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## **CURRENT STATUS OF UGANDA KOB (*KOBUS KOB THOMASI* NEUMANN) IN TORO GAME RESERVE, UGANDA**

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### **ABSTRACT**

As part of a biological assessment of Toro Game Reserve, the status of Uganda kob *Kobus kob thomasi* Neumann, was studied. A survey of traditional mating grounds, foot transects and opportunistic sightings was used to determine population size and structure. The influences of habitat, predation and poaching intensity were also investigated. This study indicates that the population of kob in Toro Game Reserve is approximately 100 animals and, though small, has a viable structure for expansion. Data indicate a comparatively high proportion of females in the population, with a ratio of adult females:adult males:juveniles (< 1.5 years old) of 5:2:2. The preferred habitat is the major vegetation type within the Reserve and presents no limiting factor to population growth. Predator levels are low and the principal threat to the survival of Uganda kob is poaching.

### **INTRODUCTION**

Toro Game Reserve (548 km<sup>2</sup>) is located in western Uganda. The Reserve is situated in the Rift Valley where steep escarpments form a natural boundary to the east and south-west of the Reserve. The seasonally flooded Controlled Hunting Area lies immediately north, extending to the Zaire border. The shores of Lake Albert form the north-west margin. During our visit to Toro Game Reserve, the area was surveyed and maps produced of the topographical features, including permanent water courses and vegetation types. Six broad habitat types were identified: grass savanna, swamp grassland, wooded savanna, scrub savanna and riverine forest (Langdale-Brown *et al.*, 1964).

Two races of kob exist: the Uganda kob (*Kobus kob thomasi*) and the white-eared kob (*Kobus kob leucotis*). Kob were originally distributed throughout the northern savanna from eastern Uganda to Senegal. These antelopes prefer perennial grasses in their early stages and need to drink daily (Estes, 1991). Their habitat of green pastures in well-watered areas is threatened by agricultural development and, as a result, their distribution is being reduced. Today, the migratory white-eared kob range the vast floodplains of southern Sudan. Both races are gregarious and polygamous forming loosely structured herds which vary in size and composition on a daily basis. At low to average densities, kob have a conventional territorial sedentary-dispersed type of social organisation (Leuthold, 1966). At higher densities of 40–50 per km<sup>2</sup> (Kingdon, 1982), roughly two-thirds of the males defend conventional territories while the remainder cluster on traditional breeding arenas or leks (Estes, 1991).

Within Toro Game Reserve, Uganda kob have been the subject of several ground surveys (Buechner, 1961a, 1961b, 1963, 1971; Buechner & Roth, 1974; Leuthold, 1966; Verner & Jenik, 1984). Aerial surveys have also been carried out to census the large mammal populations within the Reserve (Eltringham *et al.*, 1992; Olivier, 1992). Frontier-Uganda conducted a biological survey of Toro Game Reserve between 15 July and 9 September 1993. During this time the population size and structure of Uganda kob were assessed.

## METHODS

Several methods were used to assess the population of kob within the Reserve:

### Monitoring of territorial grounds

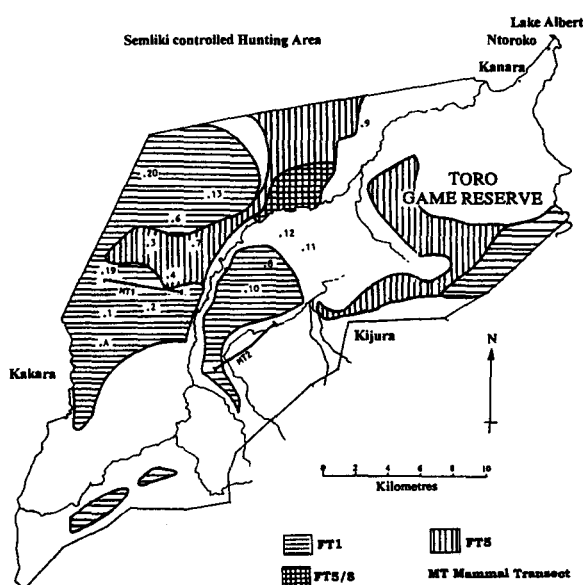
Fourteen of the 'territorial grounds' identified by Buechner (1961a), and revisited by Verner & Jenik (1984) between January and February 1978, were monitored to determine their relevance to the current kob population (fig. 1). Buechner noted that the average territorial ground was about 200 m in diameter. We studied an area of 1 km in diameter at each pre-determined site (see table 1). Territorial grounds close to one another were surveyed at similar times on the same day to avoid double counting. Those with poor access (sites 3, 6, & 9) were visited only once. Those which had experienced a change in vegetation type, either natural or influenced by encroaching cattle, were also visited less frequently as it appeared that kob were no longer present in high concentrations at these sites.

### Mammal transect

Two permanent transects of 5 km length were established in typical savanna habitats to determine the occurrence, density and distribution of large mammals within the Reserve, including

Uganda kob (fig. 1). Transects were walked early in the morning to maximise potential observations. The full results of this survey are presented in a separate report (Stubblefield, 1994). The first transect was located in partially burnt grassland; the good visibility increasing effective transect width to 600 m. The second, with an average visibility of 200 m, was located in a mosaic of mixed wooded savanna occasionally opening to grassland and grading to riverine forest in valley bottoms. These transects were walked seven and four times, respectively, and combined methods outlined by Norton-Griffiths (1978): the fixed width transect, variable width profile and Kelkar's method.

Less systematic methods were also used to assess the numbers and distribution of large mammals, including Uganda kob. Game walks of up to 15 km/day were carried out by two separate groups not exceeding four people. At least once a week



*Figure 1. Map of Toro Game Reserve to illustrate the mammal transects in relation to vegetation cover and the approximate location of kob territorial grounds resurveyed by Frontier-Uganda.*

these walks were extended up to 50 km involving overnight camping. Evidence and information on predator and poaching activities was also obtained during fieldwork, and from discussions with game guards and local people.

## RESULTS AND DISCUSSION

A total of 357 kob sightings were made. All animals appeared healthy.

### Territorial grounds

Surveys of territorial grounds (Buechner, 1961a) provided data on the relative density of Uganda kob in areas where the animals were known to concentrate (table 1). The frequency of animals at site A, noted during game walks, warranted its inclusion in the survey of territorial grounds. One possible reason for the frequency of kob at site A is its proximity to the ranger camp, where animals may feel protected.

*Table 1 Results of the monitoring of Uganda kob territorial grounds in Toro Game Reserve, July–September 1993.*

Territorial Ground	Average Number of kob / km <sup>2</sup>	Standard Deviation	Number of Visits
Site 1: FT 1*	4.7	4.6	3
Site 2: FT 1	8.3	6.8	5
Site 3: FT 5	0	-	1
Site 4: FT 1	6.5	7	8
Site 6: FT 1/5	0	-	1
Site 7: FT 5	8.5	7.7	8
Site 8: FT 1	3.5	3.5	8
Site 9: FT 5	0	-	1
Site 10: FT 1	2.8	3.5	6
Site 11: FT 5	15.5	20.5	3
Site 12: FT 1/5	1	0	8
Site 13: FT 1	2.5	0.7	3
Site 19: FT 1	5	0	5
Site 20: FT 1	0	-	1
Site A: FT 1	9.5	8.9	15

\*Table 2

Territorial grounds showing the highest kob frequency in Toro Game Reserve were those with short, verdant grass resulting from localised rainfall after burning. This was particularly apparent at site A and fits well with other findings (Deutsch, 1993; Lock, 1977). Uganda kob prefer territories with high visibility, particularly for breeding (Deutsch & Weeks, 1992), probably due to the reduced risk of predation (Balmford, 1992). Areas of high kob concentration were commonly located in *Hyparrhenia-Themeda* grassland mosaic (FT 1)(table 2). *Acacia* dominated wooded savanna comprising the same grass species (FT 5) was also frequented. The increased tree cover does not significantly reduce the high visibility favoured by these antelopes.

Table 2. Vegetation Types of Territorial Grounds (Table 1)

FT 1	<i>Hyparrhenia-Themeda</i> mosaic	Grassland with occasional trees.
FT 5	<i>Acacia-Hyparrhenia-Themeda</i> mosaic	Wooded savanna (more than 20% tree cover).
FT 8	<i>Borassus</i> savanna	Palm savanna. Scattered trees in medium-high grassland with no thicket clumps. Sometimes in a mosaic with FT 5.

Some of the traditional territorial grounds revisited during the study period appeared to have been abandoned, possibly as a result of vegetation change. Increased cover, particularly by *Acacia sieberiana* and *Capparis tomentosa* thicket have reduced visibility on grounds 10 and 11. Also, the previously protective Semliki Lodge close to site 10 is no longer there and the numbers of kob in this area are low despite suitable vegetation. Encroachment by pastoralists from the Controlled Hunting Area is also important as it has resulted in overgrazing and trampling of site 20, possibly extending as far as site 13. This may explain the absence, or near absence, of kob in these areas.

Vegetation types FT 1 and FT 5 cover some 40% of the Reserve. A mosaic of FT 5 and FT 8 covers an additional 5%.

### Mammal transects

The transects were located in typical savanna habitats. Observations made on the mammal transects, and throughout the Reserve on walks, provided information on the relative density of kob in areas where these animals are not known to concentrate (table 3).

Table 3. Results of Uganda kob observations on mammal transect 1, Toro Game Reserve, July–September 1993.

Observation number	1	2	3	4	5	6	7	Mean density of kob/km <sup>2</sup>
Direct sightings	-	1	-	3	-	-	-	0.22
Footprints seen	-	+	+	+	+	+	-	-

Transect 1, located in vegetation type FT 1, indicates a density of 0.22 kob/km<sup>2</sup>. No direct sightings were made of kob along transect 2. Kob footprints were recorded on both transects indicating their presence in the area though no frequency can be determined from this information.

The basic vegetation survey showed that some 45% of the Reserve is suitable for Uganda kob. At a density of less than 0.22 kob/km<sup>2</sup> a population of 55 kob would inhabit the Reserve. The frequency of sightings suggest that the population is in fact higher than this figure. However, it is also misleading to use the average densities recorded at the areas termed territorial grounds as these will give an over-estimate of the population. Logistical constraints reduced the proportion of the Reserve that was intensively sampled to 8% of the exploitable area, though extensive surveys covered up to 60% of the suitable habitat. This survey was carried out during the dry season: towards the end of the survey localised rainfall encouraged new grass growth attracting higher concentrations of kob to areas with good visibility.

From table 4, the drastic decline of the kob population since the 1960s is apparent. The most marked reduction was between 1982 and 1991 when numbers decreased by 97%. The results of this survey are insufficient to provide an estimate of the current population, though they indicate that the number of kob is close to 100 animals sighted in 1991 (Olivier, 1992).

Verner & Jenik (1984) discuss the pre-1978 population changes, particularly regarding the effects of cropping. Buechner, with reference to Brooks (1961), used the estimate of 18,000 kob as a basis for calculations concerning exploitation. Commercial harvesting and licensed game hunting were introduced by the Game Department in 1963 and 6,770 animals were removed between 1964 and 1970. According to Verner & Jenik (1984), the original over-estimate of population size and too high cropping calculated from incorrect data were probably the decisive factors responsible for the diminishing numbers of Uganda kob in Toro Game Reserve until the 1970s. Though legal exploitation ceased in 1975, when action was taken to suspend licensed hunting and cropping, poaching during the years of political unrest (1971–1986) is likely to have contributed to the reduction in population.

Table 4: Temporal change in the population of Uganda kob in Toro Game Reserve, Uganda.

Author	Date of count	Approximate number
Buechner & Golley (1967)	1958	7, 422
Buechner (1961a)	1961	10, 000
Buechner (1963)	1958 & 1961	12, 000
Buechner (1971)	1957–8 & 1962–3	8, 265
Buechner & Sloeth (1965)	-	15, 000
Buechner <i>et al.</i> (1966)	-	15, 000
Kyeyune (1969)	1961	18, 000
Buechner (1971)	-	19, 117
Vagner (Unpubl.)	1975	5, 000
Verner & Jenik (1984)	1978	2, 500
Eltringham <i>et al.</i> (1992)	1982	3, 460
Olivier (1992)	1991	92
This survey	1993	approx. 100

### Population structure

Individuals and pairs were usually observed, particularly adult females with very small calves. Small groups of between four and five juvenile males were frequent, often associated with young male reedbuck (*Redunca redunca*, Pallas, 1767). Mixed-sex groups of up to 30 animals were recorded, though smaller groups of between five to seven were more normal.

Female kob associate with other females at random, maintaining few, if any, long-term rela-

tionships (Balmford, 1992). Such loose associations were observed in Toro where, on any given day, female kob were seen grazing in groups of between seven and 23, and later dispersed into smaller groups and pairs. No pattern was obvious except larger groups were usually seen in the late morning. Adult and juvenile males were commonly observed as an integral part of these herds, a feature noted by Kingdon (1982), though again such associations are not permanent. Single-sex groups of up to 17 males were also recorded.

No copulation was observed, though a heavily pregnant female in a group with two adult males and another female with a very young calf was seen. Although kob breed all year round, Modha (1971) recorded two distinct peaks in mating activity in the Queen Elizabeth National Park (QENP), also located in western Uganda: February–April and August–October, coinciding with the two wet seasons. The gestation period of the Uganda kob is approximately 240 days (Buechner *et al.*, 1966). Calves tend to accompany their mother after six to eight weeks, prior to this they lie concealed in dense grass (Modha, 1971). This implies that the kob in Toro are breeding outside the peaks recognised in QENP, suggesting that suitable conditions exist for reproduction, even during the dry seasons. However, to confirm this further study in the Reserve and comparable work in QENP is required.

Data on population structure were obtained for 68% of the sightings (table 4). Population structure data for site A is also illustrated (fig. 2).

The proportion of adult females in Toro was 15% higher than that recorded in other studies (Buechner, 1971; Verner & Jenik, 1984). However the population structure was similar to that recorded by Buechner & Golley (1967) for Toro: adult males 22%, adult females 57% and juveniles (less than 1.5 years) 21%. The higher proportion of adult females observed in these studies may be the result of male territorial behaviour making them easier poaching targets.

Observations of this survey fit the theory that leks are absent where kob densities are low (Deutsch, 1993). However, kob densities at these sites still appear significantly higher than in other parts of the Reserve. Leuthold (1966) suggested that territorial grounds may become traditional centres of orientation for local population units. Also, leks are notoriously stable. Deutsch (1993) noted that they maintain their location for more than ten years. Thus the territorial grounds identified by Buechner may still be relevant to the current kob population.

Studies show that when densities are low, males defend isolated 'single territories' (Leuthold, 1966; Balmford, 1990). These are larger and more widespread than those on leks. Their size, number and distributions vary widely with season and local conditions. Single adult males were observed during this survey on several occasions, usually within 1 km of traditional territorial grounds. However, records were not sufficient to determine if they were defending a territory, or if such territories were resource-based or simply associated with traditional mating grounds.

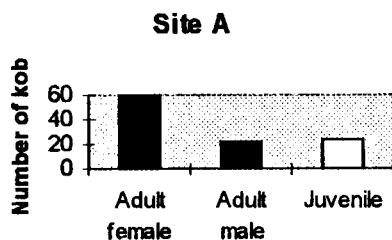


Figure 2. Kob population structure in Toro Game Reserve, Uganda. July–September, 1993.

### Predation pressure

The main predators of Uganda kob are lion and leopard (Verner & Jenik, 1984). Five cases of predation on female kob by *Python sebae* were reported from the Reserve (Hay & Martin, 1966). Large raptors are also potential predators of calves.

In 1978, 28 lion in five groups were present in Toro (Verner & Jenik, 1984). Interviews with

game guards established that there are currently five lions present in the Reserve, two solitary adult males and a family group of three (an adult male and female and a cub, sex as yet undetermined). No direct observations of these lions were made during this survey though prints were recorded. One solitary male lion inhabits the wooded savanna surrounding the ruined Semliki Safari Lodge. One fresh kob kill was observed in this area during the study period. According to the game guards, the most likely predator was this lion. Information provided by the guards suggests that the current rate of kob kills by lion is low, preferred food sources being domestic cattle, cane rats (*Thryonomys gregorianus*, Thomas, 1894) and other small to medium mammals. The drastic decline in kob, and the resultant loss of kob territorial grounds, have probably made kob hunting more difficult for lions which now hunt what they can get easily. The preferred food source was kob when the kob population was at its peak (Stubblefield, 1994). No observations of leopard or hyaena were made, although tracks were recorded and indicate that numbers are low.

### Poaching intensity

Verner & Jenik (1984) reported the strongest pressures emanating from the west and north-west of the Reserve, but traces of poaching were found in many other places. Currently no one particular area is targeted. Traps are set in specific habitat types for particular species.

Poaching pressure was difficult to quantify. However, two groups of poachers were observed: one group of eight was seen hunting kob with an automatic rifle and using dogs to work out game. The other group of four was carrying spears. Poachers' fires were common and sets of wire snares were found on four occasions. Game guards explained that poaching occurs on a local scale, but during the dry season organised groups of hunters from Zaire visit the Reserve. Thus, poaching intensity appears high and—since predation levels are minimal—is the primary threat to the viability of the kob population. Excessive burning by poachers trying to encourage new grass growth and improve visibility, and encroaching cattle, contribute to the destruction of kob habitat.

Despite the permanent presence of Game Department staff in the Reserve, poaching levels remain high. This is due to lack of anti-poaching equipment, poor morale due to low remuneration, and inadequate staff numbers scattered several kilometres apart without transport. Crucial to maintaining the population and increasing game numbers are the control of illegal hunting and habitat destruction.

### ACKNOWLEDGEMENTS

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