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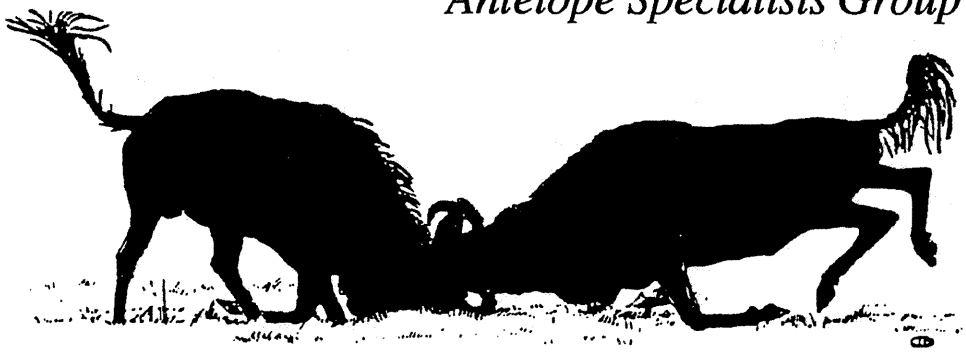
Antelope Specialists Group



GNUSLETTER

ASG NEWS

Notice to ASG Members

The letter of invitation to join the Antelope Specialist Group for the 1991-1993 triennium included the following sentence:

> As ASG members are the primary news source, all who accept this invitation will be expected to contribute information relevant to antelope conservation at least once a year to the Editor or to Rod East, Compiler of the Antelope Survey and Action Plan Coordinator.

A number of members have, in fact, not communicated during this entire triennium. They will definitely not be reappointed and will cease to receive the *Gnusletter* except by paid subscription—**unless** they fulfill their commitment before the SSC meeting of 15-17 January, preceding the IUCN General Assembly in Buenos Aires.

Since no one responded to the request in the last *Gnusletter* for names of ASG members who will be going to Buenos Aires, there will be no scheduled meeting of the ASG, and perhaps no one to present our triennial report. This is a second appeal for a volunteer to represent the antelope group.

The ASG is reputed to be one of the more active SSC specialists groups. If so, one wonders what percentage of the 3000-odd members are actively engaged in the work of their groups.

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Captive Breeding News

Steve Kingswood[ASG], of the Center for Reproduction of Endangered Species at the San Diego Zoo, has volunteered to contribute news about the captive-breeding of antelopes on a regular basis for publication in *Gnusletter*. His article on "The role of captive breeding in antelope conservation" appears on p. 11

CBSG Antelope Working Group

Jelle Boef was designated as ASG representative at the Antelope Workshop to be held at the Antwerp Zoo during the annual meeting of the Captive Breeding Specialist Group (September 3-5). The Antelope Working Group was scheduled to review progress

made to date in formulating global captive-breeding policies for Antilopinae and other antelopes on the basis of the recently completed CAMP (Conservation Assessment and Management Plans). But Boef reports (fax of 5 Nov) that the meeting had to be canceled:

"Dr. Karen Sausman, the CBSG Antelope Working Group chair, fell ill unexpectedly and it proved impossible to find a replacement at short notice. However, an impromptu meeting was convened at the request of several conference delegates with an interest in antelope captive-breeding and conservation and Dr. James M. Dolan (San Diego Zoo and Wild Animal Park) agreed to take on duties as chairman."

Participants apart from Boef and Dolan included Dr. Teresa Abaigar and Mrs. Mar Cano (Almeria), Dr. Marc Ancrenaz (National Wildlife Research Center, Taif, Saudi Arabia), Kuno Bleyenberg (Rotterdam Zoo), Sarah Christie (London Zoo), William Flavell (King Khalid Wildlife Research Center, Thumamah, Saudi Arabia), Bruno Van Puyenbroeck (Antwerp Zoo), Pim Rebholz, Randy Rieches (San Diego Zoo), Frank Rietkerk, Abdul al-Saihati, Dr. Jan Smielowski, and Bruce Williams (Fossil Rim, Texas).

In preparation for the workshop, Boef revised CAMP sheets for Arabian species, incorporating the latest available data on their status, with the intention to present these for plenary discussions. These were passed on to Karen Sausman through Jim Dolan, who served as acting chair.

Despite the aborted workshop, Boef considered the meeting worthwhile, as "a strong representation from individuals involved in gazelle conservation and captive-breeding in the Arabian Peninsula allowed an important initiative linking both disciplines to be presented at the Antwerp conference."

Antelope Camp Rescheduled for Next March

A September 21 CBSG memo advises that antelope and other large-mammal CAMPS and preliminary GCAPS will be held in San Diego next 8-12 March, immediately after the Orangutan Conference. "The Antelope CAMP needs to be updated and a GCAP draft document prepared for further development by mail and at the regional CBSG meetings and at CBSG in Sao Paulo next year."

Gosling to Head Institute of Zoology

ASG member Morris Gosling has been appointed as Director of the Institute of Zoology in London. He will take up the post in January, 1994. Morris did his PhD on hartebeest behavior in Kenya and has returned to East Africa whenever possible, most recently to work on topi mating systems in the Masai Mara Game Reserve.

Morris says that he is "looking forward very much to contributing to the Institute's scientific program. The mission is to carry out basic and applied research in support of conservation biology. An international staff of over 70 people, and usually between 10 and 15 postgraduate students, are working in programs that include conservation genetics, reproductive technologies for captive breeding, the ecology of rare and endangered species, and on diseases of captive and wild animals. The Institute receives core funding as a Research Institute of the University of London with the balance of its budget from external fund raising. There are no soft options for funding research nowadays but the Institute of Zoology is fortunate to have a stable base to help plan its conservation research strategy."

Changes of Address

Dr. Marcel Alers, 06BP948, Abidjan 06, Ivory Coast.

Dr. Martyn Murray, Division of Biological Sciences, University of Edinburgh, Ashworth Laboratories, West Main Rd., Edinburgh EH9 3JT, UK

Dr. Alan Rodgers, Chief Technical Advisor, Institutional Support for the Protection of East African Biodiversity, FAO, P. O. Box 2, Dar es Salaam, Tanzania.

Dr. Douglas Williamson, 22 Hawthorne Rd., Stapleford, Cambridge CB2 5DU, UK.

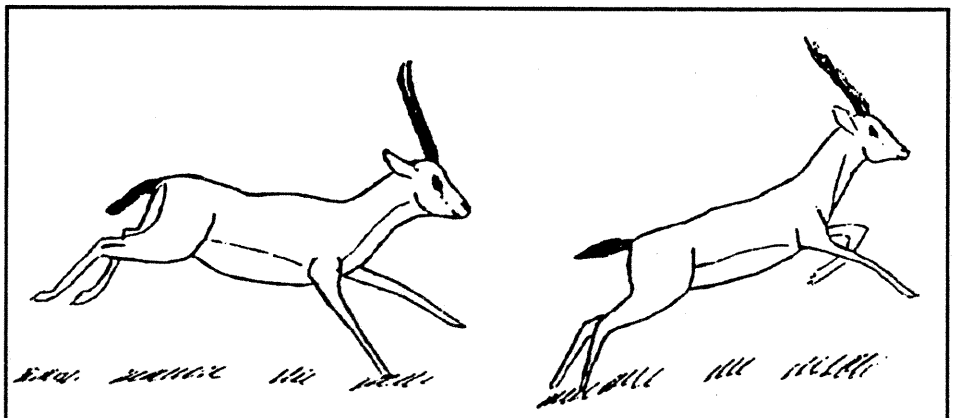
Antelope News

Goitered Gazelle of Kazakhstan

Excerpts from D. A. Blank's Thesis

In the last *Gnusletter,* David Blank[ASG] recounted his difficulties in getting his study of the Persian gazelle accepted by Tel-Aviv University as his doctoral dissertation. Blank subsequently sent me the English translation of his thesis, entitled Social and Reproductive Behavior of the Persian Gazelle *Gazella subgutturosa subgutturosa* Guldenstaedt, 1780. The manuscript runs to 103 pages, plus 36 tables and 50 figures.

In my humble opinion, this study makes a significant contribution to knowledge of the genus *Gazella* in particular and of antelopes in general. Pending its publication as a monograph, I propose to publish excerpts in the *Gnusletter* as space allows. I leave it up to readers to answer the question Blank asked in his letter:



Territorial male goitered gazelles chasing at close of challenge ritual.

"I want to ask you. Are there researchers who will be interested to know how Persian gazelles live in Kazakhstan?" Those who are interested enough to write David Blank, P. O. Box 677, Eilat 88000, Israel, could offer him needed moral support and perhaps influence the Senate of Tel-Aviv University. In the cover letter received with his thesis, Blank

says he found some inaccuracy in the earlier letter, that in fact only two reviewers had called the work on the level of studies of the 1950s and 1960s.

In order to present as much basic information about the goitered gazelle as possible, the following excerpts skip over some of the detailed information. Also, much of the quantitative data are presented in the form of tables, which cannot be reproduced here. The value of the thesis can only be fully realized by publishing most or all of it.

INTRODUCTION

Six subspecies are distinguished in the species *Gazella subgutturosa*. . . [*G. s. subgutturosa*] is the most widespread subspecies. Kazakhstan is the northernmost part of [its] range. It covers the southern part of the republic, and gazelles inhabit dry desert, semidesert and open brush country eastward from the western border."

"During recent years population size of *G. subgutturosa* showed a tendency to increase in the USSR. Ten years ago their total number was [a] few thousand (Fadeev 1978). Recent estimates show that more than 30,000 gazelles inhabit Kazakhstan (Blank and Kovshar 1986, Kovshar and Blank 1986). Approximately 20,000 animals occupy a restricted area including Buzachi Peninsula and Karatau-Aktau mountains on Mangyshlak Peninsula (Table 1). [The] remaining 10 to 12,000 are distributed through the desert zones east of Aral Sea (Kyzylkum, Muyunkum, Taukum, Saryishikotrau, and Ili Depression).

"There is a number of articles on *G. subgutturosa*, including one monograph and several reviews. They deal predominately with population size, distribution and ecology of this species. Now particular attention is given to current status of *G. subgutturosa* population and measures for its conservation. We were the first to perform special studies on the stock of these animals over the entire territory of Kazakhstan. The least-studied aspects of *G. subgutturosa* biology concern its behavior. Some of its behavioral features have been briefly described in the above cited papers but the interpretation of these is not unambiguous. This concerns behavior of females before delivery and right after birth of the young, during nursing, as well as the time when mothers leave the young and the latter form separate groups.

"For the first time we present a detailed account of the reproductive behavior in *G. subgutturosa*, as well as of the social and territorial structure of the population during various seasons. When considering particular aspects of behavior, we tried not only to describe them, but also to characterize [them] quantitatively in relation to ecological factors, such as weather, diurnal or annual cycles, etc. We believe that this approach will provide for a more complete picture of *G. subgutturosa* behavior."

MATERIALS AND METHODS

"Observations were performed for eight years (1981-1988) mostly in gravel deserts of Ili Depression, but also in sandy deserts of Taukum, Saryishikotau, Prichui Muyunkum, and clay desert Betpak-Dala. Some data were collected in Kyzylkum Desert, as well as on Ustyurt Plateau and Mangyshlak Peninsula.

"Animals were studied by keeping them under continuous visual observation for long periods. . . (up to 9 h), using field glasses. . . or a telescope. . . Observation post was usually organized on some elevation. Behavioral acts were registered in the diary, described in detail, and their duration recorded using a stopwatch."

"The total time of observations was approximately 1730 h. . . "

"In order to compare qualitative behavioral characteristics during various seasons, we have used a common criterion, i. e., the number of certain behavioral acts per 1 h of observations. The data obtained during the whole period of observations were considered; this was particularly important in the case of rare behavioral acts."

"The current size of *G. subgutturosa* population in Kazakhstan was estimated during reconnaissance flights using an AN-2 airplane or helicopter. . . In Ili Depression, cruising on feet or by car was used for direct counting of animals and determination of their sex and age with the aid of a telescope."

"The total flight time was approximately 300 h and covered 45,000 km; 10,000 km were cruised by car and 2,000 km by foot."

REGION OF STUDIES

"Ili Depression is a vast tectonic depression located in the southwestern part of Kazakhstan, between ridges of Northern Tien Shan, Trans-Ili Alatau and Ketmentau in the south and Dzhungarian Alatau in the north. In the west the Ili Depression is bordered by Kapchagai Gorst (776 m above sea level) and in the east (on the territory of China) by two adjoining ridges, Narat and Avral."

"The climate in the Ili Depression is strongly continental, characteristic of arid and semiarid zones (dry and hot spring and summer, cold winter). Closer to the mountains, the annual precipitation rate somewhat increases and the average temperatures become lower. The lowest temperatures are registered in January and February (-42°C) and the highest in August (39°C)."

"Low annual precipitation rate (200 to 300 mm), high annual rate of solar irradiation (140 kCal/cm^2), high summer temperatures and dry air make up favorable conditions for desert and semidesert vegetation."

"According to the landscapre and climate, vegetation of the studied desert region is represented by five types:" steppe deserts, brush deserts, extremely arid deserts (lowest part of Ili Depression, 550-5600 m above sea level); sandy plains; waterside vegetation.

CHARACTERISTICS OF THE STUDIED G. SUBGUTTUROSA POPULATION

Population size, Distribution and Migration

"The Kalkan-Matai Valley (870 km^2 in area) situated on the right bank of the Ili River was inhabitated by approximately 2000 gazelles (population density 2.3 individuals/km^2) (Blank and Kovshar 1986). By 1989, the number of animals increased up to 4000 and the population density to 4.7 individuals/km^2). Their population on the left bank, however, gradually decreased. Estimated number of animals at foothills of Botus was 730 (0.56 individuals/km^2) in 1985. . . and only 100 (0.08 individuals/km^2) in 1989.

"During warm season, gazelles readily migrate to elevations of 3000 and even 3500 m (Gepner et al 1961, Bannikov 1954). Low mountains and foothills of Kalkans, Katutau and Boguts in the Ili Depression are their habitat throughout the year. Gazelles frequent the ravines in Chulak and Matai mountains and climb the slopes following the routes laid by *Capra (Ibex) sibirica* who inhabited this region earlier. They usually go up to elevations of 150 to 200 m and rest there. Analysis of distribution of gazelles in the Ili Depression showed that throughout the year they prefer scarred relief of Chulak-Matai or Kalkan foothills (Fig. 18, 19) to central regions of Kalkan-Matai valley (Fig. 20). They like to graze in thicket, for example, in Mynbulak and Uzuntal oases (Fig. 21-24).

"In the northern regions of *G. subguttur-*

osa range, autumn migrations of gazelles associated with the beginning of snowfalls were observed. During previous decades these animals migrated to the south over a distance of 200 to 300 km (Antipin 1941, Geptner et al 1961, Zhevnerov and Bekenov 1983). Now, due to partial extermination of *G. subgutturosa* population, the northern limit of its range has been shifted southward, close to the regions where gazelles winter. Therefore, seasonal migration is now limited to 50 to 60 km.

"Similar changes have happened in the Ili Depression as well. Earlier, gazelles migrated from Kalkan-Matai Valley along the right bank of Ili to Saryishikotau sand plains where they remained during the warm seasons and returned only for wintering (Derevyagin 1947). Similar migration to Betpak-Dala and Taukum deserts and back for wintering was observed along the left bank of the Ili River (Zhevnerov and Bekenov 1983). Now, due to cultivation of these lands, local *G. subgutturosa* population is virtually cut off from their summer grounds.

"Local migrations within the Ili Depression do not exceed 60 to 80 km (Blank 1986). During March-April, gazelles migrate along the right bank from the eastern regions (foothills of Katutau and Kalkan) westward, to Chulak Mountains, and remain there until autumn. In October-November, when it becomes cold and shepherds herd sheep to this region, gazelles return eastward. This is, undoubtedly, a relic of former seasonal migration."

"In summer, gazelles usually gather close to water: in Taldy Ravine, Mynbulak Oasis, and beside Kapchagai Reservoir (see Fig. 20). However, spring and summer of 1987 were unusually rainy, traveling to particular watering places became unnecessary, and gazelles remained close to mountains in the west, apart from their usual sources of water.

"Some tendencies were found as concerns the distribution of males and females in the studied region. In spring, before and after birth of the young, the females remain close to watering places (not more than 5 to 7 km). During the first few weeks after birth, mothers usually leave the young in hidden places and graze elsewhere while watching their offspring; nearby females gather at the southern and eastern foothills of Chulak on the right bank of Ili (Fig. 20), where they find favorable scarred relief and Kapchagai Reservoir. For example, within a stretch of the valley between Taygak and Taldysai ravines (Chulak Mountains), 30 km long and 2 km wide, 180 females and 220 young were counted, i. e. 35% and 50% of the total number of females and young respectively on the right bank of Ili (as of June 23, 1985). Later, when the young are 1.5 months old, females lead them to watering places and stay there. Thus, on July 8, 1984, 110 females and 151 young were counted on the bank of Kapchagai Reservoir (across Taldysai Ravine) within an area 5 km long and 2 km wide.

"Males, on the contrary, keep relatively far from water (15 to 20 km) and their distribution in the studied territory appears to be more even, as compared to females. They frequent the plains south and east of the Matai Mountain. There, on a route 18 km long, 42 of 58 gazelles counted (72%) were males.

"Thus, probable changes in the state of *G. subgutturosa* population in the Ili Depression are as follows. After World War II, excessive anthropogenic stress (over-hunting) resulted in partial extermination of gazelles. Routes of the extended migrations (from Betpak Dala and Southern Balkhash to the Ili Depression for wintering) were blocked. As a result, population size and range decreased. However, broken relief of low maintains surrounding the Ili Depression appeared to be appropriate for gazelles, and they adapted themselves to new conditions. Their seasonal migrations now are limited to several dozen kilometers. Females tend to remain near water first 1.5 months after the young are born, apparently retaining previous seasonal migration pattern."

Group and Population Structure

"The social structure of most Asiatic and African gazelles and antelopes is described in detail" [a string of references]. "But the social structure of *G. subgutturosa* in the wild is very badly known.

"In *G. subgutturosa* the sex ratio at birth is 1:1 (Zhevnerov 1984). This ratio remains virtually unchanged with age."

"Gazelles either gather in groups consisting of only males, females with young, or both [sexes], or remain solitary. During the rut, males usually take control over their range. Also bachelor males can be found which do not 'own' any territory. Bachelors are not necessarily young: some mature males also remain single. Such animals often keep together. Females do not have any distinct territorial attachment: groups of females travel over a certain region which has no distinct borders.

"According to our data, seasonal changes in the structure and composition of *G. subgutturosa* groups are as follows. In March most animals (65%) are associated in large groups of more than 10 or 4 to 10 individuals (Fig. 25B). However, such groups constitute only 1/3 of all encounters with gazelles: more frequent are groups of 2 to 3 individuals (70%) and solitary animals (Fig. 25A). Small groups usually include a mature female and her young but some consists of animals of both sexes or only males (Fig. 26)." [Figs. 25-27 show monthly population composition over a 7-year period.]

"By the end of the month, all these groups congregate forming temporary herds of 400 to 600 animals. These herds migrate westward moving as a continuous stream but individual groups do not merge. Five to 10 days later (in April), migration is completed and herds disintegrate. Groups consisting of more than 10 animals also begin to separate; mixed groups first (Fig. 28) and male groups more slowly. The number of female groups, on the contrary, even somewhat increases (Fig. 26, 27).

"Incidence of large groups in May is low (15% for groups of 4 to 10 animals and 1% for groups of more than 10 animals). most groups comprise mature-horned males. Females are mostly found in family groups of 2-3 individuals, although quite a few females separate from groups before birth of the young and stay solitary..

"In the second half of the month most of the young are born. However it is almost impossible to find a female together with young since mothers keep their offspring in hidden places and graze around by themselves. Females do not let other animals near them and even drive away their own yearlings. Hence, the incidence . . . of solitary females reaches its peak (more than 60%) during this period. In contrast to females, the number of solitary mature males remains virtually constant during the whole spring and summer. The number of small male groups with 2-3 individuals also remains stable (Fig. 27)."

"When June comes, females begin to spend more time with their infants and are frequently observed together with them. Sometimes yearling females join the group. Only barren females remain single and, therefore, the total number of solitary animals decreases sharply (Fig. 26). On the contrary, the number of groups of 2-3 gazelles comprising a female and her young increases dramatically. At the same time, families begin to

join into small herds. As concerns the male groups, they begin to separate into small ones (2-3 males). Most mature males prefer such associations (Fig. 27).

"In August, most frequent are family groups consisting of a female with young, small mixed groups (of 2-3 individuals) or solitary males (Fig. 25, 28).

"Group structure changes dramatically in October, when the rut starts. The number of solitary males increases sharply. They occupy personal ranges and defend them from intruding males. Simultaneously, the number of large and, in particular, small groups decreases, as well as the number of males within each group: approximately half of the males begin to control their own ranges. Females, on the contrary, begin to associate in groups consisting of four and more animals . . . (incidence 70%). The rate of family groups also remains high. Solitary females are rather scarce (incidence3%; see Fig. 26). Female groups are often joined by males, and the number of mixed groups increases.

"In November, territorial males (numbering approximately half of the mature males) are zealously courting the females. Other males (bachelors) stay in small groups of 2-3 animals; larger groups are rare. A major part of females (65%) is associated in large groups (4 to 10 animals), and approximately 1/3 form small groups. Of mixed groups, those of 4 to 10 animals are more numerous.

"The rut ends in the second half of December, and the number of solitary (territorial) males decreases sharply to the level characteristic of the period preceding the rut. The number of groups, particularly large ones, increases, as well as the number of mature males per group (Fig. 27). Most females (72%) also associate in large groups. Only a small number of family groups can be observed (25%), and solitary females are scarce (1% of all females; incidence 9%). As concerns mixed groups, their number increases dramatically, which is particularly true of the groups of more than 10 animals. The latter comprise more than 70% of [the whole] gazelle population, and their incidence exceeds 30% (Fig. 28). Gazelles start wintering.

"Thus, distinct seasonal changes of group structure are characteristic of the *G. subgutturosa* population of the Ili Depression. Composition of groups and their structure depend on specific relationships between gazelles during migrations (in early spring and winter), as well as during the rut, lambing, or disintegration of family groups in late summer. Throughout the warm period of the year, small groups of 2 to 3 or solitary animals are most common,whereas during the cold months (from November till march) gazelles gather in large groups or herds (Fig. 25-28).

"Groups of more than 25-30 gazelles (up to 65) are seldom found. As a rule, these are mixed herds including animals of different sex and age. Larger groups. . . can be observed only during migrations."

Daily Migrations and Activity

"Apart from seasonal migrations, gazelles move every day for 6 to 7 km, to the day's resting places in the morning and to the grazing grounds and watering places in the evening. Day resting places in the Kapchagai State Reserve are found at the foothills of Chulak and Kalkan Mountains.

"In the western part of the reserve, gazelles move in the morning from the Kapchagai Reservoir to Chulak foothills and return in the evening. In regions where the reservoir is not far from mountains, animals move eastward (to the mountains) in the morning and then return westward, to the plain. Such migrations look different in the region of Zhuzasu Pass (eastern foothills of Chulak and southern foothills of Matai): in the morning gazelle descend from the mountains onto the plain, coming back in the evening. In Small Kalkans, every morning gazelles leave their night grazing grounds and watering places in Mynbulak Oasis and move towards the northern and western foothills of Kalkans. They return in the evening, when other groups of gazelles move to the western foothills for the night.

"Thus, gazelles are changing their grazing grounds even when watering places are abundant. Such a behavior ensures thorough use of grazing ground without excessive pressure on any of its regions. Since gazelles inflict small damage to vegetation, desert grazing grounds recover quickly. It should be noted that such abundance of watering places as in Kapchagai State Reserve is rarely found in other parts of the present *G. subgutturosa* range. Consequently, gazelles inhabiting other regions must find watering places unattended by shepherds with their flocks and migrate there every day.

"During daily migrations, gazelle move without any haste and keep grazing. Once or twice they lie down to rest and ruminate for 20 to 60 min, then move up again towards the day's resting places. They stay there, grazing occasionally, and descend by twilight. On their way back gazelles are grazing constantly and rest only once for no more than 20 min. Such migrations are not coordinated in time: while some gazelles are already at their day's resting places, others are starting to move up, resting halfway there, or rapidly ascending without any rest. The maximum number of migrating animals is seen around dawn or dusk. Individual animals move in various directions changing their course repeatedly; some of them even turn about and suddenly go back. However, the general direction and timing of migration are obvious.

"Only territorial males during the rut or spring peak of sexual activity and females right after birth of the young do not perform daily migrations. Females remain with the young for two to three days. Thereafter they join again other gazelles in traveling to watering places and night grazing grounds and return to their infants only in the morning. The young start to walk by themselves already 10 days after birth, moving at random. Their guided migrations together with adult gazelles start at the age of 2 to 2.5 months.

"Daily migrations cease during bad weather, before rain or snow, and gazelles remain at their day's resting places or seek a shelter deep in saxaul brush or dry river beds.

"As in other ungulates, daily activity of *G. subgutturosa* changes during the year. Morning and evening peaks of activity can be distinguished in summer, whereas in winter gazelles graze throughout the day, resting briefly at noontime. Evidently, periods of increased activity during nighttime also exist.

"Duration and timing of grazing and rest during the day change in various seasons. In the beginning of May most gazelles usually graze from 7 till 11 a.m. and from 4 to 8 p. m. Within these periods, three peaks of activity can be distinguished: at 8-9 a.m., 4-5 p.m., and 7-8 p.m. During the second half of the month, the second peak (4-5 p.m.) is not detected, and gazelles start to graze two hours earlier (at 5-6 p.m.). As a result, they rest during the day for another two hours. However, they do not cease to move or graze at midday completely, apparently due to specific daytime activities of females with infants. The daytime activity ceases in the evening one hour earlier (Fig. 29). All these changes are related to the increasing daily temperatures and duration of [daylight].

"At the end of June, duration of the active period attains the maximum of 11 h. [Conversely], the time when gazelles are at rest decreases from 8 h at the beginning of the

month to 4-5 h. We think that it is due to the following circumstances. (1) During this period, daily temperatures usually are high, precipitation rate decreases and vegetation withers; consequently, an increasing number of gazelles has to travel to watering places during daytime. (2) Overall daytime activity of the population is affected by [the] activity pattern of numerous females with their offspring; they become more mobile and feed the young around noon.

"In July, due to the hot weather, the morning peak of activity is observed two hours later (at 6-8 a.m.), and the activity lull becomes much longer (from 9 a.m. until 5 p.m.). Active period in the evening also becomes shorter (Fig. 29). Now [the] daily activity pattern of females with young hardly affects the overall picture, since by that time virtually all mothers have led their infants away from foothills of Small Kalkans to watering places.

"By late November, daily activity of gazelles is already of the winter type, i. e. shifted towards the middle of the light day (Fig. 29). However, morning and evening peaks still can be observed, and duration of grazing increases to nine hours a day. In December, a daytime activity lull is missing, since gazelles prefer to graze after midday, when it becomes warmer. A similar activity pattern is still observed in March (Fig. 29)."

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Chiru

A fax memorandum from Marco Pani, in the Italy Office of TRAFFIC Europe to Ashok Kumar, TRAFFIC India, indicates that George Schaller's concern about trade in the wool of the Tibetan antelope (*Pantholops hodgsoni)*, reported in *Gnusletter* Vol. 11 No. 3 and (to a somewhat wider audience) in the August 1993 issue of *National Geographic*, has prompted an investigation.

"Since some times I am interested in trade in wool here in Italy, especially . . . from South American camelids. After the recent article by George Schaller in National Geographic on Tibet Fauna, I start to investigate a little bit if some trade exist in chiru's wool. From a couple of sources (wool traders), I have been told that they have been offered for (their words) 'a very fine wool, finer than vicuna' from Indian traders. Today I received the last issue of TRAFFIC Bulletin and I saw your article on shahtoosh, in which you claim that alleged illegal trade is going on between India and Italy. Maybe I will receive very soon some information from my sources on who is offering this wool from India and who is buying it in Italy. If you have any information on your side, let me know. Moreover, I have been told in Brussels by Prof. Wang Su (China CITES Scientific Authority) that also trade in chiru's horns seems to be rampant due to their use in traditional medicine. Maybe this information needs to be further investigated."

New Edition of Arabian Gazelles in prep.

Khushal Habibi[ASG], author of *Arabian Gazelles*, is editing a revised edition of the work. He writes (15 Sept 93):

"*Arabian Gazelles* was first written in 1988. The monograph mainly deals with the social behavior of the sand [*Gazella subgutturosa*] and mountain gazelles [*Gazella gazella*] in Saudi Arabia. Since publication a great deal of information has been gathered on aspects of distribution, ecology, genetics, physiology, reintroduction, epidemiology, captive breeding, anesthesiology, and parasitology of the animals both in captivity and in the wild.

"The National Commission for Wildlife Conservation and Development, under the leadership of its secretary general, Prof. Abdulaziz Abudizanda, has decided to republish the book with 15 authors participating in their respective fields of expertise.

"As editor of the treatise, I am looking for people who are willing to review the different papers to appear in the forthcoming volume of *Arabian Gazelles.*""

"The deadline for the papers is 31 December 1993. Papers will be sent for review in early 1994."

Dr. Habibi's address is 5956 Hagadorn Road, East Lansing, MI 48823, USA.

More about the Mhorr Gazelle

Bertrand des Clers, Director of the International Foundation for the Conservation of Game, based in Paris, wrote on 10 Aug 93:

"I have just received Volume 12 Number 2 of *Gnusletter* and have a couple of comments:

"On page 2, and generally in conservation publications, there is no mention of our project, carried out in 1980 at the request of the Government of Tunisia, concerning the reintroduction of the scimitar-horned oryx, in the form of a herd of 10 (5.5) young animals, donated by Marwell and Edinburgh Zoos; shortly thereafter, a herd of addax was donated by Frankfurt Zoo, and we caught in the wild in Senegal some guinea-fowl. All of these animals were reintroduced in Bou-Hedma National Park in Southern Tunisia where dorcas gazelles and aoudad were already present. All of these animals are doing well and have had several generations of offspring. The ecological and biological follow-up has been carried out on our behalf by the London Zoological Society, in collaboration with the Tunisian Authorities.

"I note on page 3 the suggestion of Roland Wirth concerning Mhorr gazelle. You will find enclosed newsletters number 2 and 5 of the C.I.C. where you will see that, with the collaboration of our Foundation, the C.I.C. offered in May of last year to the King of Morocco six Mhorr gazelles (3.3), originating in part from Almeria and in part from

Hellabrünn/Munich.

"The animals have been released in the Royal Reserve of R'Mila near Marrakech and are doing well, with already some offspring since two of the females were pregnant early this year."

C.I.C. newsletter No. 2 (1992) gives a brief history of the Mhorr gazelle (*Gazella dama mhorr)*:

"The former area where the Mhorr was to be found stretched from the Spanish Sahara, Morocco, Algeria, and Tunisia across to Libya. The population in Morocco was already practically extinct in the 1930s; until the end of [the] sixties, one was still able to find this gazelle in the Sahel zone, to the north of the Sahara. From that point onwards, the drastic decrease in the population began, leading to the extinction in that region in the culling of the last gazelle in 1968.

"It is thanks to a fortunate combination of circumstances that in 1971, seven gazelles were brought to Almeria in Spain. They originated from an army camp in the Spanish Sahara, where Major Estalayo protected several individuals from the same fate as in freedom.* Through careful management and a wise plan for reproduction, the number of this initial stock has increased to more or less 110 gazelles today. These animals live in groups appropriately divided for breeding purpose, in Almeria and a few selected game reserve in the world, among which figures Hellabrünn Zoological Gardens in Munich.

"The return of the Mhorr gazelle to its original home (Morocco) is a venture that has been planned for a long time, as Professor Wiesner, scientific advisor to CIC confirmed. . . According to a unanimous opinion by experts, the best suited area for the first reintroduction is the 'Domain Royale R'mila.' Here it would be possible for the new initial stock of Moroccan Mhorr gazelles to reproduce in high numbers in a relatively short period of time, due to ideal ecological conditions and under royal protection, a fact that is not to be neglected. In this way other Moroccan regions may soon profit from this success in breeding."

*Roland Wirth reported in the last *Gnusletter* (page 3, "Which species should have priority") that the animals brought over to Almeria (Spain) were bred in captivity from a nucleus of only three (1.2) wild-caught animals. He went on to say that, "Although Mar Cano. . . keeps a studbook of all Mhorr gazelles in captivity, calculation of inbreeding levels is now further complicated by the fact that only the offspring of the fourth founder can be traced back to the wild, whereas the aforementioned other 14 animals are all still listed as 'presumed unrelated pseudo-founders' in the studbook, while in reality they were all closely related and some of them probably already the result of father x daughter, brother x sister, etc. matings."

Genetic Analyses of East African Bovids:

A Preliminary Report

by Pieter Kat

Population genetic studies of large mammals require the availability of relatively undisturbed populations and large sample sizes. Such undisturbed populations, in the genetic sense, can still be found in Africa in contrast to other continents where many wild animal populations have been manipulated repeatedly. There, population bottlenecks, translocations, and restocking programs have altered to varying extents underlying patterns of genetic differentiation. For example, while North American deer (*Odocoileus* spp.) exhibit considerable variation in different parts of their geographic range, such patterns are proposed to have arisen through a combination of factors including historical restriction of ranges during periods of glaciation, restocking and transplantation programs, hybridization with introduced taxa, and recency of immigration into North America (Cronin 1992). Although the distributional ranges and population densities of some African large mammal species have similarly been drastically decreased in some cases (to the point of extinction for such southern African species as the quagga and bluebuck), virtually intact populations remain for the more common and widely distributed species such as zebra, buffalo, impala, waterbuck, etc. These species still occupy much of their ancestral range in eastern and southern Africa, and by sampling populations in various parts of the distributional range, much unique information can be gathered about population genetics of large mammals. This information can then be utilized in a practical fashion for management programs that emphasize either conservation in the national parks or utilization on private land.

To date, our studies have focused on four bovid species: wildebeest, waterbuck, Grant's gazelle, and impala. All these species are common and widely distributed in Kenya, and all have different habitat requirements which would predict variability in the amount of interpopulation movement by individuals. Here, I report mainly about our results to date from wildebeest, waterbuck and Grant's gazelle. We are in the process of analyzing impala populations from southern Africa, and population samples from other bovid species are being collected. The following reports are drawn from three papers submitted to various journals (Arctander et al. 1993, Kat et al. 1993, and Simonsen et al. 1993), and the work was conducted as a collaborative project between the University of Copenhagen and the National Museums of Kenya. The project was funded by the Danish International Development Agency (DANIDA).

WILDEBEEST

Wildebeests (*Connochaetes taurinus*) presently are widely distributed in open bushland and grasslands in eastern and southern Africa, where they are often the numerically dominant grazing species (Kingdon 1982). Wildebeests are exclusively grazers, and are restricted to habitats that provide access to water and a short herb layer. Based on morphological characteristics such as size, coat color and horn shape differences, they have been split into a variable number of subspecies: *C.t. albojubatus* (Kenya and Tanzania east of the Gregory Rift Valley); *C.t. mearnsi* (Kenya and Tanzania west of the Gregory Rift Valley); *C.t. johnstoni* (southern Tanzania and Mozambique); *C.t. cooksoni* (Zambia); and *C.t. taurinus* (southern Africa). Within Kenya, populations of wildebeest are described either as resident (Mara, Nairobi, Amboseli) or migratory (Serengeti) in response to predictability of rainfall patterns; the Serengeti migratory herds dominate animal biomass in the ecosystem, and move over vast geographic areas (Schaller 1972, McNaughton 1991). Kenyan wildebeests are proposed to have had a more extensive distributional range in the early part of this century: *C.t. mearnsi* possibly occurred within the Gregory Rift Valley, extending as far north as Lake Naivasha, and *C. t. albojubatus* is also likely to have had a much more extensive geographic distribution, ranging north of Nairobi and occupying a large area north of Mt. Kilimanjaro (Talbot and Talbot 1963). Presently, these populations are sep-

arated from each other and are centered around Nairobi and Amboseli National Parks.

Our initial studies of wildebeest, based on enzyme electrophoresis (Georgiadis and Kat 1989), revealed genetic differentiation across the Gregory Rift Valley. A wildebeest population to the west of this geological feature (sampled from Loliondo in Tanzania) was both more genetically diverse (P = 0.065, H = 0.019, n = 18, loci = 46) than a population to the east (sampled from Nairobi in Kenya: P = 0.043, H = 0.011, n = 23), and the populations were characterized by a non-overlapping difference among alleles at the adenylate kinase locus. In the present study, we intended to examine more closely the divergence of populations across the Rift Valley as well as the apparent difference in genetic diversity by sequence analysis of the mitochondrial control region (D-loop). The D-loop is considered to be the most rapidly evolving part of the mtDNA (Brown et al. 1979, Saccone et al 1991), accumulating base substitutions, insertions, or deletions at a rate exceeding that of single-copy nuclear DNA, especially within the peripheral left and right D-loop domains. Sequence analysis of this region has therefore been particularly useful in the evaluation of population genetic differences (e.g. Arctander et al. 1993, Baker et al. 1993, Brown et al. 1993).

Four wildebeest populations in Kenya were sampled, two (Amboseli National Park (AM) and Nairobi National Park (NA)) representing *Connochaetes taurinus albojubatus* east of the Rift Valley, and two (Masai Mara resident and Serengeti migrant (MM)) representing *C. t. mearnsi* west of the Rift Valley. All individuals from the Amboseli, Masai Mara, and Serengeti populations were sampled by means of a biopsy dart fired from a Cap-Chur rifle (Karesh et al. 1989), while individuals from the Nairobi population were sampled during culling operations on a nearby game ranch. A total of 48 individuals from three localities in Kenya (10 from Amboseli, 9 from Nairobi, and 29 from the Masai Mara/Serengeti) was sequenced over 420 base pairs (bp) within the left domain (Saccone et al. 1991) of the D-loop immediately downstream from t-RNAPro. Among these individuals, a total of 38 different nucleotypes were found: 5 characterizing 10 Amboseli and 2 Nairobi individuals, 4 characterizing the remaining 7 Nairobi individuals, and 29 sequences unique to each of the 29 Masai Mara/Serengeti individuals.

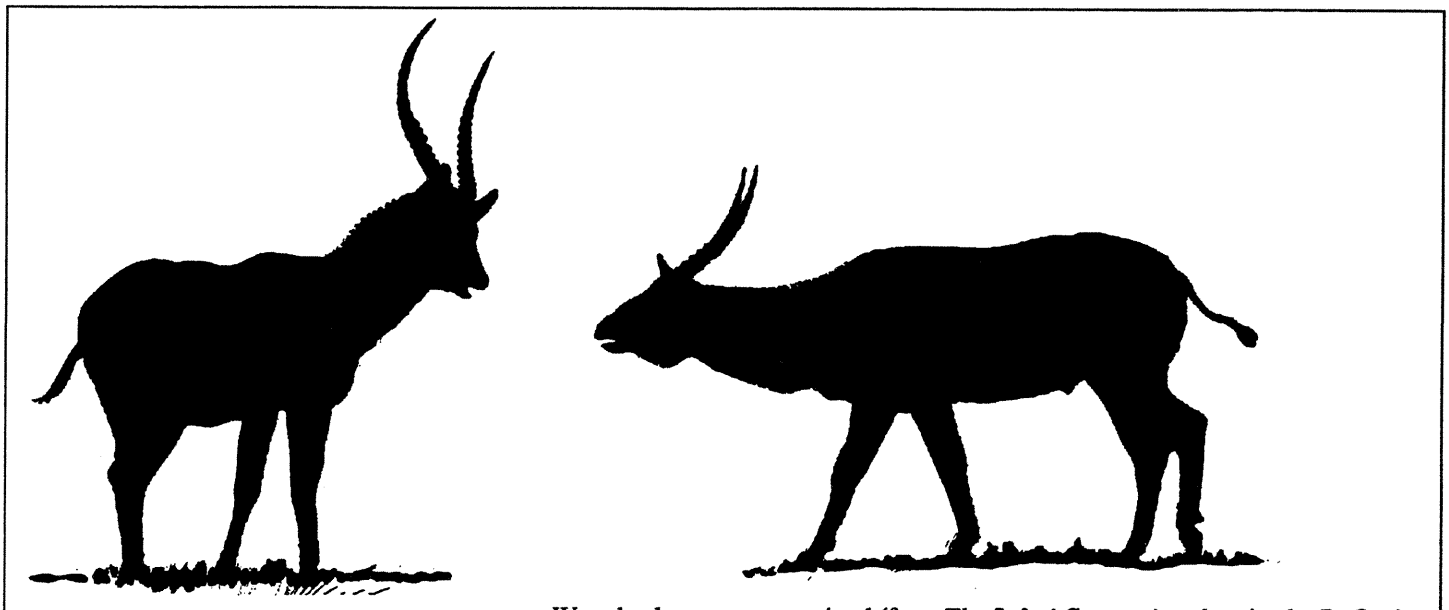
The results indicated a highly statistically significant geographic subdivision among the D-loop sequence polymorphism examined. This subdivision is minimal among the Nairobi and Amboseli populations (KST = 0.041, P=0.170), but substantial when Nairobi (KST= 0.173, P=0.000) and Amboseli (KST = 0.149, P=0.000) are compared to the Mara/Serengeti population.

Wildebeests are large, highly mobile bovids that can migrate over vast geographic areas. This mobility would predict extensive gene flow between individual populations (Avise 1987), but the wildebeest populations examined in this study exhibit considerable D-loop sequence difference across the eastern, or Gregory, Rift Valley. This subdivision confirms earlier results (Georgiadis & Kat 1989) from the nuclear genome (based on enzyme electrophoresis), and provides genetic recognition that the species is divided into separate lineages across this geographic feature. Among the most obvious morphological differences are size, coat color, and horn shape: *Connochaetes taurinus mearnsi* to the west of the Rift is smaller, darker, and has more curved horns than *C. t. albojubatus* to the east (Kingdon 1982). We proposed earlier (Georgiadis & Kat 1989) that this separation was more likely due to the dense vegetation associated with the Rift Valley walls than physical features of the Rift; in addition, the extremely arid southern section of the Rift Valley could have contributed to this separation of taxa (Talbot and Talbot 1963). We anticipate sampling a variety of other wildebeest populations in Tanzania and southern Africa to approximate the overall level of genetic variation represented within this species.

The Mara/Serengeti population on the west side of the Gregory Rift is not only statistically significantly differentiated from populations on the eastern side, but also exhibits considerably greater genetic diversity. Indeed, all 29 individuals examined from the Mara/Serengeti population could be individually identified by their D-loop sequence. This high level of diversity (nucleotide diversity = 2.05%; fraction of segregating sites = 0.098) is likely explained by the historically and presently large number of animals in this population: the Serengeti migrant population numbers close to 1.4 million animals.

In contrast, the Nairobi and Amboseli populations are much less variable, exhibiting only 9 haplotypes among 19 individuals examined (average nucleotide diversity = 0.43%, average fraction of segregating sites = 0.012). This lack of diversity might be explained by a historical bottleneck: as recently as 12,000 bp, the large mammal community structure of the savannas east of the Rift Valley was very different and wildebeests were not present (Marean & Clifford-Gonzalez 1991). Apparently, dry grasslands and arid-adapted ungulates expanded at least as far south as northern Tanzania during the last Glacial maximum, and numerical domination by large herds of wildebeest could be a recent phenomenon. If colonization of Amboseli/Nairobi savannas occurred through a series of founder events from a source population in southern Tanzania, a reduction of genetic variability would be expected.

Our data confirm historical occurrence of gene flow between the currently separated Amboseli and Nairobi wildebeest populations: two animals from Nairobi were identical in sequence to nucleotype AM2 from Amboseli. These populations were both apparently numerically larger in the past and occupied more extensive geographic ranges, although historical records do not indicate commingling (Talbot and Talbot, 1963). The populations were not statistically significantly different when compared with sequence statistics (P<0.170) as a consequence of this gene flow. However, each population does contain individuals with unique haplotype sequences, and the haplotype statistic HST for these populations was 0.084, with a corresponding statistical significance of P<0.029. These populations therefore do show a weak significant difference on the haplotype level, and both contribute to the overall genetic variability observed within *C. t. albojubatus*. The wildebeest population in the Nairobi area is under increasing threat from an expanding human population and associated land allocation in migration corridors and wildlife buffer zones. The formulation of management plans concerning this population in particular should benefit from information gathered here.



Waterbuck appeasement ritual (from *The Safari Companion*, drawing by D. Otte)

WATERBUCK

The waterbuck (*Kobus ellipsiprymnus*) is a bovid species with a widespread distribution in sub-Saharan Africa, occurring in grass savannas, bushland, and gallery forests near permanent sources of water. The taxon was originally split into two species, *defassa* (*K. defassa*) and common (*K. ellipsiprymnus*) waterbuck, based on differences in coat color and rump pattern: the defassa waterbuck is characterized by a solid white patch on the rump, whereas the common waterbuck exhibits a distinctive white ring around a dark area on the rump. The forms are now considered conspecific, although they are distributed allopatrically, with the defassa waterbuck ranging throughout western and southwestern Africa, and the common waterbuck occurring in eastern and southeastern Africa (Dorst & Dandelot 1970). The forms are separated by the Albertine (Western) and Gregory (Eastern) Rift Valleys, and it is only in northeastern Tanzania and Kenya that the two forms overlap geographically (Meester & Setzer 1971, Haltenorth & Diller 1980, Kingdon 1982). Hybridization is reported to occur in the zone of range overlap, which is believed to represent secondary contact between the two forms (Heyden 1969).

We examined variation in the mitochondrial DNA control region (D-loop) sequence of waterbucks from different localities in Kenya, representing populations morphologically resembling defassa and common waterbucks, as well as a locality (Nairobi National Park) which contains a small population of waterbuck exhibiting both types of rump pattern in addition to a variety of intermediate forms. We determined the nucleotide sequence of a 472 bp fragment of the D-loop, starting at tRNAPRO, for 105 waterbucks from seven Kenyan locations. A total of 79 variable sites were detected defining 48 different nucleotypes.

According to the sequence statistics, there is a statistically significant geographic structure among waterbuck populations in Kenya; all populations are genetically different from each other. In Kenya there is a west-east distribution of the two forms of waterbuck. Defassa waterbucks occur west of the Albertine Rift Valley, and common waterbucks occur east of Gregory Rift Valley. On the eastern slopes of the Gregory Rift Valley, morphological intermediates between the two forms have been described. Among the populations west of Gregory Rift Valley such as those in Masai Mara and Nakuru, which morphologically resemble defassa waterbuck, both defassa and common waterbuck nucleotypes are found. In the westernmost population from Masai Mara, the proportion of these defassa mtDNA types is higher than in the more eastern defassa population in Nakuru.

In the population of common waterbuck from Tsavo, only mtDNA of the supposed common waterbuck type is found. In the hybrid population from Samburu both common and defassa mtDNA types were encountered. In the Nairobi hybrid population only common waterbuck nucleotypes were found. This is congruent with the pattern revealed by the genetic distances among the waterbuck populations, where the hybrid population from Nairobi was found to be genetically closest to the common waterbuck population from Tsavo.

The distribution of the mtDNA types suggests that secondary hybridization of the two types of waterbuck has occurred west of the Gregory Rift Valley. This indicates that defassa waterbucks are expanding their geographic range eastwards at the expense of the common waterbuck range, and that hybridization is concomitantly occurring. Based on the assumptions outlined above, we suggest the following explanation for the observed population structure of Kenyan waterbucks. Ancestral populations of waterbuck were likely to have been separated from each other by forests and lakes associated with the Albertine Rift. This allopatric distribution allowed differentiation into the two morphological forms and evolution of characteristic mtDNA lineages. The defassa waterbuck population is proposed to have originally been distributed west of the Albertine Rift, while common waterbucks occurred east of this geologic feature, including the areas of Kenya which are within the present geographic range of defassa waterbuck. Possibly facilitated by climatic and vegetational changes during the latest period of glaciation, defassa waterbucks could have crossed the Albertine Rift and expanded eastwards, 'swamping' the resident common waterbuck population. Because of continuous immigration of defassa types, the water-

Arabian oryx Update on the Oman wild herd. There are now (August 93) 175 animals roaming unrestricted over a known range of 14,121 km^2.

Mountain gazelle (*Gazella gazella*). The taxonomy of these gazelles is, may I say; a confused mess!? We are at present calling all the gazelles (except the rheem—*G. s. marica*) *Gazella gazella* (mountain gazelle). One fine day we may be able to find time and experts to make a thorough survey of our gazelle populations, but I doubt very much if even then we will be able to distinguish accurately between subspecies in the field. I suspect they have been interbreeding over a very long time. Under *G. g. cora* in your article the facts in the last sentence are still correct, but we think they are all *G. gazella*. The Rangers of White Oryx Project on the Jiddat al Harasis and the management of the oryx help to ensure that the laws protecting wildlife in general are enforced more effectively in that whole area than elsewhere. The gazelle population is certainly stable and very quickly recovers from losses due to periodic long droughts. Good rains in 1992 produced widespread grazing for the oryx and gazelles. Both populations are increasing. However so have the Harasis domestic stock (camels and goats); this may cause a problem in the future. In the Wahiba sands the gazelle population is probably stable.

Muscat gazelle (*G. g. muscatensis*). I think it is doubtful if this subspecies ever existed in Oman. One thing is certain: the gazelle population on the Batinah (the coastal strip northwest of Muscat) has dwindled over the past 25 years to almost nil. So, if *G. g. muscatensis* ever was there, it is no longer. There is, however, a thriving population of *G. gazella* in the wadi systems, mountains and coastal strip between Ras Abu Daud and Qalhat (roughly between Muscat and Sur). This population has for over 20 years been under the protection of the guards of the Wadi Serin Arabian Tahr protection project of my office. Because of the mountainous nature of the general area, we find it difficult to assess the number of gazelles, but my guess is that it is not less than 2000. There are other significant populations of *G. gazella* in the Ra's al Hadd area (on the mainland south of Masirah Island) and scattered through the desert and southern mountains of Dhofar Region. These should increase in numbers under better law enforcement plans now being made by the Ministry of Regional Municipalities and Environment.

Goitered gazelle (*Gazella subgutturosa marica*). I would just add that after good rains the animals are frequently seen in the northern Jiddat al Harasis in groups of 4-20. They are also reported rather infrequently in the Bar al Hickman area. (The square peninsula opposite Masirah Island south of the Wahibah Sands.) The rheem are, unlike the gazelles, very scary animals, possibly due to hunting in the past, and are, therefore, often only seen moving fast in the distance. I hope that the Ministry's plans for better enforcement of wildlife protection laws, mentioned above, will soon have a beneficial effect on the status of Oman's rheem.

INDIA

Last Chinkara Stronghold under Siege

Two letters from Indian wildlife biologists and one from an Indian conservation group, received in September, warn of a severe threat to the chinkara *Gazella bennetti*, India's rarest antelope. Asad R. Rahman, PhD, of the Centre of Wildlife and Ornithology at Aligarh Muslim University, writes (18 Sept. 93):

"I have just returned from two-month survey of wildlife of the Indian Thar Desert, especially chinkara, blackbuck, great Indian bustard, common crane, demoiselle crane, sandgrouse, etc. There has been a drastic decline in the chinkara population in certain areas of the desert. This could be due to poaching and three years of drought. I have already done two surveys (February and July-August), and I will do one more survey of the whole Thar (Indian) Desert (200,000 sq. km) in December-January before writing the final report. Meanwhile in a few days I will send you my preliminary report on chinkara.

"I am enclosing a newspaper clipping about denotification of a Chinkara Sanctuary. One of my friends has gone to court against this illegal act of the state government. I have also written to many officials in the Ministry of Environment, Government of India. I request you to write letters to the following persons:

1. Mr. Kamal Nath, Minister of Environment, Forests and Wildlife
2. Mr. Rajamani, Secretary, Ministry of Environment, Forests and Wildlife

Address for both: Paryavaran Bhawan, CGO Complex, Lodi Road, New Delhi — 110 003, India.

The second letter, addressed to Secretary Rajamani by H. S. Panwar, Director of the Wildlife Institute of India (WII), makes clear what is at stake and how vulnerable India's protected areas (PA) are under the system that gives states such power over nature reserves within their boundaries, rather than the Central Government.

"You are of course aware of a notification issued by the Government of Gujarat denotifying 700 sq kms of the Narayansarovar Sanctuary in the Kutch region of that state. Before dealing with the factual position that the said notification is a blatant violation of the Wildlife Protection Act 1972 as amended in 1991, I would like to give below the salient conservation values of this sanctuary.

1. Its total area is 765 sq km. It was established on 14.4.1981.
2. It forms part of bio unit 03 B of the WII-Biogeographic classification, i. e. the Indian desert-Kutch region.
3. It is the only dry land PA [Protected Area] in the Great Rann of Kutch and the only representative of the Southern Kutch Thorn Forest.
4. It has one of the few rare and extensive habitats for the hourbara and the great Indian bustards endowed with good populations.
5. Endowed with ideal chinkara habitat, it has the largest single chinkara population in the country.
6. Other rare and endangered species include caracal, wolf, desert monitor, star tortoise, and lesser florican.
7. It commands a very rare gene pool of *Commiphora* (Gugal).

It is on account of these rare ecological and biogeographic attributes that WII has suggested the upgradation of 100 sq km of this sanctuary to the status of a national park, so that the country has a small segment of totally undisturbed habitat for the rare combination of floral and faunal resources of the bio unit 03 B.

Legal position: In accordance with Subsection (3) of Section 26-A of the Wildlife Protection Act 1972 (as amended in 1991), no alterations in the boundaries of a sanctuary can be ordered by any State Government without first passing a resolution in the State Legislative Assembly. We have understood that no such resolution was ever introduced or passed by the State Legislature. It appears

that a small Committee of officers was pressurized in[to] recommending such a reduction in the area of the sanctuary, which has been taken as the basis for denotification.

It is also understood that the Government of Gujarat has. . . constituted a Committee comprising PCCF, CCF (WL), CF (WL) and CF (Territorial) to review the PA network of Gujarat, perhaps to suggest further protected areas for denotification or reduction in size. The Gujarat PA network has already been reviewed by the WII (Rodgers and Panwat 1990) and specific proposals are before the Gujarat Government for implementation. These proposals are for strengthening of the network by adding new areas, enlarging some and by upgradation of legal status of some areas from sanctuary to national park.

Instead of examining the merits and feasibility of these proposals and initiating a sincere effort to implement them, the State Government has chosen to fritter away an already weak PA network of the State. Narayansarovar Taluka has a population of about 45,000 people but there has been no demand so far for the denotification of the sanctuary for any purpose. Apparently the notification is to pave the way for limestone mining for cement factories. As the crow flies, Narayansarovar is only 25 km from Karachi and therefore has a strategic importance. Any industrial development in the area may have strategic implications.

Compromising of long-term sustainable benefits: Government of Gujarat's action is obviously fueled by a very short-sighted and expedient approach. Conservation of biological diversity is now globally recognized as a requirement for the well-being and quality of life of humankind in the next century and beyond. The industrialized countries are pressing the developing countries to conserve the biological diversity because they see it as the raw material for their economic prosperity in the coming century. India is a unique country in that she not only commands almost unparalleled biodiversity values but also has the potential to develop technical capability backed by traditional knowledge to harness biological diversity for economic gain on a global scale, in addition to benefiting the communities living inside or adjacent to natural systems. India's unique biodiversity is attributable to a very vast range of habitats from the high mountains to coasts. The Kutch desert region is also one such important type in the total range. Diversion of its residual wilderness can only be at the peril of compromising our long-term economic and social welfare interests for some short-time unsustainable economic gains now.

It will be appropriate if the Central Government, in addition to the action which no doubt would already have taken to persuade the State Government, should once again try to prevail upon it to withdraw the illegal notification. We at the Institute shall feel grateful to you for an urgent and stringent action in the matter."

The Environment Awareness Club of South Gujarat addressed an appeal to the Governor of Gujrat, with a copy to SSC/IUCN. Selected quotes:

"It is with great distress and concern that we. . . have learnt about the proposed move to denotify the Narayan Sarovar Sanctuary in Kutch. . . While on the one hand, the Central and State Governments unequivocally affirm their conviction of the urgent necessity to protect and preserve the little that remains of wildlife and forest areas in our country, it is indeed shocking that on the other hand, in the name of 'development' and 'industrial growth,' such vital areas are exposed to total destruction of habitat. It is reported that the Government of Gujrat is keen to favour Sanghi Cement Co. of Hyderabad to put up a cement plant there. . . Are a handful of people in whose hands rests the future of our country to be allowed to act thoughtlessly and do whatever they please, without consideration of the consequence of their actions on the welfare of posterity?"

Several articles from the 28 July 1993 edition of *The Times of India* reported the attempt to denotify the Narayan Sarovar Sanctuary. A few paragraphs are quoted here to round out the story.

"The sanctuary, spread over an area of 766 sq km, is a natural habitat to over 1400 chinkaras. . . Due to the very high risk of its total extinction, the Central government had recently declared chinkaras as number one category of endangered species, along with lions and tigers." [Times of India News Service]

"According to WWF-India, the sanctuary is the only one of its kind in India where the chinkara is protected and still roams freely. Unlike most other protected areas in India, the Narayan Sarovar sanctuary has been under relatively low pressure from local people and grazing animals. No cases of illegal hunting have gone on record as per a 1984 report. There is no evidence of any management problem that could possibly warrant the denotification of a sanctuary that protects a unique and rare ecosystem." [Article by Prithi Nambiar]

"According to state government sources here, the Chief Minister, Mr. Chimanbhai Patel, is determined to go ahead with the proposal to denotify the area despite opposition from a section of the bureaucracy and others. The state cabinet is understood to have approved the Chief Minister's move."

"Under the Wildlife Protection Act, no Central clearance is required to notify or denotify a sanctuary area. The power is vested in the state governments unlike under the Forest Act, where Central clearance is necessary. However an approval from the state legislature is compulsory.

"The Chief Minister, however, has sought the advice of the government legal department to suggest ways to short-circuit the route and issue the notification without being required to place the proposal before the state assembly.

"The move, it is believed, was taken up in right earnest immediately after the Central Government issued a circular to all states under the Environment Protection Act in January, seeking opinion on a proposal to ban setting up of any industrial unit within five kilometers from the boundary of a declared forest or sanctuary zone. This also amply makes it clear that the Centre is opposed to the idea of any industrial unit being set up within a sanctuary."

"The environmentalists fail to see any justification for the government's move, since cement factories could easily be set up anywhere outside the sanctuary zone. Most parts of Kutch district are rich in minerals and have abundant deposits of limestone as well as lignite." [From Times of India News Service]

Blitz the Ministry of Environment

As Asad Rahmani evidently thinks that expressions of concern from the international conservation community could have some influence, ASG members and other readers who care about Indian wildlife should contact the Ministry of Environment, Forests and Wildlife.

MONGOLIA

Henry Mix, a Graduate Student in the Institute of Zoo and Wild Animal Research, Berlin, wrote the following report (6 Oct 93) of a recent trip to Mongolia for *Gnusletter*, for which I thank Reinhold Hoffman[ASG], Director of the Institute.

Present Situation of Antelopes in Mongolia

In Central Asian Mongolia still live a number of extremely rare large animal species, the situation of which regarding their population—if ever known—is critical almost without exception.

Beside the Przewalski horse (*Equus przewalski*) already extinguished 30 years ago, the following species should be mentioned: the wild camel (*Camelus ferus*), the Asiatic wild ass (*Equus hemionus*), the argali (*Ovis ammon*), the Gobi bear (*Ursus arctos*), the snow leopard (*Uncia uncia*), and all three Mongolian antelope species.

Mongolian gazelle (*Procapra gutturosa*)

Goitered gazelle (*Gazella subgutturosa*) and

Mongolian saiga (*Saiga tatarica mongolica*)

Especially the populations of antelopes decreased drastically in recent years.

The overall population of the Mongolian saiga dropped to 300 individuals. The last small herds live in an inaccessible basin of Gobi ("Shargijn Gobi") in the northern Gobi-Altai. The Dsungarian populations and those of the Transaltai-Gobi (southern slopes of the Mongolian Altai) are extinct.

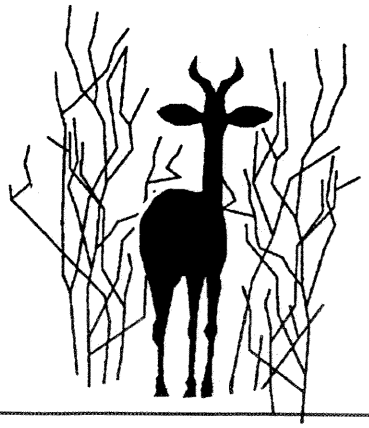
The goitered gazelle is the characteristic animal of the deserts and semideserts of Iran and northern China, but the populations decrease as well in the whole dispersal area. For the Mongolian *Gazella subgutturosa* there are no reliable figures of population sizes, but zoologists have been taking records of a constantly decreasing population. This corresponds with my own observations in the past.

The Mongolian gazelle or goitered antelope (*P. gutturosa*) is probably the one with the biggest population in Mongolia at present. As late as in the early years of this century, Russian researchers counted aggregated groups of up to 100,000 individuals. Even now, one can see herds of 30,000 animals and more in the Manchurian Steppe of the Dornod-Aimak. However, even here one can notice a drastic decrease at places. The migration area of the goitered antelope diminished by almost 50% during the last four decades. Many isolated populations in western and central Mongolia are extinct. There are no up-to-date population figures available for Mongolia; the overall population is assessed at 300,000 animals. The Chinese populations, showing a fast decrease as well, are roughly assessed at 50,000 individuals.

Despite this unclear situation, *Procapra gutturosa* is as intensively hunted now as ever. Merely in the winter 1992-93, according to official figures, 18,000 animals were shot within a few days. The hunting procedures remind one of the saiga massacres in Kazakhstan. The herds are dazzled with spotlights at night and shot irrespective of their composition. The meat is sold on the local market, but exported to Europe as well. The horns are exported to Southeast Asia by devious ways and means, where they increasingly replace the less-and-less available rhino horn as an alleged aphrodisiac.

The legal hunting limits have no effect in the present period of political upheaval. Almost 2000 km away from the capital, Ulan Bator, the herds are poached practically without any control or limits. Large preserves do not exist and there are no funds for rangers. It is just a matter of time before critical population sizes will be reached with this method. The example of saiga shows how difficult it can be to maintain the species at all.

Finding out the actually existing population size and development of a management plan or utilization concept based on this knowledge is indispensable. Investigations on the population structures and abundance dynamics must reveal, whether and to what extent such a utilization of the populations is justifiable in this time. Moreover, establishment and development of at least one large national park is required in the near future to protect the Mongolian goitered antelope against excessive utilization.



Only by prompt international support can these biggest natural migrations of animals in Asia be maintained in the long run. As an overall phenomenon, they are a unique component of the Mongolian fauna and without doubt part of the world natural heritage in the last intact steppe areas worldwide.

George Schaller was also recently in Mongolia, as part of his five-year survey of the Tibetan Plateau and surroundings. He also reported (pers. comm. Aug. 93) seeing a large concentration of *Procapra gutturosa* in eastern Mongolia (around 25,000 animals), which he likewise characterized as the last intact portion of the immense Asian steppe.

It is interesting that the Tibetan antelope (*Pantholops hodgsoni*) and *Procapra gutturosa*, two very unusual and little-known antelopes, still survive in substantial numbers within their respective biomes, whereas gazelles and other associated ungulates are comparatively rare. Establishment of the Chang Tang Reserve in northwestern Tibet has brightened the future for the Tibetan antelope. If only an equivalent area of the Mongolian steppe could be set aside, then our descendents may have the opportunity to enjoy the Mongolian antelope and other steppe wildlife.

CHINA

Li Yinghong, of the Chongqing Zoological Gardens, Chongqing 630050, wishes to make contact and exchange information with *Gnusletter* readers. He writes (23 Aug 93) in excellent English:

"I'm writing to inquire if it's possible for me to receive *Gnusletter* in the future. As the animal collection manager of Chongqing Zoological Gardens and member of CBSG,. I'm very interested in antelope species and used to be the curator of herbivores and pandas. By the way, Chongqing Zoological Gardens has had a large collection of antelopes and breed all of those species.

"In view of this, we are now planning to develop our collection of antelopes, and would like to be involved in ex situ conservation of antelopes in China. Meanwhile, I would like to exchange experience and knowledge with colleagues through [the] Antelope Specialist Group.

"So your newsletter and future cooperation would be greatly appreciated."