Onderstepoort Journal of Veterinary Science and Animal Industry, Volume 9, Number 2, October, 1937.

Printed in the Union of South Africa by the Government Printer, Pretoria.

South African Helminths.—Part I.

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THE present paper is intended to be the first of a series in which the helminths, collected in connection with the zoological survey of South Africa, are described. In addition helminths which are sent in from other sources may also be included. In this communication all the helminths except one, namely *Hyracofilaria hyracis* gen. and sp. nov. were collected in connection with the survey.

CESTODA.

Fam. TAENIIDAE Ludwig, 1886.

Echinococcus felidis sp. nov.

Numerous examples of this parasite were collected from a lion, whose intestine was literally felted over by the parasites. Macroscopically no lesions were discernible.

The largest specimens, all of which were fixed in alcohol, were 5·5 mm. long and consisted of the most part of four segments plus a head and neck. Some specimens, however, only had three segments, but in these the last segment was not gravid, and in some specimens the beginnings of a fifth segment was just discernible at the hind end of the neck where the developing genitalia showed up as an opaque central patch. In specimens with four segments the last segment was always gravid and the third from last mature; the segment between these had lost practically all its genitalia and the uterus was clearly defined and contained immature eggs.

The head has a somewhat square outline, the suckers being prominent and occupying the corners; it is from 0·365 to 0·406 mm. broad. The suckers are somewhat circular, 0·133 to 0·157 mm. in diameter and have a depth of 0·07 to 0·075 mm. In extended specimens the rostellum is from 0·11 to 0·16 mm. high with a breadth of 0·139 to 0·174 mm. It carries a double row of hooks, numbering 32 to 46. The anterior larger hooks (Fig. 1) are from 0·037 to 0·042 mm. long measured in a straight line from the base of the handle to the tip of the blade; their most characteristic feature is the general ruggedness of the handle and guard, both showing a markedly

gnarled appearance. The central axis of the handle forms practically a straight line with that of the posterior half of the blade, and the blade in most cases is not strongly arched. In the smaller hooks the handle and guard show at most only a wavy outline, and the guard is generally heart-shaped in lateral view; the axis of the posterior half of the blade is also more or less in a straight line with that of the handle. From the tip of the blade to the end of the handle the length is 0·028 to 0·035 mm.

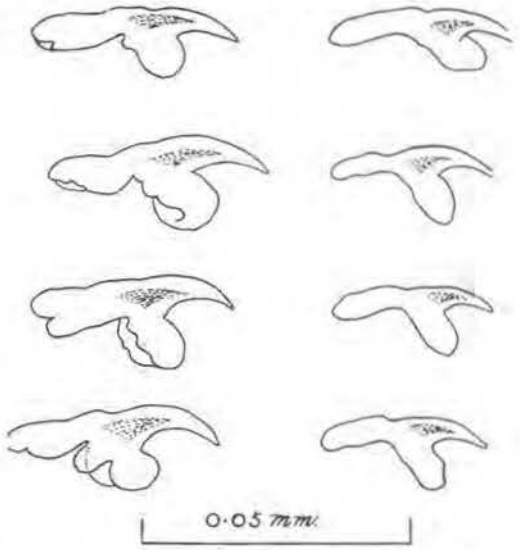


Fig. 1.—*Echinococcus felidis* sp. n. Large and small rostellar hooks.

The neck in extended specimens is generally slightly longer than broad, being from 0·26 to 0·69 mm. long, including the developing first segment which has not yet been segmented off, and from 0·29 to 0·35 mm. broad.

Mature segments are from 0·6 to 0·64 mm. long by 0·27 to 0·29 mm. broad across the level of the genital port; its anterior breadth is only about half of its posterior and about $\frac{3}{4}$ of the maximum breadth of the segment. The genital pore, which alternates irregularly, is lodged at or just posterior of its middle. The genitalia are somewhat similar to those of the genotype, except that the anterior testes attain maturity later than the posterior one and are consequently smaller: there are from 28 to 46 testes to each mature segment, the anterior about 0·015 mm. in diameter and the posterior about 0·04 mm.; they are arranged in a single sheet to form a horse-shoe round the female genitalia, and then pass forwards on the aporal side to form a band of 3 to 4 testes broad in the central area of the segment in front of the cirrus pouch. The cirrus pouch is club-shaped and passes obliquely inwards and forwards to about the middle of the segment; it is about 0·145 mm. long by 0·05 mm. broad across the club. In gravid segments it is longer and may attain a length of 0·2 mm. with a maximum thickness of 0·1 mm.

Gravid segments are larger and may attain a length of 2·4 mm. or nearly half the length of the entire parasite, by 0·5 mm. broad; the genital aperture is found in its posterior half at about the junction of its 3rd and 4th fifths; the uterus extends throughout its whole length and shows no definite branches, instead from 15 to 20 shallow sacculations are present on either side. The onchospheres have a finely pitted shell, 0·005 mm. thick and itself is slightly oval, measuring from 0·038 to 0·039 mm. long by 0·031 to 0·034 mm. broad; the embryophore is rounded with a diameter of about 0·22 mm.

Discussion.—The parasite described above is the first record of an Echinococcus occurring in a member of the Aeluroidea in South Africa; only one other species of Echinococcus has been described from the cat tribe, namely *E. oligarthrus* (Diesing, 1863) from *Felis concolor* and *Felis yaguarundi*, S. America. It is true that *E. granulosus* has been recorded several times from domestic cats, but from the work of Lorencz (1933) it is doubtful whether this parasite is normal for this host and whether it ever attained maturity; Lorencz artificially infected 51 cats and found that this parasite developed only very slowly in this host and never attained maturity, whereas artificial infection of dogs with the same material produced egg-laying adults in 36 days.

In that the mature segment is always the third from the last, this species appears to be more closely allied to the species *E. cameroni* Ortlepp, 1934, and *E. lycaontis* Ortlepp, 1934. It may, however, be distinguished from the latter species by the rugose nature of its hooks and by the absence of the 3rd and 4th row of vestigeal hooks on the head; its rugose hooks also distinguish it from the former species.

Specific diagnosis.—Slender cestodes reaching a length of 5·5 mm. in alcohol preserved material and normally carrying 4 or 5 segments, of which the mature segment is always the third from the last. Rostellum carries 32 to 46 hooks in two rows; larger hooks 0·037 to 0·042 mm. long, and smaller hooks 0·028 to 0·035 mm. long. Handle and guard of large hooks markedly rugose. 28 to 46 testes in each mature segment of which those in the front half of the segment are smaller and only mature later than those in the posterior half of the segment. Uterus with 15 to 20 sacculations on either side; Onchospheres finely pitted, 0·038 to 0·039 mm. long by 0·031 to 0·034 mm. broad.

Host: Leo leo krugeri. Rbts.

Habitat: Small intestine.

Locality: Northern Transvaal.

Types in the Onderstepoort Helminthological collection.

Fam. DAVAINEIDAE Fuhrm., 1907.

Raillietina (*Raillietina*) *pintneri* (Klaptocz, 1908).

This species was well represented in all the collections, and it, together with *Octopetalum longicirrosa* Baer, appears to be the commonest cestodes of Guinea fowls. The longest specimens attained

a length of 76 mm. In the writer's material there were from 200 to 220 rostellar hooks which were from 0·0084 to 0·0095 mm. long; these figures are slightly in excess of those of Baer (1925), who also gives the findings of Klaptocz, and Fuhrmann, but in view of the similarity in the internal organisation of their material and the writer's, there does not appear to be any valid ground for doubting the identity of these materials.

Host: *Numida mitrata*. Pall.

Location: Small intestine.

Locality: Swaziland, Transvaal and Eastern Cape Province.

Fam. Dilepididae Fuhrmann, 1907.

Octopetalum longicirrosa Baer, 1925.

This species was also present in all the guinea fowl materials submitted to the writer for identification. Baer (1925) observed that in the last segments eggs were entering the paruterine organ; the writer did not find any eggs in the paruterine organs of his specimens.

Host: *Numida mitrata*. Pall.

Location: Small intestine.

Locality: Swaziland, Transvaal and Eastern Cape Province.

Joyeuxia fuhrmanni (Baer, 1924).

This species, of which about 35 specimens were collected from a genet, varied in length from 5 to 15 mm. and only those specimens from 12 to 15 mm. long had mature segments, which attained a maximum length of 2·5 mm. The rostellum was about 0·095 mm. long and about 0·055 mm. broad at its base and carried 14 to 16 rows of rose-thorn hooks, each about 0·0055 mm. long. The head was about 0·23 mm. wide and the four suckers were slightly oval, measuring 0·08 by 0·087 mm. in diameter. The number of segments varied from 30 to 44, and the genital rudiments could just be determined from the 5th segment; the 25th or 26th segment was mature and eggs began to appear from about 10 segments lower.

The cirrus sac is elongate, about 0·13 mm. long in mature segments and 0·145 mm. long in ripe segments, with a maximum thickness of 0·04 mm.; it extends almost transversely across the excretory canals; the cirrus is smooth and when fully everted was from 0·18 to 0·19 mm. long by 0·015 to 0·017 mm. broad. The *vasa differentia* extend along the anterior margin of the segment, and those of the two sides may often meet. The testes are large, round to oval, and vary from 40 to 50 in number; they fill up the whole area in the centre of the segment between the female glands and the male ducts; none are found anterior of the *vasa differentia*. The eggs, which are lodged singly in their capsules, are thin-shelled and slightly oval, measuring 0·039 to 0·041 mm. long by 0·028 to 0·032 mm. broad; they are closely packed together and fill up the

whole space between the excretory canals, and a few may even be found exterior of these canals. In the ripest segments eggs may also be present which have not yet developed a shell or hooklets.

Host: *Genetta rubiginosa*. Puch.

Habitat: Intestine

Locality: Northern Transvaal.

Discussion.—From the literature it appears that two species of tapeworm, which may be referred to this genus, have been described from Genets, namely *Dipylidium dongolense* Beddard, 1913, from *Genetta dongolana* and *Dipylidium gervaisii* Setti, 1895, from *G. tigrina* (=*G. abissinica*) and *G. genetta*; in addition *Dipylidium genettae* (Gervais, 1847), from *G. genetta* might also belong to the genus Joyeuxia but according to Baer (1927) its description is too incomplete for any determination. According to this author and to Wittenberg (1932), the description of Beddard's species is also too incomplete for specific comparison, and the same also applies to that of Gervais. Accordingly, the writer is limited for comparison to *J. fuhrmanni* Baer, 1924, and *J. pasqualei* (Diamare, 1893). Wittenberg is of the opinion that these two species are cospecific but in a previous communication (1933) the writer has expressed the view that they are different. The material described above strengthens the writer's view, because except for their smaller size and consequent lesser number of segments, the genitalia and their internal arrangement is practically identical to that found in the material collected by the writer from a domestic cat; the writer's genet material is unfortunately not fully extended and consequently the internal organs appear more closely packed than in his cat material. As fully half the writer's genet material does not show any ripe segments, it is probable that these specimens represent a fairly recent infection and that the worms had not yet reached their maximum length.

Fam. Anoplocephalidae Fuhrmann, 1907.

Anoplocephala (*S.L.*) *genettae* sp. n.

A single immature specimen was obtained from the small intestine of a Genet in association with *Joyeuxia fuhrmanni*; it was 18 mm. long and had a maximum breadth of 1·4 mm. at its posterior end. The head is dorso-ventrally flattened, 0·56 mm. broad and 0·39 mm. long, and is not provided with a rostellum; the four suckers are rounded and about 0·23 mm. in diameter. There is practically no neck, as traces of segmentation can be made out almost immediately behind the head. The segments are broader than long, the maximum length being 0·39 mm. From the stained and mounted specimen the following details could be made out.

There are about three to five longitudinal excretory canals on either side, these being united to each other by irregularly placed transverse ducts. The outermost, representing the ventral duct, is the largest. The genital pores are all unilateral in position and situated on a slight prominence in the anterior third of the segment.

The ovary is diagonally placed on the poral side of the midline; it consists of two lobed parts separated by a pyriform receptaculum seminis, at the posterior margin of which a rounded yolk gland is attached (Fig. 2). The vagina passes almost straight to the genital

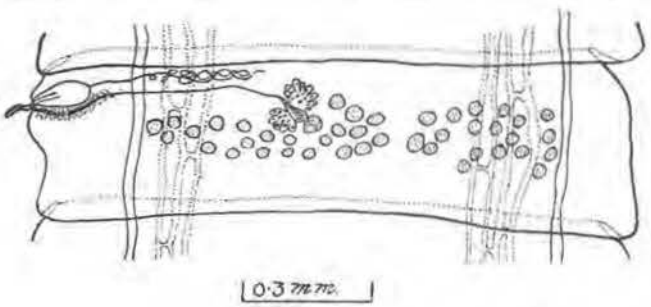


Fig. 2.—*Anoplocephala genettae* sp. n. Mature segment.

pore, its distal portion, however, being larger and surrounded by darkly staining cells; this distal portion has very fine spines on its internal surface. The cirrus pouch opens anterior of the vagina; it is pyriform and does not reach the excretory canals. At the posterior end of the strobila it is 0·125 mm. long by 0·058 mm. broad. The cirrus is armed with very minute spines. There are from 30 to 45 testes which do not extend laterally beyond the outermost excretory canal; there are from 7 to 12 testes on the poral side of the ovary, 1 to 3 immediately behind the ovary and 22 to 30 on the aporal side of the ovary; the largest testes measure 0·04 by 0·05 mm. The genital ducts appear to pass over the dorsal side of the excretory canals.

Discussion.—The absence of ripe segments showing the nature and fate of the uterus makes it difficult to assign this species to its proper systematic position among the Anoplocephalidae. However, the characters of its excretory system, and the nature and conformation of its genitalia do not fit in with any known species of this group. With access to more material it is hoped that its proper position may be determined, and in the meantime it is being placed in the genus Anoplocephala (S.L.).

Specific diagnosis.—Anoplocephalinae possessing 3 to 5 longitudinal excretory canals on either side, these canals being joined to each other by irregularly placed transverse canals. Genital pores unilateral; ovary slightly poral and two-lobed; cirrus pouch does not reach excretory canals; 30 to 45 testes extending lateral and posterior of ovary; genital ducts pass dorsal of excretory canals.

Host: Genetta rubiginosa. Puch.

Location: Small intestine.

Locality: Northern Transvaal.

Type in the Onderstepoort Helminthological Collection.

Fam. Acoleidae Fuhrmann, 1907.

Gyrocoelia kiewietti sp. nov.

Only a single specimen of this interesting cestode was obtained from the small intestine of a Blacksmith plover (*Hoplopterus armatus*) shot at Odendaal's Rust, O.F.S. The specimen was unfortunately much shrunken and no ripe egg-bearing segments were present. Sufficient data, however, were obtained to warrant the following description and for assigning it to a new species.

The entire worm was 45 mm. long and had a maximum breadth towards its posterior end of 4·5 mm. The head is slightly set off from the rest of the strobila and is 0·58 mm. across and 0·23 mm. long (Fig. 3); it carries four slightly oval and unarmed suckers

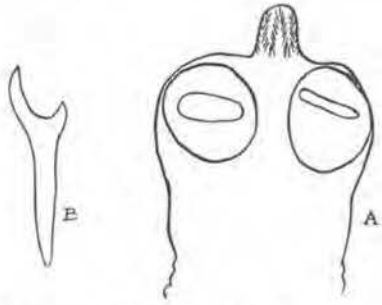


Fig. 3.—*Gyrocoelia kiewietti* sp. n. A. Scolex. B. Rostellar hook.

measuring 0·23 by 0·26 mm. The rostellum is everted and nipple like, 0·116 mm. long by 0·104 mm. across at its base; on its outer surface it carries a single row of 84 hooks arranged in six loops; there are 14 hooks to each loop and two loops are situated on each of its dorsal and ventral surfaces and one loop on each of its lateral faces. Each hook has a relatively long handle and small guard and blade; from the tip of the blade to the tip of the handle it measures 0·029 mm. and from the tip of the blade to the tip of the guard 0·007 mm.; the blade is 0·003 mm. long and the guard 0·006 mm. long. The neck is short and broad, measuring 0·14 and 0·52 mm. respectively. The first definite segments are nearly ten times as broad as long; as the segments grow older the ratio between breadth and length decreases but even in the oldest segment these are considerably broader than long.

The genital pores alternate regularly except in a few segments where 2 or 3 genital pores are adjacent; they are situated in the centre of the lateral margin and lead into a deep genital sinus, 0·26 mm. deep. The genital ducts pass over the dorsal surface of the nerve and between the excretory canals. The cirrus sac is large, muscular and oblong and extends beyond the excretory canals; it is about 0.75 mm. long with a maximum thickness of 0·15 to 0·2 mm. (Fig. 4). The cirrus is heavily spined and occupies only the proximal half of the cirrus sac, while the remainder is filled by the much coiled and thick-walled vas deferens; in the fully extended condition

the cirrus reaches a length of 0·63 mm. and has a thickness of 0·1 mm.; after emerging from the cirrus sac the vas deferens forms only a few small coils towards the anterior margin of the segment.

What may possibly be the testes is represented by a mass of follicles extending through the breadth of the segment between the cirrus sacs; these stain a dark purple with Ehrlick's acid haematoxylin; a careful search, however, did not reveal the presence of typical spermatozoa with heads and tails; in older segments these follicular cells are replaced by a granular mass consisting of isolated small nuclei. As no nucleated structures which might afford a clue were present in the male genital ducts, the writer is not able to state definitely whether this granular mass represents atypical spermatozoa or not.

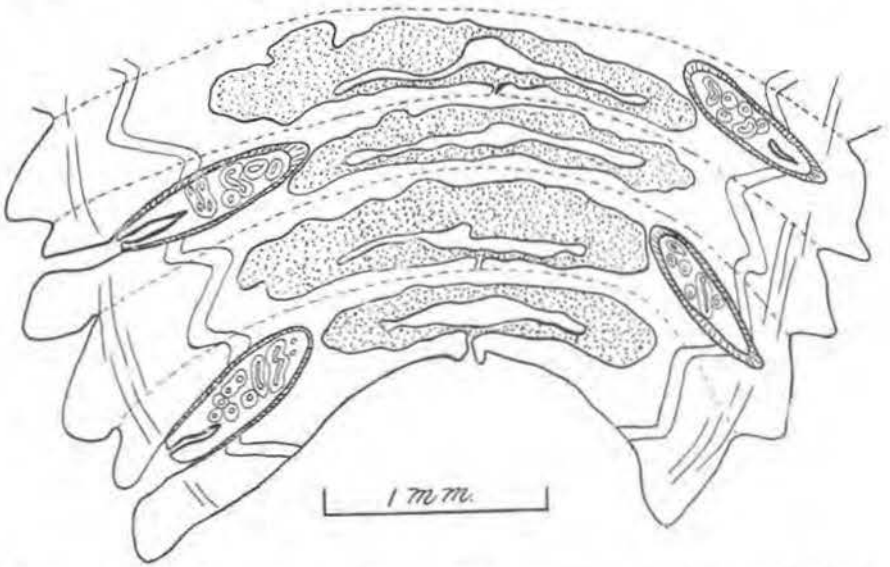


Fig. 4.—*Gyrocoelia kiewietti* sp. n. Horizontal section showing nature of uterus and cirrus sac.

The ovary is centrally placed and small and consists of relatively few tubules; it only makes its appearance after the above described testes have disappeared, i.e. in the posterior half of the strobila. As this organ appears to be immature, the writer is inclined to the view that the whole strobila had not yet attained sexual maturity, a view which is supported by the fact that even immature eggs are entirely absent. The yolk gland is represented by a few rounded cells posterior of the ovary. A vagina is entirely absent. The typical ring-shaped uterus makes its appearance very early as a transverse tube passing through the yolk gland; it continues to grow and when it reaches the excretory canals it curves forwards and then inwards again in front of the ovary to form a complete ring enclosing the ovary; its lumen enlarges and its wall becomes sacculated. A mucin-like mass, without a definite structure, occupies the greater portion of the uterus; it stains a dark purple with haematoxylin.

In the older segments there are two uterine pores to each segment, one in the centre of the posterior margin of each dorsal and ventral surface; it leads into a uterine canal which joins on to the posterior limb of the uterus. The uterine canal develops in a darker staining mass of cells extending dorsally and ventrally from the uterus to the external surface opposite.

Musculature.—The musculature is very strongly developed and the longitudinal muscles are arranged in two distinct layers, an outer consisting of a single layer of muscle bundles each composed of 30 to 50 fibres and separated by a sheet of circular muscle from the inner layer consisting of one or two layers of muscle bundles, each bundle composed of 50 to 200 fibres. A sheet of circular muscle fibres separate the inner longitudinal muscle layer from the medulla, and a thin sheet of similar muscles lie on the outer border of the outer longitudinal muscle layer. Numerous transverse muscle fibres pass irregularly dorso-ventrally through the parenchyma. The medulla has a thickness of about 0·23 mm. and the cortex 0·52 mm., of which about two-thirds is occupied by the longitudinal muscle layers.

Discussion.—Up to the present six species of cestodes have been assigned to this genus, all of which have been recovered from Charadriiform birds. In four of these, namely, *G. brevis* Fuhrmann, 1900, *G. leuce* Fuhrmann, 1900, *G. paradoxus* (v. Linstow, 1906), and *G. fausti* Shen, 1932, the number and arrangement of the rostellar hooks are known; the first two each have 40 rostellar hooks arranged in 4 loops, and the last-named has 78 hooks arranged in 6 loops; Shen's species has 66 hooks but the number of loops is not stated. The number and arrangement of the hooks in the writer's specimens easily distinguish it from Fuhrmann's two species; the arrangement, however, is similar in the writer's and von Linstow's species; the size of the hooks is also the same in both, but the number is different; the number and size of the hooks in Shen's species are different to the writer's species; a distinguishing character, however, is that in von Linstow's species there are three testes arranged in a triangle in the centre of the segment. The number of testes also distinguishes the writer's species from the two species *G. australiensis* (Johnson, 1910) and *G. perverse* Fuhrmann, 1899: the former has 50 testes according to Maplestone and Southwell (1922), these authors considering the 5 testes described by Johnston to be detached ovarian acini; the latter species has only 4 testes.

Fuhrmann (1932), in his diagnosis of this genus, decribes the rostellar hooks as "*disposés en zig-zag et formant huit angles*"; with the further knowledge we now have at our disposal, this has to be enlarged to read "*hooks arranged in a zig-zag, forming eight or twelve angles*".

Specific diagnosis.—Acoleidae with well developed rostellum carrying 84 hooks in 6 loops, two of which are dorsal, two ventral, and one on each lateral face. Genital pores, with few exceptions, alternate regularly. Testes(?) consist of a mass of follicles extending

through the breadth of the segment between the inner limits of the cirrus sacs. Ovary small (? immature) and centrally placed; uterus typical of genus; eggs not known.

Host: Hoplopterus armatus. (Burch.)

Location: Small intestine.

Locality: Odendaal's Rust, Orange Free State.

Type slides in Helminthological Collection, Onderstepoort.

NEMATODA.

Fam. DUBIOXYURIDAE nov.

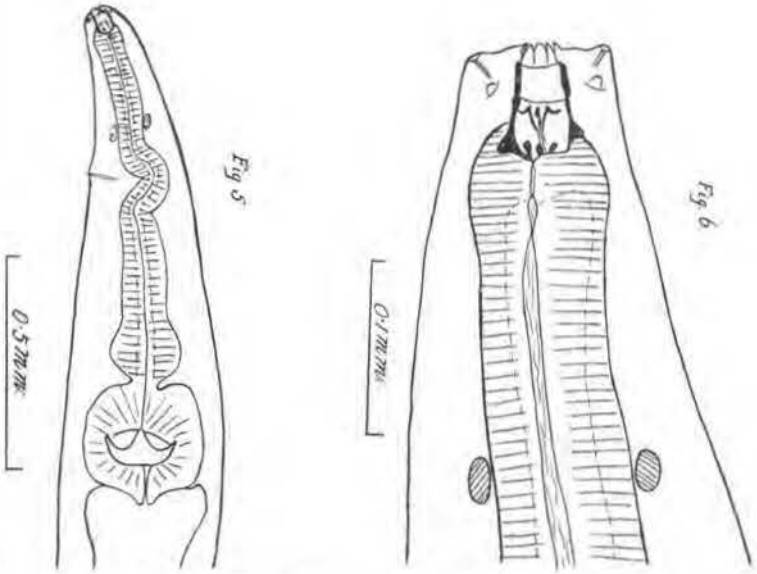
Dubioxyuris macroscelidis, gen. and sp. nov.

Six males and eight females of this interesting nematode were collected from the large intestine of an Elephant shrew. Superficially these parasites have a great resemblance to oesophagostomes except that they have a reddish colour; a cursory microscopic examination, however, quickly showed that this resemblance was only superficial, and that these parasites show a combination of characteristics not associated with any hitherto known family of nematodes. In consequence the writer cannot fit these parasites into the present scheme of classification and he proposes to create a new family of the Oxyuroidea for their reception.

The head is truncate and is not set off from the rest of the body. The cuticle is smooth and is interrupted at the anterior end by the two prominent lateral head papillae, each giving exit to a minute duct, and by the four submedian head papillae which are situated slightly behind the lateral head papillae. A pair of small wart-like cervical papillae is situated about half way down the length of the oesophagus; the excretory pore is situated 0·08 to 0·1 mm. in front of these papillae.

The mouth is round and is bordered by a ring of 11 leaf elements (*corona radiata*) (Figs. 5 and 6); it leads directly into the cylindrical buccal capsule whose diameter is equal to its depth (0·055 mm. in the female and 0·021 mm. in the male), and whose wall is thickened; this capsule leads into a second or pharyngeal capsule sunk into the anterior face of the oesophagus; the pharyngeal capsule is deeper than it is wide, being 0·038 mm. deep and 0·028 mm. wide in the male and 0·075 mm. deep and 0·06 mm. wide in the female; its wall is also thickened and externally in its posterior third it is provided with a thicker cuticular ledge; its inner surface carries three large teeth arising from the base and sides of the capsule and extending forwards almost the whole depth of the capsule; in addition two small club-like teeth are situated on either side of the base of each large tooth. The oesophagus, which is from 1·0 to 1·1 mm. long is double-bulbed, having the same shape as that found in the genus Subulura; anteriorly it is slightly thickened to form a small head into the anterior end of which the pharyngeal capsule is sunk; this portion is from 0·07 to 0·087 mm. thick; the portion immediately following measures 0·06 to 0·078 mm. in thickness; it

increases gradually posteriorly to attain a maximum thickness of 0·16 to 0·19 mm. in males and females respectively in the middle of the anterior bulb; a sudden constriction joins this bulb to the one following which is broader than long, reaching a maximum of 0·26 by 0·3 mm. in the male and 0·26 by 0·32 mm. in the female.



Figs. 5 and 6.—*Dubioæyuris macroscelidis* gen. et. sp. n. Anterior extremity.

Females.—The eight females vary in length from 7 to 8 mm. and their maximum thickness is attained in the posterior body third, where it may reach 0·46 mm. The tail is short and pointed and is from 0·15 to 0·16 mm. long (Fig. 7); the vulva is situated on a slight elevation near to the anus being only 0·13 to 0·2 mm. anterior of it. At a distance of 0·15 to 0·17 mm. anterior of the vulva the body suddenly swells out and becomes very much thicker, whereas from this level to the tail tip the body tapers uniformly; the thickness of the body at this level is 0·18 to 0·2 mm. whereas immediately anterior it is from 0·3 to 0·35 mm. thick. The vagina is from 0·44 to 0·75 mm. long by 0·04 to 0·065 mm. wide (Fig. 8); it passes anteriorly and during its course may be looped; its anterior end is provided with a sphincter about 0·08 mm. long. After the sphincter it splits into two limbs, which, however, are peculiar in that they are dissimilar; the left limb, which may be regarded as a utero-duct, is provided with a sphincter about 0·04 mm. long soon after its origin; it passes forwards for a distance of 0·5 to 0·75 mm. after which it bends back again to about the level of its sphincter when it again bends forwards to join the uterus proper at about the level of its most anterior bend; this convoluted tube maintains a more or less uniform thickness of about 0·045 mm. in young specimens but in mature specimens it is filled with eggs which consequently distend it. The uterus itself is a fusiform sac passing straight forwards and contains eggs in different stages of development; the right limb or utero-duct

is similar to that of the left except that its first portion is very much enlarged and it is not provided with a sphincter near its junction with the vagina. What the function of this sac is, is not clear as it did not contain a single egg in any of the females, notwithstanding that the remaining portions of the utero-duct and the uterus contained abundant fully developed eggs; consequently it cannot be regarded as an egg-reservoir; all these sacs were, however, filled with a granular material, some of which even passed for some distance up the utero-ducts; it is possible that this granular material represents stored spermatozoa, in which case these sacs would be receptacula semini.

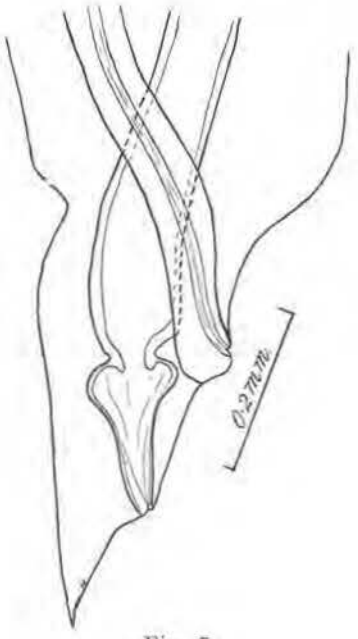


Fig. 7.

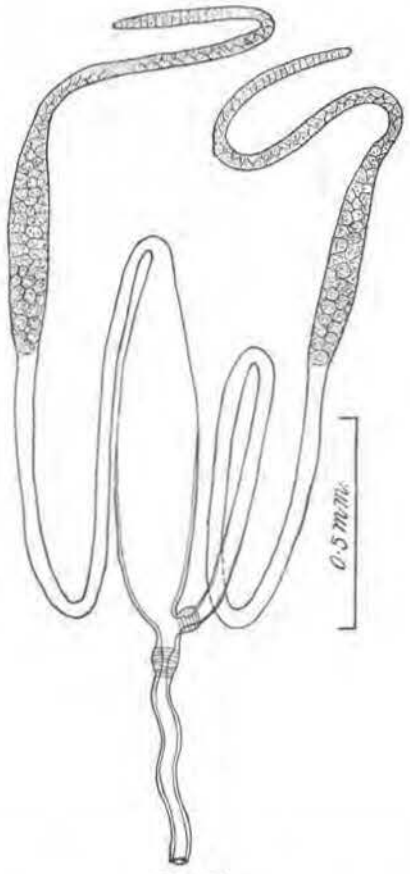


Fig. 8.

Fig. 7.—*Dubioxyuris macroscelidis* gen. et. sp. n. Posterior extremity of female.

Fig. 8.—*Dubioxyuris macroscelidis* gen. et. sp. n. Female genitalia of young specimen.

The eggs are rounded to oval and are embryonated *in utero*; they have a thickened shell and their size varies from 0·055 to 0·58 mm. in length by 0·046 to 0·048 mm. in breadth.

Males.—The six males vary in length from 6 to 7 mm. with a maximum thickness of 0·34 mm. in the middle of the body. The caudal extremity (Figs. 9 and 10) is provided with an ample membrane, supported by eight pairs of papillae, and the tail; the membrane extends across the ventral surface from the tips of the first or most anterior papilla of either side; the last 0·025 mm. of the tail is free; on each side of the anterior half of the tail there are three small rays passing almost to the edge of the bursa; the remaining five rays of either side support the lateral lobes of the caudal membrane; all extend to the edge of the membrane and the anterior three are the largest, the posterior two being much smaller; the central ray is the longest.

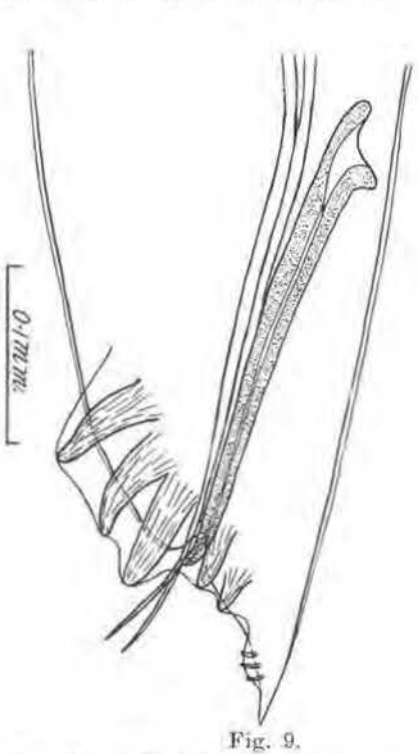


Fig. 9.

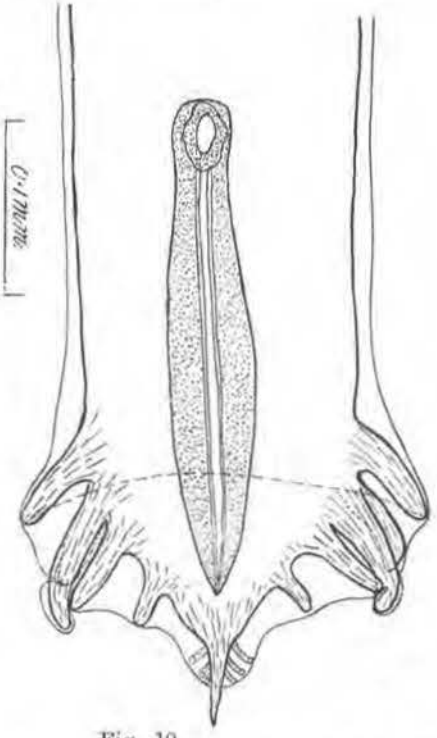


Fig. 10.

Figs. 9 and 10.—*Dubioxyuris macroscelidis* gen. et. sp. n. Lateral and dorsal view of male posterior extremity.

The two pairs of equal and similar spicules are relatively long, varying in length from 1·6 to 1·75 mm.; they have a thickness of 0·02 mm. at their base after which they taper gradually to terminate in fine points. The gubernaculum is large and massive and may protrude through the cloaca; in a dorsal or ventral view it is somewhat dagger-shaped with a midrib and lateral flanges; its maximum width in its middle is 0·046 mm. of which 0·017 mm. on either side of the midrib represents the flanges. In lateral view it is seen to be provided with an anterior head tilted dorsalwards and from here it tapers backwards to end in a bluntly rounded tip tilted ventralwards. Its total length varies from 0·275 to 0·296 mm.

Affinities.—The presence of a mouth capsule with a corona radiata, the presence of what might be considered to represent a caudal bursa with atypical ray formation, and the nature of the female caudal extremity would suggest that this parasite had some affinities with the Strongyloidea. Against this we have the definite two-bulbed nature of the oesophagus and the nature of the female genitalia suggesting Oxyuroid relationships. In the former case the characters concerned are external, whereas in the latter internal characters are concerned; the writer believes that in determining relationships internal characters, which are not so liable to change to suit different conditions, are a better guide, and are to be given a greater importance than external characters. Applying this rule the writer feels that these parasites must be considered as belonging to the Oxyuroidea. In this superfamily we find forms having a similar oesophagus and comparable mouth structures in the Subulurinae; in the Oxyurinae, especially in some forms from tortoises, we find the lips broken up to form structures which may be regarded as the forerunners of a corona radiata; caudal membranes leaving a portion of the tail free are also present in this suborder and these membranes are supported by papillae which are not arranged on a definite plan as is the case with the rays of the Strongyloidea. In addition the female genitalia of the Oxyuroidea show far more extremes of variation than those of the Strongyloidea.

Among the Oxyuroidea the writer feels that these parasites may be placed near the family Oxyuridae with whose members it agrees in having a bulbed oesophagus, double female genitalia with special modification and no special development of the ventral precloacal muscles in the male; but the first two characters (except modification of genitalia) together with the gross nature of the oesophagus with its pharyngeal capsule and teeth also suggests relationships with the Subuluridae notwithstanding the absence of specially developed precloacal muscles. The writer feels that these parasites occupy an intermediate position between these two sub-families and that a special family—Durioxyuridae—must be created for their reception; this family would be characterised by the presence of a corona radiata, buccal and pharyngeal capsules, an oesophagus with a double bulb, two uteri, well-developed caudal expansions in the male, two spicules and a well-developed gubernaculum.

Specific Diagnosis.—Oxyuroidea without lips but carrying a corona radiata round mouth; mouth and pharyngeal capsules present, the latter provided with three large and twelve small club-like teeth; oesophagus with two bulbs; vulva near to anus; tail short and pointed; right utero-duct very much enlarged and sac-like; caudal alae of male well developed and supported on either side by 5 large papillae and 3 small papillae on the tail; two spicules equal and similar and relatively long; gubernaculum large, massive and somewhat dagger-shaped in dorsal or ventral view.

Host: Macroscelides proboscideus. (Shaw.)

Location: Large intestine.

Locality: Western Transvaal.

Types in the Onderstepoort Helminthological collection.

Fam. Heterakidae Raill. and Henry, 1914.

Subulura suctoria (Molin, 1860).

Of the species of Subulura from gallinaceous birds the three species *S. suctoria* (Molin, 1860), *S. differens* (Sonsino, 1890) and *S. brumpti* (Lopez Neyra, 1922) would appear from the literature to be very closely related; the writer has unfortunately not been able to consult the original descriptions, and has had to rely on the redescriptions compiled by Cram (1927). From Cram's paper it appears that the first-named species may be distinguished from the other two species in that it possesses 11 pairs of caudal papillae in the male, and in that it is larger and has lateral alae which extend only half the length of the oesophagus. *S. differens* and *S. brumpti* are distinguished from each other in that in the latter the male tail is longer, the gubernaculum may be twice as long as in the former species and the eggs are very large.

With regard to the papillae on the tail of *S. suctoria* the writer doubts whether the statement that there are 11 pairs is correct: judging from the description and figure given by Cram the writer thinks that the caudal pores have been mistaken for papillae. Further, the writer does not think that the size and nature of the alae can in this case be employed as specific differences, because after examining numerous specimens obtained from domestic and guinea fowls fixed in alcohol or formalin, the writer found that the size of the adults varied considerably, being from 10 to 19 mm. long for the females; if the worms were allowed to die in cold water the worms stretch enormously, and females have been found to reach 25 mm. in length; as to the alae the writer also noted considerable variations and they were found to be from about half the length of the oesophagus to about half again as long as this organ; usually the alae extended to just posterior of the oesophagus. From these remarks it is clear that the supposed differences between *S. suctoria* on the one hand and *S. differens* and *S. brumpti* on the other are not valid.

The close relationship of these three species is also shown by their ovejectors, which are built on the same plan consisting of a pyriform and muscular vestibule, a saccular sphincter terminated by a thickened glandular portion, and a terminal " tromp ". This type of ovejector is also present in the writer's materials from domestic and guinea fowls. The writer dissected out about two dozen ovejectors from materials obtained from both hosts, and he found that variations were also present in the sizes of the different parts of this organ; however, it was noted that in all cases the sphincter was about half the length of the vestibule; a constant feature, however, was that in all cases the sphincter joined the vestibule laterally on its dorsal side, and a conspicuous plug protruded into the vestibule at this point.

From Cram's data the sphincter has the same length as the vestibule in *S. differens*, about five-sixths of the vestibule length in *S. suctoria* and nearly two-thirds of the vestibule length in *S. brumpti* and in addition the total length of the ovejector is about 1 mm. in this last species. Whether these data have been obtained from the examination of one or several specimens of each species it

is unfortunately not clear, but considerable variations can be expected in the size of these muscular structures, depending on the method of killing and fixation of the material, and consequently the writer is not inclined to attach any specific significance to the difference between these data and the writer's observations.

The writer is not inclined to accept the supposed specific difference in the length of the tail and size of the egg in *S. differens* and *S. brumpti;* considerable variations were noted by the writer in his materials, variations extending over the sizes given for these two species; in preserved material this was especially the case with the eggs which, due to their thin shells, were liable to undergo considerable deformations.

In the writer's material the only striking difference between the materials from domestic fowls and guinea fowls was the length of the spicule; in the former the spicular length never exceed 1·2 mm. whereas in the latter the lengths were from 1·2 to 1·6 mm. According to Cram's data the first-named materials would correspond to *S. suctoria* and *S. differens* and the other materials to *S. brumpti*. However, apart from these spicular variations, the writer's materials are so similar in all other respects (absence of lips, shape and depth of buccal capsule, alae, ovejectors, etc.), that he cannot but regard all his material as being cospecific.

From the literature these three species all have no lips or they are stated to be indefinite; they possess lateral alae; the head is bent dorsally; three small teeth are present at the anterior end of the oesophagus; they have equal spicules which are of the same shape, pointed and from 1 to 1·5 mm. long; and the ovejectors are of the same type. In addition the writer maintains that they also all have 10 pairs of caudal papillae in the male. These characters, supported by the presence of similar characters in the writer's materials, make him conclude that these species are cospecific, and, Molin's name having priority, the correct name is *Subulura suctoria*.

Subulura dentigera sp. nov.

This species occurred in guinea fowls, in association with the preceding species, and was far more abundant; all the guinea fowls examined harboured this species, and as this host originated from Swaziland, Northern Transvaal, Potchefstroom and Lady Grey, it is seen that this parasite has a very wide distributioin in South Africa.

This parasite has an external appearance typical of the members of this genus. The anterior end is bent dorsalwards and carries two prominent lateral alae generally extending to just behind the end of the oesophagus. The mouth, however, is bounded by two distinct and hemispherical lateral lips each carrying on its outer surface a median lateral papilla and two submedian papillae (Fig. 11, B and C); internally its cuticular lining is thickened to form a row of 5 or 6 denticles, 0·003 to 0·004 mm. high, and running parallel to the anterior margin of the lip: the presence of these denticles is, as far as the writer has been able to ascertain, the first record of these structures occurring in any member of the Subulurinae. The mouth

is a dorso-ventrally elongated oval aperture and leads into a dorso-ventrally elongated buccal cavity whose wall consists of thickened cuticular material; it is from 0·028 to 0·04 mm. long by 0·014 to 0·019 mm. wide, and its depth from 0·015 to 0·02 mm. in the males and 0·02 to 0·023 mm. in the females; thus the depth of the mouth capsule is considerably less in this species than in *S. suctoria* and the section of its wall is also quite different (Fig. 11 A). There are three minute teeth at the anterior end of the oesophagus, similar to those found in *S. suctoria*.

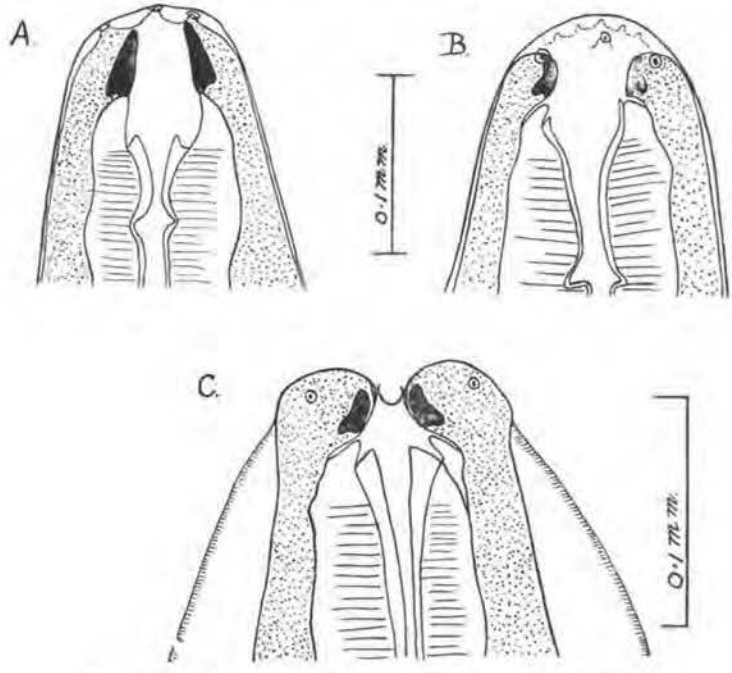


Fig. 11A.—*Subulura suctoria*. Lateral view of head.
Figs. 11B and 11C.—*Subulura dentigera* sp. n. Lateral and ventral view of head.

The females are 13 to 22 mm. long and the body has the same external appearance as in the male, except that the tail is straight and pointed; their maximum thickness across their middle is from 0·46 to 0·58 mm. The oesophagus is from 1·07 to 1·35 mm. long, and the nerve ring and excretory pore are found about 0·3 and 0·42 mm. from the anterior end respectively. The tail, which is long and is terminated by a spike-like tip, is from 0·84 to 1·05 mm. long. The vulva is non-protuberant and situated in the anterior body half; its position divides the body into the ratio of 2:3 to 3:5. The ovejector, which is from 0·43 to 0·64 mm. long, passes forwards and inwards and is built on the same plan as that of *S. suctoria*, except that the sphincter enters the vestibule at its anterior dorsal corner and not quite so lateral as in *S. suctoria* (Fig. 12); the vestibule is from 0·38 to 0·46 mm. long, the sphincter including its glandular portion from 0·15 to 0·23 mm. long, and the tromp from 0·75 to

about 1 mm. long. The eggs are oval, thin shelled and embryonated *in utero*. They are 0·07 to 0·081 mm. long by 0·058 to 0·061 mm. broad.

The males are 9 to 10 mm. long with a maximum thickness of 0·39 to 0·45 mm. across the middle of the body. Attenuation of the body anteriorly is more marked than posteriorly; across the base of the lips the body thickness is only 0·07 to 0·075 mm. The oesophagus, 1 to 1·1 mm. long, is of the usual shape and it is encircled by the nerve ring about 0·24 mm. from the anterior end of the body. The excretory pore is situated about 0·15 mm. posterior of the nerve ring. The posterior extremity is strongly arched ventralwards and

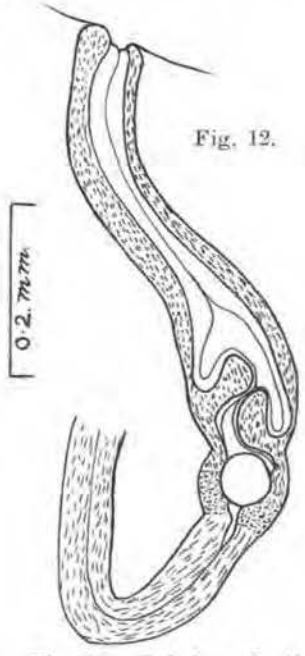


Fig. 12.

Fig. 13.

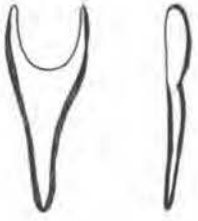


Fig. 12.—*Subulura dentigera* sp. n. Vagina.

Fig. 13.—*Subulura dentigera* sp. n. Dorsal and lateral view of gubernaculum.

the tail is provided with two distinct alae, 0·02 to 0·24 mm. wide; the tail, which is from 0·22 to 0·26 mm. long is terminated by a spike-like portion about 0·06 mm. long. There are 10 pairs of caudal papillae, arranged exactly as in *S. suctoria*, i.e. three pairs preanal of which two pairs are situated lateral of the sucker, two pairs adanal, and five pairs postanal; the minute caudal pores are found just posterior of the 3rd postanal pair. The spicules are of equal length, and alate and terminate in sharp points; they vary in length from 1·3 to 1·5 mm. with a thickness of 0·023 to 0·026 mm. about 0·1 mm. behind their proximal or head ends. A well chitinized gubernaculum is present, which is from 0·15 to 0·165 mm. long; in side view it may be straight or slightly arched, and its proximal third appears thickened; in dorsal view it is seen to be somewhat Y-shaped (Fig. 13).

Affinities.—The nature and length of the spicules, arrangement and number of the caudal papillae in the male, and the structure of the ovijector, ally this species to *S. suctoria* (Molin, 1860). It may, however, be easily distinguished from this species by its two lips each carrying a dentigerous border, the shape and depth of the buccal capsule and in that the sphincter joins the vestibule somewhat anteriorly.

Specific diagnosis.—Subulurinae reaching 10 mm. in length in the male and 22 mm. in the female, provided with two distinct lateral lips, having an internal dentigerous border. Buccal capsule shallow and dorso-ventrally elongated; three minute teeth at its base; lateral alae extend to anterior end of intestine. Spicules equal, pointed, 1·3 to 1·5 mm. long; gubernaculum Y-shaped; 10 pairs of caudal papillae; vulva in anterior body half; ovejector of vestibule, sphincter and tromp; sphincter enters vestibule at its antero-dorsal corner.

Host: Numida mitrata. Pall.

Situation: Caeca.

Locality: South Africa.

Type in the Helminthological collection at Onderstepoort.

Heteroxynema vlakhaasi sp. n.

This species is represented by one male and eight females from a hare shot in the Potchefstroom district and one male and one female from the same species of hare shot in the Klerksdorp district. Outwardly the specimens are very similar to the *Subulura suctoria*. The anterior end is in all cases bent dorsalwards to form a hook; the posterior extremity of the female is straight but that of the male is hooked ventralwards.

There are two well-developed lateral cervical alae 0·09 mm. broad and extending from immediately behind the lips to about 0·5 mm. posterior of the oesophagus (Fig. 14). These alae are hyaline and show no transverse markings; cervical papillae are absent. The mouth is provided with a dorsal and two sub-ventral lips, each somewhat dome-shaped and each carrying two papillae. The mouth cavity is very small and at its base there are three very small pointed teeth situated one on the anterior face of each of the three oesophageal segments.

The oesophagus is club-shaped and relatively short, being just over 1 mm. in the male and from 1·5 to 1·6 mm. long in the female; it is provided with a muscular bulb at its posterior end, but this bulb is not sharply constricted off from the rest of the osophagus. The bulb is 0·35 mm. long by 0·225 mm. broad in the male and 0·416 mm. long by 0·26 to 0·3 mm. broad in the female. The anterior end of the oesophagus is also slightly thicker than the rest of the oesophagus. The nerve ring is just behind this anterior thickening 0·27 to 0·28 mm. from the anterior end. An excretory pore was not observed.

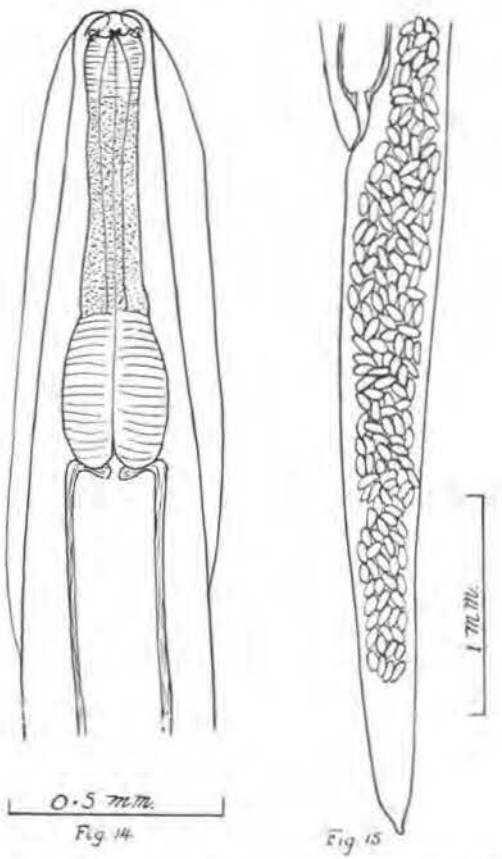


Fig. 14 Fig. 15

Figs. 14 and 15.—*Heteroxynema vlakhaasi* sp. n. Fig. 14. Anterior extremity. Fig. 15. Posterior extremity of female.

The *females* are 19·5 to 22 mm. long with a maximum thickness of 0·68 to 0·82 mm. over the middle third of the body. The tail (Fig. 15) is relatively long, 3·1 to 3·23 mm. long; it tapers gradually until near its end, when it narrows suddenly to end in a conical tip. The vulva is in the anterior body half at about the junction of the 1st and 2nd body thirds, being 6·7 to 7·4 mm. from the anterior end; it leads into a muscular vagina which passes obliquely inwards and forward (Fig. 16); it is 1·3 mm. long by 0·25 mm. thick; at its anterior end it is much thickened and then bends abruptly backwards to join an oblong swelling 0·28 mm. long by 0·17 mm. thick, 0·9 mm. from the bend. Beyond the swelling it narrows down to about 0·08 mm. and passes straight back for 2·6 mm. to join the common uterus filled with eggs; this common uterus passes further down the body and near the anus it joins the two uteri which extend down into the tail and then bending back passes forwards again to the middle body third. Numerous eggs are present and they are large and smooth-shelled and are morulated *in utero*; one side is

flattened as seen in oxyurid eggs, and opposite the flattened side, more towards one end, there is an irregularly round micropyle (Fig. 17). They vary in length from 0·122 to 0·139 mm. by 0·061 to 0·072 mm. thick.

Fig. 16.

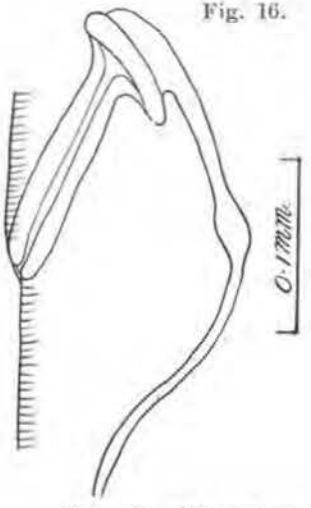


Fig. 17.

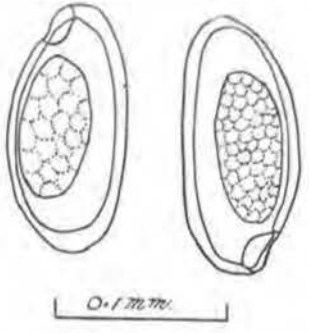


Fig. 16.—*Heteroxynema vlakhaasi* sp. n. Vagina.
Fig. 17.—*Heteroxynema vlakhaasi* sp. n. Eggs.

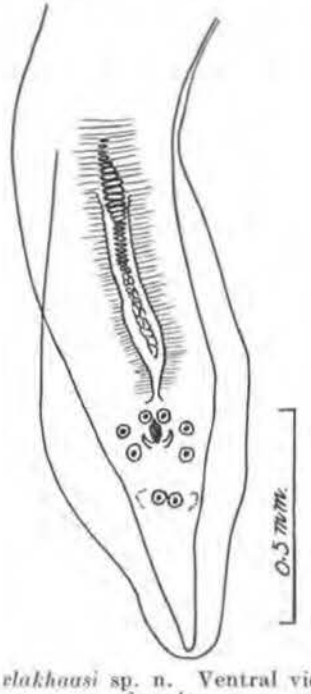


Fig. 18.—*Heteroxynema vlakhaasi* sp. n. Ventral view of posterior extremity of male.

Of the two *males* one is much shrivelled; the other is 12·5 mm. long with a maximum thickness of 0·45 mm. Two well-developed caudal alae are present which meet round the tip of the tail which is 0·484 mm. long (Fig. 18); the alae are 1·17 mm. long and attain a maximum width of 0·112 mm. There are 5 pairs of sessile papillae, four pairs of which are clustered round the cloaca; the fifth pair is ventrally placed at about the junction of the first and second tail thirds. The first pair is precloacal and ventral and immediately in front of the cloaca; the second pair is more lateral and situated at about the level of the anterior margin of the cloaca; the third pair is somewhat rose thorn-like and situated at the side of the posterior third of the cloaca; the fourth pair is more lateral and slightly posterior of the third pair. On either side of the fifth pair there is a slight cuticular elevation which, unless carefully examined, may be misinterpreted as an additional pair of caudal papillae.

In front of the 1st caudal papillae there is an elongate cuticular depression 0·4 mm. long; this is bounded on either side by a cuticular flange formed from the body cuticular lining and having the cuticular body annulations more strongly developed; these flanges do not met anterior and posterior of the depression. In the depression itself there is a streak of cuticular elevations which increase in size anteriorly and at the anterior limit of the depression become much enlarged and project prominently beyond the general body level; these enlarged cuticular elevations possibly play a rôle during copulation, because a dark-brown cement-like material was adhering to them, and a similar substance was also present round the vulva. Spicules and gubernaculum appear to be entirely absent, as a careful search for these structures in both specimens did not reveal any trace of their presence.

Affinities.—The presence of a bulbed oesophagus and a sucker-like depression in the male places this species among the *Subulurinae Travassos*, 1914. Of the members of this subfamily the nature of the sucker more closely resembles that of the genus *Heteroxynema* Hall, 1916, although the cuticular ornamentation described for *H. cucullatum* Hall, 1916, is not present in the species described above. However, the presence of three lips, the absence of spicules and gubernaculum, the nature of the female genitalia, and the oxyurid-like shape of the eggs definitely show that these species are closely related and co-generic. The writer's specimens, however, differ from Hall's species in their much larger size, in the presence of well-developed caudal alae in the male, and in the number and arrangement of the male caudal papillae. The larger size of both sexes and the absence of an unpaired postcloacal papilla in the male easily distinguishes the writer's species from *H. wernecki* Freitas and Almeida, 1936.

The writer has unfortunately not been able to consult a description of *H. muris* Vaz and Pereira, 1934, but according to de Freitas and de Almeida (1936) the genitalia of the female of this species differ considerably from those found in their's and Hall's species and they think that when the male is discovered this species will probably have to be placed in another genus.

Specific diagnosis.—Subulurinae provided with 3 lips, well-developed cervical alae and caudal alae in the males; three minute teeth at base of mouth cavity; oesophagus with posterior bulb; vulva in anterior body half; vagina long, eggs large, elongate and flattened on one side and provided with a micropyle; uterus extending some distance down tail; spicules and gubernaculum absent; 5 pairs of sessile caudal papillae in male, of which 4 pairs are circumcloacal and one pair at junction of 1st and 2nd tail thirds. Ventral sucker with internal longitudinal ridge carrying cuticular elevations which become large and prominent immediately anterior of sucker. Parasite of Leporidae (Hares).

Host: Lepus capensis capensis L. (Vlakhaas.)

Location: Large intestine.

Locality: Western Transvaal.

Types in the Onderstepoort Helminthological Collection.

Fam. FILARIIDAE (Cobbold, 1864) Claus, 1885.

Hyracofilaria hyracis gen. and sp. nov.

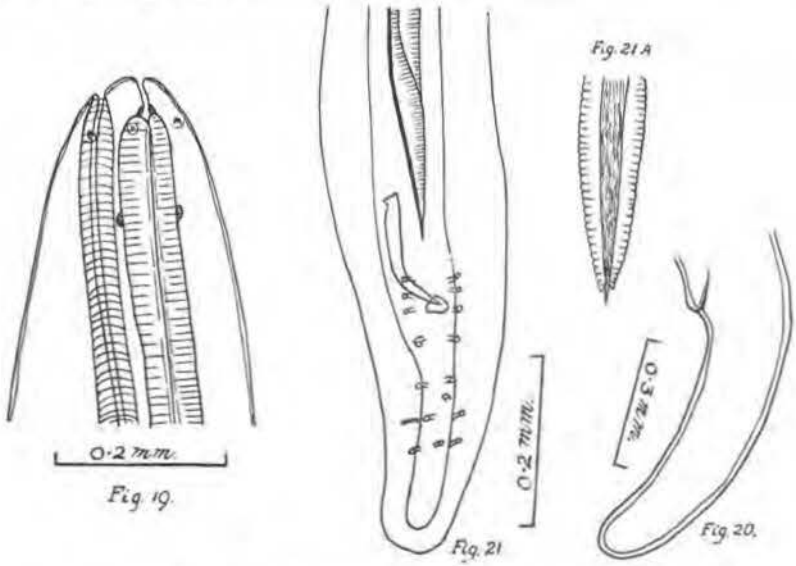
This species was represented by several complete male and female specimens, collected by Mr. Frean, Veterinary Surgeon at Potchefstroom, Transvaal; he obtained them from under the superficial muscles and fascia around the pectoral, abdominal and pudic areas of a *Hyrax* sp. shot in the Graaff-Reinet District of the Cape Province. Superficially the worms are very similar to *Setaria equina* of the horse, the females, however, being longer and thinner.

The body in both sexes has a fairly uniform thickness except towards the anterior and posterior ends, where it becomes attenuated; the anterior end is straight, but the posterior end in the female is slightly arched ventralwards and in the male forms a few loose spirals. Externally the cuticle shows no transverse annulations.

The mouth is a small rounded aperture situated in the centre of the anterior face; there are no lips, but the mouth is surrounded by a weakly-cuticularised pad whose inner surface, where it rests on the oesophagus, is strengthened by a cuticular ring (Fig. 19). Externally at the base of this pad there are the usual two lateral and four submedian papillae; a small duct traverses each lateral papilla.

The oesophagus is long, being about 6 m.m. long in the male and 12 m.m. long in the female; it consists of a short muscular portion and a much longer glandular portion. In the male this muscular portion is only about 0·12 mm. long by 0·023 mm. thick and in the female 0·45 mm. long by 0·1 to 0·17 thick; the glandular oesophagus increases in thickness posteriorly and in the male may be 0·16 mm. thick at its posterior end and in the female 0·2 mm. Cervical papillae were not seen, neither was the excretory pore seen. The nerve ring encircled the muscular oesophagus 0·1 to 0·13 mm. from the anterior end.

The *females* varied in length from 235 mm. to 290 mm., with a maximum thickness of 0·46 to 0·5 mm.; the tail (Fig. 20) is arched ventralwards, ends bluntly, and is from 0·6 to 0·7 mm. long. It carries no papillae or processes. Over the anus the body thickness has decreased to about 0·2 mm. and at the tail tip the thickness is 0·1 mm. The vulva is a ventral transverse aperture situated on the anterior face about 0·05 mm. from the mouth; it leads into a long and straight muscular vagina, 6 to 8 mm. long and about 0·12 mm. thick; this in turn divides to join the two uteri which in their initial stages pass straight down the body; only in the posterior body third do they form a few loose curves which are continued backwards to the level of the anus. The eggs are oval and thick-shelled and are embryonated *in utero*; they are from 0·05 to 0·056 mm. long by 0·035 to 0·031 mm. broad.



Figs. 19, 20 and 21.—*Hyracofilaria lyracis* gen. and sp. nov.

Fig. 19.—Anterior extremity of female.

Fig. 20.—Posterior extremity of female.

Fig. 21.—Posterior extremity of male, ventral view.

Fig. 21A.—Ventral view of tip of left spicule.

In the *male* the tail is from 0·23 to 0·26 mm. long and is loosely coiled (Fig. 20); on either side, from about 1 mm. anterior of the cloaca, an ala passes down the body and tail and round the tip of the tail; its maximum breadth of 0·06 mm. is attained anterior of the cloaca after which it narrows posteriorly to 0·02 mm. at the tip of the tail; it is provided up to the last post cloacal caudal papillae with fine transverse markings. The number and arrangement of the caudal papillae are slightly irregular, but the following, however, are constant; two pairs papillae immediately precloacal, one pair adcloacal and four pairs post coacal, on the anterior two-thirds of the tail and somewhat equidistant from each other; in

addition, there are present two or three additional ventral papillae between the last three pairs of caudal papillae. The spicules are markedly unequal and dissimilar; the left is 0·64 to 0·71 mm. long and the right 0·145 to 0·152 mm.; the former is 0·11 mm. thick just behind its head and the latter 0·13 mm. The left spicule consists of two parts, an anterior portion 0·29 to 0·32 mm. long and strongly cuticularised and a posterior membranous portion; this latter portion has two lateral membranes provided with transverse marking and extending almost to the tip of the spicule (Fig. 21A). The right spicule is well cuticularised, and is slightly arched and tapers gradually to end in a rounded tip. A gubernaculum is absent.

Affinities.—The presence of a rudimentary peribuccal ring, the shape and inequality of the spicules and the anterior vulva places this species in the family *Setartinae*. Two species of the genus, *S. loveridgei* Sandground, 1928, and *S. hyracis* Baylis, 1932, have been described from hyracoids but the writer's specimens differ from these species and also from all the known genera of this subfamily in the presence of caudal alae and the absence of epaulette-like structures at the anterior end. For this reason a new genus—*Hyracofilaria*—has been created for its reception with the following diagnosis: Setariinae having a smooth cuticle, a vestigeal peribuccal ring and no lips; vulva situated very near to the mouth; vagina long and muscular; two uteri; tail of male alate; spicules very unequal and dissimilar. Type *H. hyracis* sp. nov. from *Hyrax* sp. Cape Province.

Specific diagnosis: As for genus.

Host: *Hyrax* sp.

Location: Under muscles and fascia.

Locality: Graaff-Reinet, Cape Province.

Types in the Helminthological Collection, Onderstepoort.

SUMMARY.

Seven new species of helminths are described, namely: *Echinococcus felidis* from a lion; *Anoplocephala (S.L.) genettae* from a genet; *Gyrocoela kiewietti* from a plover; *Dubioxyuris macroscelidis* from an elephant shrew; *Subulura dentigera* from a guinea fowl; *Heteroxynema elukhaasi* from a hare; and *Hyracofilaria hyracis* from a hyrax. In addition, a new family of the Oxyuroidea, namely *Dubioxyuridae* is created for the reception of the parasite from the shrew. The status of the three species *Subulura suctoria* (Molin), *Subulura differens* (Sonsino), and *Subulura brumpti* (Nopez-Neyra) is discussed and evidence is brought forward to show that these three species are co-specific.

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