

SALMONELLA IN WILDLIFE IN THE NAIROBI NATIONAL PARK

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SUMMARY

Salmonellae were isolated from 5 out of 492 faeces samples representing 22 species of animals and birds in the Nairobi National Park but none from 251 samples involving 42 species from the Animal Orphanage at the Park.

INTRODUCTION

Reports on the incidence of Salmonella in African wild game are very rare. Guilbride *et al.* (1962) identified five different Salmonella serotypes from 10 isolates out of 149 specimens of intestinal contents of hippos in the Queen Elizabeth Park in Uganda and Cameron *et al.* (1963) reported an outbreak of *S. typhimurium* in wildebeest calves in the Kruger National Park in South Africa.

During our investigation of bovine Salmonellosis in East Africa (Gitter & Brand, 1968) an opportunity arose to examine a relatively large number of faeces of wild game animals in their natural habitat in the Nairobi National Park. This report describes the result of these examinations.

MATERIALS AND METHODS

The Nairobi National Park, covering an area of 44 square miles, lies just outside the boundary of the city with its main gate being only five miles from the city centre. Three sides of the park are fenced but the southern side is left open in order to allow animals free access to and from the extensive adjacent areas which form a large natural game reservoir. Inside the park itself there is a small forest area in the northern part but the greatest portion consists of open grassy plains cut by wooded ravines and water courses (Anon, 1968). A great variety of animals and birds can be seen at any time of the year and the animals, both large and small, live here much as they have always done; they are not fed artificially nor are they protected from each other.

Immediately adjacent to the main gate of the park is the animal orphanage. About 100 to 150 animals of 30 to 50 different species are accommodated in large wire enclosures set among trees. The animal population is always changing and it consists of orphans brought in from all over Kenya and of animals whose owners can no longer keep them.

Faeces samples were collected on 8 occasions from animals and birds in the park and orphanage between 5 July and 29 October 1968. In the orphanage they were simply collected from the animal enclosures; in the park we obtained them by following a herd or group of animals and in such cases the samples were always fresh. For obvious reasons this procedure could not be carried out in the case of predatory animals where usually the specimens were fairly dry and had to be identified by a game ranger.

The samples were inoculated within a few hours of collection (up to five hours) into

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seleinite broth and incubated at 37°C. Sub-cultures on to MacConkey agar and Desoxycholate-citrate agar were made after 24 and 48 hours incubation.

Organisms suspected to be *Salmonella* were identified by the orthodox serological and bacteriological tests and sent for confirmation, or identification, to the *Salmonella* Reference Laboratory in Colindale. Altogether 743 samples were examined, 492 from the park (Table I), representing 22 species, and 251 from the orphanage (Table II) involving 42 species of animals and birds.

TABLE I
Faeces samples collected in the Park

Animal/ Bird	No. of samples examined	Animal/ Bird	No. of samples examined	Animal/ Bird	No. of samples examined
Baboon	23	Hippopotamus	14	Ostrich	22
Buffalo	19	Hyena	7	Rhinoceros	15
Kongoni	51	Impala	45	Thomson's gazelle	38
Eland	3	Jackal	8	Vervet monkey	9
Giraffe	37	Leopard	2	Wart hog	24
Grant's gazelle	40	Lion	19	Water buck	12
Guinea fowl	11	Marabou stork	20	Wildebeest	36
				Zebra	37

TABLE II
Faeces Samples from the Animal Orphanage

Animal/ Bird	Samples examined	Animal/ Bird	Samples examined	Animal/ Bird	Samples examined
<i>Miscellaneous</i>					
Bat-eared fox	3	Hyena	9	Racoon	3
Brown bear*	3	Mongoose dwarf	3	Rhinoceros	5
Buffalo	5	Mongoose white-tailed	3	Silver-backed Jackal	5
Bush baby	3	Owl	3	Wart hog	6
Bush pig	6	Porcupine	5	Wild dog	10
<i>Antelopes</i>					
Bush buck	12	Impala	6	Uganda kob	3
Dik-dik	9	Oribi	4	Water buck	5
Grant's and Thomson's gazelles	16	Reed buck	3	Wildebeest	15
<i>Cats</i>					
Caracal	10	Genet	8	Serval	8
Cheetah	9	Leopard	10		
Civet	9	Lion	6		
<i>Monkeys</i>					
Baboon	6	Chimpanzee	6	Patas	3
Blue monkey	4	Colobus	2	Spider	5
Brazza monkey	4	Kuru	3	Sykes	5
				Vervet	5

* The brown bears were left at the Orphanage by a travelling circus. This species is exotic to Kenya.

RESULTS

Salmonellae were isolated from 5 out of 492 faeces samples collected in the Park but none from the 251 samples from the orphanage (Table III).

TABLE III
Frequency of Isolation of *Salmonella* from Animal Faeces in Nairobi Park

Animal	No of samples examined	Salmonella Positive	Serotype
Kongoni (<i>Alcelaphus bucephalus Cokei</i>)	51	1	<i>S. bovis</i> <i>morbificans</i>
Giraffe, reticulate (<i>Giraffa reticulata</i>)	37	1	<i>S. bovis</i> <i>morbificans</i>
Hyena (Species Unidentified)	7	2	<i>S. uzaramo</i> <i>S. bovis</i> <i>morbificans</i>
Ostrich (<i>Struthio camelus</i>)	22	1	<i>S. chingola</i>

DISCUSSION

The relative frequency of isolation of *S. bovis* *morbificans* may be surprising though this organism has practically worldwide distribution (Kelterborn, 1967).

We did not see the hyena(s) but the kongoni, giraffe and ostrich from whose faeces salmonellae were isolated, appeared to be in good body condition and showed no evidence of diarrhoea. It is worth noting that although all the hyena faeces examined were dry, two out of seven yielded salmonellae.

Although the number of Nairobi Park specimens examined in this survey is too small for valid conclusions to be drawn, further work in this direction may be desirable especially in connection with game cropping schemes.

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REFERENCES

ANON (1968). *Nairobi Handbook*, Vol. 4, No. 5, p. 83, published by Nairobi Publicity Association.

CAMERON, C. M., TUSTIN, R. C. & MEESER, M. J. N. (1963). 'Salmonella typhi-murium infection in blue wildebeest calves. (*Connochaetus taurinus*) Burchell'. *Journal of the South African Veterinary Medical Association*, 34, 53.

GITTER, M. & BRAND, T. (1968). To be published.

GUILBRIDE, P. D. L., COYLE, T. J., MCANULTY, E. P., BARBER, L. & LOMAX, G. D. (1962). 'Some pathogenic agents found in hippopotamus in Uganda'. *Journal of Comparative Pathology and Therapeutics*, 72, 137.

KELTERBORN, E. (1967). *Salmonella species*, p. 85, published by Den Haag, Dr W. Junk.

Salmonella in Wildlife in the Nairobi National Park.

Salmonella dans la vie sauvage du Parc National de Nairobi, Kenya.

Résumé—Cinq d'entre 492 prises de fèces représentant 22 espèces d'animal et d'oiseau dans le Parc National de Nairobi ont rendues de Salmonella, mais 251 prises enveloppant 42 espèces de chez l'orphelinat des animaux au Parc n'en ont point rendues.

Salmonella en Animales Salvajes en el Parque Nacional de Nairobi, Kenya.

Sumario—Salmonellae fueron aisladas en 5 de 492 muestras fecales que representaban 22 especies de animales y aves en el Parque Nacional de Nairobi, pero, en ninguna de las 251 muestras colectadas de 42 especies del Orfanato Animal del mismo Parque.