

TRICHOSTRONGYLUS ANGISTRIS N. SP. FROM THE RED DUIKER *CEPHALOPHUS NATALENSIS* A. SMITH, 1834 AND A REDESCRIPTION OF *TRICHOSTRONGYLUS MINORMÖNNIG*, 1932

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ABSTRACT

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Trichostrongylus angistris n. sp. was found in the abomasa of 13 red duiker *Cephalophus natalensis* A. Smith, 1834, culled in the Charter's Creek Nature Reserve, Natal. The species is closely related to *Trichostrongylus minor* Mönnig, 1932 and can be differentiated from it by the shorter dorsal ray and the different shape of the gubernaculum and spicules. The shoes of the spicules of *T. minor* are set at an angle to the long axis, while those of *T. angistris* are curved.

Upon re-examination, the *Trichostrongylus* spp., tentatively identified as *Trichostrongylus capricola* Ransom, 1907 and *Trichostrongylus vitrinus* Looss, 1905, proved to be *T. angistris*. In this paper, *T. angistris* is compared with *T. capricola* and *T. vitrinus* and *T. minor* is redescribed.

INTRODUCTION

During surveys of the parasites of free-living artiodactylids in some of the provincial nature reserves of Natal, 13 red duiker *Cephalophus natalensis* A. Smith, 1834, were culled in the Charter's Creek reserve and their parasites collected. The parasites of 3 of these animals have already been reported on (Boomker, Keep, Flamand & Horak, 1984). A new species of *Trichostrongylus* Looss, 1905, for which the name *Trichostrongylus angistris* n. sp. is proposed, was recovered from the abomasa of the remaining 10 animals. The new species occurred in moderate numbers and simultaneous infestation with *Trichostrongylus anomalus* Boomker & Vermaak (1986) was seen in 5 animals.

Specimens of *Trichostrongylus capricola* Ransom, 1907 and *Trichostrongylus vitrinus* Looss, 1905 from sheep and goats were acquired from the Commonwealth Institute of Parasitology and compared with the *Trichostrongylus* spp. from the red duiker. The type specimens of *Trichostrongylus minor* Mönnig, 1932 were also examined and the species is redescribed.

DIAGNOSIS OF THE GENUS

Trichostrongylidae: Trichostrongylinae: Small slender worms with a small head and without a buccal capsule or cervical papillae; the excretory pore opens in a notch on the ventral surface a short distance behind the nerve ring. The male bursa has large lateral lobes and a more or less distinct symmetrical dorsal lobe; an accessory bursal membrane is absent and small prebursal papillae are present. The spicules are short and stout, ridged or smooth and are variably sclerotized. A gubernaculum is present.

Females are slightly larger than the males. The uteri are amphidelphic and the ovijector is situated in the posterior third to fifth of the body. Eggs are segmented when laid.

Description of *Trichostrongylus angistris* n. sp.

Type host

Cephalophus natalensis A. Smith, 1834 from the Charter's Creek Nature Reserve, Natal, Republic of South Africa.

Material examined

C. natalensis from the type locality, syntype specimens (Onderstepoort Helminthological Collection, No. T2174), 20 male and 20 female worms.

C. natalensis from the type locality, paratype specimens (Onderstepoort Helminthological Collection, No. T2175), 20 male and 20 female worms.

C. natalensis from the type locality, 5 animals, 114 male and 130 female worms.

Description

The principal measurements are listed in Table 1.

Very small worms that are occasionally coiled; they have the typical appearance of the genus.

The male bursa is typical of the genus and has 2 large lateral lobes and a more or less distinct dorsal lobe (Fig. 1). The anteroventral rays are slender and curve anteriorly. The posteroventral rays are considerably thicker and curve laterally or only slightly anteriorly. The lateral rays diminish in size; the anterolateral curves laterally, the mediolateral curves laterally or posteriorly, while the posterolateral curves posteriorly. The externodorsal rays arise from the base of the dorsal ray and terminate some distance from the bursal margin. The dorsal ray is short and bifurcates distally (Fig. 1). Prebursal papillae are present.

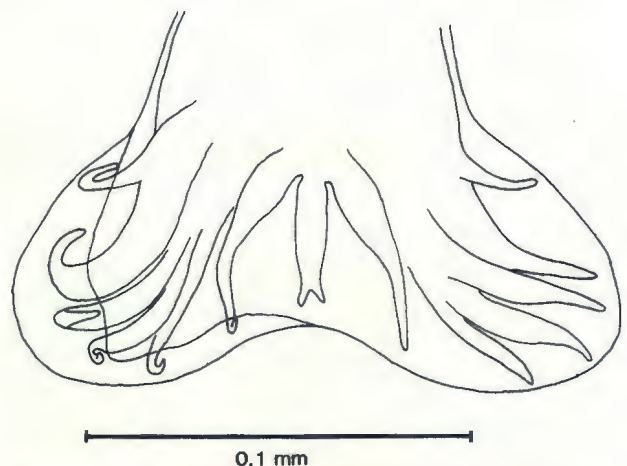


FIG. 1 Ventral view of the bursa of *Trichostrongylus angistris*

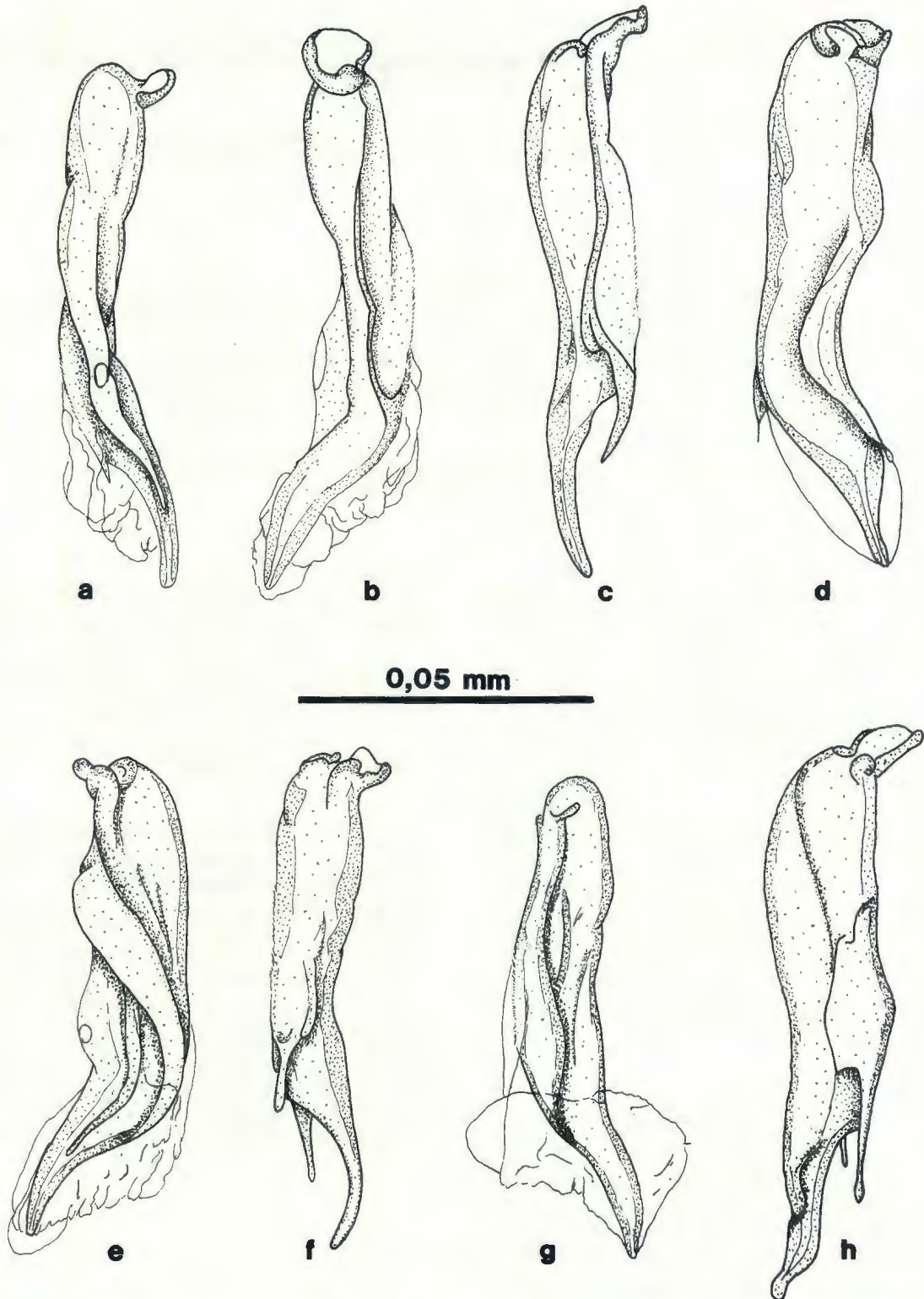


FIG. 2 Ventral (a), lateroventral (b), lateral (c) and dorsolateral (d) views of the left, and ventrolateral (e), lateral (f & h) and dorsolateral (g) views of the right spicules of *Trichostrongylus angistris*. The tip of the spicule in (h) is deformed

The spicules are subequal and moderately sclerotized and, as is usual in the genus, twisted longitudinally (Fig. 2 a, b, e). A curved projection is present on either side of both the spicules, the one being thicker than the other. The projections support the well developed membranous alae that enclose the posterior third. In lateral view the tips of the spicules are curved which, together with the thicker projection, give them the appearance of a crab claw (Fig. 2 c, f). They present different shapes when

seen from different views (Fig. 2 a-h) and because of the weak sclerotization their tips are easily deformed when the worms are manipulated under a cover slip (Fig. 2 h).

The gubernaculum is weakly sclerotized. It resembles the shape of an adult *Fasciola hepatica*, with a neck and wide shoulders (Fig. 3 a-c). The neck may be slightly curved to the one side or the other. In lateral view, the gubernaculum is hook-shaped and consists of 2 parts.

FIG. 4 The bursa of *Trichostrongylus minor*, ventral view

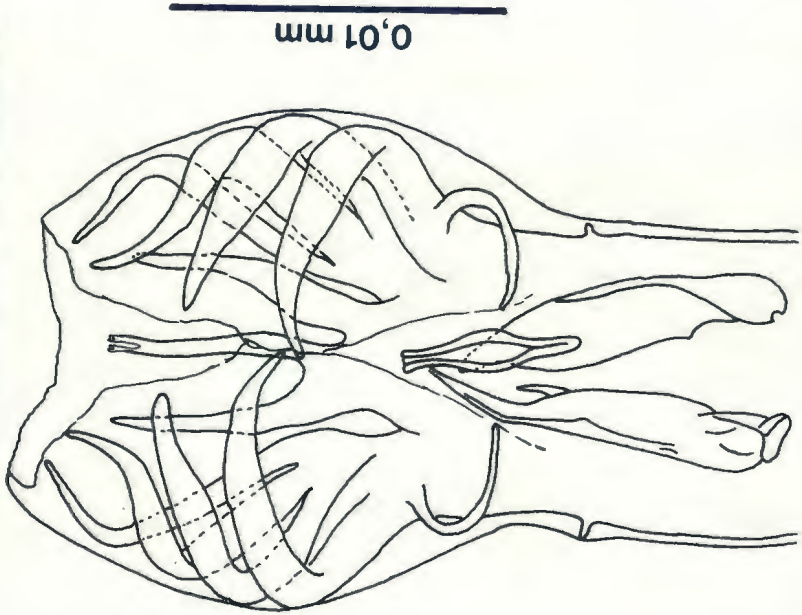


FIG. 3 The gubernaculum of *Trichostrongylus angistris*: (a-c), dorsal view, (d & e), lateral view

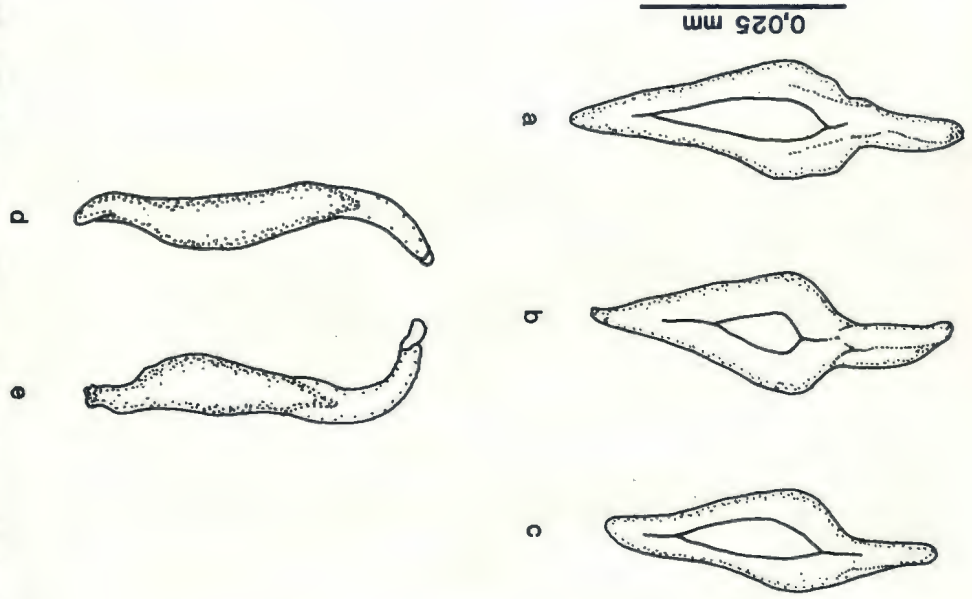


TABLE 1 The principal measurements (in mm) of *Trichostrongylus angistris* n. sp., *Trichostrongylus minor*, *Trichostrongylus capricola* and *Trichostrongylus vitrinus*

	<i>Trichostrongylus angistris</i>		<i>Trichostrongylus minor</i>		<i>Trichostrongylus capricola</i>		<i>Trichostrongylus vitrinus</i>	
	Males	Females	Males	Females	Males	Females	Males	Females
Length	3,05-4,04	3,13-4,46	4,52-5,19	4,45-5,12	4,05-5,60	5,06-6,28	4,17-4,56	5,22-6,84
Width	0,064-0,084	0,054-0,076	0,078-0,092	0,074-0,096	0,080-0,140	0,080-0,104	0,100-0,134	0,098-0,130
Length of oesophagus	0,054-0,762	0,584-0,766	0,664-0,732	0,590-0,752	0,592-0,074	0,620-0,786	0,600-0,800	0,614-0,784
Distance of excretory pore from anterior end	0,128-0,160	0,120-0,150	0,154-0,156	0,160-0,164	0,144-0,154	0,150-0,166	0,102-0,164	0,088-0,130
Distance of prebursal papillae from posterior end	0,094-0,118	—	0,140-0,174	—	0,138-0,180	—	0,182-0,194	—
Length of dorsal ray	0,034-0,046	—	0,074-0,080	—	0,040-0,048	—	0,052-0,060	—
Length of left spicule	0,098-0,116	—	0,100-0,114	—	0,132-0,154	—	0,160-0,180	—
Length of right spicule	0,090-0,108	—	0,092-0,100	—	0,124-0,156	—	0,152-0,170	—
Length of gubernaculum	0,040-0,052	—	0,052-0,056	—	0,072-0,092	—	0,082-0,092	—
Combined length of ovijectors and sphincters	—	0,220-0,350	—	0,284-0,478	—	0,280-0,350	—	0,408-0,460
Distance of vulva from anus	—	0,540-0,858	—	0,816-1,006	—	0,868-1,250	—	1,246-1,462
Distance of anus from tip of tail	—	0,054-0,074	—	0,064-0,084	—	0,070-0,076	—	0,076-0,090
Distance of vulva from tip of tail	—	0,612-0,916	—	0,880-1,090	—	0,940-1,320	—	1,324-1,550
Eggs (<i>in utero</i>), length	—	0,068-0,100	—	0,070-0,084	—	0,072-0,090	—	0,078-0,098
width	—	0,034-0,048	—	0,036-0,044	—	0,042-0,056	—	0,044-0,060

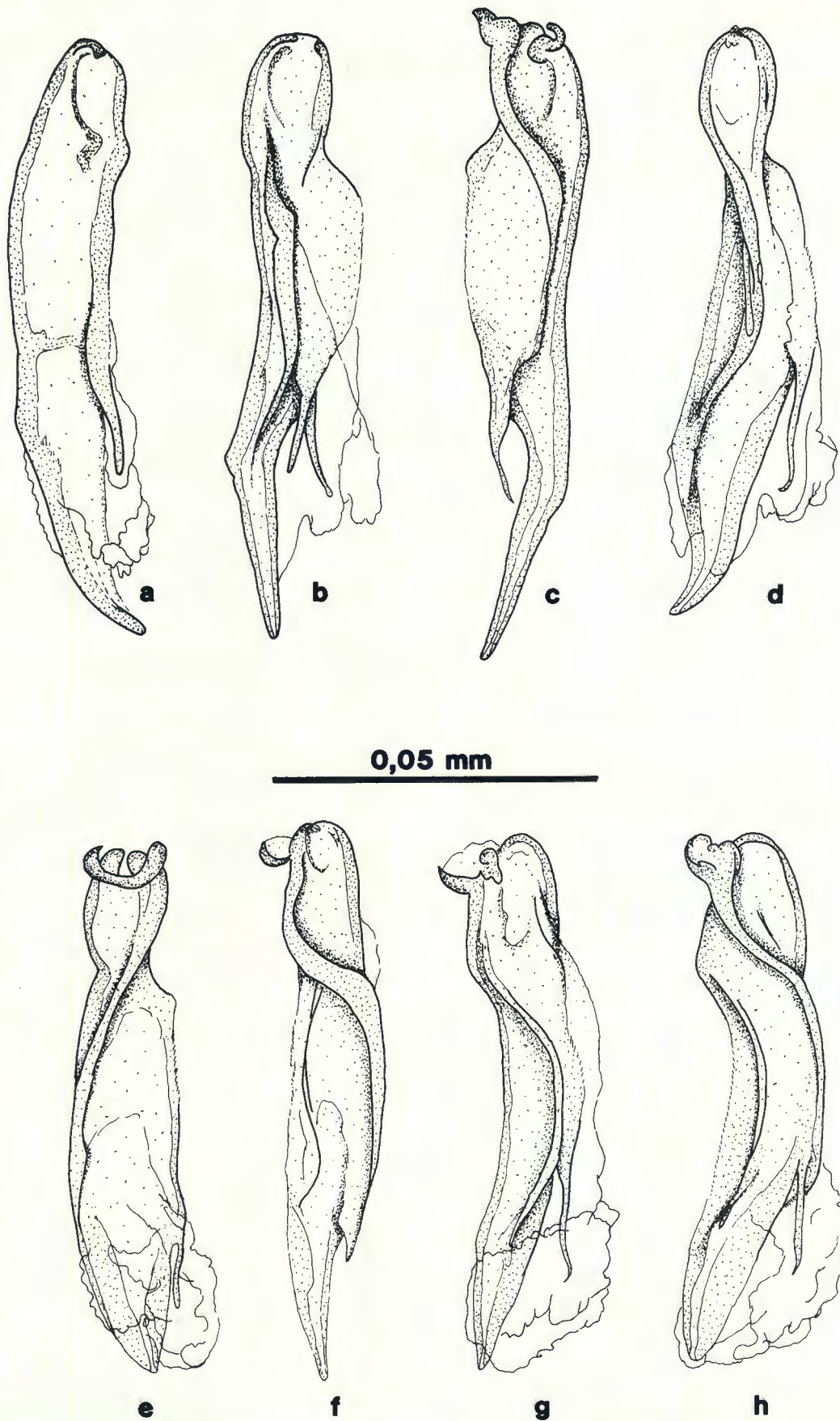


FIG. 5 Dorsolateral (a), lateral (b & c) and ventrolateral views of the left, and ventrolateral (e), dorsolateral (f) and lateral (g & h) views of the right spicules of *Trichostrongylus minor*

The part corresponding to the neck is weakly sclerotized, almost membranous, while the body is thicker, more or less straight and slightly better sclerotized (Fig. 3 d-e).

The females are larger than the males. The vulva is situated approximately at the division of the anterior 2/3rds and the posterior 1/3rd of the body and vulvar lips

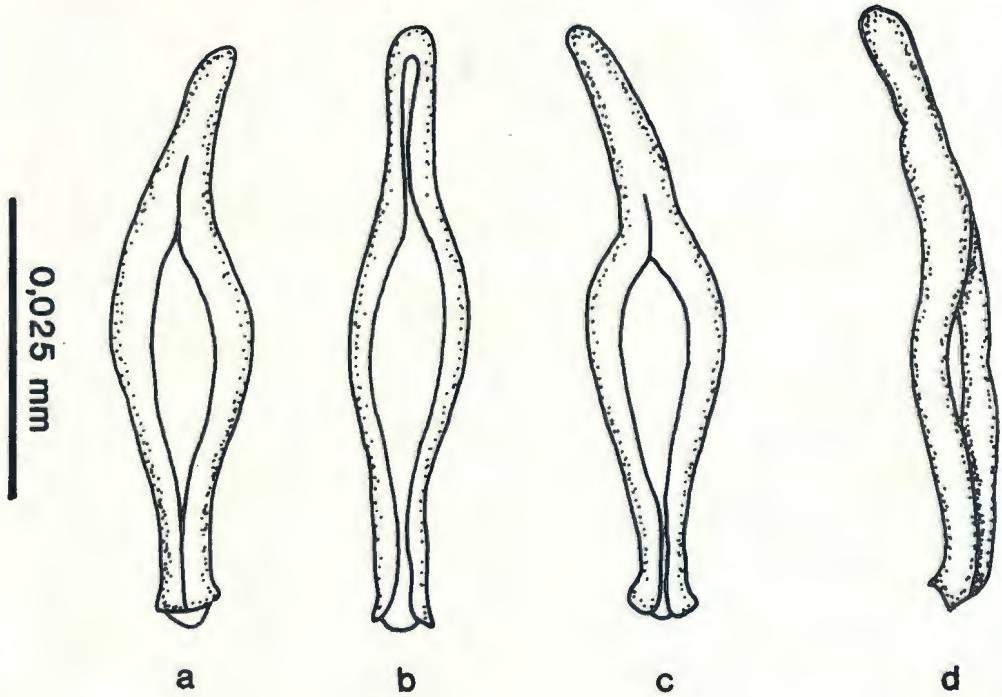


FIG. 6 The gubernaculum of *Trichostrongylus minor*; (a-c), dorsal and ventral views (d), lateral view

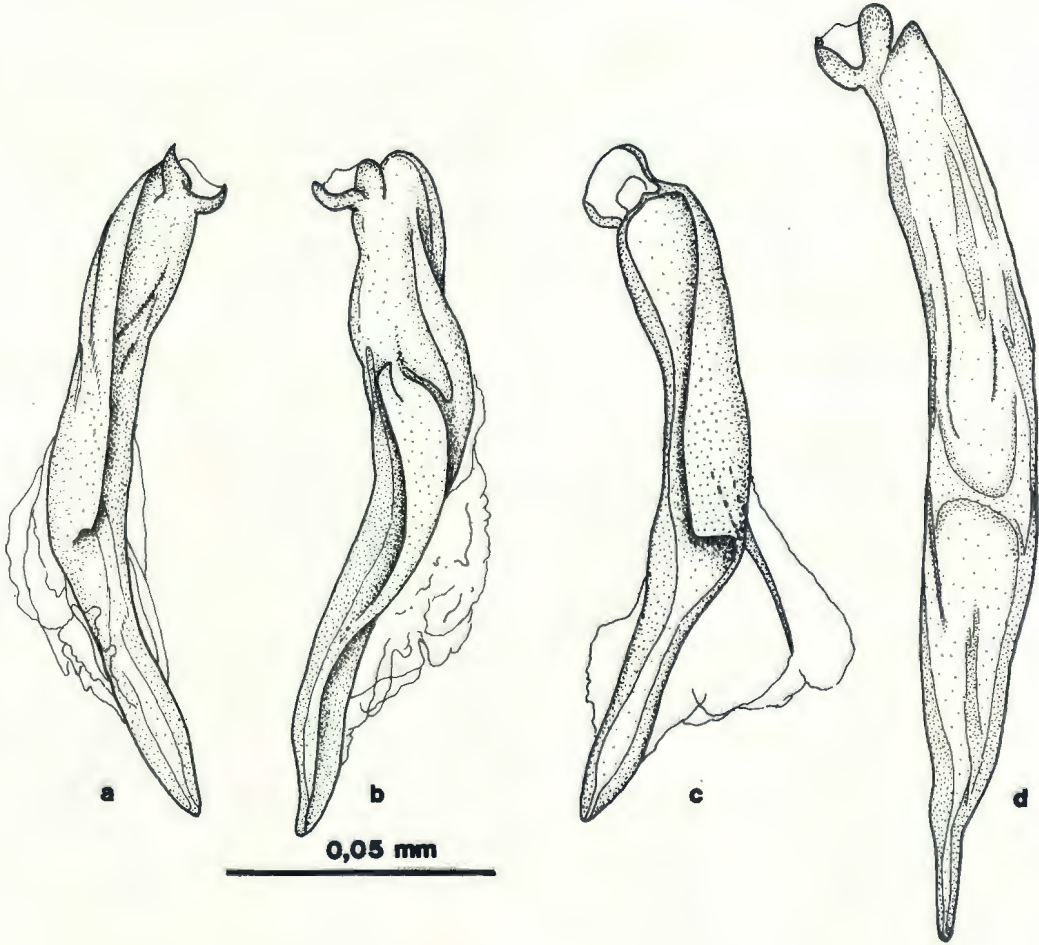


FIG. 7 The spicules of *Trichostrongylus capricola* (a-c) and *Trichostrongylus vitrinus* (d)

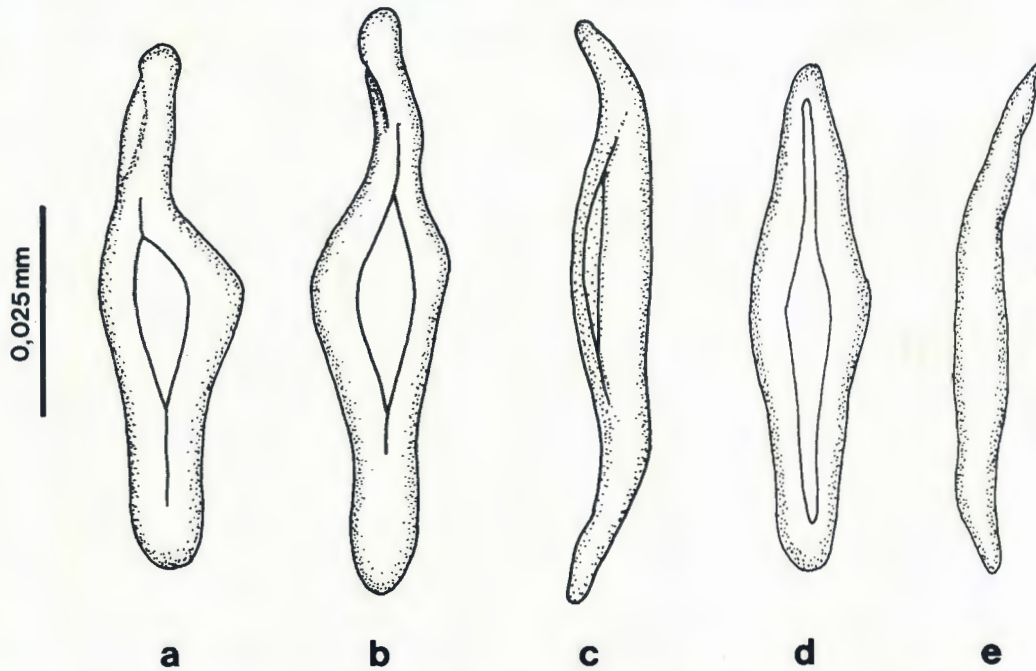


FIG. 8 The gubernacula of *Trichostrongylus capricola* (a & b), dorsal view, (c), lateral view and *Trichostrongylus vitrinus* (d), dorsal view (e), lateral view

are inconspicuous. The uteri are amphidelphic and the eggs are segmented when laid.

Redescription of *Trichostrongylus minor* Mönnig, 1932

Type host

Damaliscus dorcas phillipsi Harper, 1939 from Theunissen, Orange Free State, Republic of South Africa.

Material examined

D. dorcas phillipsi from the type locality, syntype specimens (Onderstepoort Helminthological Collection, No. T2049), 3 male and 8 female worms.

D. dorcas phillipsi, locality not given, 4 males.

Description

The principal measurements are listed in Table 1.

The bursa is similar to that of the other species of the genus, with 2 large lateral lobes and a more or less distinct dorsal lobe. The anteroventral rays are slender and curve anteriorly. The posteroventral rays are thicker and curve laterally or only slightly anteriorly. The lateral rays diminish in size; the anterolateral curves laterally, the mediolateral curves laterally or posteriorly and the posterolateral curves posteriorly. The externodorsal rays arise from the base of the dorsal ray and do not reach the margin of the bursa. The dorsal ray is long and terminates some distance from the bursal margin (Fig. 4). Small prebursal papillae are present (Fig. 4).

The spicules are weakly sclerotized, are subequal, and appear to be longitudinally folded (Fig. 5 e, g, h). The tips of the longer spicules are slender, straight, or only slightly curved, and are set at an angle to the long axis. The shorter spicules have thicker tips. Two slender projections arise from the distal part of the body and they support the well developed membranous alae that surround the distal 1/2 to 1/3rd of the spicule. Both spicules vary considerably in shape when seen from different views (Fig. 5 a-h).

The gubernaculum is weakly sclerotized and is boat-shaped. The anterior part is curved to one side or the other, while the posterior part appears to be bifid with small lateral protuberances on the extreme tip (Fig. 6 a-c). When pressure is applied to the gubernaculum, the distal 1/3rd splits longitudinally and the protuberances become quite distinct. In lateral view the gubernaculum appears as a straight rod-like structure (Fig. 6 d).

The females are larger than the males. The vulva is situated approximately at the division of the anterior 2/3rds and the posterior 1/3rd of the body and vulvar lips are inconspicuous. The uteri are amphidelphic, and the eggs are segmented when laid.

DISCUSSION

T. angistris is closely related to *T. minor* in that the length of the spicules is about the same and that the shape of the spicules is similar.

The differences between these 2 nematodes are the following: *T. minor* is a larger worm, with a long dorsal ray and prebursal papillae that are situated 0,140-0,174 mm from the posterior tip of the bursa, while *T. angistris* is smaller, the length of the dorsal ray is approximately half of that of *T. minor* and the prebursal papillae are situated 0,094-0,118 mm from the posterior tip of the bursa. The tips of the spicules of *T. minor* and *T. angistris* are weakly sclerotized, but those of *T. angistris* seem to deform more easily than those of *T. minor* when the worms are manipulated. The 2 processes on the spicules of *T. minor* are slender and often difficult to see, while those of *T. angistris* are curved and thicker, giving the tip of the spicule the appearance of a crab claw in lateral view. In addition, the tips of the longer spicules of *T. minor* are usually set at an angle to the long axis, while those of *T. angistris* are curved, augmenting the appearance of a crab claw. In dorsal and ventral view, the gubernaculum of *T. minor* is boat-shaped and the anterior part is usually bent to one side. The posterior part seems to be bifid and carries lateral protuberances. The gubernaculum of *T. angistris* is shaped like *Fasciola hepatica* and has a short, straight neck; the wide shoulders are distinct.

In lateral view the gubernaculum of *T. minor* is straight or only slightly curved, while the anterior part of that of *T. angistris* curves dorsally and appears almost membranous.

The *Trichostrongylus* spp. previously recovered from red duiker from Natal were tentatively identified as *T. capricola* and *T. vitrinus* (Boomker *et al.*, 1984). They were re-examined and compared with specimens of *T. capricola* and *T. vitrinus* which were obtained from the Commonwealth Institute of Parasitology, England. For comparative purposes, the principal measurements of the last-named worms are listed in Table 1, and their spicules and gubernacula illustrated in Fig. 7 & 8. The *Trichostrongylus* spp. previously recovered should be regarded as *T. angistris*. The difference in the measurements of the spicules, as recorded by Boomker *et al.* (1984) is due to the easily deformed tips of the spicules, which render them longer than their actual length. As yet, *T. capricola* has not been recorded from South Africa.

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REFERENCES

- BOOMKER, J., KEEP, M. E., FLAMAND, J. R. & HORAK, I. G., 1984. The helminths of various antelope species from Natal. *Onderstepoort Journal of Veterinary Research*, 51, 253-256.
- BOOMKER, J. & VERMAAK, DALENE, 1986. *Trichostrongylus anomalous* n. sp. (Nematoda: Trichostrongylidae) from the red duiker *Cephalophus natalensis* A. Smith, 1834. *South African Journal of Wildlife Research*, (in press).
- MÖNNIG, H. O., 1932. Wild antelopes as carriers of nematode parasites of domestic ruminants. Part II. *18th Report of the Director of Veterinary Services and Animal Industry, Union of South Africa*, pp 153-172.
- RANSOM, B. H., 1911. The nematodes parasitic in the alimentary canal of cattle, sheep and other ruminants. *Bulletin of the Bureau of Animal Industry, U.S. Department of Agriculture*, No. 127, pp 1-132.