

PARASITES OF DOMESTIC AND WILD ANIMALS IN SOUTH AFRICA. IX. HELMINTHS IN BLESBOK*

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ABSTRACT

HORAK, I. G., 1978. Parasites of domestic and wild animals in South Africa. IX. Helminths in blesbok. *Onderstepoort Journal of Veterinary Research* 45 (2), 55-58 (1978).

Four blesbok culled in the Rietvlei Nature Reserve during May 1972 were each infested with *Trichostrongylus axei* and *Impalalia nudicollis*. Some of these animals also harboured *Haemonchus bedfordi*, *Haemonchus contortus*, *Trichostrongylus falculatus*, *Skrjabinema alata* and *Avitellina centripunctata*.

Thirty-two blesbok were culled in pairs at approximately 4-5 week-intervals in the Percy Fyfe Nature Reserve from July 1972 to November 1973. Adult *H. contortus* were recovered in fair numbers from buck slaughtered from August 1972 to February 1973 and during November 1973. Peak numbers of 4th stage larvae were recovered from individual animals slaughtered during October 1972, February and March, and July to October 1973.

Peak burdens of *T. falculatus* were recovered during October to December 1972 and November 1973.

The largest numbers of adult *I. nudicollis* were recorded from January to July and during September 1973.

Other helminths recovered were *T. axei*, *S. alata* and *A. centripunctata*.

Avitellina centripunctata, *H. bedfordi* and *S. alata* are new records for the blesbok.

Résumé

PARASITES DES ANIMAUX DOMESTIQUES ET SAUVAGES EN AFRIQUE DU SUD.
IX. HELMINTHES DU BLESBOK (*Damaliscus dorcas phillipsi*)

Quatre Blesbok éliminés de la Réserve municipale de Rietvlei en mai 1972 étaient tous parasités par *Trichostrongylus axei* et *Impalalia nudicollis*. Certains de ces animaux étaient également infestés de *Haemonchus bedfordi*, *H. contortus*, *Trichostrongylus falculatus*, *Skrjabinema alata* et *Avitellina centripunctata*.

Dans la réserve Percy Fyfe, trente-deux Blesbok furent éliminés par paires, à des intervalles de 4 à 5 semaines, de juillet 1972 à novembre 1973. Des *H. contortus* ont été récupérés en quantités appréciables chez des antilopes sacrifiées d'août 1972 à février 1973 et en novembre 1973. Le plus grand nombre de larves du 4e stade a été retrouvé chez des individus sacrifiés en octobre 1972, en février-mars et de juillet à octobre 1973.

Les charges maximales de *T. falculatus* ont été trouvées d'octobre à décembre 1972 et en novembre 1973.

On a observé les plus fortes quantités d'*I. nudicollis* adultes de janvier à juillet et en septembre 1973.

T. axei, *S. alata* et *A. centripunctata* sont parmi les autres helminthes qu'on a retrouvés. Les deux dernières espèces, ainsi que *H. bedfordi*, n'avaient pas encore été observées chez le Blesbok.

INTRODUCTION

Of the numerous antelope species in South Africa, the blesbok lends itself to semi-domestication more readily than most other species. The relative simplicity with which they are captured and contained and the fact that they breed readily in captivity has led to blesbok being kept on many farms as a source of income from hunting or in small game parks as an attraction. Both systems require a degree of confinement and this may lead to problems with internal parasites. This did indeed occur in the bontebok, a closely related species, in the National Bontebok Park in the Bredasdorp district (Van der Walt & Ortlepp, 1960).

Several of the nematodes parasitic in the blesbok have been described by Mönnig (1931, 1932), while Round (1968) gives a check-list of the helminths recovered from this species. No studies on the seasonal fluctuations of worm burdens in the blesbok have been published and, with the exception of the surveys of Bindernagel & Todd (1972) in buffalo in Uganda and of Baker & Anderson (1975) in the white-tailed deer in Canada, few such studies in antelope have apparently been undertaken.

The blesbok culled in the present studies were examined also for the presence of larvae of oestrid flies, the findings of which have been published separately (Horak & Butt, 1977).

SURVEY I. HELMINTHS IN BLESBOK IN THE RIETVLEI NATURE RESERVE

MATERIALS AND METHODS

The Rietvlei Nature Reserve (25°53'S; 28°17'E; Alt. ±1 500 m) is situated to the south-east of Pretoria and during May 1972 it became necessary to cull a number of blesbok rams. The lungs, livers and gastro-intestinal tracts of 4 of these animals were processed for worm recovery, as described by Horak & Louw (1977).

RESULTS

The number of helminths recovered from the blesbok, which for convenience have been numbered from 1-4, is summarised in Table 1.

All the buck harboured *Trichostrongylus axei* in small numbers, and *Impalalia nudicollis* in burdens varying between 1 970 and 20 583 worms. At the same time *Haemonchus bedfordi*, *Haemonchus contortus*, *Trichostrongylus falculatus*, *Skrjabinema alata* and *Avitellina centripunctata* were recovered in small numbers from individual animals.

* This survey was conducted while the author was employed at the MSD Research Centre, Hennops River

Received 13 December 1977—Editor

TABLE 1 The worm burdens of 4 adult blesbok rams culled in the Rietvlei Nature Reserve

Blesbok No.	Date culled	Numbers of helminths recovered							
		<i>Haemonchus</i> spp.			<i>Trichostrongylus</i> spp.		<i>I. nudi</i> .	<i>S. alata</i>	<i>Avit.</i>
		4th	<i>H. bedfordi</i>	<i>H. contortus</i>	<i>T. axei</i>	<i>T. falculatus</i>	Adult	Adult	Scolices
1972									
1.....	16 May.....	0	70	0	3	346	3 913	45	0
2.....	16 May.....	0	0	10	10	0	20 583	0	0
3.....	23 May.....	0	0	0	1	0	4 547	0	0
4.....	23 May.....	60	0	0	2	0	1 970	83	1

I. nudi=*I. nudicollis*
 4th=Fourth stage larvae
Avit.=*A. centripunctata*

DISCUSSION

Haemonchus bedfordi, *S. alata* and *A. centripunctata* had not previously been recovered from blesbok. *H. bedfordi*, however, was recovered from a closely related antelope, the topi (*Damaliscus korrigum*), by Sacks, Gibbons & Lweno (1973).

The small numbers of immature and adult *Haemonchus* spp. recovered are in sharp contrast to the large numbers of this parasite encountered at this time of year in tracer sheep (Horak & Louw, 1977; Horak, 1978) and calves (Horak & Louw, 1978) grazed within 40 kilometres of the Rietvlei Reserve. Because of the small number of animals examined in this survey, the reasons for this difference are difficult to suggest.

The recovery of large numbers of *I. nudicollis*, originally described from the blesbok by Mönning (1931), suggests that this parasite is not only well adapted to blesbok but also to the prevailing environment.

SURVEY 2. HELMINTHS IN BLESBOK IN THE PERCY FYFE NATURE RESERVE

MATERIALS AND METHODS

Some of the background of the Percy Fyfe Nature Reserve and many of the methods employed in this survey appeared in a previous publication (Horak & Butt, 1977).

The blesbok were shot in pairs at 4-5 week-intervals from 31 July 1972 to 2 November 1973. During August and September 1973, however, the interval between cullings was only 10 days.

The lungs, livers and gastro-intestinal tracts were transported to the laboratory at Hennops River and processed for worm recovery. The lungs, processed for the recovery of oestrid larvae (Horak & Butt, 1977) were also examined for the presence of helminths. The livers were processed and examined as described by Snijders, Horak & Louw (1971), while 1/10th samples of the abomasal, small intestinal and large intestinal ingesta were washed separately over sieves with 38 micron apertures and the remainder over sieves with 150 micron apertures. These samples were examined microscopically and macroscopically for helminths.

RESULTS

The buck were numbered from 5-36 and the total worm burdens of each animal are presented in Table 2.

Haemonchus contortus: Peak burdens of 4th stage larvae were recovered from individual animals during October 1972 and February, March and July to October 1973. Adult burdens exceeded 150 worms in individual animals from August 1972 to March 1973 and again in November 1973.

Trichostrongylus spp.: *Trichostrongylus axei* was recovered in small numbers from individual animals virtually throughout the survey period. Peak burdens of *T. falculatus* were recovered from individual animals from October to December 1972 and during November 1973.

Impalala nudicollis: No seasonal pattern could be determined for the 4th stage larvae of this species. Peak adult burdens were recorded from January to July and during September 1973.

Skrjabinema alata: This species occurred in fairly large numbers in some animals, while other animals were not infested. The 4 blesbok lambs examined were all infested with this nematode.

Avitellina centripunctata: Eleven buck harboured these cestodes and burdens varied from 1-7 worms.

DISCUSSION

As only 6 blesbok were originally introduced in 1933 (Horak & Butt, 1977), the helminths that were introduced with them would have had to be well adapted to blesbok and adaptable to the local environment to have survived. That a total of 6 helminth species only was recovered in this survey is probably a reflection of this fact. Since other animals in the reserve, notably tsessebe and roan antelope, were not examined for helminths, it is not possible to say whether cross-infestation had taken place or whether the latter animals harboured the same species as the blesbok, and thus could serve as an alternative source of infestation.

The seasonal fluctuations in worm burdens in this survey must be considered in the light of 2 factors: firstly, that only 2 animals were slaughtered on each occasion and, secondly, that the number of blesbok was reduced from 780-34 during the first 2 months of the survey (Horak & Butt, 1977). As a result of this the grazing density altered from approximately 1 animal/2 ha at the outset to 1 animal/50 ha during the remainder of the survey. Despite the small numbers of animals examined and the alteration in grazing intensity reducing the chances of infestation, certain trends in the worm burdens emerged.

TABLE 2 The worm burdens of blesbok culled in the Percy Fyfe Nature Reserve

Blesbok No. and age	Date culled	Numbers of helminths recovered								
		<i>H. contortus</i>		<i>Trichostrongylus</i>		<i>I. nudicollis</i>		<i>S. alata</i>		<i>Avit.</i>
		4th	Adult	<i>T. axei</i>	<i>T. falculatus</i>	4th	Adult	Imm	Adult	Scolices
1972										
5, 2T	31 Jul	0	0	0	0	1	622	0	527	6
6, FM	31 Jul	0	0	4	0	7	29	0	61	0
7, FM	28 Aug	6	46	141	9	22	7	0	0	0
8, Aged	28 Aug	44	501	368	0	1	30	0	0	0
9, 2T	2 Oct	40	750	10	460	40	1 820	20	261	0
10, 4T	2 Oct	420	1 320	31	1 380	660	3 190	170	110	0
11, Lamb	30 Oct	0	292	0	594	0	766	1 071	0	2
12, 4T	30 Oct	245	364	5	0	10	3 135	5	0	1
13, Lamb*	4 Dec	30	193	0	542	0	821	381	1 124	1
14, Lamb	4 Dec	10	253	12	430	11	620	40	340	3
1973										
15, FM	8 Jan	0	175	0	20	0	10 298	0	0	0
16, FM	8 Jan	0	206	2	0	5	4 330	0	0	0
17, 6T	5 Feb	320	760	0	0	95	7 840	80	697	0
18, FM	5 Feb	0	590	45	5	20	12 880	0	237	7
19, FM	5 Mar	20	80	10	0	10	6 413	0	0	0
20, FM	5 Mar	320	195	60	0	228	7 220	0	0	0
21, FM*	9 Apr	0	40	5	0	6	15 991	120	106	0
22, 6T	9 Apr	0	10	5	0	0	3 887	165	105	1
23, 2T	14 May	25	30	25	15	107	1 543	3 095	245	1
24, FM	14 May	0	25	1	0	45	6 898	60	30	0
25, 6T	18 Jun	6	1	6	0	23	3 120	61	87	0
26, FM	18 Jun	0	0	25	0	20	5 068	2	32	0
27, 2T	25 Jul	245	2	22	0	103	1 021	1	20	0
28, FM	25 Jul	12	2	8	0	10	7 773	1	0	0
29, 2T	27 Aug	51	0	0	0	39	1 812	0	0	0
30, 4T	27 Aug	75	0	20	0	53	881	0	0	1
31, 4T	6 Sep	250	1	0	0	22	16 250	0	0	0
32, 4T	6 Sep	833	35	10	0	320	8 260	0	0	0
33, 2T	5 Oct	11	22	0	0	10	243	0	60	1
34, 4T*	5 Oct	190	123	39	10	60	60	0	0	1
35, Lamb*	2 Nov	20	84	0	400	0	30	2	61	0
36, 4T	2 Nov	33	371	0	0	0	930	2	0	0

4th=Fourth stage larvae

Imm=Immature worms

* Ewe

T=Tooth

FM=Full mouth

Lamb=Born during October or November of previous year

Avit.=*A. centripunctata*

The presence of peak burdens of adult *H. contortus* in those animals slaughtered from September or October to March corresponds to observations made on this parasite in surveys in sheep in South Africa (Rossiter, 1964; Viljoen, 1964; Reinecke, 1964).

The presence of fairly large burdens of 4th stage larvae of *H. contortus* (and the virtual absence of adults) from July to September 1973 indicate inhibition in larval development, although this was not the case the previous year. This inhibited larval development ensures the survival of the nematode in the host during the winter months when conditions on the pasture are unfavourable (Muller, 1968) and closely corresponds to observations made on *H. contortus* in sheep (Viljoen, 1964; Horak & Louw, 1977; Horak, 1978), and in white-tailed deer infested with *Ostertagia* spp. (Baker & Anderson, 1975).

The major difference between the *H. contortus* burdens encountered in this survey and those recorded in sheep is numerical. Whereas sheep in the Transvaal generally harbour considerable burdens of this nematode during summer (Horak & Louw, 1977; Horak,

1978), the worm counts in the blesbok in the same season are by comparison low. This could, however, be a reflection of different stocking densities in the various surveys.

The recovery of *T. falculatus* in fairly large numbers, generally only from those animals slaughtered from October to December is difficult to explain and would suggest that this parasite is able to survive on the pasture as eggs or pre-infective larvae during the remainder of the year. In the Karoo, Viljoen (1969) recovered the greatest numbers of *T. falculatus* from tracer lambs exposed during the winter months, thus demonstrating that the free-living stages can survive on the pasture despite the virtual absence of rain. The possibility of cross-immunity between this nematode and *I. nudicollis*, which also occurs in the small intestine, cannot be excluded, as peak burdens of the one occurred at those times when burdens of the other were low. The likelihood of cross-immunity between helminths affecting the establishment of certain species in natural infestations has been suggested by Reinecke (1964), Muller (1968) and Viljoen (1969).

Although burdens of *I. nudicollis* varied considerably, the trend appeared to be for total worm burdens to increase from January to April. These worms and later infestations probably survived until July or even September, after which a decline in reinfestation coupled with death or expulsion of the existing worms resulted in low burdens until the following January. This pattern of incidence corresponds fairly closely to that observed for *Cooperia* spp. in cattle by Horak & Louw (1978).

S. alata was originally described from sheep by Mönnig (1932). Its prevalence in the animals examined in both the present surveys would suggest that the blesbok is a suitable host for this nematode. The same would seem to apply to *A. centripunctata*, although it too has not previously been described from this host.

ACKNOWLEDGEMENTS

The assistance of Dr D. E. Wilson and Mr J. M. Smith of the Transvaal Department of Nature Conservation with the culling of the buck is gratefully acknowledged.

I am also indebted to Mr M. J. Butt for transporting many of the buck to Hennops River, to Mrs S. M. Raymond and Miss I. Penderis for assisting with the helminth recoveries and to the Division of Nature Conservation of the Transvaal Provincial Administration for placing the blesbok at my disposal.

REFERENCES

BAKER, M. R. & ANDERSON, R. C., 1975. Seasonal changes in abomasal worms (*Ostertagia* spp.) in white-tailed deer (*Odocoileus virginianus*) at Long Point, Ontario. *Canadian Journal of Zoology*, 53, 87-96.
 BINDERNAGEL, J. A. & TODD, A. C., 1972. The population dynamics of *Ashworthius lerouxi* (Nematoda: Trichostrongylidae) in African buffalo in Uganda. *British Veterinary Journal*, 128, 452-456.
 HORAK, I. G., 1978. Parasites of domestic and wild animals in South Africa. V. Helminths in sheep on dry-land pasture on the Transvaal Highveld. *Onderstepoort Journal of Veterinary Research*, 45, 1-6.

HORAK, I. G. & BUTT, M. J., 1977. Parasites of domestic and wild animals in South Africa. III. *Oestrus* spp. and *Gedophilus hässleri* in the blesbok. *Onderstepoort Journal of Veterinary Research*, 44, 113-118.
 HORAK, I. G. & LOUW, J. P., 1977. Parasites of domestic and wild animals in South Africa. IV. Helminths in sheep on irrigated pastures on the Transvaal Highveld. *Onderstepoort Journal of Veterinary Research*, 44, 261-270.
 HORAK, I. G. & LOUW, J. P., 1978. Parasites of domestic and wild animals in South Africa. VI. Helminths in calves on irrigated pastures on the Transvaal Highveld. *Onderstepoort Journal of Veterinary Research*, 45, 23-28.
 MÖNNIG, H. O., 1931. Wild antelopes as carriers of nematode parasites of domestic ruminants.—Part I. *Report of the Director of Veterinary Services and Animal Industry, Union of South Africa*, 17, 233-254.
 MÖNNIG, H. O., 1932. Wild antelopes as carriers of nematode parasites of domestic ruminants.—Part II. *Report of the Director of Veterinary Services and Animal Industry, Union of South Africa*, 18, 153-172.
 MULLER, G. L., 1968. The epizootiology of helminth infestation in sheep in the south-western districts of the Cape. *Onderstepoort Journal of Veterinary Research*, 35, 159-194.
 REINECKE, R. K., 1964. Epizootiology and control of nematode parasites of sheep. *Journal of the South African Veterinary Medical Association*, 35, 603-608.
 ROSSITER, L. W., 1964. The epizootiology of nematode parasites of sheep in the coastal area of the Eastern Province. *Onderstepoort Journal of Veterinary Research*, 31, 143-150.
 ROUND, M. C., 1968. 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, 252, vi pp.
 SACKS, R., GIBBONS, L. M. & LWENO, M. F., 1973. Species of *Haemonchus* from domestic and wild ruminants in Tanzania, East Africa, including a description of *H. dimniki* n.sp. *Zeitschrift für Tropenmedizin und Parasitologie*, 24, 467-475.
 SNIJDERS, A. J., HORAK, I. G. & LOUW, J. P., 1971. Studies with rafoxanide. 2. Efficacy against *Fasciola gigantica* in cattle. *Journal of the South African Veterinary Medical Association*, 42, 253-257.
 VAN DER WALT, K. & ORTLEPP, R. J., 1960. Moving the bontebok from Bredasdorp to Swellendam. *Journal of the South African Veterinary Medical Association*, 31, 459-463.
 VILJOEN, J. H., 1964. The epizootiology of nematode parasites of sheep in the Karoo. *Onderstepoort Journal of Veterinary Research*, 31, 133-142.
 VILJOEN, J. H., 1969. Further studies on the epizootiology of nematode parasites of sheep in the Karoo. *Onderstepoort Journal of Veterinary Research*, 36, 233-264.