OBSERVATIONS ON THE MIGRATION AND HABITS OF THE ANTELOPES OF THE KALAHARI GEMSBOK PARK. PART IV.

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The present paper is the outcome of a 12-day visit to the Kalahari Gemsbok Park during the second half of April 1960, and under the headings used in previous reports the following observations of this visit can be recorded.

1. *Animal Movements.*

There is not much to add to earlier observations on this point. Compared to the previous year the position was briefly as follows.

The gemsbok and springbok populations showed a slight increase, due to an influx from neighbouring areas, but no large-scale movements that could be regarded as migration appeared to have taken place.

The blue wildebeest population remained more or less stable and did not extend the limits of their very restricted territory in the upper portion of the Auob river.

It is, however, of interest to record that the blue wildebeest inhabiting this locality, and which were previously regarded as a sedentary herd that never migrates, even under adverse conditions, wandered about a great deal when conditions became unfavourable towards the end of the previous year.

Of the total number of about 500 animals inhabiting this area, the majority moved away, dispersing in a northern and southern direction to points as far as 35 miles from the river. They returned after about two months, almost immediately after their regular haunts near Mata Mata had a good shower of rain.

The red hartebeest showed a definite increase in the Nossob area and a large influx of animals must have taken place, probably soon after the commencement of the rainy season. It is possible that this animal, as well as the blue wildebeest of the Nossob area, still migrate regularly and on a large scale.

Only one herd of eland was encountered. It was a herd consisting of 17 animals, mostly bulls, and they were on the point of crossing the Nossob

River from the direction of the Park into Bechuanaland. It is evident that the Park does not have a permanent eland population. There seems to be an interminable coming and going of these animals between the Park and the adjoining portion of Bechuanaland, but there is no fixed pattern in these movements.

2. *Food Habits.*

The following direct feeding observations were recorded.

The Springbok :

Amaranthus thunbergii, Indigofera alternans, Eriocephalus pubescens, Aptosimum lineare, Aizoon fruticosum, Zygophyllum sp., Euphorbia sp. (Leistner 1851), *Acacia haematoxylon, Acacia detinens, Psoralea obtusifolia.*

The Gemsbok :

Chloris virgata, Panicum coloratum, Tragus racemosus, shoots of Colocynthis naudiniana, Acacia haematoxylon, Brachiaria glomerata, Aristida obtusa, Monechma hereroense, Enneapogon brachystachyus, Panicum laevifolium.

The Red Hartebeest :

Panicum coloratum, Aristida ciliata, Brachiaria glomerata, Schmidtia kalahariensis.

Blue Wildebeest :

Panicum coloratum, Panicum laevifolium.

In addition to the above feeding observations, the following plants were identified in a stomach analysis of the springbok and gemsbok respectively. The feeding observations as well as the stomach analysis were carried out with the kind assistance of Mr. O. Leistner.

The Springbok :

Cucumis hookeri, Lycium sp. (Leistner 1855), *Aristida obtusa, Tribulus sp., Rhigozum trichotomum, Amarantus thunbergii, Boerhaavia cf. B. diffusa* (Leistner 1889), *Brachyaria glomerata, Tragus berteronianus, Barleria rigida* (fruit), *Limeum argute-carinatum, Chrysocoma polygalaefolia.*

The Gemsbok :

Acacia detinens, Acacia giraffae, Acacia haematoxylon, Aristida ciliata, Aristida amabilis, Asthenatherum glaucum, Bracharia glomerata, Colocynthis citrullus (fruit), *Cucumis hookeri* (fruit), *Eragrostis lehmanniana, Fimbristylis exilis, Gisekia miltus* (flowers and seeds), *Limeum viscosum.*

According to Mr. Leistner more than 90% of the stomach contents consisted of grass, of which *Brachiaria glomerata* comprised about 50%.

3. *Numbers and Distribution of Game Animals.*

To make a general survey of the relative abundance and distribution of the antelopes in the Park, regular counts were made on our travels throughout the Park.

As there are so many areas which are virtually without any game, the publication of the census tables are not justified. Instead, a general account of our observations will be given.

The Auob River was in a wonderful condition, but in spite of the abundance of food, gemsbok and springbok were relatively scarce in the river bed. Blue wildebeest were plentiful within the boundaries of their usual haunts.

The total number of blue wildebeest inhabiting the Auob River is about 500. The largest herd encountered consists of over a hundred animals. They are usually found very close to the river and the largest number occur within a few miles from Mata Mata.

The largest number of springbok counted on a single trip from Twee Rivieren to Mata Mata (a distance of 76 miles) was 600. This number is composed of two large herds, numbering 214 and 200 respectively, a few smaller herds and odd individuals. They all occurred in the river bed or the dunes immediately adjoining it, feeding on the ephemereals and short-cropped *Aristida obtusa*.

We never counted more than 200 gemsbok on a single trip between Twee Rivieren and Mata Mata, and we covered this portion at various times of the day. This number is exceptionally low but it can be accounted for by two possible reasons. Firstly, the days and nights were relatively cool and the animals' water requirements are much less than in summer; secondly, ephemereals and young, luscious grass were plentfiul in the dune country south-west of the Auob River. Gemsbok feeding on this have very little need of water.

The only red hartebeest encountered in the Auob River was a solitary bull, which we saw on a number of occasions.

A trip through the dune country south-west of the Auob revealed that some parts of this area carried a large concentration of gemsbok. In the area around Camms Pannen we counted 567 gemsbok within an area of 10 miles. The largest single herd numbered 200 animals. Other members of our party encountered a herd consisting of 330 animals.

These large herds occurred in the valleys between the dunes, where the dominant feature of the vegetation was the dense stands of short *Rhigozum trichotomum;* in fact, these valleys are generally known as "driedoring-strate" *(Rhigozum-streets).* A large variety of ephemereals and young *Schmidtia kalahariensis* and *Brachiaria glomerata* occurred amongst the *Rhigozum.* The

ephemereals consisted mainly of *Limeum viscosum, Oxygonum alatum, Gisekia miltus, Tribulus sp.* and *Indigofera alternans,* while *Limeum arenicolum* occurred on the dunes. These ephemereals, as well as the young grass, all figure prominently on the gemsbok's menu. This fact, as well as the absence of any dense grass or other growth in these valleys, account for the large concentration of gemsbok in this area.

In the area around the Klein Skrij Pans we found another large concentration of gemsbok. Of 367 animals counted in this area, 173 were found standing in the two pans, consuming "brak" (mineral or salt lick).

Wherever we came across dunes of the covered type, or crossed valleys with a dense cover of grass, the number of game showed an immediate decrease. Gemsbok prefer the open red dunes and avoid the grass-covered dunes and valleys as far as possible.

The game inhabiting the Nossob River showed a very interesting distribution. On our last visit to the Park — September 1959 — the area between Twee Rivieren and Melkvlei proved to be the most prolific area in the Park. This stretch of the river ,a distance of about 25 miles, carried about a thousand springbok, and a large number of gemsbok and red hartebeest. On the present trip, however, this area was almost devoid of game. A few small herds of springbok, some solitary gemsbok and a single blue wildebeest, were the only animals encountered in this area.

Table 1 gives a fair indication of the distribution of game in the Nossob River, up to Groot Kolk.

The herd of springbok shown in the first class interval occurred at the confluence of the Auob and Nossob Rivers, and were almost invariably found there, feeding on the ephemereals in the river bed.

Over the first 45 miles hartebeest were very scarce, but they showed a gradual increase and from Lijersdraai onwards they became really plentiful.

The whole trip to Groot Kolk, a distance of 155 miles, yielded only 7 blue wildebeest, and this number is made up of 7 solitary bulls, found miles from each other. The almost total absence of blue wildebeest in the Nossob at this time of the year seems to corroborate the author's view put forward in a previous report (Koedoe Nr. 4, 1961) to the effect that Bechuanaland seems to be animal's wintering quarters.

On the four different occasions that we visited the northern part of the Nossob River, the game showed a substantial increase from Groot Brak to Union's End, a distance of about 40 miles. In this respect Table I is slightly misleading, because the concentration of game in this area is actually much heavier than indicated by this particular table. It was definitely the most prolific area in the Park as far as variety and numbers of game are concerned.

TABLE 1.

Number of animals counted on a trip from Twee Riviere to Groot Kolk on 19.4.60. Time of departure 9 a.m. Time of arrival at destination 4.45 p.m.

Class Interval (in miles)	Springbok	Gemsbok	Blue wildebeest	Red hartebeest
0— 4	100			
5— 9	24			
10— 14	50			
15— 19	8	1		
20— 24				
25— 29	1	2		
30— 34	1			
35— 39	2	6		1
40— 44				
45— 49	7	14		5
50— 54	17	4		1
55— 59	20	1		1
60— 64		2		1
65— 69	128	13	1	24
70— 74	38	2		2
75— 79				
80— 84		4		1
85— 89	1			16
90— 94				1
95— 99		1		12
100—104		2	1	5
105—109		1		
110—114			1	
115—119		1		3
120—124	1	1		3
125—129	6	55		
130—134		1		20
135—139	39	96	1	127
140—144	10	2		6
145—149	45	18	1	13
150—154	136	7	2	73

On one occasion, on returning from Bechuanaland, we entered the Nossob 21 miles from Union's End. Over this stretch of 21 miles we counted 876 springbok, 281 gemsbok, 6 blue wildebeest and 269 red hartebeest.

On another occasion we encountered a congregation of animals grazing in one large herd at Lijersdraai, about 35 miles from Union's End, consisting of 210 springbok, 98 gemsbok and 120 red hartebeest.

These large numbers of game occurred either in the river bed or in the proximity of the river.

A thorough investigation was carried out to account for the concentration of game in this part of the Nossob.

For the greatest part of this area the river bed was covered with a carpet of grass, chiefly *Chloris virgata, Eragrostis porosa, Eragrostis bicolor, Enneapogon brachystachyus, Setaria verticillata, Tragus berteronianus* and *Tragus racemosus.*

This carpet of grass formed a lovely contrast to the bare and barren river bed that was so glaringly conspicuous on our previous visit in September. Yet most of this grass do not seem to be really utilised by the game. The young shoots of *Eragrostis bicolor,* a perennial grass, appeared to be well grazed, but the other species do not seem to be grazed to any extent and, although *Chloris virgata, Enneapogon brachystachyus* and *Tragus racemosus* were found to be consumed by gemsbok in the Auob River, they are probably not important food items on its menu, except perhaps when young and luscious. At this time of the year they appear to be tough and unpalatable and are probably not utilised much by the game animals except as a utility food.

The key to the large concentration of game is to be found in the young and green *Aristida obtusa,* which occur over large areas, mainly in the bends of the river and on the gently sloping banks of the Nossob, where the sand is rich in lime.

The area north of Groot Brak had a shower of rain some time during March, which did not fall further south. The young, short-cropped Bushman-grass *(Aristida obtusa),* interspersed with innumerous young seedlings, occurring on the banks and bends of the river, is an irresistible attraction to the springbok, red hartebeest and gemsbok.

The presence of so many game in this part of the Nossob could therefore be satisfactorily explained by :

(1) The presence of large areas of short-cropped *Aristida obtusa,* in excellent condition after the recent rains.

(2) The attraction of the river bed, which consists of a micaceous silt. In the author's second report (Koedoe Nr. 2, 1959) it was stated that although the antelopes utilise this silt, "it seems to be nothing more than an inferior substitute". In the light of subsequent observations this statement appears to be erroneous, as the game seem to make good use of this silt as a mineral lick. Pellets of different antelope species found in the Nossob were found to contain numerous particles of mica, an indication of the extent to which the silt is utilised.

(3) The bareness of the river bed and the Bushman grass veld type. This is the type of habitat preferred by gemsbok, springbok and red hartebeest.

(4) Ephemereals like *Gisekia miltus,* various *Plinthus sp., Limeum viscosum* and *Helichrysum argyrosphaerum* were also observed amongst the Bushman grass and although they did not occur in abundance, they are probably a factor to be reckoned with.

The huge area enclosed by the Auob and Nossob Rivers were traversed

twice. The one trip took us from Union's End to Mata Mata, along the S.W.A. border. On the second trip we made a zig-zag crossing from Kamkwa in the Auob to Kaspersdraai in the Nossob River.

On the first ten miles of our trip from Union's End we counted 1 steenbok, 6 red hartebeest and 163 gemsbok, the latter consisting of two herds of 71 and 92 respectively. Over the next 63 miles the only animals encountered were 4 steenbok and 29 gemsbok, with 8 as the largest number found together.

The two large herds of gemsbok both occurred in what could be described as large saline depressions where the vegetation is very scanty. This fact, together with some ephemereals and short, green *Schmidtia kalahariensis* and *Brachiaria glomerata* that occurred there, account for their presence. It was noticeable that the *Brachiaria* was much better grazed than the *Schmidtia*.

On our trip from Kamkwa to Kaspersdraai we covered 51 miles. We encountered one herd of 76 gemsbok and the rest of the trip yielded 24 gemsbok and 2 steenbok. For most of the time we travelled through grass-covered dunes and valleys, with dense stands of *Schmidtia kalahariensis* and *Aristida uniplumis*. The dunes were interrupted by a vast vaalkameel plain, which is a typical feature of the area between the two rivers. The plain has a dense grass cover, with *Asthenatherum glaucum* and *Aristida amabilis* perhaps the dominant feature. Where the large herd of gemsbok occurred, the grass cover was not so dense, and ephemereals like *Limeum arenicolum, Limeum argute-carinatum* and *Tribulus sp.* and young *Schmidtia kalahariensis* and *Brachiaria glomerata* were plentiful, providing an attractive menu to the gemsbok.

As usual we made a short trip into Bechuanaland. On a routine inspection trip a few weeks earlier the Game Ranger encountered vast herds of game at the Rambuka Pans and we decided to cover the same area. As far as numbers of game are concerned our trip proved to be a failure, because on a wide detour of 65 miles we counted the following numbers of game : 6 springbok, 289 gemsbok, 2 blue wildebeest, 20 red hartebeest, 8 steenbok and 1 duiker.

Various signs indicated that some areas through which we travelled must have carried huge numbers of game until very recently. In a short space of time large numbers of game must have left this area, simply moving away to an unknown destination.

The area beyond the Rambuka Pans where we expected to find the game, could be described as savannah country, with scattered trees and dense stands of *Schmidtia kalahariensis*. We travelled through miles and miles of waving, green *Schmidtia*, interrupted now and then by low, irregular dunes and huge saline depressions where the soil is different and the vegetation very scanty.

A noteworthy feature of this area is the scarcity of perennial grasses.

Schmidtia kalahariensis is the dominant type of grass everywhere, in fact the dominant feature of the whole vegetation.

These dense stands of Schmidtia is probably one of the main reasons why the game left this area so suddenly. In its young stage of growth *Schmidtia* seems to be quite palatable and the game make good use of it, but as soon as it reaches a certain stage of growth it acquires a burning and acid taste, becoming quite unpalatable.

According to the game ranger, animals feeding on it in this stage of growth get swollen and cracked lips, and it is no wonder that they leave such an area altogether. As a rule the *Schmidtia* is not touched again until it has dried up completely, after which it is utilised again.

This is another very clear indication that it is usually the quality, and not the quantity, of the food that is the decisive factor in the movements of game.

Wherever the grass cover was not so dense we came across game. The largest herd of gemsbok (95) found on our trip into Bechuanaland occurred on a large saline depression, where the vegetation was very scanty, with *Monechma incanum* especially abundant. Ephemereals and short annual grasses like *Enneapogon brachystachyus* and *Triraphis fleckii* (called gemsbok-grass) occurred amongst the *Monechma* and provided a good source of food. It is possible that the soil, which appears to be rich in lime, is utilised as a mineral lick.

Two other herds of gemsbok, numbering 38 and 22 respectively, occurred on similar depressions.

In some places where the *Schmidtia kalahariensis* was not so dense, *Brachiaria glomerata* was fairly abundant and was well grazed in some areas.

Out of this account of the distribution and abundance of the game a few general conclusions emerge.

The key factors in the habitat preference of the springbok, red hartebeest and gemsbok are :

(1) The denseness of the vegetation. One very rarely finds these antelopes in an area where the grass is high or dense. Not only do they prefer short grass for grazing purposes, but, as has been pointed out before, they have a very strong preference for bare, open veld with a rather scanty vegetation. Whenever the grass or vegetation becomes too dense, the area is avoided.

The wide open spaces of the Nossob with its huge river bends, gently sloping banks and wide open plains at places like Lijersdraai and Groot Brak, is probably a decisive factor in the red hartebeest's strong preference for the northern part of the Nossob.

(2) The quality of the grazing, as shown by the denudation of certain areas when the *Schmidtia kalahariensis* reaches a certain stage of growth.

(3) Availability of mineral licks. The "brak", obtainable in the pans and river beds, is a very important factor in the ecology of these animals.

The eland remains an enigma. In spite of a generous food supply in the

Park, it is always on the move and the Park can not claim to have a resident eland population. The eland's habitat preference is different from that of the antelopes mentioned above. The Park can probably meet all its food requirements, but the eland seems to prefer savannah country, which means that it will always prefer Bechuanaland's savannah country to the Park's treeless dunes and plains.

Of the 27 steenbok counted on the whole trip, only one was encountered in a river bed. All the others were found far from the river. The number would probably have been much higher, but with the dense stands of grass it was extremely difficult to detect this small antelope.

Only one duiker was observed. Although this number is very misleading, it does show how very rare this antelope is in this part of the country.

4. *General Observations.*

The red hartebeest of the Nossob River and the blue wildebeest inhabiting the Auob River had a very good calving season.

Thanks to observations by Mr. O. Prozesky, ornithologist at the Transvaal Museum, and Mr. S. le Riche, Game Warden of the Park, the blue wildebeest's calving time could be dated exactly. The first blue wildebeest calf was observed on the 19th of January, but the main calving time was during the first two or three weeks of February.

Out of 259 blue wildebeest (representing 4 herds) counted on one afternoon in the Auob, 61 were calves. The majority of these were between two and three months old, but a few were still sucking and one was not older than two weeks, which puts its birth in April.

The springbok appears to have had an unsuccessful lambing season. The majority of young springbok appeared to be at least two months old.

Two gemsbok calves of less than two weeks old were observed amongst the dunes southwest of the Auob.

Through the kind co-operation of Mr. S. le Riche, Game Warden, the author has acquired a lot of valuable data on the breeding activities of the Park's antelopes. This data will be worked out and presented at a later stage when additional information has been acquired.

It is significant to record that for the first time since this project got under way in 1957, we came across the elusive kudu. Three cows were encountered between Kwang and Rooikop, about hundred yards from the Nossob River. A very interesting fact to record is that these animals were definitely of a darker colour than the kudus of the Kruger Park, an observation that forms an interesting exception to the general rule that animals in deserts have a paler colouration than those living in moderate climates.

Apart from the study of the antelopes, some very interesting observations on the predatory habits of lions and hyaenas were made, but a discussion of this falls outside the scope of the present paper.