

On some South African Reptilian Oxyurids.

By R. J. ORTLEPP, M.A., Ph.D., Empire Marketing Board Research Officer,
Onderstepoort.

NUMEROUS oxyurid parasites were collected by Mr. J. H. Power of Kimberley from *Testudo terrestris*; these were forwarded to this Institute and placed at the writer's disposal for identification. A casual examination showed that several species were present in this material, and on sorting these out it was found that these were two species of the genus *Tachygonetria* Wedl, 1862, one species each of the genera *Thelandros* Wedl, 1862, *Alaouris* Thapar, 1925, and *Atractis* Duj., 1845, and one species for which it has been deemed necessary to create a new genus. On comparing these species with the descriptions and figures of known tortoise oxyurids it was found that all represented hitherto undescribed species.

TACHYGONETRIA POWERI N. SP. (Figs. 1-6).

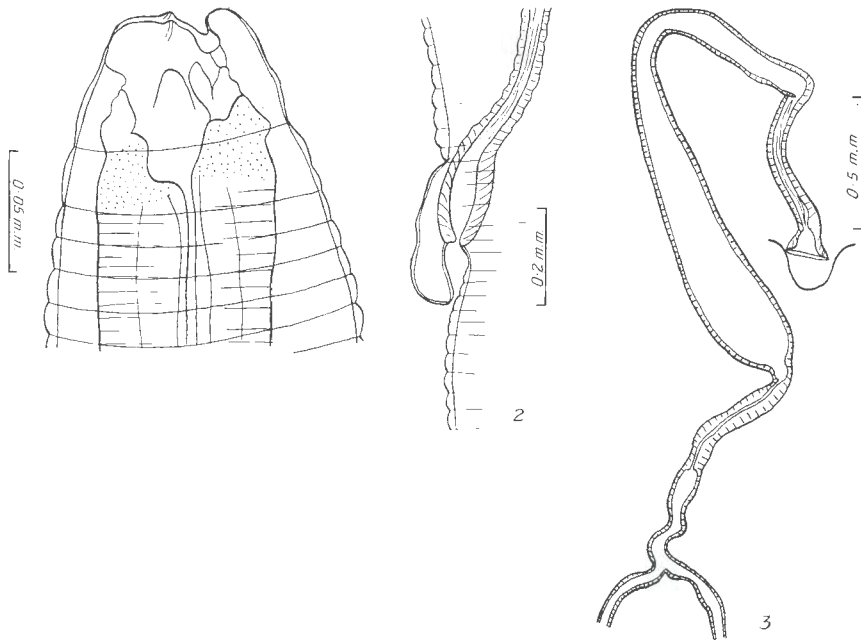


Fig. 1. *Tachygonetria poweri* sp. n. Cephalic extremity.
Fig. 2. *Tachygonetria poweri* sp. n. Vulva and vagina.
Fig. 3. *Tachygonetria poweri* sp. n. Female genitalia.

Some dozen and a half males and females of this species all in good preservation were available for examination. All appear to be fully mature, notwithstanding the fact that none of the females contained any eggs. They are medium sized helminths, bearing long cuticular hairs in some specimens, particularly the females; the males varying in length from 3.7 mm. to 4.6

SOME SOUTH AFRICAN REPTILIAN OXYURIDS.

mm. and the females from 6.1 mm. to 7.3 mm.; they taper in both sexes towards the extremities, the maximum body thickness being found at about the middle of the body; in the males the thickness varies from 0.43 mm. to 0.57 mm. and that of the females from 0.72 mm. to 0.98 mm. The annular striations of the cuticle are about 0.013 mm. apart in the females and 0.012 mm. apart in the males and there are no lateral flanges to the body. The head (Fig. 1) is slightly set off from the rest of the body by a slight constriction, and is provided with three simple lips, one dorsal and two ventro-lateral; these are separated from each other by fairly deep indentations. Only the lateral papillae were seen, and these form slight protuberances in the dorsal half of the lateral lips. Each is traversed by a thin canal. The anterior end of the oesophagus is hollowed out to form an irregularly shaped oesophageal funnel lined with cuticle. Anteriorly the oesophagus carries a thickened rim of cuticle, which carries three tongue-like flanges, one running more or less parallel to the inner surface of each lip; in optical section these flanges look like tooth-like projections projecting into the mouth cavity. The oesophagus is long and thin and is terminated by a rounded bulb with valvular apparatus: in the male it is from 1.8 to 2 mm. long, i.e., about $\frac{1}{3}$ of the total body length, and in the female from 2.9 to 3.3 mm. long, i.e., from about $\frac{2}{5}$ to slightly less

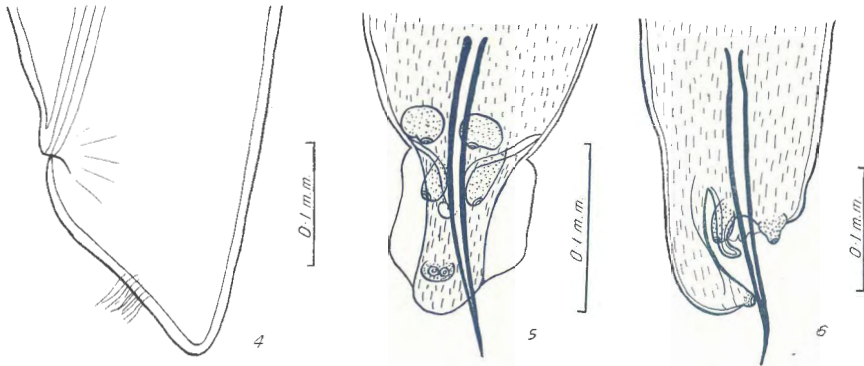


Fig. 4. *Tachygonetria poweri* sp. n. Tail of female.

Fig. 5. *Tachygonetria poweri* sp. n. Posterior extremity of male, ventral view.

Fig. 6. *Tachygonetria poweri* sp. n. Posterior extremity of male, lateral view.

than $\frac{1}{2}$ of the body length. The nerve ring encircles it at about the junction of its 1st and 2nd fifths. The anterior portion of the intestine forms a characteristic swelling in both sexes, and is filled with dark food material.

The excretory pore is prebulbular in both sexes.

The vulva is situated in the posterior half of the body, roughly at the junction of the 3rd and 4th fifth of the body. Its position is indicated by a flap which arises as a thickening of the cuticle in front of the vulva, and extends backwards over the vulva for about 0.13 to 0.15 mm. (Figs. 2 and 3). The vulva is a transverse slit which leads into a short vagina; this passes into an elongate ovejector, about 0.6 mm. long and 0.055 mm. in thickness extending obliquely inwards and forwards (Fig. 3). The following portion, the "trome" is J-shaped, the longer limb extending backwards more or less parallel to the ovejector; this portion is enlarged to form a club-shaped egg-chamber some 1.33 mm. long and 0.27 mm. broad at its thickened end; the whole trompe is about 2.5 mm. long. There are two long uteri running forwards somewhat parallel to each other and forming some complicated loops anterior of the vulva and each is about 5 mm. long; these are joined onto the trompe by a

short common stem some 0.45 mm. long and 0.05 mm. thick. Small and inconspicuous receptacula semini (0.09 mm. by 0.055 mm.) join the uteri to the short oviducts (0.25 mm.) and these by a sudden thickening pass into the elongate and much convoluted ovaries, some 4 mm. in length. As has already been stated, no eggs were present in any of the females. The tail (Fig. 4) is short and stumpy and varies from 1/40th to 1/46th of the total body length, measuring from 0.15 mm. to 0.17 mm. in length.

The posterior portion of the body of the male is deeply cut out ventrally and is produced backwards dorsally to form a short stumpy tail, 0.108 to 0.117 mm. long (1/33rd to 1/39th of body length) (Figs. 5 and 6). Laterally it carries two conspicuous alae, and towards its tip, on the ventral surface, a single large papilla provided with a double pulp. There are only two pairs of circumcloacal papillae, of which the most posterior pair are elongate. The spicule is large, straight and tapers to a fine point: it is from 0.225 mm. to 0.27 mm. long with a maximum thickness of 0.012 to 0.014 mm. The relatively large gubernaculum has its tip bent ventralwards, and is in the form of a very wide V.

Host: *Testudo verreauxi*.

Habitat: Intestine.

Locality: Niekerk's Hope, Griqualand West.

Affinities.—The presence of three caudal papillae allies it to the members of the genus *Thelandros*, from which members it, however, differs in the absence of lateral and the presence of caudal alae.

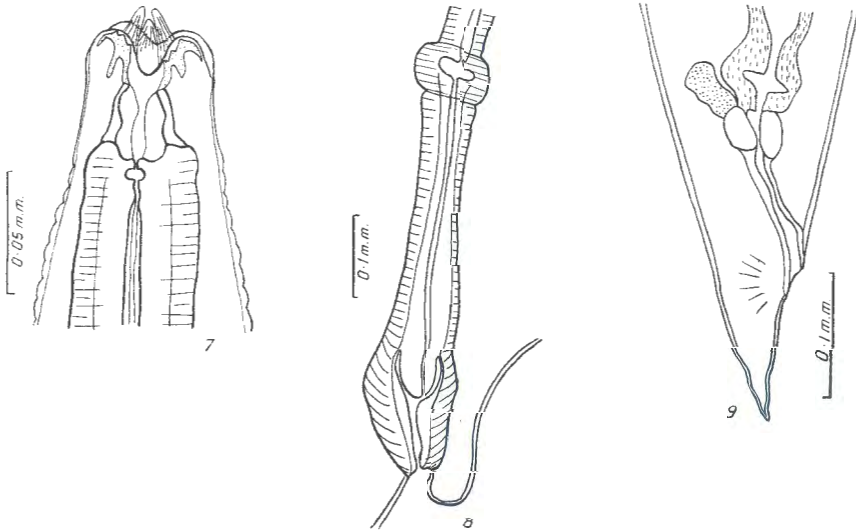


Fig. 7. *Tachygonetria quadrilabiata* sp. n. Cephalic extremity.

Fig. 8. *Tachygonetria quadrilabiata* sp. n. Vulva and vagina.

Fig. 9. *Tachygonetria quadrilabiata* sp. n. Posterior extremity of female.

The outstanding characters of this species are the presence of a vulvular flap, the large spicule, the presence of a double papilla towards the tip of the tail in the male, and the hooked nature of the gubernaculum. As far as the writer is aware none of these characters have been recorded or figured for any of the known species of this genus.

TACHYGONETRIA QUADRILABIATA N. SP. (Figs. 7-11).

The material examined consisted of four males and eight females, all in good preservation. They are rather small worms, the males being from 3 to 3.2 mm. long with a maximum thickness of 0.308 to 0.323 mm. and the females from 4 to 5.3 mm. with a maximum thickness of 0.51 mm. to 0.57 mm.; the body is thickest at about its middle from where it tapers gradually towards both extremities in both sexes.

The head (Fig. 7) is slightly set off from the body, and in the males has a lateral diameter across the base of the lips of about 0.035 mm. and in the females of about 0.05 mm. The cuticle of the head is not traversed by any annular striations, but the rest of the body is and these are about 0.010 mm. apart in the male and 0.015 mm. apart in the female. Lateral alae are absent in both sexes, but both sexes are provided with a few clumps of cuticular hairs, especially evident about the excretory pores. The excretory pore is found just in front of the oesophageal bulb in the females, and at the level of the junction of the bulb and intestine or just posterior to it in the males. There are three conspicuous lips of which the dorsal is large and deeply bilobed; they are all separated from each other by deep indentations. The two lateral

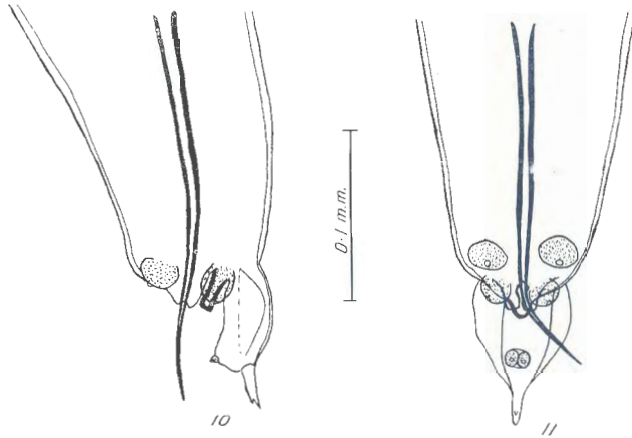


Fig. 10. *Tachygonetria quadrilabiata* sp. n. Posterior extremity of male, lateral view.
 Fig. 11. *Tachygonetria quadrilabiata* sp. n. Posterior extremity of male, ventral view.

papillae are situated one in the dorsal half of each lateral lip and they form a slight bulging from the general contour of the lips. Submedian papillae were not seen. Each lip is strengthened internally by a mass of cuticle carrying three backwardly directed prongs; the innermost of these prongs rests on the anterior margin of the wall of the buccal capsule. Internal to each lateral lip and medially between the two lobes of the dorsal lip there is found a sheet of cuticle which is directed forwards and inwards; these in optical section appear like three large teeth arising one from the inner side of each lip. There is a distinct buccal capsule bounded by thickened cuticle and about 0.025 mm. deep; the capsule has a smaller internal diameter at its anterior end (0.015 mm.) than at its posterior end (0.03 mm.), and the wall of the capsule itself gradually thickens from its anterior towards its posterior margin. The cavity of the capsule is divided into three compartments, confluent centrally, by three large cuticular lamellae arising from the inner surface of the buccal capsule.

The oesophagus is relatively long and thin and is terminated posteriorly by a rounded bulb which is partially sunk into the enlarged anterior end of the intestine. In the males the whole organ is from 1.03 to 1.23 mm. long ($1/3 \cdot 1$ to $1/2 \cdot 3$ of the body length) and in the females from 1.75 to 1.94 mm. long ($1/2 \cdot 3$ to $1/2 \cdot 7$ of the body length). The nerve ring encircles it about the junction of its 1st and 2nd sevenths.

The vulva is situated in the posterior half of the body and its position is indicated by a small cuticular flap, about 0.035 mm. long, which overhangs it from its anterior face; it is a transverse slit which leads into a short and muscular vagina, about 0.15 mm. long (Fig. 8). The ovejector, about 0.4 mm. long by 0.07 mm. broad, passes obliquely inwards and forwards, and forms a rounded swelling at its junction with the common limb of the uteri. At its junction with the vagina it sends backwards a papillae-like outgrowth extending into the vagina and carrying the genital canal through its middle. The common uterine limb or trompe is long and J-shaped, the larger limb being directed posteriorly parallel to the intestine; it is just over 1 mm. in length with a more or less uniform thickness of 0.035 to 0.04 mm.; no portion of it appears to be differentiated to form an "egg chamber." The two uteri are opposed at first, but the posterior uterus soon bends back on itself and passes forwards parallel to the anterior uterus. Each uterus is about half as long again as the "trompe" and of about the same thickness. A thin oviduct, about 0.3 mm. long, joins the uteri to the large and club-shaped ovaries about 0.8 mm. long. Only three of the females contained any eggs, and in these the number was less than ten in each. The eggs are thin-shelled, oval and smooth and contain a partially developed embryo *in utero*: their average size is 0.15 by 0.07 mm., but they vary in length from 0.14 to 0.152 mm. with a thickness of 0.068 to 0.072 mm. The body is terminated by a short and pointed tail (Fig. 9), 0.132 to 0.154 mm. in length ($1/30$ th to $1/34$ th of body length).

The posterior extremity of the male is cut away ventrally and is produced dorsally to form a short and alate tail terminated by a spike about 0.02 mm. long (Figs. 10 and 11); the whole tail is from $1/33$ rd to $1/39$ th of the total body length, varying in length from 0.08 to 0.09 mm. There are three pairs of caudal papillae of which two pairs are large and circumcloacal in position and the third pair is small and situated on the tail just anterior to the origin of its spike; this last pair is small and the papillae are closely approximated to each other. There is only a single spicule which varies in length from 0.215 to 0.225 mm. with a maximum thickness at its proximal end of about 0.015 mm. It is smooth, straight and rounded and tapers gradually to end in a very fine point. The gubernaculum is strongly chitinized, and in the form of a wide V with its pointed extremity straight.

Host: *Testudo verreauxi*.

Habitat: Intestine.

Locality: Niekerk's Hope, Griqualand West.

Affinities.—The size and shape of the spicule, the presence of caudal alae, the close approximation of the last pair of caudal papillae, and the presence of a flap over the vulva allies this species to *T. poweri*, from which species it can, however, be easily distinguished by the apparant four lips; presence of a buccal capsule; presence of a spike on the male tail; the unhooked tip of the gubernaculum; the more pointed female tail; and the absence of an egg chamber.

THELANDROS SEXLABIATA N. SP. (Fig. 12-15).

Some half-dozen females of this species were available, and were all in good preservation. They are medium sized worms varying in length from 5.1 to 6 mm. with a maximum thickness, at about the middle of the body, of 0.572 mm. to 0.66 mm.; from this region the body tapers gradually towards both extremities. The head is slightly set off from the rest of the body and is not provided with any cuticular striations; the rest of the body has striae about 0.019 mm. apart, and these extend backwards almost to the middle of the tail. Along each lateral line there is a well developed cuticular ala originating about 0.8 mm. from the anterior end and terminating about 0.35 mm. anterior of the anus; these alae, in the different specimens, have five to seven kinks along their course.

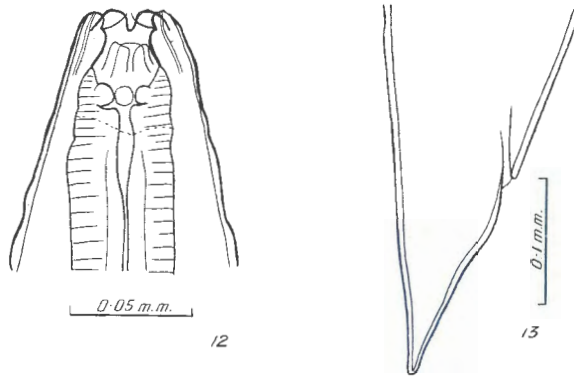


Fig. 12. *Thelandros sexlabiata* sp. n. Cephalic extremity.
 Fig. 13. *Thelandros sexlabiata* sp. n. Posterior extremity of female.

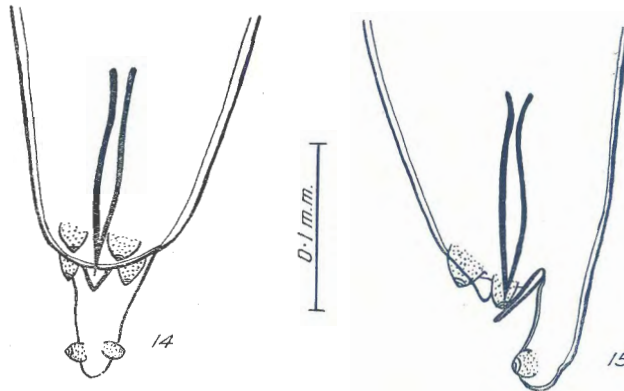


Fig. 14. *Thelandros sexlabiata* sp. n. Posterior extremity of male, ventral view.
 Fig. 15. *Thelandros sexlabiata* sp. n. Posterior extremity of male, lateral view.

The excretory pore is prebulbular in position and is generally surrounded by a tuft of cuticular hairs.

The head has a diameter across the base of the lips of about 0.05 mm., and is terminated anteriorly by three markedly bilobed lips (Fig. 12), all the lobes being of the same size and shape. The lateral papillae are represented by a thin duct passing through the centre of the dorsal half of each lateral lip. Sub-lateral papillae were not seen. On the inner surface of the lips, about midway

between their anterior and posterior limits there is an annular groove and from this groove a sheet of cuticle extends inwards and forwards into the mouth; in optical section this sheet of cuticle simulates a leaf crown. The anterior end of the oesophagus is slightly expanded and its lumen is enlarged to form a small oesophageal funnel about 0.018 mm. deep; at its base there are found three rounded knobs very prominent in optical section of the head. These are situated one at the junction of each pair of oesophageal segments, i.e., one is ventral and two are lateral in position. Between each pair of knobs and slightly anterior to them there is a small somewhat rectangular flap of cuticle arising from the oesophagus and passing forwards more or less parallel to the inner surface of the lips; these in optical section look like delicate teeth-like structures. The oesophagus is long and delicate and is terminated posteriorly by a rounded bulb; it varies in length, according to the length of the worm, from 2.04 mm. to 2.45 mm. with a more or less uniform thickness, except for the bulb, of 0.05 mm. to 0.055 mm.; the bulb has a transverse diameter of about 0.2 mm.; the whole organ is roughly about 2/5th of the total body length. It is encircled by the nerve ring towards its anterior end, at about the junction of its 1st and 2nd tenths. At the junction of the oesophagus with the intestine the latter forms a saucer-like depression into which the oesophageal bulb is sunk. The 3-oesophageo-intestinal valves project freely into the lumen of the intestine.

The vulva is situated in the posterior half of the body, roughly at the junction of the 2nd and last body thirds; its position is indicated externally by a cushion-like thickening of the cuticle on its anterior face, which cushion may sometimes pass backwards over the vulva in the form of a flap. The vulva is a large transverse slit leading into the short and muscular vagina which passes forwards and inwards, about 0.18 mm. long, and is heavily lined with cuticle. The ovejector is also very muscular, about 0.37 mm. long, and its distal extremity projects into the vagina in the form of a rounded papilla; its proximal extremity is swollen to form a small thickening. The unpaired uterus or trompe is long, about 1.8 mm. long by 0.04 mm. broad and does not appear to have its middle portion enlarged to form an egg-chamber. The paired uteri are each about 3 mm. long and have a uniform diameter of about 0.03 mm. a thin oviduct, about 0.22 mm. long, joins the uteri to the club-shaped ovaries about 1.5 mm. long. The disposition of the different parts of this system inside the body is very similar to that found in *Tachygonetria quadrilabiata*. There are relatively very few eggs present, only three of the seven females examined containing one egg each. These are slightly flattened on one side, oval, smooth, and become morulated *in utero*. They are from 0.12 to 0.125 mm. long by 0.075 mm. broad. Behind the anus the body tapers to form a relatively sharp tail (Fig. 13); this is from 0.154 mm. to 0.171 mm. long—1/37th to 1/33rd of total body length.

To this species there are assigned some males which do not appear to fit in with any of the other female species found in the collection. These possess most of the general characters described for the females except that the lips are not so markedly bilobed; each lip having only a slight depression in its middle. Otherwise the characters of the mouth and oesophagus are similar, the excretory pore is prebulbular in both and is provided with a bunch of cuticular hairs, and both have well developed lateral alae. These males, which are from 3.6 to 4.1 mm. long, have a maximum body thickness in their middle of 0.374 to 0.418 mm.; the oesophagus is from 1.55 to 1.72 mm. long and occupies almost 2/5th of the body length. The caudal extremity is cut away ventrally; and the tail is roughly trapezoidal and non alate; this latter carries

a pair of prominent papillae near its distal extremity (Figs. 14 and 15). It is from 0.063 to 0.072 mm. long and forms from 1/62nd to 1/54th of the total body length. There are two pairs of large circumlocal papillae, and in some specimens there appears to be present a third pair, adanal in position and very small and inconspicuous. There is a single spicule which is straight and thickened towards its middle; its average length is 0.124 mm. but may vary in length from 0.117 mm. to 0.135 mm. The gubernaculum is V-shaped and somewhat inconspicuous.

Host: *Testudo verreauxi*.

Habitat: Intestine.

Locality: Niekerk's Hope, Griqualand West.

Affinities.—This species appears to show characters which are intermediate between the genera *Tachygonetria* and *Thelandros*, in that it agrees with the former in possessing a gubernaculum and sessile genital papillae, and with the latter in possessing lateral alae; it agrees with both in the absence of caudal alae. As Thapar has rightly stressed, the presence or absence of a gubernaculum in the reptilian oxyurids is not a character to which too great importance should be given as it may be present or absent in members of the same species. Also,

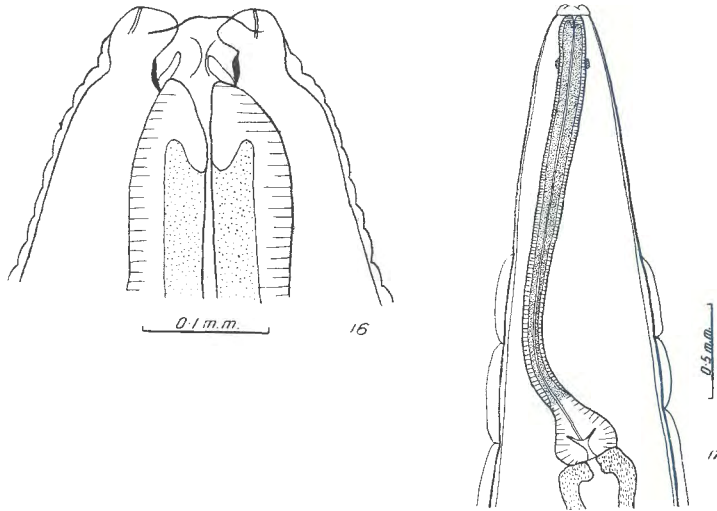


Fig. 16. *Alaeuris conspicua* sp. n. Cephalic extremity.

Fig. 17. *Alaeuris conspicua* sp. n. Anterior extremity.

the nature of the caudal papillae, i.e., whether they are stalked or sessile, cannot be interpreted too literally as the one type grades into the other. However, because of the markedly bilobed nature of the lips in the female, and the presence of well developed lateral alae in both sexes, the species described above is referred to the genus *Thelandros*. Of the known members of this genus, only two species are known with spicules exceeding 0.1 mm. in length; these are *Thelandros echinatus* (Rud., 1819) in which they are 0.105 mm. long and *Thelandros numidicus* Seurat, 1918 where they reach a length of 0.2 mm. The above described species is easily distinguished from both these species by the presence of lateral alae and further differs from Rudolphi's species by the difference in shape of the caudal extremity of the female, the position of the vulva and consequent direction of the vagina inside the body; and from Seurat's species by the absence of caudal alae in the male.

ALAEURIS CONSPICUA N. SP. (Figs. 16-22).

In the collection there were about four dozen specimens of this species: all in good preservation. They are fairly stout worms, the females being about twice as large as the males: the latter vary in length from 3.5 to 4.2 mm. ; with a maximum thickness at about the middle of the body of 0.4 to 0.46 mm. ; from this point the body tapers gradually towards both extremities. The females are from 6 to 8.2 mm. long and have a body thickness at about the middle of from 0.66 to 0.92 mm. The cuticle is finely striated in both sexes, and also carries very conspicuous lateral alae: these originate from about half-way down the length of the oesophagus and extend to about 0.3 to 0.35 mm. anterior of the ano-genital aperture in the male and to the level of the anus in the female. The alae are unstriated and are festooned to a greater or lesser extent in the individual worms: in some this festooning is fairly regular down to the length of the worm, but this is not usually the case.

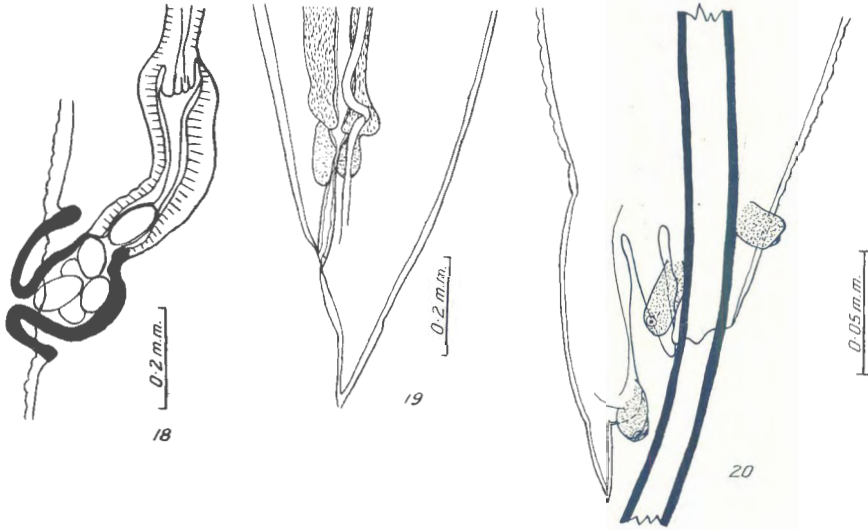


Fig. 18. *Alaeuris conspicua* sp. n. Vulva and vagina.

Fig. 19. *Alaeuris conspicua* sp. n. Posterior extremity of female.

Fig. 20. *Alaeuris conspicua* sp. n. Posterior extremity of male, lateral view.

The head is slightly constricted off from the rest of the body, and is bounded anteriorly by three simple and rounded lips, one dorsal and two ventro-lateral in position (Figs. 16 and 17). there are no submedian head papillae, but the lateral papillae are indicated by a fine duct in each lateral lip. The bases of the lips, on their inner surface, are lined by thickened cuticle, and from the junction of the lips and oesophagus a thickened annular sheet of cuticle projects forwards and inwards into the mouth cavity. The oesophagus is fairly stout and long forming just less than half of the body length in the males and about $\frac{2}{5}$ th in the females. It varies in length from 1.52 to 1.8 mm. in the males and from 2.27 to 2.7 mm. in the females: it is somewhat club-shaped, being thickest at its proximal end and thinnest at its junction to the bulb; except for the bulb it consists of an inner core of a glandular nature traversed by the oesophageal lumen, and of an outer rim of muscular tissue; the bulb is somewhat pyriform in shape, being just slightly longer than broad; it is slightly sunk into the broadened anterior end of the intestine. The nerve ring is very inconspicuous and is found towards the anterior end of the oesophagus about 0.23 mm. from the anterior end in the males and from 0.26

to 0.37 mm. from the anterior end in the females. The excretory pore is post bulbular in position in both sexes, being found just posterior to the junction of the oesophageal bulb and intestine in both sexes; in some of the specimens it is surrounded by a bunch of cuticular hairs.

The vulva is very prominent and is found in the posterior half of the body at about the junction of the 3rd and 4th fifths. It is lined by very much thickened cuticle and is sunk into the body to form a transversely elongated chamber (Fig. 18) sometimes found to contain eggs; the lips bounding the transverse aperture protrude slightly above the body surface. The vagina is relatively short, being about 0.5 mm. long and passes obliquely forwards and inwards; it has a thick muscular wall which becomes gradually thicker towards its proximal end, where its lumen is enlarged to receive the papillae-like outgrowth from the ovejector. The uteri consist of a common stem or trompe about 1.75 mm. long, and two long and much coiled uterine branches. The former soon bends backwards and runs more or less parallel to the intestine. The oviducts are short and thin, but the ovaries are relatively massive, long and club-shaped. Eggs were not present in all the specimens, some of the

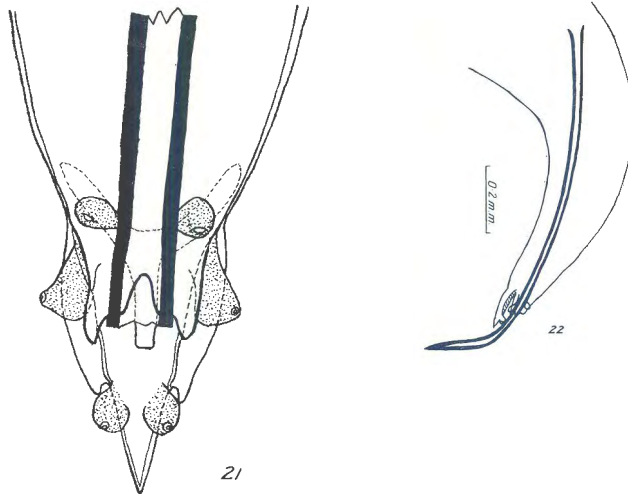


Fig. 21. *Alaeuris conspicua* sp. n. Posterior extremity of male, ventral view.
Fig. 22. *Alaeuris conspicua* sp. n. Spicule *in situ*.

largest even containing none; however, much smaller specimens contained numerous eggs. These are oval, smooth, brownish and thin-shelled, and contain a partially developed embryo *in utero*. They vary in length from 0.113 to 0.12 mm. with a maximum thickness of 0.075 to 0.079 mm. The body is terminated by a short and pointed tail (Fig. 19) from 0.25 to 0.3 mm. in length forming roughly from 1/28th to 1/22nd of the body length.

The posterior extremity of the body of the male (Figs. 20 and 21) is cut away ventrally and is carried back dorsally by a short tail from 1/30th to 1/36th of the body length (0.12 to 0.13 mm. long); it is terminated by a spike about 0.03 mm. long; two plain but conspicuous caudal alae extend from the base of the tail to the origin of the spike. There are three pairs of large caudal papillae, two pairs being circumcloacal in position, the more anterior being ventral, and one pair situated ventro-laterally on the tail at the origin of the tail spike; in addition the lateral margins of the cloacal lips extend backwards

as two stumpy processes. A single spicule is present which is relatively very long and varies in length from 1 to 1.27 mm. (Fig. 22); it is broadest at its proximal end, and tapers to end in a sharp point; its distal quarter is slightly enlarged and curved dorsalwards when extruded when it assumes the shape of a sabre. A strongly cuticularized and V-shaped gubernaculum is present.

Host: *Testudo verreauxi*.

Habitat: Intestine.

Locality: Niekerk's Hope, Griqualand West.

Affinities.—The presence of caudal and lateral alae, a gubernaculum and three simple lips easily places this species in the genus *Alaeuris* Thapar, 1925. It differs from it, however, in having only three pairs of caudal papillae instead of four pairs. This, however, cannot be considered to be of much weight as the adanal pair is very small or even absent in many reptilian oxyurids. Three species have up to the present been referred to this genus, namely *A. alaeuris* Thapar, 1925, from *Testudo iberica*; *A. iguanae* Thapar, 1925, from *Iguana tuberculata* and *A. hirsutus* Sandground, 1929, from *Iguana rhinolopha*. The above described species is easily distinguished from Thapar's species by its very much larger spicule and by the nature and shape of the vulva. It is distinguished from Sandground's species by the presence of lateral alae and by the complicated nature of its female genitalia.

THAPARIA MACROSPICULUM N.G., N.SP. (Figs. 23–28).

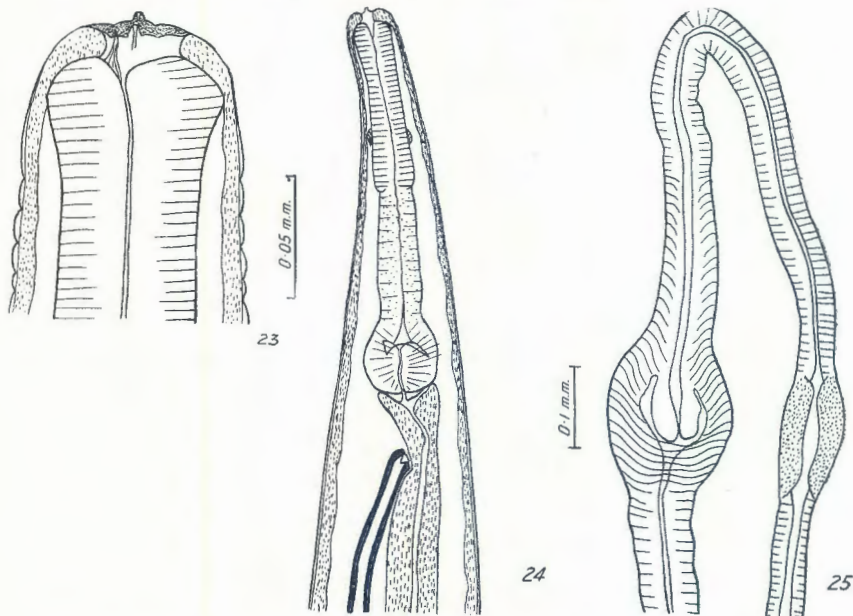


Fig. 23. *Thaparia macrospiculum* g.n.; sp. n. Cephalic extremity.

Fig. 24. *Thaparia macrospiculum* g.n.; sp. n. Anterior extremity.

Fig. 25. *Thaparia macrospiculum* g.n.; sp. n. Portion of female genitalia.

The material available for examination consisted of five males and eleven females, all except one of which were mature. They are medium sized worms the males varying in length from 3.3 to 3.9 mm. with a maximum breadth in the middle of the body of 0.25 to 0.315 mm.; the mature females vary in

length from 3.4 to 5.6 mm. with a maximum body thickness of 0.33 to 0.495 mm. The body tapers from the middle towards the extremities in both sexes, the head end of the male being, however, much finer than that of the female. In the female the tail tapers off to a sharp point, whereas in the male it is somewhat trapezoidal in shape. There are three somewhat flattened lips, each of which is slightly bilobed; on the summit of each dorsal half of the lateral lips there is a conspicuous papilla-like structure on the tip of which opens the duct of the cephalic glands (Fig. 23). No lateral head papillae were observed. On the inner surface of the dorsal lip there is a somewhat rectangular cuticular flange lying close up to the lip and in optical section appears like a spike arising from the base of the lip. There is no buccal capsule. The oesophagus consists of three distinct parts, namely an anterior muscular portion, a middle semi-glandular portion and a muscular bulb (Fig. 24). The middle portion represents the very much elongated neck of the bulb. The whole organ is relatively

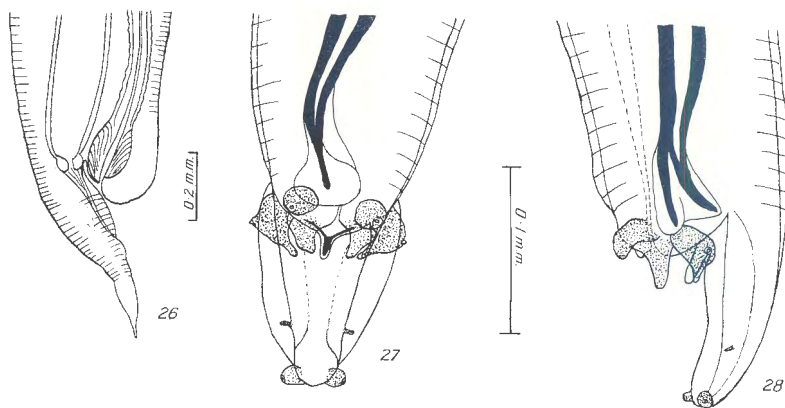


Fig. 26. *Thaparia macrospiculum* g.n.; sp. n. Caudal extremity of female.

Fig. 27. *Thaparia macrospiculum* g.n.; sp. n. Caudal extremity of male, ventral view.

Fig. 28. *Thaparia macrospiculum* g.n.; sp. n. Caudal extremity of male, lateral view.

short being about one-tenth of the total body length in the female and between one-eighth and one-ninth in the male. The muscular and glandular portions are separated off from each other by a slight constriction, and the former is slightly broader than the latter portion. The whole organ, including the bulb, is about 0.43 mm. long in the males and 0.53 mm. long in the females. The muscular portion measures about 0.18 mm. long in the males and 0.23 mm. in the females with a maximum thickness of 0.045 and 0.063 mm. respectively in the two sexes. It increases slightly in thickness towards its posterior end, and the nerve ring encircles it at about the junction of its second and last thirds. The glandular portion has a maximum thickness of 0.043 mm. in the males and 0.052 mm. in the females; it has a more or less uniform thickness throughout except that it forms a slight constriction or neck just before it joins on to the bulb. It measures about 0.16 mm. long in the males and 0.19 mm. in the largest females. The bulb is of the usual oxyurid shape and structure and, as a rule, is slightly broader than long; in the males it is about 0.08 mm. long by 0.085 mm. broad and in the females 0.12 by 0.135 mm. respectively. The excretory pore is situated some considerable distance behind the level of the bulb in both sexes, being found some 0.5 mm. behind it in the males and 0.55 mm. in the females. Lateral alae are absent.

The vulva is situated near the anus being only about 0.18 mm. anterior to it; its position is indicated by a very pronounced cuticular swelling of its anterior lip (Fig. 26). The vagina is very long, 1.8 to 1.9 mm., and has a uniform thickness of from 0.055 to 0.06 mm.; it passes forwards more or less parallel to the intestine to join a large, oval and muscular sphincter (Fig. 25). This latter is somewhat flask-shaped, consisting of a very muscular bulb, the muscle fibres of which have a semi-circular arrangement, and a neck; these two portions are more or less equal in length, the diameter of the former, however, being about 0.13 mm. and of the latter about 0.07 mm. in the largest female; the centre of the bulb is hollowed out and carries a large papillae, carrying the opening of the genital canal, which extends into it from its anterior face. The ovejector is J-shaped the longer limit being directed posteriorly; it has a more or less uniform thickness of about 0.055 mm. and is terminated by an ovoid swelling; this whole portion is about 0.7 mm. long. The unpaired limb of the uteri is directed posteriorly and has about the same thickness as the preceding ovejector and is about 0.64 mm. long; except for a short distance the two uteri are opposed, but eventually they recurve and approach one another and finally, together with the two large ovaries, make a few complicated windings about each other in the centre of the body. Relatively few eggs are present in the uteri, most of the females possessing less than ten; however, one female had 26; they are thin-shelled, oval and contain a partially developed embryo *in utero*; they vary in size from 0.09 mm. by 0.064 mm. to 0.102 mm. by 0.062 mm. The tail tapers to a fine point (Fig. 25) and is about 0.35 mm. long; its posterior half is devoid of cuticular annulations.

The posterior extremity of the male is deeply cut out on the ventral side, and the tail itself has a stumpy appearance (Figs. 26, 27 and 28). There are four pairs of caudal papillae, the most posterior pair being situated at the corners of the tail end; the remaining three pairs are grouped around the cloaca, and the first and last of these are large, whereas the middle one is smaller and adanal in position. There are conspicuous caudal alae extending from just in front of the anterior pair of caudal papillae to the base of the last pair of papillae on the end of the tail. An inconspicuous gubernaculum in the form of a wide V is present. The most striking characteristic is the remarkably long and stout single spicule; it extends practically through the whole length of the body, its proximal extremity in some specimens even passing anterior of the oesophageal bulb; it varies in length from 2.57 mm. to 3.4 mm. with a maximum thickness of 0.25 to 0.32 mm.; except for its distal extremity it has a more or less uniform thickness throughout; towards its distal end it narrows down to form a kind of neck after which it broadens out and becomes membranous.

Host: *Testudo verreauxii*.

Location: Intestine.

Locality: Niekerk's Hope, Griqualand West.

Affinities.—The shape of the caudal extremity of the male, the disposition and number of the caudal papillae and the presence of caudal alae simulate the corresponding structures found in the members of the genus *Alacuris* Thapar, 1925, but the nature of the oesophagus, the position of the vulva, the structure of the female genitalia and the extraordinary size of the spicule, these characters together, place this species in a unique position among the reptilian oxyurids; it has in consequence been deemed necessary to create a new genus—*Thapararia*—for its reception, which genus may briefly be characterised as follows: Medium sized worms possessing three lips and a relatively short oesophagus consisting

of an anterior muscular portion, a middle glandular portion and a posterior bulb; excretory pore postbulbular; lateral alae absent. Vulva approximated to anus; vagina very long; two uteri and two ovaries. Caudal extremity of male cut and ventrally and continued backwards to form a short truncated and alate tail. Four pairs of caudal papillae, three pairs circumcloacal and one pair towards tip of tail. Single spicule very long and stout extending to or even anterior of the oesophageal bulb. Type *T. macrospiculum* from *Testudo verreauxi*, Griqualand West.

ATRACTIS AFRICANA N. SP. (Figs. 29 and 30).

This species was represented by numerous specimens in different stages of development. They are rather small and slender, the males being from 3.5 to 4 mm. long with a maximum thickness of 0.162 mm. and the females from 4 to 4.5 mm. long with a maximum thickness of 0.22 mm. There is a slight attenuation of the body towards the anterior end in both sexes, which

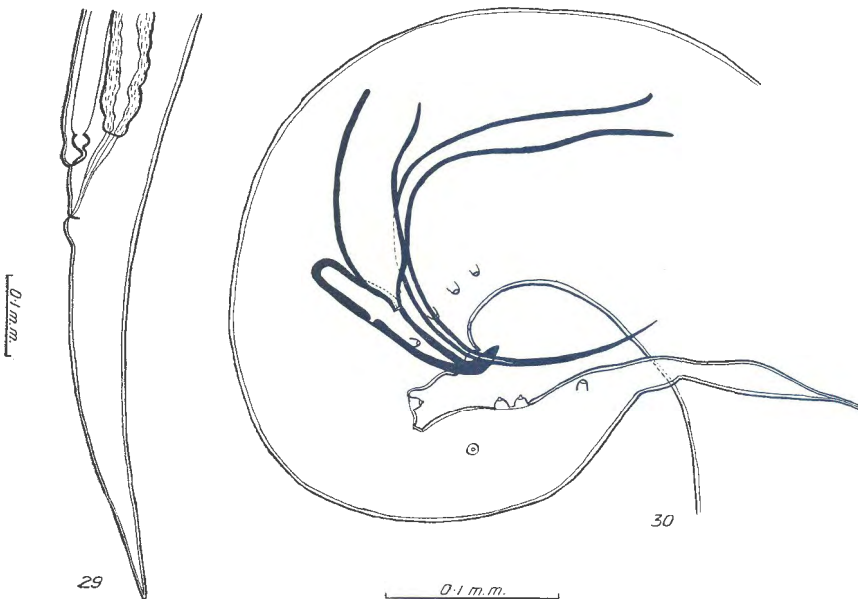


Fig. 29. *Atractis africana* sp. n. Posterior extremity of female.
 Fig. 30. *Atractis africana* sp. n. Posterior extremity of male.

end is terminated in a somewhat bluntly rounded head not definitely set off from the rest of the body. The body of the female is more or less straight and is terminated by a fairly long, straight and pointed tail; in the males the posterior half or third of the body is spirally coiled, and is also terminated by a fairly long and pointed tail.

The cuticle is finely striated transversely, and in the oesophageal region is provided with a number of irregularly scattered small bosses; there are no cervical papillae or lateral alae. The mouth is surrounded by six small triangular lips, each of which carries a papillae which protrudes forwards from its tip. There is no buccal capsule. The oesophagus consists of the two parts typical of the genus, namely a muscular anterior portion about 0.36 mm. long in both sexes, and a slightly smaller glandular posterior portion terminating

in a bulb; this portion is about 0.34 mm. long in both sexes, and is encircled by the nerve ring near its junction with the anterior portion. The two oesophageal parts are separated from each other by a distinct constriction. The excretory pore is post-oesophageal in position in both sexes; its position is further back in the males than in the females, being found about 0.3 mm. in the males and about 0.2 mm. in the females behind the oesophagus; its aperture is guarded by a number of small and delicate radiating cuticular rods.

The vulva is situated from 0.045 to 0.06 mm. anterior to the anus (Fig. 29) and is lodged behind a small cuticular pad. It leads into a short vagina about 0.03 mm. long which in its turn joins on to the single uterus, whose size depends on the size of the embryos contained in it; it passes forwards ventral of and parallel to the intestine, and is terminated by a small and club-shaped ovary, which is recurved backwards in most cases. The tail is long and pointed and is from 0.41 to 0.46 mm. long.

In the males the posterior extremity is spirally coiled (Fig. 30). There are two very dissimilar spicules, the left being about 0.4 mm. long and terminating in a fine point; at its proximal end it has a thickness of 0.02 to 0.022 mm., and just posterior of this it swells out slightly. The right spicule is stout, hollow and somewhat bottle-shaped with its short neck directed posteriorly; it is from 0.126 to 0.13 mm. long with a maximum thickness of 0.036 to 0.04 mm. at its proximal extremity; its distal extremity is provided with a small aperture leading into the lumen of the spicule. The gubernaculum is straight and strongly cuticularised and has its distal extremity sharply bent ventralwards; it is from 0.11 to 0.125 mm. long; at about the junction of its 1st and 2nd thirds it forms a slight shoulder on its ventral side, and here it attains a maximum thickness of 0.022 mm.; opposite the shoulder, on its dorsal side, there is a characteristic thinning of its cuticular wall. There are nine pairs of caudal papillae, namely two pairs lateral and preanal, two pairs lateral and adanal, and five pairs postanal in position; of these postanal papillae three pairs are approximated towards the ventral line, whereas the remaining two pairs are laterally placed. Behind the last pair of papillae the tail is suddenly attenuated to end in a filiform point; the whole tail is from 0.26 to 0.3 mm. long.

Host: *Testudo verreauxi*.

Habitat: Intestine.

Locality: Niekerk's Hope, Griqualand West.

Affinities: This species is very closely related to *A. dactyluris* (Rud.) with which species it agrees in the number and distribution of its caudal papillae; it differs from it, however, in its smaller size, much shorter tail in both sexes, slightly larger left spicule, perforated right spicule, the hooked tip of the gubernaculum and the presence of bosses at the anterior end of the body.

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