

PARASITES OF SOUTH AFRICAN WILDLIFE. II. HELMINTHS OF KUDU, *TRAGELAPHUS STREPSICEROS*, FROM SOUTH WEST AFRICA/NAMIBIA

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ABSTRACT

BOOMKER, J., ANTHONISSEN, M. & HORAK, I. G., 1988. Parasites of South African wildlife. II. Helminths of kudu, *Tragelaphus strepsiceros*, from South West Africa/Namibia. *Onderstepoort Journal of Veterinary Research*, 55, 231–233 (1988)

A total of 23 kudu, *Tragelaphus strepsiceros*, were shot at 2-month intervals from June 1983 to April 1984 in the Etosha Game Reserve in the north of South West Africa/Namibia. The parasite survey conducted on these animals yielded 2 cestode and 12 nematode species.

Haemonchus vegliai and *Cooperia neitzi* were the most prevalent nematodes and occurred in 13 animals each, followed by *Cooperia acutispiculum* and an *Onchocerca* sp. (9 animals each). The remaining nematodes were present in 4 (17%) or fewer of the antelope. *C. neitzi* was the most numerous nematode, a total of 3 564 being recovered from all the antelope, followed by *C. acutispiculum* (2 552) and *H. vegliai* (1 050).

Individual total worm burdens varied from 4–1 326 with 2 kudu harbouring no worms. The mean burden of 399 worms was considered negligible.

A single kudu was shot in the Namib-Naukluft Park in the south of the country. This animal harboured no parasites.

INTRODUCTION

As part of the ongoing surveys of the helminth parasites of wild animals in southern and South Africa, parasites were collected from 23 kudu shot in the Etosha Game Reserve in the north of South West Africa/Namibia. In addition, a single kudu was shot in the Namib-Naukluft Park in the south of the country.

The helminth parasites of greater kudu have been listed by Round (1968), of which 1 trematode, a *Cysticercus* sp. (*sic*) and 9 nematode species occur in South Africa. None, however, are listed from these antelope in South West Africa/Namibia.

MATERIALS AND METHODS

The Etosha Game Reserve (18° 30'–19° 30' S, 14° 22'–17° 10' E; altitude 1 100–1 366 m) is situated in the north of South West Africa/Namibia. It is approximately 21 000 ha in extent and the vegetation consists of saline desert with a dwarf shrub savanna fringe and mopane savanna (Giess, 1971). During the period June 1983–April 1984 the total rainfall was 444.5 mm, most of which fell between November and April. The mean minimum and maximum temperatures varied from 5–27 °C during winter to 18–35 °C during summer. Frost seldom occurs.

Apart from kudu, numerous other antelope species are present, as well as rhino, elephant, giraffe and carnivores, such as lion, leopard, hyaena and jackal. Horses, donkeys and mules were used in the reserve as transport animals in the early days of its establishment. Horses are still used to a limited extent by rangers on patrol, but no other domestic animals are present.

Four kudu were shot on each occasion at 2-month intervals from June 1983–April 1984. However, only 3 antelope could be secured during February 1984. The antelope were not selected according to sex and 9 males and 14 females were randomly collected.

One female kudu was shot in the Namib-Naukluft Park (22° 43' S; 16° 43' E), a region that includes both semi-desert and savanna transition (Giess, 1971).

The lungs hearts and livers were processed for worm recovery as described by Horak (1978 a). The abomasa,

the anterior 10 m of the small intestines and the large intestines were processed as described by Reinecke (1973). Separate aliquots each representing 1/25th of the volume of the ingesta of the abomasa, small intestines and the large intestines were processed as described by Reinecke (1973). Separate aliquots each representing 1/25th of the volume of the ingesta of the abomasa, small intestines and large intestines were made and examined under a stereoscopic microscope. The adult worms were cleared in lactophenol and examined by means of a standard microscope. Where more than 1 species of a genus was present, the males were identified specifically, but not the females. Fourth stage larvae were identified to generic level only.

RESULTS

The helminths recovered from the kudu from the Etosha Game Reserve are listed in Table 1.

Twelve nematode species and 2 cestodes were recovered. In many instances only female worms were present. The most prevalent worms were *Haemonchus vegliai* and *Cooperia neitzi* each of which occurred in 13 animals, followed by *Cooperia acutispiculum* and an *Onchocerca* sp. (9 animals each).

The most numerous worm was *C. neitzi* (3 564), followed by *C. acutispiculum* (2 552) and *H. vegliai* (1 050). Fragments of *Moniezia expansa* were found in 1 animal and fragments of a *Thysaniezia* sp. in another. The smallest burden was 4 worms and the largest 1 326, and 2 animals had no worms at all.

The bi-monthly individual, total and mean helminth burdens for each month in the different sexes are listed in Table 2. The mean burden over the entire period was 399 worms.

No worms were recovered from the kudu shot in the Namib-Naukluft Park.

DISCUSSION

Several of the helminths recovered from the kudu in the Etosha Game Reserve are the same as those of browsing antelope from other regions (Boomker, Du Plessis & Boomker, 1983; Boomker, Keep, Flamand & Horak, 1984; Boomker, Horak & De Vos, 1986), namely *H. vegliai*, *C. neitzi*, *C. acutispiculum* and *Impalaea tuberculata*. A notable addition to the list is *Cooperioides hamiltoni*, found only in the kudu in the Etosha Game Reserve.

C. hamiltoni was originally described from an impala, *Aepyceros melampus*, (Mönnig, 1932, 1933) in which it

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Received 21 July 1988—Editor

TABLE 1 The helminths recovered from greater kudu, *Tragelaphus strepsiceros*, from the Etosha Game Reserve, South West Africa/Namibia

Helminth species	Numbers of helminths recovered			Number of animals infested
	Larvae	Adults	Total	
Cestodes				
<i>Moniezia expansa</i>	#	Fragments	—	1
<i>Thysaniezia</i> sp.	#	Fragments	—	1
Nematodes				
<i>Agriostomum</i> sp. females	—	50	50	1
<i>Cooperia acutispiculum</i>	0	2 552	2 552	9
<i>Cooperia neitzi</i>	0	3 564	3 564	13
<i>Cooperia</i> spp. females	—	117	117	2
<i>Cooperioides hamiltoni</i>	0	292	292	4
<i>Cordophilus sagittus</i>	0	2	2	1
<i>Haemonchus vegliai</i>	25	1 025	1 050	13
<i>Impalaia nudicollis</i>	0	350	350	3
<i>Impalaia tuberculata</i>	0	100	100	1
<i>Impalaia</i> spp. females	—	350	350	4
<i>Paracooperia devossi</i>	0	350	350	1
<i>Onchocerca</i> sp.	0	24	24	9
<i>Trichostrongylus falculatus</i>	0	25	25	1
<i>Trichostrongylus thomasi</i>	0	75	75	2
<i>Trichostrongylus</i> spp. females	—	275	275	4

= Not found in kudu
 — = Not applicable

TABLE 2 Comparison of the total and mean helminth burdens of kudu of different ages and sexes from the Etosha Game Reserve

Age group	0-12 months		13-24 months		25-48 months		48 months +		Total monthly burden	Mean monthly burden
	Male	Female	Male	Female	Male	Female	Male	Female		
Sex										
June 1983	350	—	—	400	201	627	—	—	1 578	395
August 1983	978	400	—	1 326	—	—	1 026	—	3 730	933
October 1983	255	150	—	—	—	76	578	—	1 059	265
December 1983	—	0	—	*675	—	75	—	—	1 425	356
February 1984	—	—	—	4	—	129	577	—	710	237
April 1984	75	0	—	—	—	—	550	50	675	169
Total burden	1 658	550	0	3 080	201	907	2 731	50	9 177	
Mean burden	414	138	0	616	201	227	683	50		

— = No kudu of this age or sex shot
 * = Mean burden of 2 animals

commonly occurs (Horak, 1978 b; Horak & Boomker, unpublished data, 1980). Black-faced impala are common in the eastern part of Etosha, and the worms that were found in 4 of the kudu conceivably originated from them. This helminth should be regarded as an occasional parasite of kudu.

The fact that *Agriostomum* sp. females only were present, and that *Trichostrongylus falculatus* was recovered from 1 animal only, indicates that they are occasional parasites of kudu in Etosha.

Cordophilus sagittus is a definitive parasite of the tragelaphine antelope and since only 2 adult parasites were recovered from 1 kudu we assume that either the parasite or its vector is not common in the Etosha Game Reserve.

Impalaia nudicollis was described from blesbok (Mönnig, 1931) and has subsequently been found in a number of antelope (Boomker, 1977; Gibbons, Durette-Desset & Daynes, 1977; Horak, Meltzer & De Vos, 1982) as well as in warthog (Horak, Biggs, Hanssen & Hanssen, 1983). Apart from its taxonomic status, little is known about this parasite but it appears to be more common in the drier western parts of southern Africa. Its presence in the kudu is probably due to cross-infestation from other antelope, but not from warthog in which it is considered an accidental parasite (Horak *et al.*, 1983).

An *Onchocerca* sp. was found in the connective tissue around the trachea and, as few were recovered, specific identification was not possible.

Paracooperia devossi is a recently described nematode of bushbuck, *Tragelaphus scriptus*, in the Kruger National Park (Boomker & Kingsley, 1984). It has also been found in the same host in Natal (Boomker *et al.*, 1984). Its occurrence in kudu in the Etosha Game Reserve is unexpected because all the known species of *Paracooperia* of the tragelaphine antelope have been described from the wetter, eastern parts of the continent (Boomker, 1986).

T. thomasi is an abomasal parasite of a number of antelope species (Horak *et al.*, 1982; Horak, De Vos & Brown, 1983; Boomker *et al.*, 1986). It replaces *Trichostrongylus axei* in regions where domestic ruminants do not occur. Its occurrence in kudu is probably due to cross-infestation from other antelope in the reserve.

From Table 2 it can be seen that the greatest numbers of helminths occurred in kudu during August 1983, but as all the worm burdens are very low this need not necessarily reflect a seasonal trend.

As the sample of animals examined is biased towards the females, no valid deductions can be made as to the helminth burdens in the different sexes. In the animals

0–12 months old, equal numbers of males and females of which were examined, more worms were recovered from the males. No clear pattern of infestation for the animals of different age groups is evident.

ACKNOWLEDGEMENTS

We should like to thank the Director, Department of Agriculture and Nature Conservation, for placing the animals at our disposal; Dr H. C. Biggs, Central Veterinary Laboratory, Windhoek for making the necessary arrangements and the staff of the Etosha Game Reserve for assistance with the autopsies and parasite collections.

REFERENCES

- BOOMKER, J., 1977. A revision of the genus *Impalaia* Mönnig, 1924. *Onderstepoort Journal of Veterinary Research*, 44, 131–138.
- BOOMKER, J., DU PLESSIS, W. H. & BOOMKER, ELIZABETH A., 1983. Some helminth and arthropod parasites of the grey duiker *Sylvicapra grimmia*. *Onderstepoort Journal of Veterinary Research*, 51, 91–94.
- BOOMKER, J. & KINGSLEY, SHIRLEY A., 1984. *Paracooperia devossi* n. sp. (Nematoda: Trichostrongylidae) from the bushbuck *Tragelaphus scriptus* (Pallas, 1766). *Onderstepoort Journal of Veterinary Research*, 51, 21–24.
- BOOMKER, J., KEEP, M. E., FLAMAND, R. J. & HORAK, I. G., 1984. Helminths from miscellaneous antelope from some Natal game reserves. *Onderstepoort Journal of Veterinary Research*, 51, 253–256.
- BOOMKER, J., HORAK, I. G. & DE VOS, V., 1986. The helminth parasites of various artiodactylids from some South African nature reserves. *Onderstepoort Journal of Veterinary Research*, 53, 93–102.
- BOOMKER, J., 1986. *Paracooperia horaki* n. sp. (Nematoda: Trichostrongylidae) from the nyala, *Tragelaphus angasi* Gray, 1849. *Onderstepoort Journal of Veterinary Research*, 53, 161–165.
- GIBBONS, LYNDA M., DURETTE-DESSET, MARIE-CLAUDE & DAYNES, P., 1977. A review of the genus *Impalaia* Mönnig, 1923 (Nematoda: Trichostrongylidae). *Annales de Parasitologie Humaine et Comparée*, 52, 435–446.
- GISS, W., 1971. A preliminary vegetation map of South West Africa. *Dinteria*, 4, 5–14.
- HORAK, I. G., 1978 a. Parasites of domestic and wild animals in South Africa. IX. Helminths in blesbok. *Onderstepoort Journal of Veterinary Research*, 45, 55–58.
- HORAK, I. G., 1978 b. Parasites of domestic and wild animals in South Africa. X. Helminths in impala. *Onderstepoort Journal of Veterinary Research*, 45, 221–228.
- HORAK, I. G., MELTZER, D. G. A. & DE VOS, V., 1982. Helminth and arthropod parasites of springbok, *Antidorcas marsupialis*, in the Transvaal and western Cape Province. *Onderstepoort Journal of Veterinary Research*, 49, 7–10.
- HORAK, I. G., BIGGS, H. C., HANSSSEN, TAMMY S. & HANSSSEN, ROSE, E., 1983. The prevalence of helminth and arthropod parasites of warthog, *Phacochoerus aethiopicus* in South West Africa/Namibia. *Onderstepoort Journal of Veterinary Research*, 50, 145–148.
- HORAK, I. G., DE VOS, V. & BROWN, MOIRA R., 1983. Parasites of domestic and wild animals in South Africa. XVI. Helminth and arthropod parasites of blue and black wildebeest (*Connochaetes taurinus* and *Connochaetes gnou*). *Onderstepoort Journal of Veterinary Research*, 50, 243–255.
- MÖNNIG, H. O., 1931. Wild antelopes as carriers of nematode parasites of vertebrates. Part I. *17th Report of the Director of Veterinary Services and Animal Industry, Department of Agriculture, Union of South Africa*, pp. 233–254.
- MÖNNIG, H. O., 1932. New strongylid nematodes of antelopes (Preliminary notes). *Journal of the South African Veterinary Medical Association*, 3, 171–175.
- MÖNNIG, H. O., 1933. Wild antelopes as carriers of nematode parasites of domestic ruminants. Part III. *Onderstepoort Journal of Veterinary Science and Animal Industry*, 1, 77–92.
- REINECKE, R. K., 1973. The larval anthelmintic test. *Technical Communication, Department of Agricultural Technical Services, Republic of South Africa*, No. 106, pp. iii + 20.
- ROUND, M. C., 1968. A check list of the helminth parasites of African mammals of the orders Carnivora, Tubulidentata, Proboscidea, Hyracoidea, Artiodactyla and Perissodactyla. *Technical Communication of the Commonwealth Bureau of Helminthology*, 38, pp. vi + 252.