

## HELMINTH AND ARTHROPOD PARASITES OF SPRINGBOK, *ANTIDORCAS MARSUPIALIS*, IN THE TRANSVAAL AND WESTERN CAPE PROVINCE

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### ABSTRACT

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The helminth burdens of 17 springbok from 2 localities in the Transvaal and of 4 springbok from the western Cape Province were determined. Eight of the animals from the Transvaal and the 4 from the Cape Province were also examined for arthropod parasites.

In all, 26 helminth species, 5 species of ixodid ticks and 4 species of lice were recovered from the springbok. Of the helminths *Dictyocaulus magnus*, *Trichostrongylus axei*, *T. falculatus* and *Agriostomum equidentatum* were recovered from animals in each of the surveys. The lice *Damalinea antidorcus*, *Linognathus antidorcitis* and *L. bedfordi* were present on animals in the Transvaal and the western Cape Province.

### INTRODUCTION

The helminth parasites recovered by several workers from the springbok, *Antidorcas marsupialis*, have been listed by Round (1968). Zumpt (1965) and Ledger (1980) have listed some of the ectoparasites recovered from this host and Horak (1980a) has tabulated the helminth and arthropod parasites that he has recovered from springbok. The actual numbers of parasites harboured by springbok, however, have received scant attention.

The present paper reports the helminth and arthropod parasite burdens of springbok culled near Lichtenburg in the western Transvaal and near Swellendam in the western Cape Province, and the helminth burdens of animals culled near Krugersdorp in the southern Transvaal.

### MATERIALS AND METHODS

Four springbok rams were culled during May and 4 during June 1977 in the wildlife reserve of the National Zoological Gardens. This reserve is situated near Lichtenburg (26°09'S; 26°11'E) in a region classified as Dry *Cymbopogon-Themeda* Veld (Acocks, 1975). Five springbok were culled in the Krugersdorp Game Reserve near Krugersdorp (26°06'S; 27°46'E) during June, 2 during July and a further 2 during August 1977. This reserve is located in a region classified as Bankenveld (Acocks, 1975). Both Lichtenburg and Krugersdorp are situated in the summer rainfall region of the Republic of South Africa (RSA). Four springbok were culled during December 1979 in the Bontebok National Park near Swellendam (34°02'S; 20°26'E), a region classified as Coastal Renosterbosveld (Acocks, 1975) and located within the winter rainfall region.

The lungs and livers of the springbok were processed for helminth recovery as described by Horak (1978), while the contents of their abomasa and small intestines were sieved separately over sieves with 38 µm apertures and those of their large intestines over sieves with 150 µm apertures. The mucosa of the abomasa and the small and large intestines was digested with pepsin and HCl and then sieved over sieves with 38 µm apertures. The contents of the sieves were preserved with formalin and retained for future examination. The nasal passages and paranasal sinuses of the animals from Lichtenburg and Swellendam were examined for oestrid larvae as described by Horak (1977).

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The hides of the heads and of the bodies, and the legs below the knee and hock joints with the hide intact, of the antelope from near Lichtenburg were immersed separately in water at approximately 60–70 °C and thereafter scraped with a sharp knife to remove adherent ectoparasites. The water in which the hides had been immersed and the scrapings were sieved over sieves with 38 µm apertures and the contents of the sieves collected and preserved with formalin. The hide of 1 side of the body and 1 side of the head, and both the legs from 1 side with their hide intact, of each of the springbok from near Swellendam were immersed in an emulsion of amitraz\*, a tick-detaching agent, for approximately 10 min. Thereafter, the hide and legs were placed in a plastic bag, which was then tightly closed until the following day. These parts were then thoroughly scrubbed, with brushes with 20 mm long steel bristles, and washed in water. The fluid in which the hides had originally been immersed and that in which they had been scrubbed and washed was sieved through sieves with 150 µm apertures. The contents of the sieves were preserved with formalin and retained for later examination.

### RESULTS

The helminth and arthropod parasites recovered from springbok near Lichtenburg are listed in Table 1. Eighteen species of adult helminths were recovered and, in addition, large numbers of 4th stage larvae of *Haemonchus* spp., *Longistrongylus/Ostertagia*-type, *Cooperia/Cooperioides/Paracooperia*-type and *Impalaia* sp. The animals also harboured 3 species of ticks, all of which were in an immature stage of development, and 4 species of lice.

The worm burdens of the springbok culled near Krugersdorp are listed in Table 2. Thirteen helminth species were recovered plus, from the majority of antelope, numerous 4th stage larvae of *Haemonchus* spp., *Longistrongylus/Ostertagia*-type, *Cooperia/Cooperioides*-type and *Impalaia* sp.

The parasites recovered from the springbok culled near Swellendam are listed in Table 3. These animals harboured 9 nematode species, large numbers of 4th stage *Longistrongylus/Ostertagia*-type larvae, 2 tick species, and 3 louse species.

### DISCUSSION

In all, 26 helminth species were recovered from springbok in the 3 survey regions. Of these only *Dictyocaulus magnus*, *Trichostrongylus axei*, *T. falculatus* and *Agriostomum equidentatum* were recovered from animals in each of the surveys. A total of 5 ixodid tick species and 4 louse species was also recovered. The ticks

\* Triatix: Coopers SA (Pty) Ltd

HELMINTH AND ARTHROPOD PARASITES OF SPRINGBOK IN THE TRANSSVAAL AND WESTERN CAPE PROVINCE

TABLE 1 Helminth and arthropod parasites recovered from springbok No. 1-8 culled near Lichtenburg in the western Transvaal

Parasites		Dates of slaughter and numbers of parasites recovered							
Species	Stage of development	26 May 1977				15 June 1977			
Helminths		1	2	3	4	5	6	7	8
<i>Dictyocaulus magnus</i>	Adult	46	34	176	24	79	44	28	143
<i>Gongylonema</i> sp.	Adult	0	0	0	0	21	0	14	12
<i>Haemonchus</i> spp.	4th stage	2 862	1 796	3 600	600	6 653	2 950	4 130	8 950
<i>H. bedfordi</i>	Adult	20	180	50	32	21	0	40	0
<i>H. krugeri</i>	Adult	100	0	0	0	0	0	0	0
<i>Longistrongylus/Ostertagia</i> -type	4th stage	1 761	2 159	2 388	578	13 402	2 974	3 779	14 062
<i>L. albifrontis</i>	Adult	653	1 450	180	507	306	1	860	130
<i>O. hamata</i>	Adult	0	0	0	120	0	0	0	0
<i>Trichostrongylus</i> spp.	4th stage	92	123	0	0	71	75	0	0
<i>T. axei</i>	Adult	0	2	2	4	13	2	11	1
<i>T. colubriformis</i>	Adult	1 100	1 100	550	300	300	625	200	3 400
<i>T. falculatus</i>	Adult	8 873	1 260	8 940	6 033	5 440	345	2 600	18 900
<i>T. thomasi</i>	Adult	0	241	0	70	0	80	0	120
<i>Cooperioides/Paracooperia</i> -type	4th stage	4 010	1 610	2 350	1 112	150	2 633	1 640	7 000
<i>C. antidorca</i>	Adult	740	640	140	767	2 860	14	620	1 390
<i>P. serrata</i>	Adult	18 920	740	5 420	2 356	11 020	1 806	2 980	12 850
<i>Impalaia</i> sp.	4th stage	1 040	1 000	1 110	294	900	1 878	480	3 430
<i>I. nudicollis</i>	Adult	100	50	250	127	0	400	400	910
<i>Agriostomum equidentatum</i>	Adult	35	40	53	91	112	40	13	148
<i>Oesophagostomum</i> sp.	4th stage	30	10	0	10	70	10	20	210
<i>O. africanum</i>	Adult	65	13	31	3	63	5	20	146
<i>Trichuris</i> sp.	Adult	0	1	0	6	0	0	0	0
<i>Avitellina</i> sp.	Scolices	0	0	0	0	2	0	0	12
Arthropods									
<i>Boophilus</i> sp.	Larvae	0	0	0	1	0	0	0	0
<i>Boophilus</i> sp.	Nymphae	0	0	0	1	0	0	0	0
<i>Rhipicephalus appendiculatus</i>	Nymphae	0	0	0	1	0	0	0	0
<i>Rhipicephalus evertsi evertsi</i>	Larvae	69	2	25	1	40	50	62	40
	Nymphae	0	1	5	0	0	4	1	0
<i>Damalinea antidorcus</i>	Nymphae	11	0	0	41	51	9	26	34
	Adults	2	0	0	11	28	5	6	24
<i>Linognathus antidorcitis</i>	Nymphae	11	3	13	1	22	0	18	85
	Adults	8	1	4	2	13	2	11	55
<i>Linognathus armatus</i>	Nymphae	4	0	0	0	14	0	4	4
	Adults	0	0	0	0	2	1	0	17
<i>Linognathus bedfordi</i>	Nymphae	0	0	0	0	0	0	7	2
	Adults	0	0	0	0	1	2	13	4

from near Lichtenburg differed from those near Swellendam, but 3 of the louse species in these 2 areas were the same.

Three species of *Haemonchus* were recovered from the animals slaughtered in the Transvaal. The presence of *Haemonchus krugeri*, a parasite described from impala (Ortlepp, 1964), in springbok at Lichtenburg is probably a direct result of cross-infestation from the impala which were also present in the reserve. *Haemonchus contortus*, although originally probably a parasite of sheep (Horak, 1980 b), has been recovered from several wild ruminant species, including springbok (Round, 1968; Gibbons, 1979), while *Haemonchus bedfordi* seems to have a wide range of wild ruminant hosts (Round, 1968; Gibbons, 1979; Horak, 1980 a).

*Longistrongylus albifrontis* was originally described from blesbok (Mönnig, 1931) but was also subsequently recovered from springbok (Mönnig, 1933). Its recovery from animals in 2 of these surveys may well be due to the presence of blesbok in the reserves near Krugersdorp and Lichtenburg. *Longistrongylus curvispiculum* was described from material collected from Grant's gazelle in

Tanzania (Gibbons, 1973), but has also been recovered from many other antelope species in East Africa (Gibbons, 1977). It has also been found in blesbok in South Africa (Horak, unpublished data, 1980). Ortlepp (1963) described *Longistrongylus namaquensis*, which he referred to as *Bigalkenema namaquensis*, from the abomasum of a sheep in the north-western Cape Province of the RSA and to our knowledge it has not been recorded since. As worms of the genus *Longistrongylus* generally parasitize wild ruminants (Gibbons, 1977), it seems likely that *L. namaquensis* is an accidental parasite of sheep and that some antelope, possibly springbok, is the normal host.

*Trichostrongylus axei* is a parasite of various domestic animals (Levine, 1968), but it has also been recovered from blesbok, bontebok and Burchell's zebra (Round, 1968). *Trichostrongylus falculatus* is well adapted to semi-arid regions of the RSA (Viljoen, 1969) and, as these regions make up a large proportion of the normal habitat of springbok (Ansell, 1971), it is not surprising that nearly all the springbok were infested with this nematode. *Trichostrongylus thomasi*, although originally described from the abomasa of impala (Mönnig,

TABLE 2 The helminth parasites recovered from springbok No. 9-17 culled near Krugersdorp in the southern Transvaal

Helminths		Dates of slaughter and numbers of helminths recovered									
Species	Stage of development	29 June 1977					13 July 1977		16 August 1977		
		9	10	11	12	13	14	15	16	17	
<i>Dictyocaulus magnus</i>	Adult	37	73	23	35	64	57	162	22	23	
<i>Haemonchus</i> spp.	4th stage	1 459	5 260	990	1 693	9 356	4 140	7 486	3 620	4 060	
<i>H. bedfordi</i>	Adult	30	0	20	0	0	10	30	0	0	
<i>H. contortus</i>	Adult	0	0	0	0	0	0	0	60	40	
<i>Longistrongylus/Ostertagia</i> -type	4th stage	2 787	7 463	2 013	1 887	6 676	4 009	5 158	744	2 116	
<i>L. albifrons</i>	Adult	196	10	171	80	10	20	30	100	180	
<i>Trichostrongylus</i> spp.	4th stage	0	70	0	0	30	40	0	0	60	
<i>T. axei</i>	Adult	829	472	330	364	120	1 452	1 238	661	2 332	
<i>T. falculatus</i>	Adult	0	40	1 485	440	60	970	1 880	1 143	3 090	
<i>Cooperia / Cooperioides</i> -type	4th stage	504	504	2 231	1 114	3 555	1 484	743	952	1 380	
<i>Cooperia hungi</i>	Adult	10	120	0	80	190	821	2	400	711	
<i>Cooperioides antidorca</i>	Adult	1 115	112	2 025	2 206	643	480	583	318	0	
<i>Paracooperia serrata</i>	Adult	108	2 274	1 252	2 280	93	684	6 521	728	80	
<i>Impalaia</i> sp.	4th stage	190	1 183	183	202	120	320	1 442	260	520	
<i>I. nudicollis</i>	Adult	0	416	1	381	0	0	700	40	80	
<i>Nematodirus</i> sp.	4th stage	0	160	40	0	0	200	60	85	380	
<i>N. helvetianus</i>	Adult	7	40	0	120	0	80	0	1 371	640	
<i>Strongyloides</i> sp.	Adult	220	280	120	0	620	360	360	726	3 550	
<i>Agriostomum equidentatum</i>	Adult	11	25	10	21	27	31	79	10	17	

TABLE 3 The helminth and arthropod parasites recovered from springbok No. 18-21 culled near Swellendam in the western Cape Province

Parasites		Animals slaughtered and numbers of parasites recovered			
Species	Stage of development	18	19	20	21
<i>Helminths</i>					
<i>Dictyocaulus magnus</i>	Adult	24	48	10	24
<i>Longistrongylus/Ostertagia</i> -type	4th stage	10 075	13 325	3 535	5 185
<i>L. curvispiculum</i>	Adult	440	410	0	330
<i>L. namaquensis</i>	Adult	275	385	70	450
<i>O. hamata</i>	Adult	0	0	0	100
<i>Trichostrongylus axei</i>	Adult	75	90	50	0
<i>Trichostrongylus falculatus</i>	Adult	0	0	375	50
<i>Paracooperia</i> sp.	Adult	2 880	10	5 505	990
<i>Nematodirus</i> sp.	4th stage	3 975	0	1 165	0
<i>N. spathiger</i>	Adult	0	0	1 135	0
<i>Agriostomum equidentatum</i>	Adult	75	0	0	0
<i>Arthropods</i>					
<i>Ixodes pilosus</i>	Adult	0	2	0	0
<i>Rhipicephalus</i> sp.	Larvae	0	2	0	0
<i>Rhipicephalus</i> sp.	Nymphae	2	2	0	0
<i>Rhipicephalus nitens</i>	Adult	29	27	16	26
<i>Damalinea antidorcus</i>	Nymphae	178	454	26	16
	Adult	38	286	26	24
<i>Linognathus antidorcitis</i>	Nymphae	6	2	4	0
	Adult	2	6	2	4
<i>Linognathus bedfordi</i>	Adult	0	12	0	0

1932, 1933), resembles *Trichostrongylus axei* in that it can be found in the abomasa or stomachs of a multitude of hosts (Horak, unpublished data, 1981).

*Cooperia hungi* seems to be equally well adapted to impala and blesbok (Horak, 1980 b) and its presence in the springbok near Krugersdorp is probably the result of cross-infestation from the above-mentioned hosts, which were also present in the reserve. Both *Cooperioides antidorca* and *Paracooperia serrata* are parasites originally described from springbok (Mönnig, 1931). Their absence in the animals from Swellendam may well be due to the winter rainfall climate of the region compared with summer rainfall at the other 2 localities. The springbok at Swellendam also harboured a *Paracooperia* sp., but this has still to be specifically identified.

*Impalaia nudicollis* was originally described from blesbok (Mönnig, 1931), but has also been recovered from several other wild ruminant species (Round, 1968). Its recovery in the present surveys may reflect the presence of 1 of these hosts in the reserves or may be due to the fact that the springbok can also serve as a definitive host.

As is the case with *T. falculatus*, *Nematodirus spathiger* is well adapted to semi-arid regions of the RSA (Viljoen, 1969) and may well be a definitive parasite of springbok. *Nematodirus helvetianus* is a parasite that has been recovered from cattle in Natal (Hobbs, 1961) but has apparently not been encountered in wild ruminants.

Both *Agriostomum equidentatum* and *Oesophagostomum africanum* are parasites originally described from

springbok (Mönnig, 1929, 1933). The lungworm, *Dictyocaulus magnus*, was originally described from blesbok (Mönnig, 1932) but also infests springbok (Ortlepp, 1962).

Large numbers of 4th stage larvae were recovered during the winter months (May–August) from the animals slaughtered in the Transvaal, and during summer (December) from the animals slaughtered in the western Cape Province. This is probably largely because the development of these larvae became arrested to enable them to survive in a favourable environment inside the host animal during times of the year when climatic conditions would be unfavourable for the development and survival of the free-living stages (Michel, 1974). In the Transvaal the winters are cold and dry, while in the western Cape Province the summers are hot and dry, so to ensure their survival during these unfavourable climatic periods the larvae become arrested in the host animals.

Of the ticks only *Rhipicephalus evertsi evertsi* and *R. nitens* were present in sufficient numbers to warrant discussion. The immature stages of *R. evertsi evertsi* are found on cattle, equines, goats, sheep and on wild antelopes (Hoogstraal, 1956) and reach peak numbers on impala in the northern Transvaal from May–July (Horak, unpublished data, 1981). These facts probably account for the number of immature *R. evertsi evertsi* recovered from the springbok near Lichtenburg examined during June and July 1977. *R. nitens* has a geographical distribution limited to the south-western Cape Province (Morel, 1969) where it has also been found on bontebok (Horak, unpublished data, 1980).

The various species of lice recovered are all frequently encountered on springbok (Ledger, 1980).

No oestrid larvae were recovered from any of the springbok.

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