae...My resul ts suggest that the impala has been evolutionarily separated from other species in the Bovidae for much longer than was previously suspected, and fully deserves exclusive subfamily status."

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REGIONAL RUNDOWN

NIGERIA

Arthur Green, of the Nigerian Conservation Foundation, has written an account of a trip he made to several forest reserves (*in lit.* to Rod East, 1.Aug 87):

"In February, 1987 I did a brief reconnaissance of the Okwangwo, Boshi, and Boshi Extension Forest Reserves of Cross River State (southeast), Nigeria. This is lowland rainforest along the Cameroun border, just south of the Obudu Plateau, a tongue of the Bamenda Highlands of Cameroun extending northwest into Nigeria. I have just finished the report I have been working on. The forest reserves cover a total of about 580 km² between 6°06' N and 6°28'N and between 9°05'E and 9°21'E. Most of the area is rain forest, breaking up into savanna woodland in parts of the northeast along the escarpment of the Obudu Plateau.

"There are some village enclaves in the forest reserves, and there is a network of footpaths across the area. Hunting is rife, with shotgun cartridges seen every couple hundred metres along the paths, carbide from lamps every half kilometre, and snares everywhere. In four days there I only saw bat s, squirrels, and a family of brush-tailed porcupines in a cave. At a saltlick I saw tracks of duikers, elephant and buffalo. I only heard monkeys—didn't see any.

Antelopes: Some savanna species penetrate in the north where there is savanna/forest edge ecotone, and I think into some of the enclaves. Bushbuck..., *Redunca redunca* reedbuck (localized to Batum River in north of area), Defassa waterbuck (*Kobus ellipsiprymnus unctuosus* , said to penetrate the high forest), western kob (*Kobus kob*), localized to the Matche River area in north of area), roan antelope...(from Kundeve area in north). All these animals must be very uncommon now, as their habitat is small and overrun by man. Also oribi...from Batum River area and klipspringer...from the escarpment of the Obudu Plateau in Boshi Extension Reserve.

[The] blue duiker (*Cephalophus monticola*) is widespread. It is said to occur in 85% of bushmeat examined. The yellow-backed duiker...is widespread and occurs in 35% of bushmeat examined. The forestry reports only list red-flanked duiker (*C. rufilatus*), saying it is widespread. I would not expect it in the high forest. No mention is given of two other species which should be here: bay duiker (*C. dorsalis*) and Oligby's duiker (*C. ogilbyi*). These two are supposed to occur in high forest east of the Cross River. So I expect the three species have been confused.

The black duiker (*C. niger)* is supposed to occur west of the lower Niger River, as far as I know. But the forestry reports say that it is widespread in this area and that 40% of bushmeat inspected contains some of this species. I don't see what other species this one could be confused with. What do you say?"

"...*C. niger* should not occur there," Rod replied (6 Sept 87) "(There appear to have been no specimens of the black duiker obtained from east of the Niger River). The forest reports...are therefore in conflict with all the other information we have on this species. As you suggest, it is difficult to see how *C. niger* could be confused with any other species, so it would be very interesting to obtain some duiker specimens from hunters in this area, if possible."

GHANA

B. Y. Ofori-Frimpong, Chief Game and Wildlife Officer of the Department of Game and Wildlife, has sent in a checklist and status report of the antelopes that occur in 11 different parks and reserves.

MALI

Steven de Bie, Chris Geerling, and Albert Heringa have published a remarkably detailed plan for utilizing wildlife of the West African savanna. Entitled *Ressources Sahelo–Soudaniennes, Utilisation du Gibier,* it is part B–1 of the final report of a project entitled, *Recherche pour l'utilisation rationnelle du Gibier au Sahel..*

Financed by the Government of Mali and the General Directorate for International Cooperation of the Netherlands Ministry of Foreign Affairs, the field work was carried out from 1977 to 1981 by the Department of Nature Conservation of Wageningen Agricultural University, in cooperation with Mali's Service des Eaux et Forêts. After two years of data analysis, the first report (B–2) was published in 1984.

The 109 page booklet consists of three parts. Section I describes the actual state of wildlife utilization in the West African savanna. Section II presents a master plan for the introduction of wildlife utilization as a sustainable type of land use, and Section III presents a case study: the introduction of wildlife utilization in a certain area

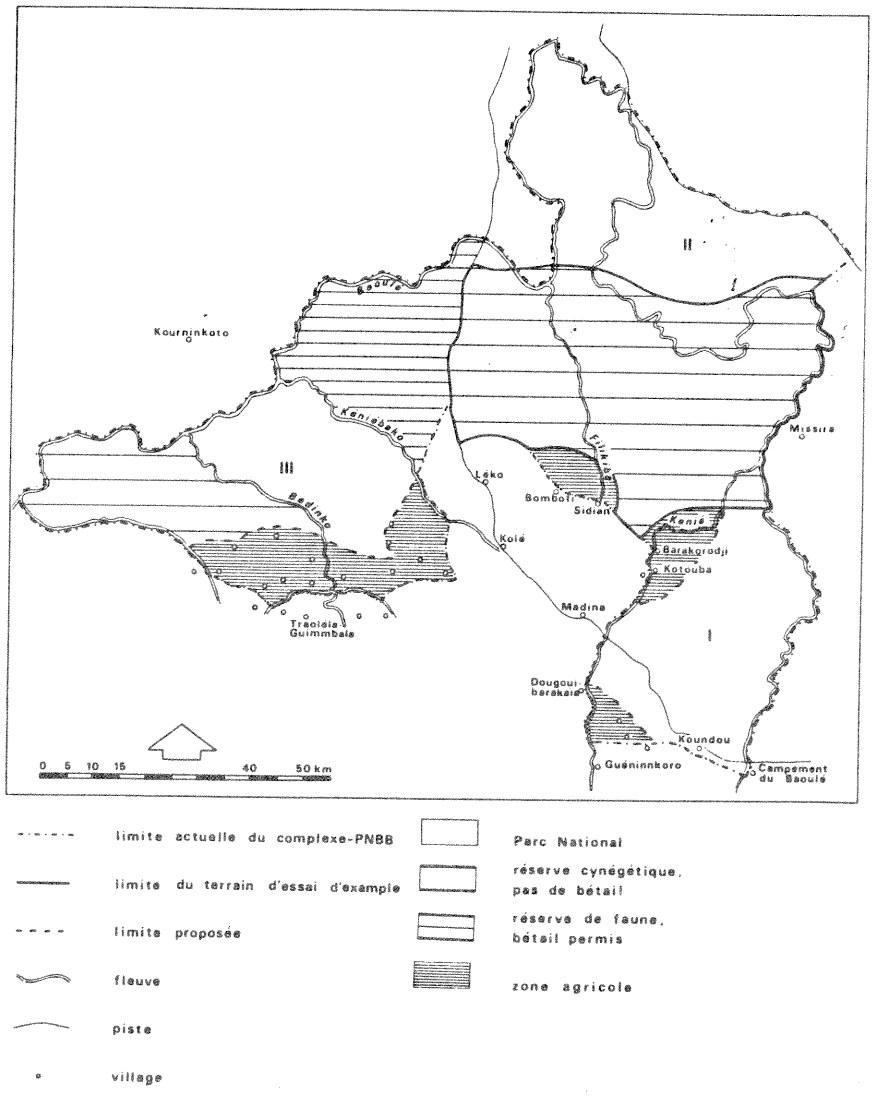


Figure 1. Location of the game utilization project in SW Mali

of the Biosphere Reserve "Boucle du Baoulé, following the guidelines of the master plan (fig. 1)

Although the project was originally intended for the Sahel, by far the most suitable area in Mali to begin a wildlife utilization project was the Boucle du Baoulé National Park and adjacent reserves, which lie within the Soudanian Zone, where the mean annual rainfall of 650–1100 mm has decreased since 1970 to 500–600 mm in the north and 800–900 mm in the south. The vegetation is typical of the Northern Soudanian Savanna, dominated in the north by monotonous trees and bushes of the Combretaceae and perennial grasses, grading into *Isoberlinia doka* savanna going south. An area of 2400 km^2 was selected for the utilization project.

On the basis of intensive analyses of the soils, vegetation, climate, the animals, the human population and their hunting methods, the researchers calculated levels of sustainable utilization of each species, to be recalculated on a yearly basis, both in normal and in drought years, at current and potential population levels, as shown in table 2.

The authors point out that their data and conclusions are applicable to the Soudano-Zambesian savannas of all Africa from an ecological standpoint, and to the savannas of West Africa from the socio-economic and cultural viewpoint. To obtain copies, write Wageningen Agricultural University, Dept. of Nature Conservation, Box 8080/6700 ER, Wageningen, The Netherlands.

ALGERIA

Sellami Mahdi, Algerian research fellow and agricultural engineer, has applied to the Fauna and Flora Preservation Society for a grant to continue his studies of *Gazella cuvieri*. (see Sept 1987 *Gnusletter*). His project title is "Spatial distribution and food habits of the Cuvier's gazelle in the Mergueb Nature Reserve."

Quoting from the project justification: "There is no information at all on the ecology and ethology of the Atlas gazelle in the wild. The Spanish scientists (Escos *et al*) studied its behavior in captivity in Almeria, but for the rest every information comes from fleeing gazelles which are not representative at all.

"The ±50 gazelles of the Mergueb Nature Reserve (12,500 ha) are rather well protected in its central zone, but around still heavily poached, and as the vegetation is recovering, normally the population should go up. For a better management of the species we should find out:

1. what it eats and its plant preferences
2. if it drinks and how often
3. if predation is a problem (jackal, hyena present, wild cat...)
4. what is the normal number of offspring (are there twins?), when parturition takes place, and at what age females breed (are females conceiving at 6 months?
5. the spatial rules of males
6. normal densities
7. how far they go for food/water
8. how their habits differ in summer (dry and warm) or in winter (cold and wet)."

This is an example of the kind of project the Antelope Specialist Group has resolved to promote (see resolutions 2 and 4 above under ASG Meeting.)

SUDAN

Wim Bergmans, Secretary of the Stichting IUCN-Leden contact of Amsterdam, sent me a copy of a letter he wrote Gren Lucas last August 13 about an annual game slaughter in Sudan. In the following quotes, the identity of his informant has been disguised to protect him from possible reprisals.

"Last week we had a visit from a (man] who is following a course at one of our universities...He came to tell us a very

sad story...In the mountain region east of the Nubian Desert and bordering on the Red Sea...he has witnessed for a number of years, from November to March, a cruel and meaningless hunt of all Artiodactyla species indigenous in the region, carried out by members of the royal family of Saudi-Arabia, accompanied by a virtual army of hundreds of people equipped with the most advanced technological gear, hawks to spot the game and aircraft—helicopters—to transport the hunters to places otherwise inaccessible (and thus likely hiding places for game).

"This little army kills hundreds of animals each year. The rare wild mountain goat, *Capra ibex*, is wanted most. The second popular species would be what is called mountain sheep—I have no idea what that may be (*Ammotragus* does, to my knowledge, not occur there). In the foothills and adjoining desert, three species of *Gazella* are involved in the hunt, but these are easy to hunt and 'less important.' On the side, the hunters shoot any other animal they see. The meat is salted and flown to Arabia, 'for a change' in the royal diets. Saudi-Arabia's own poor game situation and the fact that Northeast Sudan is so much like their own country are the reasons for the Saudis to hunt there, but if this indiscriminate hunting continues, it is thought there will be no larger animals left in the region in ten years time.

"I would appreciate it if IUCN could undertake a more detailed analysis of the problem and approach the responsible authorities in Saudi-Arabia and Sudan. Because of their royal ties, the hunting parties will enjoy, officially and unofficially, considerable power and protection. Therefore it goes without saying that all actions should be carried out with the utmost subtlety.

"...Mr. [ ] cannot act in this affair and cannot, for personal reasons, allow himself to be involved in it...He emphasized that he is not a zoologist and that his observations therefore may not be as accurate or complete as desired, but on the other hand, he feels that what is happening is so obviously against the principles of conservation and sustainable use of natural resources that there may be no need for such details—in any case, there is not much time left."

NATAL, SOUTH AFRICA

P. J. Thomson of the Natal Parks Board is proposing to carry out a project entitled"The conservation of oribi in Natal."

The oribi is a species that has declined throughout the southern African subregion, at least partly because of elimination of its grassland habitat and grazing competition with domestic livestock. It is classified as "vulnerable" in Reay Smithers' (1986. *South African Red Data Book—Mammals*. CSIR, Pretoria).

"In Natal," (quoting from the proposal), "oribi occur in a few conserved areas and on a number of privately owned farms. The total number is unlikely to exceed 3000 and these are scattered in some 150 discrete populations of which 20–30% number 10 or less individuals...With a few exceptions populations on private land are under threat and declining, and in at least one large game reserve numbers have decreased over the past decade."

"Oribi population densities in Natal vary from 1 per 10 ha to 1 per 30 ha or more ha and some populations appear to be thriving while others are declining. The field work part of this project should consist of a comparative investigation of selected populations aimed at explaining these differences and recommending management action to improve the status of the species wherever possible."

In addition to evaluating the performance of oribi under different ecological conditions and management regimes, Thomson aims "to review all available knowledge on oribi with particular reference to habitat requirements and limiting factors,...to provide management guidelines, particularly for National Parks Board reserves, and to identify the need for further research."

ANGOLA

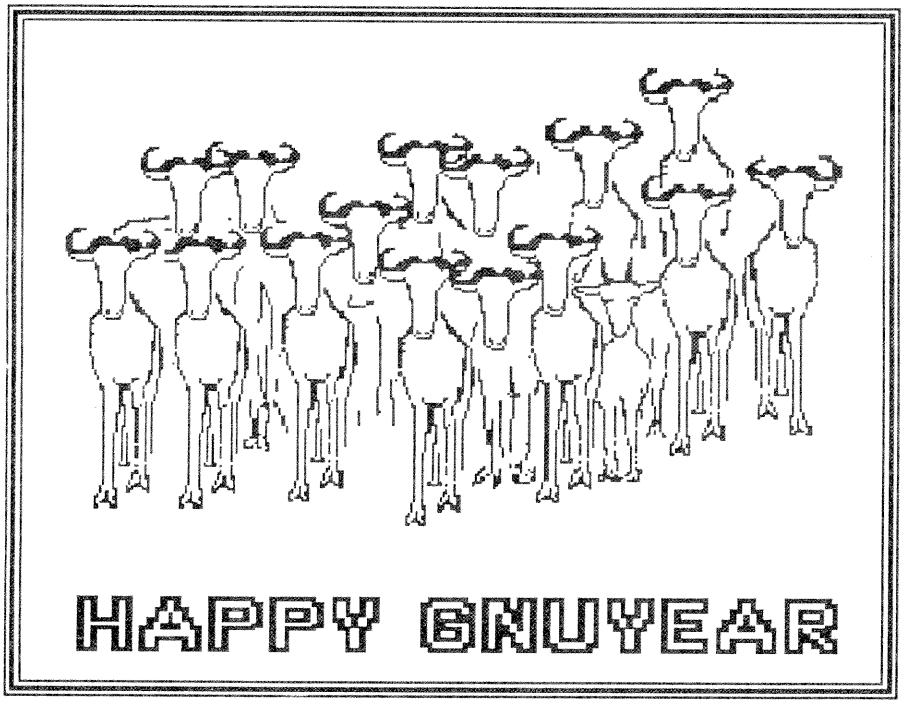
During my 1982 mission to Angola (summarized in September, 1982 *Gnusletter*), I found that the giant sable was holding its own in Kangandala National Park, thanks to the vigorous efforts

Table 3. Maximum sustained yield (= 1/2 maximum birth rate x 1/2 the carrying capacity) of wild herbivores per year in the Boulé management area.

	Normal Year			**Drought Year**		
	Carrying Capacity	*Size of Harvest	Live Weight	Carrying Capacity	Size of Harvest	Live Weight
Phacochoerus	10,600	636	38,160 kg	2,700	162	9,720 kg
Tragelaphus scriptus	2,000	120	4,800	1,300	78	3,120
Cephalophus rufilatus	850	51	765	600	36	540
Sylvicapra grimmia	4,600	276	4,140	3,500	210	3,150
Redunca redunca	6,700	402	16,080	1,100	66	2,640
Kobus ellipsipyrmnus	1,700	102	18,360	260	0	–
Hippotragus equinus	3,000	180	36,000	700	0	–
Ourebia ourebi	12,000	720	10,800	2,400	144	2,160
	Total	2,487	29.1×10^3		696	21.3×10^3

of the Warden, João Amaro (an Angolan of Portuguese extraction) and very severe penalties for shooting giant sable, the official State animal. After spending five days in the park and counting some 45 animals, I concluded that the population of this small (630 km²) sanctuary probably still supported as many sable as I had estimated in 1970—ca. 100.

From the officials of the Angolan Directorate of Nature Conservation who attended the Wildlife Symposium in Harare, I learned that the situation in Kangandala has changed drastically within the last year or so. 1) João Amaro is dead (from a swimming accident). 2) UNITA forces have occupied the Park, burned down the warden's house, and are allegedly shooting sable.

In view of these grave developments, it seems clear that the giant sable must now be considered endangered more than ever before. If UNITA forces have advanced as far north as Kangandala, presumably the Luando Reserve, the main giant sable sanctuary, further south, is also under their control. Why the Angolans in UNITA should be more inclined to squander their wildlife heritage than are Government forces (if indeed they are) is puzzling; and the apparent lack of control over the activities of UNITA forces by Jonas Savimbi and his South African allies is particularly disturbing.

Ever since the Angolan civil war began in the 1970's, concern over the fate of the giant sable has often prompted conservationists to propose captive breeding as a hedge against the extinction of this greatly admired antelope. Maybe this is an idea whose time has come.