

BIGALKENEMA NAMAQUENSIS, GEN. & SP. NOV., A
TRICHOSTRONGYLID WORM FROM SHEEP

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Among several types of abomasal helminths collected from sheep from farms in Namaqualand, North Western Cape Province, there were present a number of small male nematodes which differ from known ovine worms. These were associated with the specimens of *Haemonchus contortus*, *Ostertagia circumcincta* and *Trichostrongylus rugatus*, which were present in very large numbers in approximately all the sheep examined. After being cleared in partially evaporated 70 per cent alcohol plus 5 per cent glycerine, they were easily separable from other male worms present by the faint cuticularization of their spicules. They have been identified as members of a new genus and are described under the name:

Bigalkenema namaquensis n.g., n. sp.

Male

The length varies from 5.5 to 6.5 mm, the maximum body thickness reaches 0.1 mm. The anterior body third tapers towards the head, whereas the rest of the body maintains a more or less uniform thickness. The head end is from 0.018 to 0.02 mm thick, the mouth appears to be surrounded by three small, insignificant lips. There are two prominent spike-like lateral cervical papillae about 0.29 to 0.3 mm from the anterior end. Numerous, very faint longitudinal cuticular striations cover the whole body. In some worms about 20 of these striations show up more prominently. The transverse body annuli are also very faint. The oesophagus is from 0.57 to 0.6 mm long; at its anterior end it is about 0.018 mm thick, and increases in thickness posteriorly so that at its hind end it is 0.05 to 0.052 mm. In specimens cleared in glycerine or gum arabic the anterior portion for about two fifths of its length is seen to be histologically different from the remaining portion; this anterior portion shows transverse striations whereas the posterior part is granular in appearance. The nerve ring is immediately anterior to the junction of these two parts. Ventrally the small aperture of the excretory gland is about 0.01 mm behind the nerve ring. Striking features of the bursa are: Firstly, the massive latero-ventral bursal rays; in a dorsal or ventral view of the posterior end, when the lateral lobes are enrolled, they produce outward bulges in the lateral profile. Secondly, the distal halves of the postero- and antero-lateral rays diverge strongly from the medio-lateral ray (Fig. 1). The spicules are characteristic in that they are poorly chitinized, with the distal pointed tip bent inwards. The bursa consists of two ample, somewhat hemispherical lobes and a small dorsal lobe. The dorsal ray is relatively

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thick, about 0.06 to 0.065 mm long; its distal quarter is split into two short stumpy branches, each of which is split into two minute twigs. The extero-dorsal and dorsal rays have a common stem, the former being arched and supporting the inner portions of the lateral lobes. The three lateral rays also originate from a common stem. The postero- and medio-lateral rays reach to the edge of the bursa, and are only about half the thickness of the antero-lateral ray. The ventral rays also arise from a common stem, proximally they diverge, distally their endings approach each other and terminate close together near the edge of the bursa. The latero-ventral is the thickest ray, being about half as thick again as the antero-lateral ray which is the second thickest. In comparison the ventro-ventral ray is poorly developed, being the thinnest of the bursal rays. The inner surface of the bursa is covered by irregular series of cuticular elevations which give this surface a rugose appearance. No signs of an accessory bursal lobe can be seen.

The two similar spicules are from 0.15 to 0.16 mm long; their central portions are very poorly chitinized and appear to be membranous; there is a very small and insignificant spike-like branch on the medial aspect of each spicule near to its tip; the main body of the spicules terminates in sharp points which curve inwards. No gubernaculum can be seen; if present, it must be very weakly chitinized and thus very difficult to differentiate. Well developed prebursal papillae are present.

Among the female worms present three differed from *T. rugatus* and *O. circumcincta*; they were longer and stouter than the females of *T. rugatus* and considerably smaller than those of *O. circumcincta*. These females are tentatively referred to the new species.

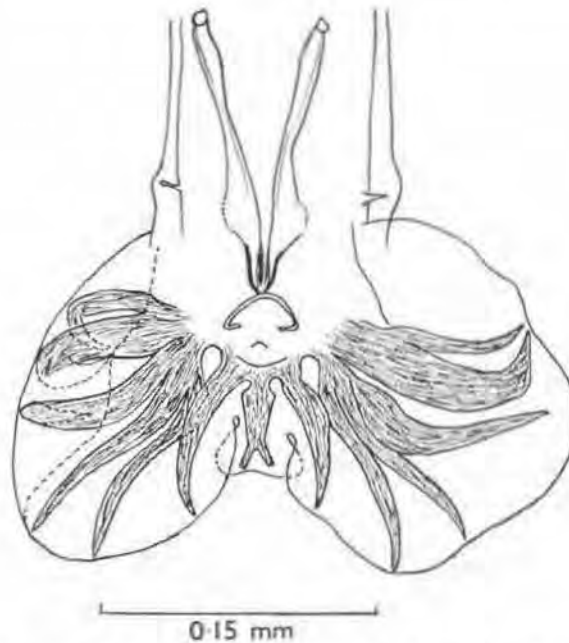


FIG. 1. *Bigalkenema namaquensis* sp. n. Bursa, dorsal view.

Female

The length varies from about 6.0 to 7.0 mm (specimens somewhat coiled) with a maximum thickness of 0.08 to 0.1 mm. The head has a thickness of 0.021 mm. The oesophagus varies in length from 0.5 to 0.59 mm, and is 0.016 mm thick at its anterior end and 0.048 mm at its posterior end. The nerve ring is 0.2 to 0.22 mm from the anterior end. The excretory pore is about 0.275 mm from the front. Laterally, immediately behind the level of the excretory pore are two spike-like cervical papillae. The tail is straight, 0.082 to 0.093 mm long, tapering to a bluntly rounded end. The vulva is 1.2 to 1.4 mm from the tail end; it is a transverse slit, not overhung by a cuticular flap as it is generally in *O. circumcincta*. The combined lengths of the ovejectors vary from 0.26 to 0.029 mm. The eggs *in utero* measuring about 0.053 mm long and 0.032 mm broad, are thin-shelled, morulated.

Host: Domestic sheep (*Ovis aries*).

Location: Abomasum.

Locality: Namaqualand (N.W. Cape).

Types: In the Onderstepoort collection.

A single male specimen from a steenbuck, *Raphicerus campestris* (Thunberg), from the same locality is also referred to this genus and species.

Affinities

The structure of the bursa shows that this species is related to *Bigalkea sabie*, Mönnig 1932; it differs from it in that the males are smaller, the spicules shorter and of a different shape, the dorsal ray supports a definite but small dorsal bursal lobe; a distinct gubernaculum is absent. In both species the single dorsal rays are bifurcate only in their posterior quarters and the lateral rays all diverge from one another.

Discussion

In July, 1931, le Roux described a new genus and species, *Longistrongylus meyeri* from the red hartebees, *Alcelaphus buselaphus* (Pallas). Apart from general trichostrongylid characters this genus is characterised by the presence of two large lateral bursal lobes plus a distinct but smaller dorsal lobe; equal and parallel ventral bursal rays terminating close to the edge of the bursa, the antero-lateral diverging from the other lateral rays, medio- and postero-laterals equal and parallel, dorsal ray short and bifurcating from near its origin into two stout branches; spicules equal, slender and terminating in two short points. In August, 1931, Mönnig described *Bigalkea albifrontis* n.g. & n. sp., from the blesbuck, *Damaliscus albifrons* Burchell. According to his diagnosis and description this and le Roux's species are very similar and certainly belong to the same genus; the only differences are that in the genus *Bigalkea* there is no definite dorsal bursal lobe and the latero-ventral ray is stouter than the ventro-lateral. The dorsal rays are similar in both genera. In both also the medio- and postero-lateral rays are parallel and the structure of the spicules is similar.

Following a preliminary communication in 1932, Mönnig (1933) gave a fuller description of a second species of his genus namely *Bigalkea sabie*, from the impala, *Apyceros melampus* Lichtenstein; this differs from his first species in having a dorsal bursal lobe, the dorsal ray being split only towards its tip and the medio- and postero-lateral rays diverging from each other.

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Travassos (1937), in his monograph on the Trichostrongylidae relegated the genus *Bigalkea* to synonymy with *Longistrongylus* and transferred both of Mönnig's species to it. To this genus Ortlepp (1939) also referred a new species namely *L. schrenki* from the waterbuck, *Kobus ellipsiprymnus* (Ogilby). According to Skrjabin, Shikhobalova & Schults (1954), Skrjabin & Shikhobalova (1952) were in agreement with Travassos that the type species of *Bigalkea* namely *B. albifrontis* belonged to the genus *Longistrongylus*; however, they considered that *Bigalkea sabie* should not be placed in this genus because of the structure of its dorsal ray and disposition of its postero- and medio-lateral rays. Consequently they placed this species and *L. schrenki* in a separate genus for which they proposed the retention of Mönnig's name, namely *Bigalkea*. Furthermore they nominated *B. sabie* as its type species. The author is in agreement with this procedure as far as the placing of these species in separate genera is concerned but not with the retention of the generic name *Bigalkea* or the placing of *L. schrenki* in this genus. When *B. albifrontis* was transferred to the genus *Longistrongylus*, the genus *Bigalkea* lost its type and became a synonym of *Longistrongylus*. Thus according to the rules of zoological nomenclature Mönnig's name cannot be retained. *B. sabie* shows close affinities to the new species described above and it is consequently transferred to this genus under the name *Bigalkenema albifrontis* (Mönnig, 1931) nov. comb.

The genus *Bigalkenema* is characterised by, and differs from, the genus *Longistrongylus* by the presence of divergent postero- and medio-lateral rays, a dorsal ray which is not split to its base, the absence of a distinct bursal lobe and the presence of a gubernaculum.

The species *L. schrenki* occupies an intermediate position between the members of the genera *Longistrongylus* and *Bigalkenema*; it approaches the members of *Longistrongylus* in that the postero- and medio-lateral rays are long and parallel, a distinct dorsal bursal lobe is present and a gubernaculum is apparently absent. It differs, however, in that its dorsal ray is not split in two and in that the latero-ventral ray is larger than the other rays. These two characters ally it to the genus *Bigalkenema*. Because of these differences the writer proposes to erect a separate genus *Kobusinema* n.g. for its reception. This genus is characterised by, and differs from, the genera *Longistrongylus* and *Bigalkenema* by the features listed above. At present it contains a single species *Kobusinema schrenki* (Ortlepp, 1939) nov. comb. a parasite of the waterbuck, *Kobus ellipsiprymnus*.

Summary

Bigalkenema namaquensis n.g., n. sp., is described from domestic sheep. The new genus belongs to the Trichostrongylidae. It is closely related to the genus *Longistrongylus* le Roux, from which it is separated by its dorsal ray, bifurcated near its tip and not from its base, and in that the lateral bursal rays are divergent. Two species are placed in this genus: *B. namaquensis* n. sp., type species, and *Bigalkenema sabie* (Mönnig, 1932) nov. comb. The genus *Longistrongylus* is restricted to the two species *L. meyeri*, le Roux, 1931 and *L. albifrontis* (Mönnig, 1931). The species *Longistrongylus schrenki* is transferred to a closely related new genus *Kobusinema*, characterised by parallel postero- and medio-lateral rays and a dorsal ray split only towards its tip.

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