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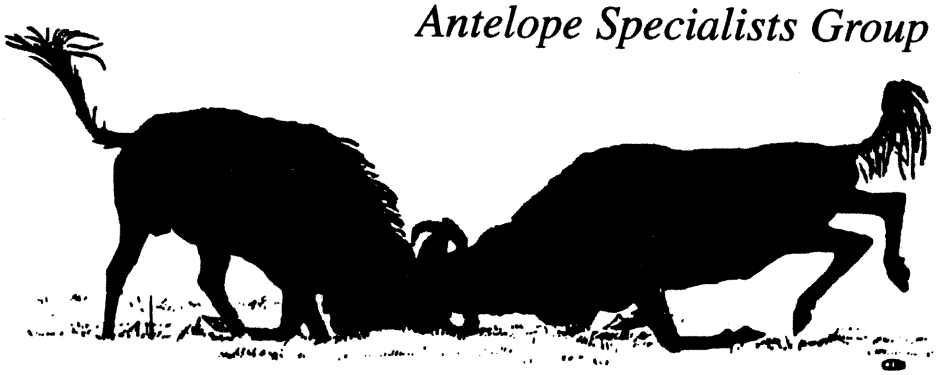
Antelope Specialists Group



GNUSLETTER

ASG News

ASG Report to SSC

Rod East prepared the following Specialist Group Report for the forthcoming SSC's 50th anniversary special issue of *Species*.

The Antelope Specialist Group was created in 1978 and currently has more than 100 members based in over 40 countries. It is essentially a scientific advisory group and operates mainly by correspondence. The term "antelope" has no precise taxonomic status, but the ASG covers 102 species, mainly bovids, of which three-quarters occur in sub-Saharan Africa. This includes all of the antelopes of Africa, the Middle East and Asia, plus various miscellaneous species such as giraffe, okapi, water chevrotain, African buffalo and saola.

A key objective of the group is to monitor the conservation status of all of these species and the success of attempts to conserve and sustainably utilise antelopes. The results of extensive surveys of the distribution, abundance and conservation status of antelopes in all countries of sub-Saharan Africa were published in parts one to three of *Antelopes: Global Survey & Regional Action Plans* in 1988–90. Part four, covering North Africa, the Middle East and Asia, is scheduled for publication in 1999. These publications provide a baseline for future comparisons and identify priorities for antelope conservation. New information is published regularly in the group's *Gnusletter* (two issues per year) and occasionally in the *Antelope Survey Update* series. The ASG's information on the conservation status of all antelope species in sub-Saharan Africa was reported in December 1998 in the *African Antelope Database 1998*.

Areas identified as key priorities for the conservation of representative antelope communities show a high degree of overlap with the conservation requirements of other wildlife. Many of these priorities are being addressed by major biodiversity conservation projects funded through bilateral development assistance and agencies such as the GEF. These projects are not usually aimed specifically at antelopes, but they often recognise antelopes as a key component of biodiversity and are usually of general benefit to wildlife conservation. This type of international assistance is at an historical high, e.g., currently more than US$100 million per annum in sub-Saharan Africa, but the long-term success of wildlife conservation in many antelope range states will also depend on greater political commitment to conservation at the national and local level.

Since 1995, the ASG has been directly involved in fund-raising efforts for small-

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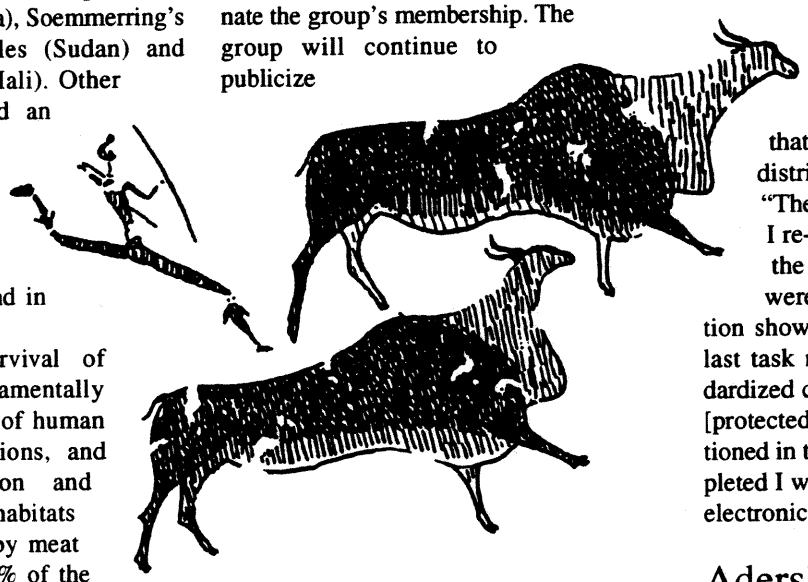
ASG News *continued*

er, antelope-specific projects. These aim to answer research questions of significance to antelope conservation and to assist the conservation of threatened taxa which are poorly represented in or absent from the existing network of protected areas, e.g., hirola (Kenya), Soemmerring's and red-fronted gazelles (Sudan) and western giant eland (Mali). Other projects have included an anti-poaching feasibility study in the eastern Central African Republic and research on the seasonal movements of the giant eland in northern Cameroon.

Threats to the survival of antelopes arise fundamentally from the rapid growth of human and livestock populations, and consequent degradation and destruction of natural habitats and excessive offtake by meat hunters. At present, 71% of the antelope species of North Africa, the Middle East and Asia, and 23% of the antelope species of sub-Saharan Africa are classed as threatened (Red List status of Critically Endangered, Endangered or Vulnerable) or are already extinct. Many antelope species still exist in large numbers, e.g., half of the species of sub-Saharan Africa currently number at least in the hundreds of thousands and 85% in the tens of thousands or more, but most species are in decline. *The African Antelope Database 1998* projected that the proportion of antelope species in sub-Saharan Africa which is threatened (or extinct) will double from its present level of about one-quarter to about half by 2025 if current trends continue. Reversal of this trend will depend on greater realisation of the economic potential of wildlife in antelope range states, e.g., through game-viewing tourism and sustainable trophy hunting.

Key goals for the ASG over the next 20 years will include continuation of the group's monitoring of the conservation status of antelopes and how this is influenced by various approaches to conservation ranging from strict protection to community participation and private-sector involvement. We also aim to increase the number of ASG members who are nationals of antelope range states with the aim that these people will eventually dominate the group's membership. The group will continue to publicize issues related to antelope conservation and research and attempt to raise further funds for specific high-priority antelope conservation projects within the constraints of the ASG's reliance on the voluntary efforts of its members. Attention is currently focused on antelopes such as giant sable, bongo, giant eland, Swayne's hartebeest, dibatag, beira and Aders' duiker.



African Antelope Database 1998

Demand for Rod East's magnum opus, which Simon Stuart called "one of the best outputs I have ever seen from the SSC" (e-mail of 1 March 99), has exceeded the supply of copies Rod produced and distributed early this year. Fortunately, IUCN is going to publish it. It is now in press and can soon be ordered from the IUCN Publication Services Unit, 219c Huntingdon Rd., Cambridge, CB3 0DL, UK (**info@books.iucn.org**). The price has yet to be announced.

Antelope Survey, Part 4

The Herculean labors of David Mallon[ASG] and Steve Kingswood[ASG] to gather, process and keep updating the information on the status of antelopes in North Africa, the Middle East and Asia are finally coming to a successful conclusion. In a 24 May 99 e-mail, David reports that only some final revisions of the distribution maps remain unfinished: "The distribution maps are complete. I re-did these as the first versions, in the same format, as parts one–three were small and much of the information showed up poorly or not at all. The last task now under way is getting standardized country maps showing all the PA [protected areas] and other locations mentioned in the text. As soon as they are completed I will send the whole thing off (plus electronic version) to Gland."

Aders' Duiker Meeting In Zanzibar

Proposals for more effective conservation of this endangered red duiker, which is ineffectively protected in the fragmented habitat it occupies on the island of Zanzibar, will be considered this September (date still unspecified) at an ASG-sponsored meeting on Chumbe Island. Difficulties in capturing and translocating duikers for captive-breeding and a controversial proposal to permit trophy-hunting are detailed in Antelope News.

The meeting will be hosted by Chumbe Island Coral Park Ltd., site of the captive-breeding facility. For further information, contact Eleanor Carter, Project Manager, e-mail **chumbe.island@raha.com**.

Just who will be representing the ASG is still undetermined. Any and all East African members who can spare the time are urged to attend. Unfortunately, my next Tanzania field session ends in mid-August.

Antelope News

Arabian Oryx

Report by Andrew Spalton[ASG], Office of the Adviser for Conservation of the Environment, Diwan of Royal Court, PO Box 246, Muscat 113, Sultanate of Oman. E-mail: **acedrc@gto.net.om**.

The alarming decline in free-ranging Arabian oryx of Oman was reported by Andrew Spalton in the last *Gnusletter* (17.2). The whole story has now been published in the April 1999 issue of *Oryx* (vol. 33. no. 2. pp. 168–175). The abstract is reprinted here as background to a brief report on the First Abu Dhabi International Arabian Oryx Conference held in Abu Dhabi in early March, at which Spalton presented much the same paper.

Arabian oryx reintroduction in Oman: successes and setbacks, by J.A. Spalton, M. W. Lawrence and S.A. Brend

Abstract

The return of the Arabian oryx *Oryx leucoryx* to Oman symbolized the success of a new approach to species conservation and established reintroduction as a conservation tool. Ten years after the species had been exterminated in the wild by poaching, the first 10 founder oryx (descendants of the "World Herd") were reintroduced to the desert in central Oman in January 1982. A second release followed in 1984 and the population grew slowly through a three-year drought that was broken by rain in June 1986. Further years of good rainfall and more founders meant that by April 1990 there were more than 100 oryx in the wild, independent of supplementary feed and water, and using a range of over 11,000 sq km.

At that time, a new monitoring programme was implemented that allowed the transition from individual to population-based monitoring and management. The population continued to grow, and by October 1995, numbered approximately 280 in the wild (of which 22 were surviving founders) and used over 16,000 sq km of the Arabian Oryx Sanctuary. However, in February 1996, poaching resumed and oryx were captured for sale as live animals outside the country.

Despite the poaching, the population continued to increase, and by October 1996, was estimated to be just over 400. However, poaching intensified and continued through late 1996 and 1997. By September 1998 it had reduced the wild population to an estimated 138 animals, of which just 28 were females. The wild population was no longer considered viable and action was taken to rescue some of the remaining animals from the wild to form a captive herd.

At the end of May, Andrew reports there were 100 oryx in the wild, 13 females and 87(!) males, and 44 in captivity for future release.

International Conference

At the international conference, the key issues of illegal trade and security of oryx populations in the wild were addressed. Key recommendations:

1. The conference recommends to establish a coordinating body with the purpose to facilitate the conservation of the Arabian oryx in the range states with the long-term objective to establish a viable population that will roam freely the Arabian Peninsula. In order to facilitate this process the conference recommends that a secretariat be established in one of the range states.

   The conference welcomes the invitation of Oman to host the constituting meeting of the coordinating body.
2. The conference expresses its concerns over the recent Arabian oryx poaching problems that have arisen in Oman. It encourages the Government of Oman to continue strengthening its efforts to address this problem. It also encourages the governments of the region, international institutions, non-governmental organizations (NGOs) and individuals to cooperate in eliminating illegal trade of oryx and its products. The conference further encourages all parties to support Oman in its efforts to rebuild their wild population of Arabian oryx to viable numbers.

Since the conference, Oman has increased considerably its anti-poaching effort and very effectively brought the poaching to a halt. Security forces have detained a number of suspected poachers. There has been no poaching of oryx since January, and we now have an opportunity to implement longer-term sustainable solutions.

We have also been given the green light to restructure the ranger force of the White Oryx Project in order to retire old and ineffective rangers and recruit new educated rangers from all tribes of the region. Previously, all rangers were from one tribe and although this did not cause the poaching (which was for financial gain), it certainly helped fuel it.

Oman has also agreed to host the first meeting of the coordinating body (referred to in 1 above). This is an important step towards a more regional focus on conservation of the species and will help to ensure that the issue of security/trade continues to have a high profile. Further, through the coordinating body, Oman will be able to accept the offers of range states to make oryx available for rebuilding the wild population.

Although there is much work to be done, there seems to be a new dawn for the Arabian oryx in Oman.

Vacancy for Field Manager, Arabian (White) Oryx Reintroduction Project, Sultanate of Oman

The position of Field Manager on the project will be available in June 1999 for an individual with diverse interests, patience and experience of living in remote conditions. The project is based at Jaaluni, about 500 km from the capital, Muscat. Jaaluni operates as a small, self-contained community with 40 Omani, 8 Asian and 2 European staff. The camp consists of air-conditioned portacabins for office, laboratory, messes and staff accommodation. There is a separate wooden bungalow for the Manager and a well-equipped camp garage/workshop. Communications with the Adviser in the Muscat office are by HF radio; telephone is not available.

Antelope News *continued*

Main requirements: Experience with staff and camp management in wildlife projects; experience of protected area management; experience of and willingness to live in remote desert conditions; biological degree an advantage. Duties include overall organization and administration of the Project and assisting the Project Biologist in his work to implement the programme of scientific research and monitoring of the oryx and other wildlife. Post is suitable only for a single or unaccompanied male. Valid driving license and computer literacy essential. Arabic a very great advantage. For further details, contact The Adviser for Conservation of the Environment, Diwan of Royal Court, PO Box 246, Muscat 113, Sultanate of Oman. (Fax No: + 968 740550 Email: **acedrc@gto.net.om.**)

Job Specification – Field Manager

The Field Manager is the senior representative at Jaaluni of the Adviser for Conservation of the Environment in the Diwan of Royal Court, and reports directly to him on all matters or to the Assistant Field Manager in his absence. He is responsible to the Adviser for the following:

- The daily conduct, organization and administration of the project as a whole.
- The implementation, with the Project Biologist, of the programme of scientific research and monitoring of the oryx as agreed by the Adviser for Conservation of the Environment.
- The welfare and discipline of all Omani and Expatriate Staff at Jaaluni Camp.
- The security of and accounting for project funds and equipment.
- The maintenance of the Jaaluni camp buildings, installations, generators and project vehicles.
- Preparation of the draft annual budget for the project.
- The annual performance reports on the staff of specified grades.
- The Jaaluni camp imprest and other accounts.
- Looking after authorized visitors to Jaaluni as directed by the Adviser. He will be expected to do what in reason can be done for casual visitors who may turn up unannounced.

In the furtherance of the above duties he will:

- Organize in collaboration with the Project Biologist the collection, collation and dissemination of scientific data as directed by ACE.
- Make monthly reports to the Adviser in conjunction with the Project Biologist.
- Record and monitor any activity detrimental to the wildlife and its environment. Draw to the attention of the Adviser all such activities and liaise with him should action be required.
- Organize staff training as required.
- Ensure that the checks, inspections, reports and records that are laid down in the Administrative Instructions are implemented.
- Liaise as necessary with the following local organisations based at Haima: the Wali, the Commanding Officer of the Wasta Region ROP, the Director of the Ministry of Regional Municipalities and Environment, the Director of the Ministry of Housing, the Director of the Ministry of Water Resources, the Government Veterinary Officer and the Senior Medical Officer of the Hospital. Keep in touch with local Sheikhs as required.
- Liaise with the Sultan's Armed Forces, oil and other commercial companies who may be authorised to operate in the Arabian Oryx Sanctuary and the staff of the Ministry of Regional Municipalities and Environment who are responsible for composing and carrying out the management and land use plans of the Arabian Oryx Sanctuary.
- When absent on duty or leave, he is to ensure that his deputy, the Project Biologist and Assistant to the Field Manager, is present and adequately briefed.

Sahelo-Saharan Antelopes

On the subject of endangered antelopes, the publication in March of the latest scimitar-horned oryx and addax studbooks provides a timely look at the conservation status of two of the most endangered antelopes which, however, unlike Aders' duiker, have substantial captive populations.

Scimitar-horned oryx-EW

Alan Rost[ASG], International Studbook Keeper/Species Coordinator, Jacksonville Zoological Gardens, 8605 Zoo Parkway, Jacksonville, FL 32218. Tel: (904) 757-4463, Fax: (904) 757-4315, E-mail: **arost@jaxzoo.org**.

Legal Status – While some conservation organizations estimate that there are 100–250 scimitar-horned oryx in the wild, most experts now feel they are extinct in the wild (EW). Scimitar-horned oryx are listed under CITES as an Appendix I species. They are not listed in the U.S. Fish & Wildlife Service Endangered Species List.

Description – The scimitar-horned oryx is named for its long curving horns, which may reach over 3 feet. Its coat is white; the neck and chest is chestnut brown and there is a brown stripe over the eyes. Scimitar-horned oryx are about 4 feet tall at the shoulder.

Range – The scimitar-horned oryx formerly ranged over much of sub-Saharan Africa's semi-arid sahelian grassland and scrubland on the northern and southern fringes of the Sahara Desert. The last sighting of a scimitar in the wild was in 1983.

Habitat – This oryx lived in the transition area of the Sahara between the true desert and savannah woodland zone, and as such, was not a true desert animal. As a result, it required better quality grazing land than did the more truly desert-loving addax.

Diet – Scimitar-horned oryx migrated seasonally in search of suitable grazing areas and fed on a variety of grasses.

Social Organization – Oryx lived in herds consisting of 5 to 15 females and young led by a male. Only dominant males formed herds. Females bear a single calf.

Threats to Survival – The scimitar-horned oryx is a victim of over-hunting, overgrazing and continued warfare in the region. It is valued for its meat and hide, and its horns have made it a prized sport trophy. Oryx must also compete with intense domestic cattle grazing.

Zoo Programs (SSP) – In North America, at least 23 zoological institutions hold a combined total of more than 500 scimitar-horned oryx. Worldwide, at least 1,250

oryx are managed in captive spaces in zoos and private facilities. Zoos are concerned about the genetic diversity of the herd used to found the captive stock and are researching methods for analyzing the genetic make-up of captive herds. Because only the dominant male breeds with the females, careful management is required to insure that the genetic material carried by other males is not lost. Research and propagation is also being done on a large herd at the Bamberger Ranch near San Antonio, Texas, to analyze herd behavior and organization for use in forming groups for reintroduction.

Reintroduction – Zoological facilities have become involved in helping governments to obtain suitable animals for reintroduction because of the healthy and increasing captive population worldwide. This already commenced in North Africa when 10 captive-bred, scimitar-horned oryx were released in Bou-Hedma National Park in Tunisia in 1985–86.

By 1997, this herd had increased to 81 animals. A similar exercise was initiated in Souss-Massa National Park, Morocco, in 1995. A site in the Air and Tènère National Nature Reserve in Niger is being considered as a future release site. It is hoped that other efforts will be made in the former sub-Saharan range states of Senegal and northern Burkina Faso, efforts that if successful will protect suitable habitat for other threatened sahelo-Saharan antelope species.

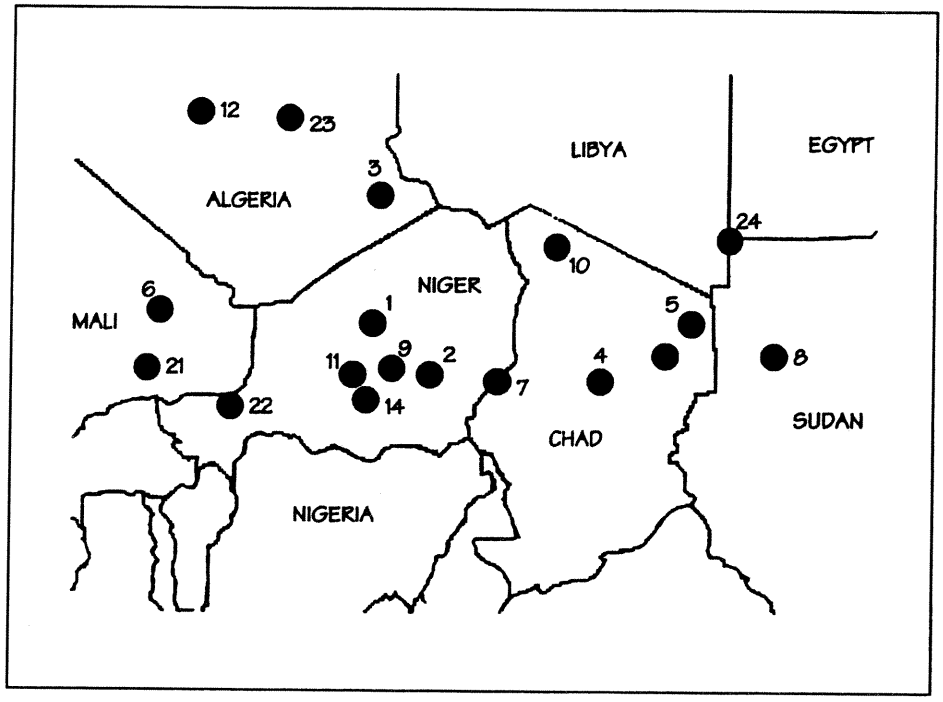


Figure 1. Priority sites for the conservation of sahelo-saharan ungulates.

Addax

Terrie Correll, International Studbook Keeper: The Living Desert, 47-900 Portola Ave., Palm Desert, CA 92260. Tel: (760) 346-5694, Fax: (760) 568-9685.

William Houston, North American Species Coordinator, St. Louis Zoological Park, Forest Park, St. Louis, MO 63110. Tel: (314) 781-0900, Fax: (314) 647-7969

Legal Status – CITES regulates international commerce of addax by listing them as an Appendix I species. Although rare and highly endangered in the wild, they are not protected by the Endangered Species Act. Today, addax probably number less than 250.

Description – Addax are large, sand-colored antelopes with long, thin, spiral horns that slant back and upward. They stand about 42 inches at the shoulder and have large splayed hooves for walking in soft sand. On their forehead is a prominent brown tuft of hair; a white chevron crosses their nose.

Range – Historically, addax ranged over the entire Sahara Desert of Africa. Today, they are restricted to isolated populations in Mauritania, Mali, Niger and Chad. Populations in Western Sudan are probably extinct.

Habitat – Addax inhabit true desert, physically covered by sand dunes and hard-packed desert terrain containing little water and scant vegetation.

Diet – Addax feed on desert grasses and tender young shoots of shrubs and trees. They get all their water from the plants.

Social Organization – Addax do not establish long-term territories, but move back and forth across their range following rains. Before they were eliminated from most of their range, addax probably lived in family groups of five to 20 individuals led by a dominant male. Today, addax are only found as isolated individuals or in groups of two to four.

Threats to Survival – Motorized, illegal hunting following WWII is the primary cause of the addax's decline. More recently, motorized intrusions by tourists have resulted in addax being chased until exhaustion and death. Prolonged droughts and wars in the region have further reduced their numbers. Only the inaccessibility of the desert has prevented their complete extirpation.

Zoo Programs (SSP) – While addax breed well in captivity, few animals can trace their origin to the wild. Currently, there are approximately 200 addax in the SSP population, and over 1,000 registered in zoological collections worldwide. In the United States, another 2,000 are owned by private individuals. An international studbook was recently completed to help manage captive populations, but genetic studies of captive herds will need to be completed to determine relationships of many animals.

Conservation – Effective protection of the remaining wild addax is generally unlikely to be feasible because of the remoteness and inaccessibility of most of the species' last refuges. More likely

Antelope News *continued*

Site	ISO Country Code	Rank	Addax	Scimitar-horned Oryx	Dama Gazelle	Slender-horned Gazelle	Dorcas Gazelle	Cuvier's Gazelle	Barbary Sheep	Cheetah*	Ostrich*	Total
Air/Ténéré	NE	1	3	1	3	2	3	0	3	2	3	20
Termit	NE	2	2	1	3	2	3	0	3	2	2	18
Tassili	DZ	3	2	1	2	2	3	0	3	2	0	15
Ouadi Rimé/Ouadi Achim	TD	4	2	2	3	0	3	0	0	2	2	14
Mourdi	TD	5	2	1	2	2	3	0	2	1	1	14
Adrar des Iforghas	ML	6	1	1	2	0	3	0	3	1	2	13
Kanem	TD	7	2	2	2	0	3	0	0	2	2	13
Wadi Hawar	SD	8	1	1	2	2	3	0	0	2	1	12
Gadafawa	NE	9	2	1	2	0	3	0	0	2	2	12
Tibesti Piemont	TD	10	1	0	2	2	3	0	3	0	1	12
Tadress	NE	11	0	1	2	0	3	0	1	1	2	10
Grand Erg Occidental	DZ	12	1	1	1	3	3	0	0	0	0	9
Mergueb	DZ	13	0	0	0	0	3	3	2	1	0	9
Gadabeji	NE	14	0	1	1	0	3	0	0	2	1	8
Majabat al Koubra	ML	15	2	1	1	0	3	0	0	0	1	8
Majabat al Koubra	MR	16	2	1	1	0	3	0	0	0	1	8
Tilimsi	MR	17	1	1	1	0	3	0	0	1	1	8
Akle Aouana	MR	18	1	1	1	0	3	0	0	1	1	8
Banc d'Arguin	MR	19	1	1	1	0	3	0	0	1	1	8
Ain Sefra	DZ	20	0	0	0	0	3	3	2	0	0	8
Ansongo-Menaka	ML	21	0	1	1	0	3	0	0	1	1	7
Ekrafane	NE	22	0	1	1	0	3	0	0	1	1	7
Grand Erg Oriental	DZ	23	1	1	0	2	3	0	0	0	0	7
Jebel Uweinat	SD	24	1	0	0	0	3	0	3	0	0	7
El Ager	MR	25	0	1	0	0	3	0	0	1	1	6

Table I. Priority conservation sites for sahelo-Saharan ungulates. Index to country codes: BF Burkina Faso, ML Mali, SN Senegal, DZ Algeria, MA Morocco, TD Chad, ER Eritrea, NG Nigeria, TN Tunisia, ET Ethiopia, NE Niger, LY Libya, SD Sudan.

prospects for preventing the species' extinction may involve reintroduction of captive-bred animals to securely protected areas within its natural range. Reintroduction was initiated in North Africa in 1985–1988 when 14 addax from the Hanover Zoo, Germany, and the San Diego Zoo, USA, were released within a 20 sq. km. fenced enclosure in Bou-Hedma National Park, Tunisia. This population, which had increased to 50 in 1997, is in a region where addax had not been seen for decades. In 1994–95, 53 addax were released in an enclosure in Souss-Massa National Park, Morocco. It is hoped that reintroduction efforts will also be made in the southern part of the species' former range, and the newly created Air-Tènère Reserve* in Niger has set aside prime addax habitat. Currently, the World Wildlife Fund and the London Zoological Society, in cooperation with the government of Niger, are planning to reintroduce zoo-bred animals to add to the herds of the Air-Tènère Reserve. To assist this effort, large, captive herds are being studied to better understand the dynamics of addax behavior.

Education – Education of local residents is an important component of conservation efforts. Within original range countries, most people have never seen an addax though it is an important part of regional culture.

At a May 1998 meeting of the Antelope Taxon Advisory Group in Texas, John Newby of WWF International, Director of Species Conservation and a leading authority on sahelo-Saharan wildlife, reported on the status of large animals in the region and plans for reintroduction and *in-situ* breeding. His list of priority conservation sites is reproduced (Table I) and those with highest priority are illustrated on a map (see Figure 1, page 5).

** Recent information about Air-Tènère is reported in the Regional Rundown.*

Giant Sable

As recently as last December, it looked as though an aerial survey of the giant sable's sanctuaries in central Angola might at long last be carried out this July. The survey was made one of the ASG's top priorities a decade ago. During a five-day stopover in South Africa on the way home from Tanzania, I was priveleged to meet and discuss the status of the giant sable with the Angolan Vice Minister of Environmental Affairs, Serròdio de Almeida. During the meeting, it was tentatively agreed that the survey would be carried out in July 1999, organized by the Ministry and funded by the ASG.

Getting the funds for the survey was the other breakthrough, for which the ASG's benefactors are Anne and Bill Dodgson, who raised nearly $14,000 from Safari Club International members for conserva-

tion of one of the most coveted of all antelope trophies.

Hardly a week after getting home, extension and intensification of the 30-year civil war, which started up again in April 1998 after a four-year lull, "knocked our plans into a cocked hat." The rebel Unita forces had taken control of towns within 100 km or less of the north and south borders of the giant sable reserves. So once again, the prospects of visiting the giant sable reserves have been put on hold, for who knows how long?

Fears for the survival of this endangered subspecies have peaked once again. Although a survey is essential to determine the real status, I personally doubt that the giant sable population has been shot out or even reduced to a critical level. As I wrote the Dodgsons (11 May 99), after reading reports of the bombing of Malanje, "Although the Cangandala population is vulnerable—being in a small park criss-crossed by regularly used footpaths and close to Malanje—the Luando Reserve is very large [10,000 km^2] and remote, and I feel sure that most of the troop and vehicular movements have been along the one main road that traverses the reserve from north to south. It would take a concerted, deliberate effort to hunt and kill all the different sable herds. The fact that virtually all of the 16,000 or more people who formerly lived inside the reserve have left and taken refuge in the larger towns and cities suggests that the sable population has been subjected to less disturbance and habitat destruction than in the past."

Only time will tell whether my optimism is justified. Meanwhile, tax-deductible contributions to the Giant Sable Conservation Fund can be made through the Rare Species Conservatory Foundation, 1222 "E" Rd., Loxahatchee, FL 33470.

Mountain Nyala

Update by Fred Duckworth, Duckworth Safaris International, PO Box 60, 5370 AB Ravenstein, The Netherlands. Fax 31 486-41 2135

25 April 1999

Since corresponding with you last, we have been persisting with our plans in Ethiopia to somehow reverse the rapidly escalating tragic down-trend in the mountain nyala population throughout its former range in the Arssi and Bale Mountains of Ethiopia.

Emerging facts of great immediate interest are outlined here:

1. The ministry of the Ethiopian Government, which is the appropriate authority concerned with wildlife, appears uninterested in the plight of the mountain nyala, and the Ethiopian Wildlife Conservation Organization (EWCO) is thus incapable of effective action to save the mountain nyala from certain extinction within a few years.

   The Ministry concerned and EWCO readily take the paid-in-advance and non-refundable US$5,000 Trophy Fee for the mountain nyala from tourist hunters, whether they get their animal or not, and the various safari outfitters in Ethiopia are happy to go along with this, probably until the nyala populations collapse.

   However, closing the hunting of mountain nyala would only add to the disinterest of the appropriate authorities and hasten the end for the mountain nyala, and must be avoided.
2. All wildlife and national parks land, designated or *de facto*, has been handed over to the Regional Administrations, but these Regional Authorities do not understand the importance of the mountain nyala, nationally or internationally.

   They permit the local people to graze their livestock and collect firewood—and to a lesser extent cultivate—inside the National Parks areas, which is causing a major degradation of the fragile mountain habitats. And, since most of the men are armed with AK-47 submachine guns, they shoot the nyala, male or female, for food when the opportunity is offered.

   However bad this may appear at first sight, the answer to the future survival of the mountain nyala rests in the hands of the various appropriate Regional Administrations where the nyala occurs. This is the only way to secure a future for this unique species.
3. We have established two important facts: a) The Regional Administrations are not satisfied with the revenues brought in by their share of the Hunting Fees; and b) nor are they happy with what the granting of grazing rights to the peasants brings in.

A recent conversation between our reporter in Ethiopia and a senior regional official indicates that a long rental lease of substantial areas of mountain nyala habitat to an NGO is a possible solution. It is just a matter of money for and careful negotiation with the Regional Administrations.

I and my wife, Elise, and our man in Ethiopia are prepared to go to Ethiopia for up to two months to investigate this window which has opened. We would endeavor to see all the Regional Administrations involved to try and work out exactly what area of land we can plan to lease and for how many years, before getting involved with extensive plans and further expenditure.

We are looking at several hundreds of square kilometers of mountain nyala habitat for a lease period of 15 to 25 years. What we will achieve is an unknown, but if we do not try to do something now we can never know what we may have gained.

One thing is sure. If we fail to achieve an agreement with the appropriate Regional Administrations for the urgent conservation of the mountain nyala now, the prognosis is the certain extinction of the species within 15 years!

Future planning includes recruiting the most notorious illegal hunters of the local communities to serve as Game Rangers under a dedicated and knowledgeable Warden, and fencing of key areas wherever possible.

Fundraising in the future should consider requests for donations from the very many hunters who have so enjoyed hunting the uniquely beautiful mountain nyala, Ethiopia's most precious antelope, these past 30 years.

What we seek are the funds to travel to

Antelope News *continued*

Ethiopia, stay there for up to two months later in 1999, perhaps November and December, temporary accommodation in Addis Ababa, a 4-WD vehicle such as a Toyota station wagon with maintenance costs, travel expenses, adequate camping equipment for the mountains, plus a driver/mechanic and two or three other staff.

In conclusion, we would just wish to point out that, for all their millions of accumulated donated funds and their repeated rhetoric, not a single international wildlife conservation cum preservation society from Europe, the Americas or from elsewhere in the northern hemisphere have been successful in making progress with saving the mountain nyala.

We have no stake in Ethiopia, unless you call love a stakeable asset. We are only involved here because we know and love Ethiopia so well. And, we are convinced we are the ones who should attempt to pull this off at this time, while there is still time.

2 June 1999 Pre-Survey Update

To bring you up-to-date, Elise and I have recently received several reports from Ethiopia which clearly indicate that, apart from the Gaysay and in Dinshu, where there appears to be a stable population of mountain nyala, the entire remaining area where mountain nyala occur, in fast-decreasing numbers, is under threat. It is predicted by those who know, that if the present conditions endure, the mountain nyala will be extinct in 99 percent of its present range within 15 years. I think this is an optimistic forecast!

As we have reported in mid-April, there is a possible way to secure large parcels of suitable mountain nyala habitat on lease from the various Regional Authorities in Ethiopia, and it is this which we wish to follow up.

Feedback from persons to whom we sent our Update in mid-April includes the suggestion that we contact the Safari Club International Wildlife Conservation Department and certain S.C.I. Chapters that have shown an interest in raising funds for the conservation of the mountain nyala with a view to securing matching funds from SCI-DWC.

We'll also be contacting other interested parties such as the IUCN Antelope Specialist Group and potential donor organizations in Europe with our proposal.

It does, however, begin to appear that in these initial stages it will be the hunters who must show the way to the international wildlife conservationists.

Proposal: to make an investigation in Ethiopia to test the feasibility of leasing substantial areas of existing mountain nyala habitat for the conservation of that species in nature.

Dates Proposed: November and December 1999.

Personnel: Fred and Elise Duckworth plus one other locally resident ex-pat., two Ethiopian assistants plus one EWLCO game scout.

Costs (estimated): US$18,260 – made up as follows:

1. two return air tickets Europe/ Ethiopia/Europe	$1,600
2. 60 days food and accommodation (rented) & expenses	3,000
3. Purchase of suitable mountain camping equipment for personnel and local staff	3,000
4. Hire, maintenance and fuel of 4-wheel vehicle @ $120/day x 60 days	7,200
5. Staff wages, food and allowances – 3 persons for 60 days	1,800
Subtotal	$16,600
Contingency	1,600
Grand Total	US$18,260

Note: We shall endeavor to seek sponsors for items 1, 3 and 4. All funds will be strictly accounted for, and residual funds will be returned to donors on a pro-rata basis.

We are leaving for Addis Ababa on 18 June 1999, where we shall be meeting with several persons in connection with this proposed preliminary investigation. We shall be in Addis Ababa for four days.

Aders' Duiker Conservation Proposals

A. Reintroduction and Monitoring of Aders' Duiker on Chumbe Island, Zanzibar

Proposal submitted to Chicago Zoological Society/Chicago Board of Trade Endangered Species Fund

Project Leader: Eleanor Carter, Project Manager, Chumbe Island Coral Park, PO Box 3203, Zanzibar, Tanzania. E-mail: chumbe.island@raha.com

Rationale Aders' duiker (*Cephalophus adersi*) has an IUCN Red List status of Endangered and is recognized by the IUCN/SSC Antelope Specialist Group as one of the most globally threatened antelope species. It occurs in only two known localities, Zanzibar (Unguja) Island (Tanzania) and Arabuko-Sokoke Forest (Kenya).

The Zanzibar population decreased from an estimated 5,000 in 1983 to 1,400 in 1995 because of habitat destruction and poaching for meat. These pressures continue unabated, and field observations suggest that the decline of this population has intensified since 1995. The Kenyan population is already on the verge of extinction for similar reasons. No Aders' duikers are held in captivity. Part of the species' range on Zanzibar is included in the proposed Jozani-Chwaka Bay Conservation Area which is being developed with support from CARE Tanzania, but this is a long-term approach. Other, more immediate conservation measures are considered essential to enhance this species' chances of survival.

Proposed Activities – The privately operated Chumbe Island Coral Park protected area is attempting to establish a breeding population of Aders' duiker by translocating up to 10 individuals from the main island to an area of 16 hectares of undisturbed forest on Chumbe, which provides excellent habitat for this species. It formerly occurred on Chumbe but was exterminated by hunters in the 1950s.

Chumbe Island was gazetted as a pro-

tected area by the Government of Zanzibar in 1994. It is patrolled by rangers around the clock and provides effective protection for Zanzibar's threatened indigenous species. A female Aders' duiker was translocated to Chumbe in 1997 at the request of the Department of Forestry and is still present on the island. A second translocation was attempted in 1998 but this animal died from unknown causes within 3 days of release. It has been agreed with the Zanzibar Commission for Natural Resources (ZCNR) that all animals translocated in future will be monitored after release and that this will necessitate the use of radio-tracking gear with a collar and transmitter provided for each translocated animal. The very dense forest on Chumbe precludes any other method of monitoring.

While this requirement for monitoring adds considerable costs to the reintroduction project, it will also provide a perfect opportunity to investigate territories, range size, feeding patterns, etc., which will assist the conservation of this little-known duiker species. In collaboration with ZCNR and CARE, a holding pen has been constructed on Zanzibar to temporarily house animals post-capture, prior to transfer to Chumbe. This will minimize the possibility of translocation myopathy, which may have contributed to the failure of the second translocation. Funding has been obtained for the radio-tracking equipment and is now being sought for the capture operation. Animals will be captured by proven procedures using nets. This technique has been used successfully on more than 200 occasions during surveys on Zanzibar with only a single directly related fatality.

Budget	**$US**
1. Radio-tracking equipment (receiver, 9 collars & transmitters) funded by Fauna & Flora International and Eco-tec Ltd.	$6,200
2. Capture operation for 9 animals (payment of hunters, driver, fuel, translocation by boat to Chumbe) @ $160 per animal	1,440
3. Tower construction and radio-tracking field work on Chumbe	1,180
Funds Requested from Chicago Bd. of Trade End. Sp. Fund (items 2 & 3)	$2,620

Outputs – Up to nine additional Aders' duikers successfully translocated to Chumbe Island by 1 June 2000.

Discussion Document on the Potential of Trophy Hunting as a Conservation Method for Aders' Duiker *Cephalophus adersi*

Jozani Forest Project [SMTP:careznz @twiga.com], Rob Wild, CARE International

Jozani-Chwaka Bay Conservation Project is an ICDP in Tanzania that is currently considering a trophy hunting scheme for an endangered antelope species, Aders' duiker, *Cephalophus adersi*. The three-year-old community-based wildlife management scheme here has been stifled by the absence of tangible local benefits, and the trophy hunting option seems one of the only methods of creating a perceived value for the species.

As far as we know, no trophy hunting has ever taken place with such a rare antelope (population estimates are as low as 200 globally).

Executive Summary

The Zanzibar island of Unguja (Zanzibar Island) represents the last hope for the survival of the Aders' Duiker.

It is estimated that 75–150 animals have been hunted annually in recent years by local hunters. The current population is unknown and could be in the range of 300–2,000.

Recent conservation efforts have included population survey, establishment of a sanctuary, a six-months-per-year closed hunting season, conservation education, community-based management, establishment of by-laws and translocation.

All these efforts have been limited by lack of funds.

Despite these efforts, the population seems still to be declining as evidenced in the difficulties in capturing animals for the translocation programme.

Funds are being sought for a captive breeding programme.

Safari hunting is being considered a mechanism to change duiker economics such that conservation of the animal and its habitat is promoted at the village level.

The trial safari hunting of five individuals is being considered for July and August 1999, subject to a number of provisos, including improved population survey, CITES authorization, and the development of appropriate management systems.

This programme will be dependent on ecological and sociological research.

The following is being sought:

1. Opinion on the merits and demerits of the safari hunting proposal;
2. Technical information on the population survey techniques;
3. Expertise to participate in surveys;
4. Funding to support this and other parts of the Aders' duiker conservation and recovery plan;
5. Long term partnerships with academic, conservation and other institutions to support the conservation of this species.

Outside Unguja Island (the main island of the Zanzibar archipelago), the last sighting of Aders' duiker, *Cephalophus adersi*, was in 1995 in Arabuko Sokoke Forest, Kenya (*Erustus Kanga*, pers. comm.). Unguja, therefore is generally regarded as the last remaining hope for the duiker globally (Kingdon 1997).

Despite a recent survey, the population is not known and some estimates put the population as low as 300 (Andrew Williams, pers comm.). If this estimate is correct, *C. adersi* is one of the rarest of the world's duikers. The IUCN [1996 Red List] status is Endangered.

Despite the efforts of the Commission for Natural Resources (CNR), the Zanzibar Government institution responsible for wildlife management and CARE Tanzania, an international development agency, it is feared that the numbers of Aders' duiker are continuing to fall. Communities (shehias) still do not see themselves as responsible for the conservation of the duikers and furthermore cannot identify tangible

Antelope News *continued*

(economic) benefits resulting from protective management of the species (Williams, Masoud and Othman, 1997). While all the current methods to protect the species could improve its chances of survival, especially if well funded, safari hunting is the only intervention thus far proposed which could give communities a real incentive to conserve the species and should even promote conservation of suitable habitat.

Conservation activities – It has been illegal to hunt Aders' duiker since 1919 in Zanzibar. Pre-independence conservation efforts included the translocation of a population to Funzi Island, Pemba and a closed hunting season for all duiker hunting. A successful captive breeding programme was carried out in Nairobi quite some years ago. Both the translocation and the captive breeding ended in tragedy.

Since 1994, the Commission for Natural Resources has been implementing an Aders' Duiker conservation programme. This has been supported in 1994 by Finnida and since 1995 by the Jozani-Chwaka Bay Conservation Project (JCBCP, a partnership between CNR Zanzibar and CARE Tanzania). The main aim of the latter project is the establishment of the Jozani-Chwaka Bay Conservation Area and the duiker programme has been secondary to the main project goal. The duiker programme has therefore been implemented with minimal funding. It contains the following elements.

Population Survey – A three-month population survey of all mini-antelope species on the coral rag of Unguja was carried out in 1995 (Williams *et al.*, 1995). During this survey, 267 separate daytime net drives by local hunters, and 776 ha were surveyed over 155 random plots. Only 14 of the 288 animals encountered were Aders'. Aders' was found to be specific to high thicket and undisturbed high thicket had the highest densities (11.4 ±5.18km^{-2}). The conclusion was that Aders' population was at a level below 2,000 individuals. A previous estimate was made by Swai in 1983 of 5,000 individuals.

A study carried out in 1995 (Archer and Mwinyi, 1995) suggested that 10 villages on the island hunted a total of 75 *C. adersi* in an average six-month period (July–December). Assuming 200 animals have been hunted annually for the past four years, the population could therefore be in the region of 1,400. The duiker's habitat represents the last high-thicket areas on the island, which are targeted for firewood harvesting. Southern Unguja is the main harvest location for firewood which is used in Zanzibar town (population 100,000).

Due to the continued hunting and habitat losses, as well as inadequacies and difficulties in surveying this species, it is possible that numbers may, however, be as low as 300 individuals (Williams, pers comm.). Renewed efforts to survey the population, and if possible establish its territory size through radio tracking, are essential.

Conservation Education – Many meetings have been held with village hunters and other village members. Workshops have been held with village and National Hunters, district staff, police and other concerned agencies. Far more work is needed before the plight of the animal is widely understood on Zanzibar.

Community Duiker Management – One of the outputs of the many village meetings has been the establishment of hunting associations in 12 villages in the vicinity of Jozani Forest. By-laws have been negotiated and legislation passed on local hunting licenses and management. Implementation of the by-laws has been slower than planned and these are just now in place and it will require more time to evaluate whether this system is sustainable (either economically or in terms of duiker populations). These by-laws do not allow the hunting of Aders' duiker, and it is not yet known whether they will stop the illegal hunting of this species. Furthermore, JCBCP currently has insufficient resources for adequate follow-up.

In addition to hunting by-laws, the project has been establishing community-managed forests outside Jozani. It is hoped these forests will adjoin or will be linked by corridors and when under sustainable management will provide long-term adequate habitat for the species. Many of the communities in the area depend on wood cutting. It is likely to be at least 10 years or even longer before many of the forest areas have recovered sufficiently to support Aders'. Alternative income generation will need to be found for many woodcutting families.

Sanctuary Area – Increased protection in the Jozani Forest Reserve has reduced the amount of hunting in the reserve. While hunting has not been controlled completely, this is now limited to occasional bush-pig hunting. Despite the high pressure on Jozani, we believe Aders' to be reasonably well protected in the reserve itself. Increased patrolling will increase our confidence in the security of the animals in the reserve. The population size in the reserve is unknown but based on the area of suitable habitat and discussions with knowledgeable reserve staff (Shabani Amani, pers comm.) may be 20–50 animals. No hunting will be permitted within the reserve.

Closed Hunting Season – Since 1995, a six-month Closed Hunting Season has been implemented each year, which (at least in theory) does not allow any hunting of mini-antelope. This is the resurrection of a pre-1962 closed season. The effectiveness of the programme has been variable depending on the resources for public education and patrolling. With more resources the closed season will help the recovery of the species.

Translocation – In 1997, a translocation project was initiated with the aim of transfering five pairs of Aders' duiker from Unguja to Chumbe Island Coral Park, a small protected area off the West Coast of Zanzibar. So far one female has been successfully transferred, but due to unavoidable delays and financial constraints, the project is on hold until February 1999. Funding is presently being sought for extended research (based on radio-tracking) into the behavioural ecology of the transferred individuals. A population introduced to Funzi Island, Pemba once flourished but was eliminated by feral dogs (Kingdon, 1997).

Captive Breeding – Preliminary discussions have been held on a proposal, developed by the Commission for Natural

Resources, for captive breeding of the species. A field evaluation visit has been made to Zanzibar by the European Association of Zoos and Aquaria and funds for the programme are being sought from European and North American Zoos. This species was successfully bred in the outskirts of Nairobi some years ago. This breeding programme ended when a leopard entered the enclosure and killed all the animals (Archer, pers. comm.). While a breeding programme would help ensure the survival of the species, it will not help *in-situ* conservation unless the zoos concerned are able to raise additional funds for conservation efforts on Zanzibar.

Conservation and Recovery Plan – An output of the past three years work was the production of a conservation and recovery plan. This document reports in some detail the activities carried out above and includes the proposal for the safari hunting. This was given limited circulation in 1998. A weakness of this document is the lack of proposed further research.

Proposed Safari Hunting of Aders' Duiker

Safari hunting over the last 10 years has become part of accepted conservation practice, and wildlife management areas are being established in many countries with the benefits of safari hunting being passed to local communities. Most of these schemes hunt the more common species. As far as we know, this sort of scheme has not been attempted yet with a species as endangered as this in Africa.

At the end of 1997, JCBCP was approached by a professional hunting company, Fred Duckworth Safaris, which was interested in hunting on Unguja. Since then the project has been considering the pros and cons of sport hunting as a method of positively altering the economics of local forest conservation at the community level.

The Safari company's clients would be willing to pay $3,000 US (250 times the current market price of $12) per Aders' duiker taken, and this money would be passed directly to the communities within whose forests the animals were hunted. Our hypothesis is that by receiving immediate and substantial economic benefits, these communities would perceive a clear value in the conservation of the Aders' duiker habitat and thus assume responsibility for conserving the animal and its habitat. These fees would go to support the costs of patrolling and administration and would also fund community development projects in the hunting shehias. Hunting by-laws and community forest agreements would give communities secure tenure over the management of the duikers and the forests.

A number of critical issues present themselves to make this programme effective. These include:

- ensuring the target populations can sustain the offtake proposed;
- developing a system of hunting management which is not open to abuse;
- that projects which bring widespread and immediate community support are selected to receive funding;
- ensuring that communities can and are willing to actually stop any other hunting of Aders' duiker within their forest area, either by their own hunters or third parties.

Survey – We aim to ensure that any hunting be managed using precise and reliable ecological data. We have informed the hunting company that no animals will be taken until we are convinced that a target population can support hunting. We have requested that [the company] provide funding for these basic surveys. Thus far, $2,000 USD has been received, and an additional $10,000 is expected.

We are looking for assistance from suitably qualified research personnel and academic institutions in the implementation of these basic surveys. We are starting a review of survey techniques to improve on the methodology used in 1995. This work will be the start of a longer-term research programme and we are seeking long-term partners (e.g., academic institutions) to assist us in conducting research into the species' population numbers, basic ecology, harvesting potential and the social aspects of hunting.

Governance – Initiatives such as these are often hijaked by elites and special-interest groups at village, regional and national levels. The project has been working with Jozani adjacent communities over the last four years to improve village-level governance of forest and financial resources. Experience has shown that the flow of good and complete information to all community members is essential as a basis for joint decision-making and management. Additionally, the project has promoted representative committees in each village. Representatives from the eight village conservation committees meet monthly in an Advisory Committee. The Advisory Committee is forming a Jozani Community Association, which will soon be submitted for NGO registration. The Jozani Community Association has chosen Aders' duiker to be the central part of its logo and has selected "Paa Nunga" (KiSwahili for Aders' Duiker to be its local identity). The Jozani Community Association will be involved in ensuring that safari hunting is well managed at a village level.

Critical to the success of the programme is also the selection of a reputable safari company that is willing to be a partner in this conservation excercise. This company will need to be able to control the behavior of its clients to prevent temptations of attempting to take additional animals and corrupting village-level or higher-level managers. The company will also need to mobilize funds to support the programme. Additionally, the company staff could work with local hunters and their institutions to understand the current hunting situation and promote responsible hunting on the island. It is proposed that a sole company is selected, and currently we are seeking references for Fred Duckworth Safari International, the company that made the initial approach.

The proposed hunting programme will be widely discussed among the senior levels of the Government of Zanzibar. There will therefore be wide information as to what is taking place. An advantage of an activity such as this that is taking place on Zanzibar is that in a small island community, untoward activities seldom go unnoticed.

Antelope News *continued*

Current Stage of the Programme

A preliminary proposal for Fred Duckworth Safaris to hunt five Aders' duikers has been approved, in principal, by the Ministry of Agriculture, Livestock and Natural Resources for July–September 1999. This is a pilot programme and will only proceed if:

a) research has been completed by the above dates and suggests that this harvest level is not overly harmful to the target populations;
b) an adequate framework for the management of the scheme has been established by Jozani-Chwaka Bay Conservation Project, the Ministry of Agriculture, Livestock and Natural Resources and the hunting communities;
c) CITES permission has been received for the export of the trophies;
d) the wider conservation community is generally supportive.

After this pilot phase, the scheme will be evaluated and assessed by all parties before proceeding further.

Over the coming months we will be developing this proposal in more detail. We would like other suggestions as to alternative conservation approaches. One suggestion, for example, has been received that communities be paid annually by the international community to conserve their forests based on a value derived from the biodiversity values of that specific forest area. We would greatly appreciate your comments, positive and negative, suggestions and support—financial, technical or moral—points of additional information, and requests for more information.

REFERENCES

Williams, A.J., Mwinyi, A.A., Ali, S.J. 1996. A population survey of the three mini-antelope—Aders' Duiker (*Cephalophus adersi*), Zanzibar blue duiker (*Cephalophus monticola sundervalli*), Suni (*Neotragus moschatus moschatus*)—of Unguja, Zanzibar. Forestry Technical Paper No. 27. Commission for Natural Resources, Zanzibar.

Kingdon, J. (1997). *The Kingdon Field Guide to African Mammals*. London, New York: Academic Press.

Swai (1983). Wildlife Conservation Status in Zanzibar. Commission for Natural Resources, Zanziba.

Reaction to Hunting Proposal

Opposition to the hunting proposal reflects two different viewpoints:

1. It is inappropriate for an endangered species. Period.
2. The whole project is too complicated with too many unknowns and too dependent on the good faith of all concerned to be workable.

Support for hunting of endangered species as a possible conservation tool comes from Rod East (e-mail of 11 May 1999):

My views on trophy hunting are set out clearly in the *African Antelope Database 1998*, viz., that sustainable trophy hunting, monitored and controlled by well thought-out, comprehensive and effectively implemented regulations, can be a powerfully positive factor in antelope conservation. The fact that a species is threatened or near-threatened doesn't alter this; e.g., the ASG's recommendations for the conservation of the Critically Endangered giant sable antelope (if the Angolan civil war ever ends) include consideration of sustainable removal of animals by trophy hunting and/or live capture for sale to zoos, [and] the giant eland in Cameroon is only given effective protection within safari hunting zones, etc.

The fact that Aders' duiker is endangered doesn't preclude this option (the offtake of sustainable trophy hunting is, of course, always very small), although the regulation of hunting obviously needs to be especially stringent in such cases. CITES, for example, has recently approved carefully regulated trophy hunting of the markhor (an Appendix I species) with up to five trophies to be taken per annum in Pakistan. In my opinion, the ASG would lose credibility as a scientific advisory group if we simply dismissed what appears to be a well-thought-out proposal with a knee-jerk response...

Likewise, I don't see "public opinion" as a hugely important consideration in this case. Outside Zanzibar, I doubt that many members of the general public have ever heard of Aders' duiker. If there really is a significant body of public opinion out there which is concerned about the fate of this species, how come I have had to spend some of my recent weekends writing grant applications to try and raise a lousy few thousand US$ for the proposed translocation of a breeding nucleus to Chumbe Island?

It may well be that after considering all of the issues, the conclusion is reached that trophy hunting is not a feasible conservation option for Aders' duiker. Even if all of the pre-conditions laid down in the CARE proposal can be met (which is probably a tall order), there are additional issues to consider, as you, Tom [Butynski[ASG]] and Reg [Hoyt[ASG]] have pointed out. Presumably, only males would be legally hunted, but I'm not sure how a hunter is supposed to determine the sex of such a cryptic species before he/she shoots it. Then there's CARE's lack of experience in wildlife conservation and management and the inevitable "hands in the till" problems if trophy hunting of Aders' duiker became a successful commercial venture. I suspect that this approach would only succeed with experienced, private sector involvement, e.g., if the hunting concession was under the long-term control of a hunting/conservation manager (partly or entirely funded by the safari company) with responsibility for carrying out conservation management according to the agreement.

My only plea is that the issues are worked through carefully and rationally before we jump to any conclusions.

Capture/Translocation Update
Circular to All Interested Parties in Aders' Duiker Recovery Program

Eleanor Carter, reported by ***SYSOP@aza.org****, EACAP Digest for 7 May 1999*

As many of you already know, the translocation of Ader's duiker to Chumbe Island as part of the species recovery plan was put on hold last year following the fatality of the second translocated individual. This was for a variety of reasons:

- a full investigation into cause of death was desired (conclusions pointed to translocation myopathy);
- funding from WWF for the overall operation was found to be inadequate and plans were put forward to extend the budget;
- it was decided that radio-tracking was essential for the monitoring of the released animals, not only to keep track of their health and physical status, but also to learn more about this little-known creature!

After much discussion amongst a variety of experts about reducing the stress to the animal, finally on Monday 19th April, hunting began again. This followed the construction of a holding pen at Jozani Forest (on Zanzibar), in which animals were to be placed for recovery post-hunting before final translocation to the island.

The first Ader's Duiker was captured after only 3.5 hours of net-drive hunting. This could be taken as a good indication of population levels in the capture area "Mtende." At this time, the animal was identified as female, and after a further 20 minutes, was noted by the carrier to be pregnant.

From the moment of capture, the animal displayed great anxiety, struggling and calling continuously. After capture, a cover was put around the face of the animal and Mr. Adrian Ely, Mr. Ali Mwinye (Wildlife Officer, Zanzibar Commission for Natural Resources) and Mr. Makame Haji Mwinye (chief hunter) left the hunting group with the animal and proceeded without delay to the hunting pen at Jozani. The transport time was exactly 2 hours 25 minutes (less than half the time taken for the previous capture operation). Due to the animal's continued distress, it was decided that potentially stressful activities (i.e., ear-tagging, tissue sampling etc.) should be postponed.

The animal was left, but periodically checked after release into the pen. The last check on the animal was at 1700, and at the following check at 1727 (2 hours after release into the pen), the animal was found dead.

Initial examination of the body could find no obvious reasons for death. There was nothing present in the pen that could have caused injury and no injuries were found (other than slight abrasions on the rear limbs received during the struggle in transit).

The body was taken from Jozani to Stonetown where an autopsy was carried out. This confirmed that the animal was pregnant, however, we are still awaiting further results that may suggest a cause of death. Without the full autopsy results, we currently believe that because the animal was highly stressed, this is most likely to be the primary contributory factor leading to its death. Hence, the capture operation has once again been halted.

Adrian, leading the capture side of the operations, is unwilling to continue without either specialist veterinary support or a viable means (a sedative drug or the like) of substantially reducing stress during post-capture transportation.

Frank Rietkirk, in a recent e-mail suggested he may be able to obtain such veterinary support and we would be grateful for any advance in this direction that could be made. In the early days of the operation, we learned from Andrew Williams that tranquillizer darts should not be used on this species as past experience with this methodology resulted in high mortality rates in other duiker species. However, we would value any input concerning the possibilities of using alternative forms of sedative drugs.

The body is currently being held in a freezer for preservation. If anybody has an interest in the body, please inform us as soon as possible, otherwise we shall bury the animal in a pre-determined location so that bone remains may be removed at a later date. The body was in the field for approximately 18 hours before removal to the freezer, therefore some decomposition processes have begun. However, for an animal whose biology is as little understood as this, we believe that a pregnant female specimen may warrant further study by specialists with expertise beyond that present in Zanzibar.

We would greatly appreciate any feedback on the above situation. Obviously, here in Zanzibar we are all disappointed with this development. At the moment our opinion is that sedatative drugs of some sort seem to be necessary for the capture operation. As mentioned, we have postponed further activity until all concerned have had a chance to voice their views.

We look forward to hearing from you.

Regional Rundown

GHANA

Discovery of Two Locally Extinct Antelopes

By Patrick Adjewodah and Godwin Yerenkyi, Nature Conservation Research Centre, Accra, Ghana

April 9, 1999

Two antelope species, the sitatunga *Tragelaphus spekei gratus* and the korrigum *Damaliscus lunatus korrigum*, believed to be locally extinct in Ghana, have been discovered in the country in the past nine months. A 1994 distribution survey of the large mammals of Ghana, sponsored by the World Conservation Union (IUCN), was unable to provide any present locality records for sitatunga and the korrigum in the country (Wilson 1994).

Wilson's survey report conformed to previous information on the status of the two antelopes provided by Ghana's Wildlife Department to the Antelope Survey Updates since 1990. Until recently, the sitatunga and the korrigum were classified as extinct and not present in Ghana. Concerning the korrigum, the *African Antelope Database 1998* noted its former occurrence in the northern savannah of Ghana, and its extermination by the mid-1970s. In 1952, the sitatunga was reported in the Oti River Valley on the border area with Togo, but there have not been any confirmed records of this species in Ghana (East 1990). The report of a possible sitatunga skull identified by an expatriate hunter near the Kalakpa Resource Reserve in the mid-1980s (East 1990) has since been confirmed as an immature male waterbuck.

Discovery of Sitatunga

The first confirmed discovery of sitatunga in Ghana occurred on August 6, 1998. The discovery of sitatunga was a joint effort of the Wildlife Department and the Nature Conservation Research Centre (NCRC), a local non-governmental environmental organization. In July 1998, NCRC was informed by the Volta Regional Manager of the Ghana Tourist Board (GTB), Mr. Frank Kofigah, of the reported presence of a large antelope in the Avu Lagoon in the southwest corner of the Volta Region of Ghana. The Volta Region is the region/province located in the southeast portion of the country on the border with the neighbouring Republic of Togo. The GTB manager came across this information while on a tour of some of the remote parts of the region to compile a list of tourist attractions.

On August 6 and 7 1998, the Executive Director of NCRC, John J. Mason, carried out an initial investigation in the Avu Lagoon area to search for the antelope. Horn, skin, hoof and skull samples of the antelope were observed and photographed in hunters' shrines in selected villages. It was immediately clear that the samples were from sitatunga. Horn, skin and hoof samples were secured from hunters and brought back to Accra for further analysis and documentation.

NCRC immediately informed the Wildlife Department of the discovery and requested a collaborative effort to garner further information. Following additional field trips into the area to collect additional samples, the Wildlife Department organised a 45-minute aerial reconnaissance flight over the Avu Lagoon on December 2, 1998. The flight, with staff from the Wildlife Department and NCRC, sighted two males and one female.

Local people in Avu Lagoon area were not aware that the sitatunga was unknown in Ghana. They report that the species has always been present in the area and the number of sitatungas killed on a monthly basis suggests that the population stands at reasonable numbers. The inaccessibility of their habitat—made of floating and marshy vegetation—makes hunting extremely difficult, thus saving it from being hunted out of the area.

Now that [the presence of] sitatunga has been confirmed in the Avu Lagoon, there is strong suspicion that it may occur at several other locations in the Volta and Western regions.

Re-discovery of Korrigum

The re-discovery of korrigum in Ghana occurred in February 1999. Korrigum occurred in the past in the northeast corner of the country. In late 1998, TechnoServe Ghana—a non-governmental organization—contracted NCRC to undertake the ecological monitoring of an on-going project in the Upper East Region. In December 1998, NCRC conducted a baseline ecological survey of the project area, during which an investigation of the wildlife resources of the project area was conducted.

As part of the survey, the NCRC team interviewed a number of local hunters about the resources of the area. Hunters provided repeated descriptions of a large antelope in the area that did not match with any known species in the country. The team was unable to identify the species from the descriptions, but recorded the name in the local Kusasi language.

The antelope appears to be concentrated around the confluence of the Red and White Volta Rivers on the border between the Upper East and Northern regions of the country. NCRC has also received unconfirmed reports that the same species can also be found in the Sissilli River Valley at the border of Upper East and Upper West Region.

The survey team returned to Accra, and in discussions with the NCRC Executive Director, it was agreed that the most likely match was the korrigum that has been reported locally extinct since the early 1970s. In the meantime, a NCRC field assistant, Mr. George Agbango, photographed a live specimen of the species in question that had been caught in a snare. It was immediately clear that the specimen was a juvenile korrigum. In late February 1999, the Executive Director made a field trip to the project area to gather additional information. During this trip, horn, skin and skull samples of korrigum were observed and photographed in hunters' shrines. A full skin was also collected by NCRC from a hunter.

NCRC informed the Wildlife Department about the re-discovery of korrigum in March 1999. The two organizations are

gathering additional information to gain an initial picture of the general range of this population.

Significance of these Discoveries

The rediscovery of the sitatunga and the korrigum in Ghana is a significant development for the conservation of these two antelope species in the West African Subregion. The korrigum, which was formerly the most abundant large antelope in West Africa, has disappeared in many of its range states and has declined in the remaining others. The last surviving population of the sub-species, west of Cameroon, is that of the Arli - W - Pendjari area in southeastern Burkina Faso, southwestern Niger, northern Benin and northern Togo (East 1990).

NCRC has proposed a collaborative ground survey of the antelopes with the Wildlife Department. The survey aim is to identify existing populations of the study species and to investigate their status.

The primary result of the proposed survey will be a technical report outlining the status of the remnant populations of the sitatunga in Ghana. It will also confirm and document the presence of the korrigum. The report will provide records on the population status of these antelopes and map the extent of their range and the condition of their habitat, and will also identify threats to existing populations. The study species occur in areas outside the protected area system of the country. Establishing their presence and status will provide the impetus and justification for the conservation of the habitats of these rare antelopes. The survey report will also provide an avenue to consider developing alternatives to the current unsustainable uses of natural resources within these areas.

Excerpts from a Ghanaian newspaper article about the sitatunga, by Godwin Yirenkyi.

Known to the Anlo people as "tsimese," meaning water antelope, the sitatunga is remarkable for being the only aquatic antelope in the world with the ability to walk on marshy vegetation, hide by diving into deep water with only the tip of the nose above water, as well as the capability to escape by traveling long distances in this manner.

Besides Ghana, the West African sitatunga is found in a few isolated spots in Senegal, Gambia and the Niger Delta in Nigeria. Another widely distributed, less striped variant known as Selous's sitatunga occurs in eastern, central and southern Africa. Taking into account the vast zoo-geographic gaps in the spread of the species in the West African sub-region, Mr. Mason, who spoke about the possible discovery of another unknown antelope in the country, is keen to pursue more scientific analysis of the sitatungas to determine whether they may not be an entirely new sub-species.

Due to their restricted wetland ranges, sitatungas are highly vulnerable to environmental disturbance and excessive hunting. In fact, with their larger and longer hind legs, the animals have a quaint gait on hard ground, [making them] an easy prey on land.

How to protect the newly-found sitatungas of the Avu Lagoon and adjoining wetlands is the main priority of the Wildlife Department. According to Mr. Nick Ankudey, Acting Chief Wildlife Officer, a survey is to be carried out to determine the population distribution and reproductive patterns of the animals to enable the Department to formulate appropriate conservation cum ecotourism management plans.

He said the Avu Lagoon area where the animals have been found falls within the newly created Keta Lagoon Complex Ramsar Site, one of the six wetland sites in Ghana under international protection of crucial biodiversity. Wetlands provide habitat and breeding grounds for several wildlife species including water birds, many of them seasonal migrants, and others like fish and plant forms. Mr. Ankudey added that wetlands are also important in the regulation of water supplies, hence the need to maintain them on a sustainable basis is an urgent requirement for the long term socioeconomic benefits of neighbouring communities and society at large.

To encourage community participation, the Wildlife Department plans education and public awareness campaigns in the Akatsi, South Tongu and Keta districts surrounding the lagoons, while one experienced hunter has been employed by the Department to forestall poaching.

NIGER

The Air Tènère Reserve

*Ibrahim Thiaw, IUCN Regional Representative for West Africa/Ouagadougou, Burkina Faso (**uicnbrao@fasonet.bf**) sent the following e-mail to Simon Stuart and David Sheppard at IUCN/WWF headquarters*

10 February 1999

As you know, IUCN has been working for the last 15 years on the Air Tènère Reserve in Niger. The project we had there with Swiss and Danish support had to be suspended in 1992, due to the civil unrest in the northern part of Niger.

A peace accord was signed last year between the Government and the Touareg Rebels, and the situation is now back to normal. I had the opportunity to visit the reserve 10 days ago, together with a large delegation from Switzerland (the local mission and a desk officer from Berne).

I gather Air Tènère has been discussed many time at the World Heritage Committee. One of the sad consequences of the war is that the ostrich population has been severely affected. From 2,000 individuals in 1992, there seem to remain less than 10 now. The addax population has migrated to another area and has left the reserve.

The Niger authorities have requested... IUCN support to reintroduce some ostriches from Chad, a neighbouring country. We have some resources to do something, but no one has made a clear estimation of the cost. Actually, we need technical advice from our specialist groups in order to avoid (at least limit) stress, death and so on. I would appreciate it if Simon and his crew can provide us with advice on who to contact and how.

Furthermore, eco-tourism is a big issue. Now that tourists can again visit the Air

forest is the only source of food for livestock as resources in the vicinity of the forest were depleted.

Often times, conflicts take place between the nomadic tribes and government officials who try to fell trees or clear a portion of the preserve. Sometimes the conflict is taken to court. Although the Forestry Department prohibits any illegal act such as tree felling and collection of firewood, many trucks sneak into the forest to do these illegal acts which lead to conflicts with the nomadic tribes. In many occasions, licenses were issued by the Forestry Department for firewood collection and some other activities, but the nomadic livestock raisers continue to be the real conservationists of the forest.

Although most of them have firearms illegally, the nomadic tribes at DF denied any poaching of the gazelle. However, they guide the poachers and safari hunters to locate the gazelle.

Recently, most arable land around DF is being cleared for sorghum cultivation. This clearing is expanding rapidly and threatening the existence of the forest. Evidently, the gazelle habitat is shrinking rapidly. This shrinkage would not only deplete the gazelle, but the nomadic tribes and villagers around the forest would also be greatly affected. They practice traditional farming on a limited scale. Most of their agricultural fields were close to the Dinder River, implying that they had a minimum impact on the Singa gazelle. However, the villagers collect dead, fallen trees as firewood from the forest. In addition, they eke out their living during the dry season by guiding hunters, loading trucks with firewood and sometimes charcoal making. Obviously, the forest is not only good habitat for Singa gazelle, but it is a source of income for the villagers and an important foraging site for the nomadic tribes.

Management Plan

Singa gazelle lives mostly in the northern portion of the forest where the utilization of resources was minimal. It is adapted to highly disturbed areas, so its management could be made compatible with conservation of the forest.

The villagers and the nomadic tribes were very cooperative in conserving the forest on which their living depends. It appears that involvement of these groups in the conservation of the forest and the Singa gazelle is important for the benefit of the people and the perpetuation of the forest resources. What is required is the coordination between the National Forestry Corporation and the Wildlife Administration.

The expanding mechanized agriculture should be stopped; poaching and felling of trees should be controlled. Regular patrols by the Wildlife Administration is essential for curtailing the poaching, as punishment of one poacher deters others from doing likewise.

The Red Sea Hills (RSH)

Six geographic areas were surveyed in the RSH, including Musmar, Haya, Ariab, Mohammed Gol and Gebeit. In these areas, wildlife habitats were very similar, being valleys (wadis), streams (khors) and flat plains surrounded by mountains.

Musmar, a relict town, is named after a range of mountains. Habitats in the vicinity of Musmar were not depleted due to the severe shortage of water which limits the distribution of livestock. However, the cultivated land close to Musmar is subjected to severe wind erosion to the extent that Musmar is gradually being buried.

The density of gazelles at Musmar was very low as only four Isabelline Gazelles (*Gazella dorcas isabella*) were encountered during the survey. The animals showed by a great flight distance when approached by a vehicle that they were highly disturbed. Plains, wadis and khors were criss-crossed with numerous tracks of vehicles searching for gazelles.

Haya, a relatively large town, lies east of Musmar. Three Singa gazelles and four Isabelline gazelles were encountered at a short distance southwest of Haya where there were seasonal streams and a thick overstory cover. Like the situation in Musmar, gazelles in Haya were highly molested—they escaped at a very great flight distance.

Ariab

Ariab is the gold mining headquarters which lies north of Musmar, and is now attracting most of the inhabitants of the RSH. Utilities such as electricity and clean water are available, beside an airstrip that receives regular flights from Khartoum and Paris. Mass movement towards Ariab is now taking place.

Heavy machinery was found in all active mining centres and the roads leading to them were graded and paved. Health services and employment are provided by the Ariab Sudanese-French mining company.

The mining activity was and still is having a direct impact on wildlife in the area. In the absence of wildlife personnel, company employees talked about killing many gazelles either by shooting them or mostly by chasing them with vehicles until they collapsed. This practice is still continuing although it has decreased due to the decrease in the number of gazelles.

Gold processing at Ariab affected wildlife in two ways. Firstly, gold is processed by soaking it in large containers with cyanide solution. Sand grouse (*Pterocles sp*) frequent these containers to drink and mass mortality takes place. Most of the birds die immediately from poisoning and some of them fly a short distances and die afterwards. Other predators that eat the poisoned birds were expected to die from poisoning. Secondly, the mining company uses dynamite, and the explosions may disturb Isabelline gazelle surviving in the region.

No Singa gazelles were reported at Ariab, although anecdotal information suggested its existence in the area. Only three Isabelline gazelles were encountered.

Mohammed Gol and Gebeit Máadin

Mohammed Gol lies 162 km north of Port Sudan on the Red Sea Coast. All the residents at Mohammed Gol were involved in fisheries activity. Few people were involved in livestock raising and some of them worked as guides for safari hunters.

The activity of hunters at Mohammed Gol and Gebeit Maadin was more than in any other area in the RSH. Numerous tracks of vehicles were encountered on plains, khors and wadis. Generally, safari hunters camped at an appropriate hunting area for a long time. During this camping, they hunted during the day and during the night, using spotlights. They hunted any animal they encountered, including hares, gazelles and predators such as Rüppel's fox (*Vulpes ruepelli*).

Mohammed Gol and Gebeit Máadin areas are very rich with gazelles. The populations increase going westwards. Numer-

ous Isabelline gazelles were encountered during the survey, but few Singa gazelles.

During an eight-hour tour southeast of Gebeit Máadin, 25 gazelles were encountered of which 19 were Isabelline and 6 were Singa gazelles. It cannot be assumed at present that the 6 gazelles were either Singa or the true red-fronted gazelle. But we observed that the gazelle is larger in size than the Isabelline gazelle and the way it ran was also different from that of Isabellines. (Literally, the gazelle ran like a goat.)

It is worth mentioning that both Singa and Isabelline gazelles are called Eritrean gazelle (Dr. P. Grubb, *in litt.*). This mix-up in naming of the two gazelles could be attributed to their sympatric ranges and the difficulty of telling them apart when they are very far away. But generally, the Singa gazelle is more alert than the Isabelline gazelle.

The occurrence of the red-fronted gazelle at the southern ranges of the RSH has been reported by Mackenzie (1954) and Hillman and Fryxell (1980). The gazelle was seen twice at the RSH. First, it was seen in the 1970s in the vicinity of Erkaweit (Frazer Tong, Dept. Wildlife, Univ. Juba, pers. comm.). Secondly, the gazelle was seen by a wildlife officer who accompanied tourists in the vicinity of Ariab and Musmar in the 1990s.

Public Attitudes

It is important that public attitudes toward wildlife in the RSH be considered here. Tribal chiefs of Hadendowa were very much concerned about depletion of natural resources, particularly wildlife in their domains. They were very cooperative with us during the survey and most of them guided us to locate the gazelles. Every tribal chief or sheik was reluctant to trespass the sheikdom of his neighbor. They just led us to the boundary of their sheikdoms and provided us with information about the sheikh in the [next] neighborhood.

Discussing the question of wildlife with them, almost all sheiks expressed the desire to enforce the wildlife laws if authorized by the Wildlife Administrator. The sheiks were particularly worried about the safari hunters from the Middle East who visit the country during the cool season, starting in December. The sheiks stated that the safari hunters always exceed their bag limits and they would like to curb them provided that the Wildlife Administration authorized them to do so.

On the other hand, the Wildlife Administration at the RSH was skeptical about the attitude of sheiks. Incidents were reported that Hadendowa guides helped the safari hunters to kill more animals than was required. This accusation could be correct if we take into consideration that the hunters try by all means to satisfy their interest.

In fact, the hunters were always accompanied by one of the Wildlife Administration rangers. It appeared that when they were in the bush, the hunters had the means to hunt the number of animals they wanted.

Management of Singa Gazelle At the RSH

The only protected area in which Singa gazelle occurs is Dinder National Park. Other mosaic habitats of the gazelle are experiencing rapid depletion. Singa gazelle is still on Schedule III, indicating that it is not threatened and can be hunted. In fact the gazelle outside the Dinder Park is threatened and it is high time it was shifted to Schedule II, if not Schedule I.

Because hunters are unable to differentiate between the Singa and Isabelline gazelle in sympatric ranges it is imperative that experienced rangers accompany the hunters to make sure they are hunting the right animal.

Beside Ariab, another Sudanese-British gold mining company started some time ago, but closed down recently for one reason or another. It is likely that the company will begin mining again in the near future. Gold processing should be environmentally controlled so that birds and other wildlife species would not be subjected to mass mortality.

Tourist and safari hunters should be checked frequently so as not to exceed their bag limit.

Presently, the Wildlife Administration has a main office at Port Sudan and a small office at Sinkat. Two more offices are needed at Ariab and Gebeit to stop poaching by the workers of the mining companies and to check the activity of hunters in these two areas. In all areas surveyed, the query about public attitude toward wild animals showed that all respondents like the animals and regretted that they are disappearing at an alarming rate. They attributed the disappearance to three reasons: poaching (46%), habitat destruction (30%) and other causes (23%).

The respondents would like to see the animals protected and they were willing to participate in their protection. Their willingness to protect the animals was mainly related to national heritage (46%), economic reasons (15%), education purposes (9%) and other different reasons (30%). It is worth explaining that 46% of the respondents were illiterate, 31% had primary education, 7.7% secondary education and 7.7% Khalwa (below primary school) education.

SUMMARY

Tora hartebeest, (*Alcelaphus buselaphus tora*), Soemmerring's gazelle (*Gazella soemmeringii*), the wild ass (*Equus africana*) and Singa/Heuglins gazelle (*Gazella rufifrons tilonura*) were surveyed in eastern Sudan. The survey extended from Dinder National Park on the Ethiopian Border to the Red Sea Hills close to the border with Egypt.

No tora hartebeest or Soemmerring's gazelle was encountered. It is likely that a few Soemmerring's gazelles occur in the Red Sea Hills but their population is not viable. As far as tora hartebeest is concemed, it has been exterminated more than 20 years ago.

Singa gazelle and the wild ass still occur in Eastern Sudan. Singa gazelle occurs in a mosaic of habitats, extending from Dinder National Park to the Red Sea Hills. Although the gazelle is protected in Dinder National Park, it is threatened in other areas due to intensive poaching and habitat depletion.

As far as the wild ass is concemed, its range extended from around Mohammed Gol on the coast to Gebeit Máadin about 80 km west. There appears to be colour variation in the wild ass, from uniform at the coast to increasingly variable to the west.

Both Singa gazelle and the wild ass need further study. There is confusion about the genetic makeup of both species. It is not known thus whether the red-fronted gazelle that usually occurs west of the Nile is also found east of the Nile. Furthermore, the biology of the gazelle needs to be studied in detail so it could be managed properly. Concerning the wild ass, it is important to determine the range of the pure race before

the mixing of the whole population in the Red Sea Hills.

Literature Cited

Ati, H.A., Vetaas, O.R., Manger, L. 1996. The natural environment of the Red Sea Hills—Lessons in variability. In Manger *et al.*, *Survival on Meagre Resources*. Hadendowa pastoralism in the Red Sea Hills. Pp. 37–58. Nordiska *Africainstitute*, Uppsala.

Burnham, K.P., Anderson, D.R, and Laake, J.L. 1980. Estimation of density from line transect sampling of biological populations. *Wildlife Monographs* no. 72. The Wildlife Society.

Dasman, W.P. 1972. Development and Management of the Dinder National Park and its Wildlife. UN/FAO report No. TA 3113, Rome.

Dorst, J. and Dandelot, P. 1970. *A Field Guide to Larger Mammals of Africa*. Collins, London.

Forbes, A. 1950. The Dinder Park and shooting parties in early years. *Sudan Wildlife and Sport* 1: 25–29.

Harir, S. 1996. Adaptive forms and process among the Hadendowa—coping with unpredictability. In Manger *et al.* Pastoralisn in the Red Sea Hills, pp. 81–102. Nordiska *Afrikainstitute*, Uppsala.

Harrison, G.L. 1905. *Sudan Wild Life and Sport*: Dinder 1905. McCorquodale & Co. Ltd., Sudan.

Hashim, I.M. 1987. Relationship between biomass of forage used and masses of fecal pellets of wild animals in meadows of the Dinder National Park. *Afri J. Ecol.* 25:217–223.

Hashim, I.M. 1996. Sudan. In R. East (ed). *Antelope Survey Update No. 3*, pp. 34–40. IUCN Publication Services, Cambridge, UK.

Hillman, J.C. and Fryxell, J.M. 1988. Country reports: Sudan. *In* R. East, (ed.) *Antelopes: Global Survey and Regional Action Plans*, pp. 5–16. IUCN, Gland.

Holsworth,W.M. 1968. Report to Sudan Govemment on Dinder National Park, No. TA245. FAO, Rome.

IUCN. 1990. 1990 IUCN Red List of Threatened Animals. IUCN, Gland, Switzerland and Cambridge, U.K.

Mackenzie, P.Z. 1954. Catalogue of Wild Life: Mammals of the Sudan occurring in the natural orders Artiodactyla and Perissodactyla. Sudan Museum (Natural History), publication no 4.

Moehlman, P. 1992. African wild ass (*Equus africana Fitzinger*). *In* P. Duncan (ed). *Zebras, Asses and Horses. An Action Plan for the Conservation of Wild Equids.* pp. 1520. IUCN, Gland, Switzerland and Cambridge, U.K.

Nimir, M.B. 1983. Wildlife values and management in Northern Sudan. D.Sc. Thesis. Colorado State University, Fort Collins.

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