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On some trematode parasites of Amphibia from Lucknow*

by

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Family: PARAMPHISTOMIDAE Fischoeder, 1901

Diplodiscus amphichrus Tubangui, 1933
(Figs. 1-3)

Ten specimens of this form were collected from the rectum of *Bufo* sp. at Lucknow.

DESCRIPTION: Body conical and aspinose, 1.01-3.29 mm long and 0.49-1.44 mm in maximum width in front of acetabulum. Oral sucker subterminal, spherical or oval, 0.14-0.37 × 0.14-0.54 mm in size. A pair of oral diverticula arising from its base, 0.08-0.23 × 0.14-0.47 mm in size. Esophagus long tubular, 0.12-0.28 mm in length. The posterior end of esophagus is dilated to form an esophageal bulb, 0.11-0.23 × 0.07-0.15 mm in size bifurcating into two broad intestinal caeca running straight on both sides of body extending up to or a little in front of anterior border of acetabulum. Acetabulum extremely large, cup-shaped, convex and situated at the posterior extremity, 0.37-0.90 × 0.51-1.37 mm in size. It is provided with an additional sucker with a depression in the centre, 0.10-0.22 × 0.12-0.26 mm in size.

Genital pore either just behind the esophageal bulb or extracaecal, 0.33-1.15 mm from anterior extremity. Excretory pore dorsal and preacetabular. Excretory bladder tubular.

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Lymph system consists of two large vessels lying outside and dorsally to the caeca.

Testis single, entire, oval or triangular, preovarian and post-equatorial. It measures 0.10-0.22 × 0.12-0.26 mm in size at 0.515-1.610 mm from anterior extremity. Cirrus pouch elongated to subglobular, 0.09-0.27 × 0.05-0.17 mm in size. Vesicula seminalis externa present. Vesicula seminalis interna narrow, coiled, 0.048-0.090 × 0.10-0.40 mm in size. Pars prostatica tubular, 0.01-0.04 × 0.008-0.02 mm in size. It continues as an ejaculatory duct, 0.03-0.08 mm long The space in the cirrus pouch around the vesicula seminalis and pars prostatica is surrounded by a large number of prostate gland cells.

Ovary entire, oval and submedian. It is laterally situated to the left just behind the testis, and measures 0.06-0.23 × 0.05-0.21 mm, at 0.37-1.23 mm from hind end. Oviduct arises from the posterior end of ovary and opens at oötype. Receptaculum seminis absent. Vitellaria large, follicular, extending from oral diverticula up to anterior border of acetabulum, mainly lateral in position but meeting medially in the acetabular part to form a dorsally placed row. Two transverse vitelline ducts meet together in front of acetabulum opening at the oötype. A large number of Mehlis's gland cells surround the oötype. Uterus arises from the oötype and runs posteriorly on the right side of ovary; on reaching near the anterior end of acetabulum it runs forward occupying the entire intercaecal space and passes into a thick convoluted metraterm. Eggs oval, non-operculated, 0.081-0.132 × 0.032-0.075 mm in size.

HOST: *Bufo* sp.
LOCATION: Intestine
LOCALITY: Lucknow.

DISCUSSION: TUBANGUI (10) described *Diplodiscus amphichrus* from Philippines. SRIVASTAVA (8, 9) described a new variety, *D. amphichrus magnus* from *Rana cyanophlyctis* from India. KAW (3) recorded *D. mehrai* from Kashmir, and observed two testes while PANDE (6) has described only one. SINGH (7) redescribed *D. amphichrus* and considered that *D. amphichrus magnus* SRIVASTAVA, 1934 and *D. mehrai* PANDE, 1937 are synonymous to *D. amphichrus* Tubangui, 1933, as the position of genital and excretory pores are minor differences and are negligible in value. The author is in agreement with Singh, as in the author's specimens the position of genital pore is variable (depicted in figures).

Family: LECITHODENDRIIDAE Odhner, 1911
Subfamily: Ganeoninae Yamaguti, 1958 (11)

Ganeo tigrinum Mehra et Negi, 1928
(Figs. 4-5)

A large number of specimens of this form were collected from the intestine of *Rana tigrina* at Lucknow.

DESCRIPTION: Body elliptical, spinose, tapering anteriorly and rounded with a small depression posteriorly. It measures 3.42-6.28 × 1.69-1.76 mm. Oral sucker terminal, oval, 0.17-0.19 × 0.20-0.23 mm in size. Pharynx muscular, globular, 0.08-0.12 × 0.12-0.13 mm in size; esophagus long, tubular, 0.35-0.47 mm in length, bifurcating into two intestinal caeca extending beyond the vitellaria quite anterior to caudal end. Ventral sucker spherical, 0.22-0.33 mm in diameter at 1.23-1.55 mm i. e. one third of body length from anterior extremity.

Genital pore situated ventrally on the left margin of body between the pharynx and intestinal bifurcation at 0.69-0.88 mm from anterior extremity. Excretory pore subterminal, lying on the posterior depression of body. Excretory bladder V-shaped with thick branches extending intercaecally up to hind end of ovary.

Testes entire, oval, subequal, intercaecal, obliquely tandem close or away from intestinal bifurcation. Anterior testis preacetabular, just postbifurcal, overlapping or separate from posterior testis, 0.29-0.36 × 0.32-0.35 mm in size at 0.88-1.7 mm from anterior extremity. Posterior testis lies on the right side of ventral sucker close to caeca or overlapping it, 0.33-0.44 × 0.32-0.40 mm in size at 1.12-1.46 mm from anterior extremity. Cirrus pouch absent. Vesicula seminalis is a coiled tubular structure lying transversely on the left side of posterior testis, extending up to anterior or posterior end of ventral sucker. Pars prostatica well developed, flask shaped, 0.42-0.55 × 0.22-0.28 mm in size. Ejaculatory duct, 0.23-0.50 mm in length; cirrus muscular and spiny. A large number of prostate gland celis lie freely in the parenchyma outside the pars prostatica.

Ovary oval, preequatorial, post-acetabular, situated on the right side of body or posterior to acetabulum, equal to or larger than ventral sucker, measuring 0.23-0.27 × 0.23-0.33 mm at 1.36-1.69 mm from anterior extremity. Oviduct arises from the ovary's median side and opens at the oötype. Receptaculum seminis large, oval or pear shaped, lying just behind or on left side of ovary, 0.22-0.32 × 0.20-0.30 mm in size. Vitellaria small, follicular, mainly lateral, covering the intestinal caeca extending from ventral sucker or ovary up to a little anterior to termination of intestinal caeca. Two transverse vitelline ducts run transversely to form a yolk reservoir and open at the oötype. A large number of unicellular Mehlis's gland cells surround the oötype. Uterus arises from oötype, runs posteriorly to fill up the intercaecal space behind the ovary. It runs anteriorly to open at the genital pore. Eggs oval, non-operculated, 0.0252-0.0325 × 0.012-0.0185 mm in size.

HOST: *Rana tigrina.*

LOCATION: Intestine.

LOCALITY: Lucknow.

DISCUSSION: MEHRA and NEGI (5) described *Ganeo tigrinum* from *Rana tigrina* at Allahabad. The present form is closely related to *G. tigrinum* but differs from it in the distribution of vitellaria (i.e., from hind end of ventral sucker up to a little anterior to termination of caeca), in having ovary posterior or lateral to ventral sucker, and in the relative size of testes and ovary. Another

species of *Ganeo* recorded from India, *G. kumaonensis* Pande, 1937 is closely related to this species. PANDE (6) distinguished *G. kumaonensis* from *G. tigrinum* in the more anterior position of ovary in relation to the acetabulum, shape of vesicula seminalis, smaller size of eggs, more anterior extent of the vitellaria and much smaller size of their follicles. In the opinion of the author *G. kumaonensis* is a synonym of *G. tigrinum* as the differences cited above are minor and variable.

Subfamily: Prosotocinae Yamaguti, 1958 (11)

Mehraorchis tigrinarum Gupta, 1954
(Fig. 6)

Only one specimen of this form was collected from the intestine of *Bufo* sp. at LUCKNOW.

DESCRIPTION: Body ovoid, spinose with rounded extremities, measuring 5.44 × 2.88 mm. Oral sucker terminal and oval, 0.25 × 0.36 mm in size; prepharynx absent; pharynx large, globular, 0.27 × 0.25 mm in size; esophagus long, slightly curved, 0.8 mm long; intestinal caeca simple and wide, running parallel to the lateral sides and reaching the hind end of body. Ventral sucker median, oval larger than oral sucker, 0.425 × 0.49 mm in size at 2.0 mm from anterior extremity.

Genital pore lies on left side of body a little behind the oral sucker at 0.47 mm from anterior end.

Excretory pore lies dorsally at the posterior end of body. Excretory bladder Y-shaped.

Testes symmetrical, entire, subequal, oval, preequatorial, and extracaecal. Right testis, 1.15 × 0.55 mm in size at 1.14 mm from anterior extremity. Left testis 1.1 × 0.6 mm in size at 1.68 mm from anterior extremity. Cirrus sac claviform, in neck region broader posteriorly while narrower anteriorly. It lies obliquely anterior to the left testis extending behind and lying ventrally to the commencement of the left intestinal caecum. The vesicula seminalis is cylindrical, winding in a coil at the basal portion of the cirrus sac. It measures 1.35 × 0.29 mm. Anteriorly it is continued into a globular pars prostatica, 0.2 × 0.1 mm in size and a long ejaculatory duct, 0.49 mm long. The cirrus is muscular and non-spiny. The space around the pars prostatica and vesicula seminalis is surrounded by a large number of prostate gland cells.

Ovary entire, oval, preequatorial, dorsolateral to ventral sucker, 0.52 × 0.58 mm in size at 2.15 mm from anterior extremity. A small, elongated, bulb-shaped receptaculum seminis 0.13 × 0.08 mm in size lying on the left side of ventral sucker. Oviduct arises from the hind end of ovary and opens at the oötype. Vitellaria small, follicular, irregular in shape extending from pharynx to hind end of ovary. They are mainly lateral in position but cover parts of testes and intestinal caeca. Two transverse vitelline ducts unite to from a yolk

reservoir and open at the oötype. A large number of Mehlis's gland cells surround the oötype. The uterus arises from the oötype and runs posteriorly occupying the entire space behind the ovary. Anteriorly it opens at the genital pore. Eggs oval and non-operculated, 0.021-0.032 × 0.012-0.020 mm in size.

HOST: *Bufo* sp.
LOCATION: Intestine.
LOCALITY: Lucknow.

DISCUSSION: The present form is referred to *Mehraorchis tigrinarum* Gupta, 1954 (2) but differs from it in the absence of prepharynx, in the extension of vitellaria to the hind end of ovary, in the possession of a tubular coiled vesicula seminalis and in having ovary posterior to ventral sucker. These, in the opinion of the author, are variations within the species.

Family: PLAGIORCHIIDAE Lühe, 1901 emend. Ward, 1917

Tremiorchis ranarum (Mehra et Negi, 1926)
(Figs. 7-8)

SYN.: *Centrovitus pentadelphi* Bhalerao, 1926 (1).

Only four specimens of this form were recovered from the intestine of a frog *Rana tigrina* at Lucknow.

DESCRIPTION: Body elongated, rounded at the extremities measuring 3.24-4.40 × 1.00-1.23 mm, covered with small backwardly directed spines extending from anterior end up to a little posterior to hind end of posterior testis. The spines are of small size closely set in longitudinal rows which encircle the whole body. Oral sucker terminal, spherical or subspherical, 0.26-0.30 × 0.27-0.30 mm in size. Prepharynx small and thin walled; pharynx large, muscular, ovoid, 0.15-0.18 × 0.13-0.16 mm in size; esophagus long tubular, straight or slightly curved, 0.35-0.63 mm in length; intestinal caeca simple extending up to the anterior or hind end of anterior testis. Ventral sucker subspherical, larger than oral sucker, 0.31-0.38 × 0.29-0.33 mm in size at 1.0-1.5 mm i.e., about one third of body length from anterior extremity. The ratio of the suckers is nearly 3:4.

Genital pore lies behind intestinal bifurcation closely in front of ventral sucker at 1.07-1.48 mm from anterior extremity. Excretory pore lies on dorsal side at the hind end of body. Excretory bladder Y-shaped, extending forward beyond testes then dividing into right and left branches.

Testes oval, entire subequal, close or away from each other, slightly post equatorial and separated from each other by uterine coils. Anterior testis 0.27-0.34 × 0.32-0.40 mm in size at 1.55-2.65 mm from anterior extremity. Posterior testis larger than anterior testies, 0.29-0.35 × 0.39-0.45 mm in size at 1.18-1.41 mm from anterior extremity. Cirrus sac long, flask shaped and

curved, lying on right side of ventral sucker extending from a little behind to intestinal bifurcation to a little distance behind ventral sucker where it ends anterior to ovary. It measures 0.69-0.76 × 0.14-0.20 mm in size. Vesicula seminalis bipartite, narrow, occupying about two thirds of length in the cirrus sac. Distal end, 0.18-0.24 × 0.06-0.09 mm in size separated by a constriction from the proximal part, 0.2-0.28 × 0.05-0.08 mm in size. Anteriorly it continues into a globular pars prostatica, 0.06-0.08 × 0.03-0.04 mm in size and an elongated ejaculatory duct, 0.09-0.15 mm in length. Cirrus muscular and non-spiny. The space around the pars prostatica and vesicula seminalis in the cirrus sac is surrounded by a large number of prostate gland cells.

Ovary entire, triangular or oval, preequatorial, situated in close proximity behind the ventral sucker or away from it. It measures 0.24-0.27 × 0.27-0.33 mm in size at 1.28-1.87 mm from anterior extremity. Receptaculum seminis pear shaped, lying close behind the ovary or left side of Mehlis's gland cells, 0.20-0.28 × 0.1-0.12 mm in size. Oviduct arises from the ovary and opens at the oötype. Vitellaria small, follicular, extending from middle of ventral sucker to termination of caeca or to anterior end of posterior testis. They are mainly lateral in position covering the intestinal caeca. Two vitelline ducts run transversely and unite to form a common yolk reservoir and open at the oötype. A large number of Mehlis's gland cells surround the oötype. The uterus arises from the oötype with its ingoing and outgoing branches running posteriorly occupying the entire space behind the ovary. Anteriorly it opens at the genital pore. Eggs small and non operculated, 0.020-0.044 × 0.012-0.021 mm in size.

HOST: *Rana tigrina.*

LOCATION: Intestine.

LOCALITY: Lucknow.

DISCUSSION: The present form belongs to *Tremiorchis ranarum* (Mehra et Negi, 1926) (4) (Syn. *Centrovitus pentadelphi* Bhalerao, 1926) but differs from it in the extension of vitellaria from middle of ventral sucker instead of from bifurcation of caeca up to its posterior end, in the extent of intestinal caeca up to anterior or posterior end of anterior testis instead of front end of anterior testis, and in having genital pore inter- or extracecal. These are considerer as variations within the species.

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SUMMARY

Four adult forms, viz., *Diplodiscus amphichrus* Tubangui, 1933 and *Mehraorchis tigrinarum* Gupta, 1954 from *Bufo* sp., *Ganeo tigrinum* Mehra et Negi, 1926 and *Tremiorchis ranarum* Mehra et Negi, 1926 from *Rana tigrina,* are redescribed from Lucknow.

RESUMEN

Se redescriben las formas adultas de cuatro tremátodos de anfibios colectados en Lucknow, a saber: *Diplodiscus amphichrus* Tubangui, 1933 y *Mehraorchis tigrinarum* Gupta, 1954 de *Bufo* sp. y *Ganeo tigrinum* Mehra et Negi, 1926 y *Tremiorchis ranarum* Mehra et Negi, 1926 de *Rana tigrina.*

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Figs. 1-3 *Diplodiscus amphichrus* Tubangui, 1933

Fig. 1 Vitellaria extending from hind end of oral sucker. Dorsal view.

Fig. 2. Vitellaria a little posterior to oral sucker. Ventral view,

Fig. 3 Immature. Cirrus pouch extracaecal. Ventral view.

Figs. 4-5. *Ganeo tigrinum* Mehra et Negi, 1928.

Fig. 4 Dorsal view.

Fig. 5. Ventral view.

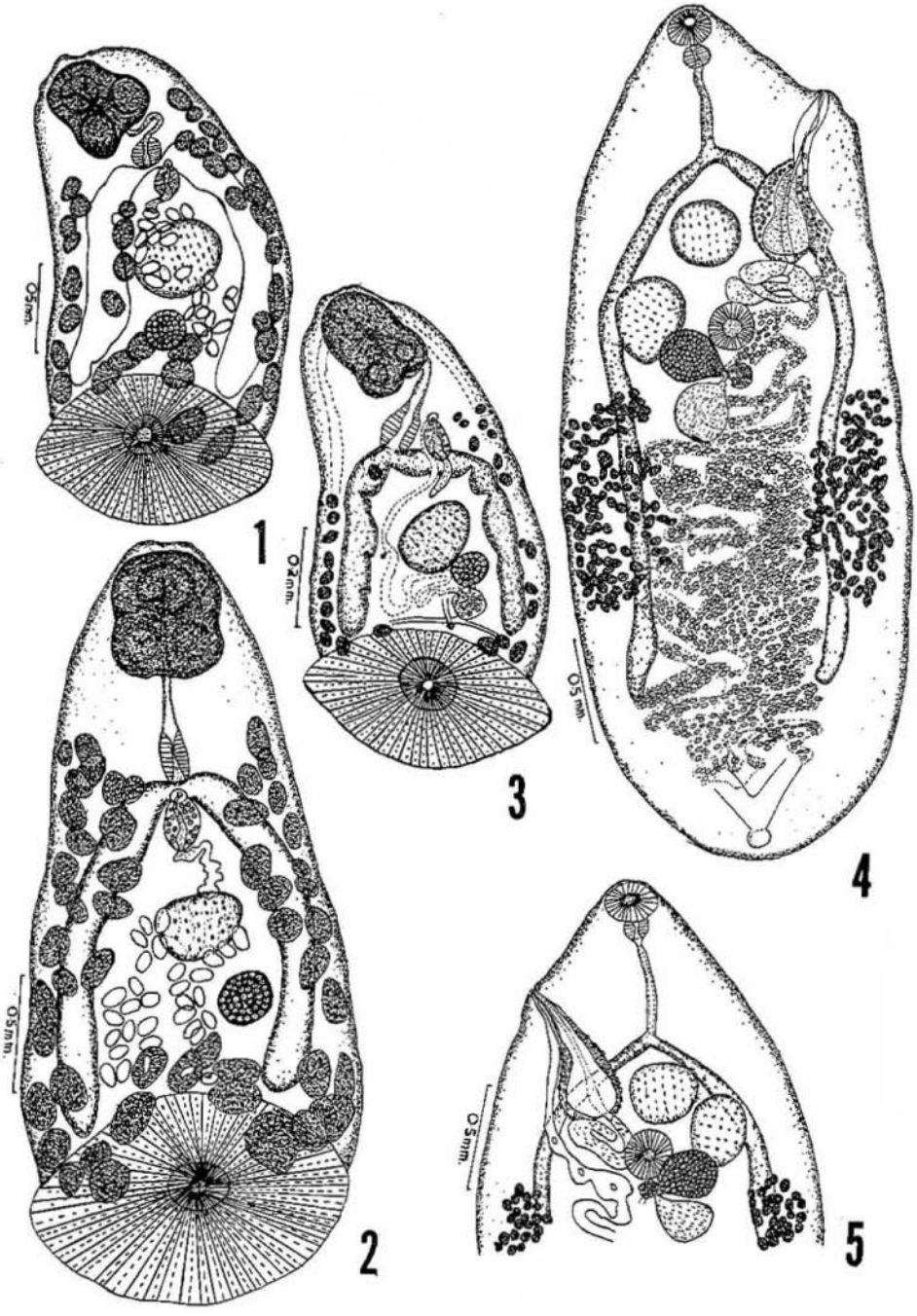
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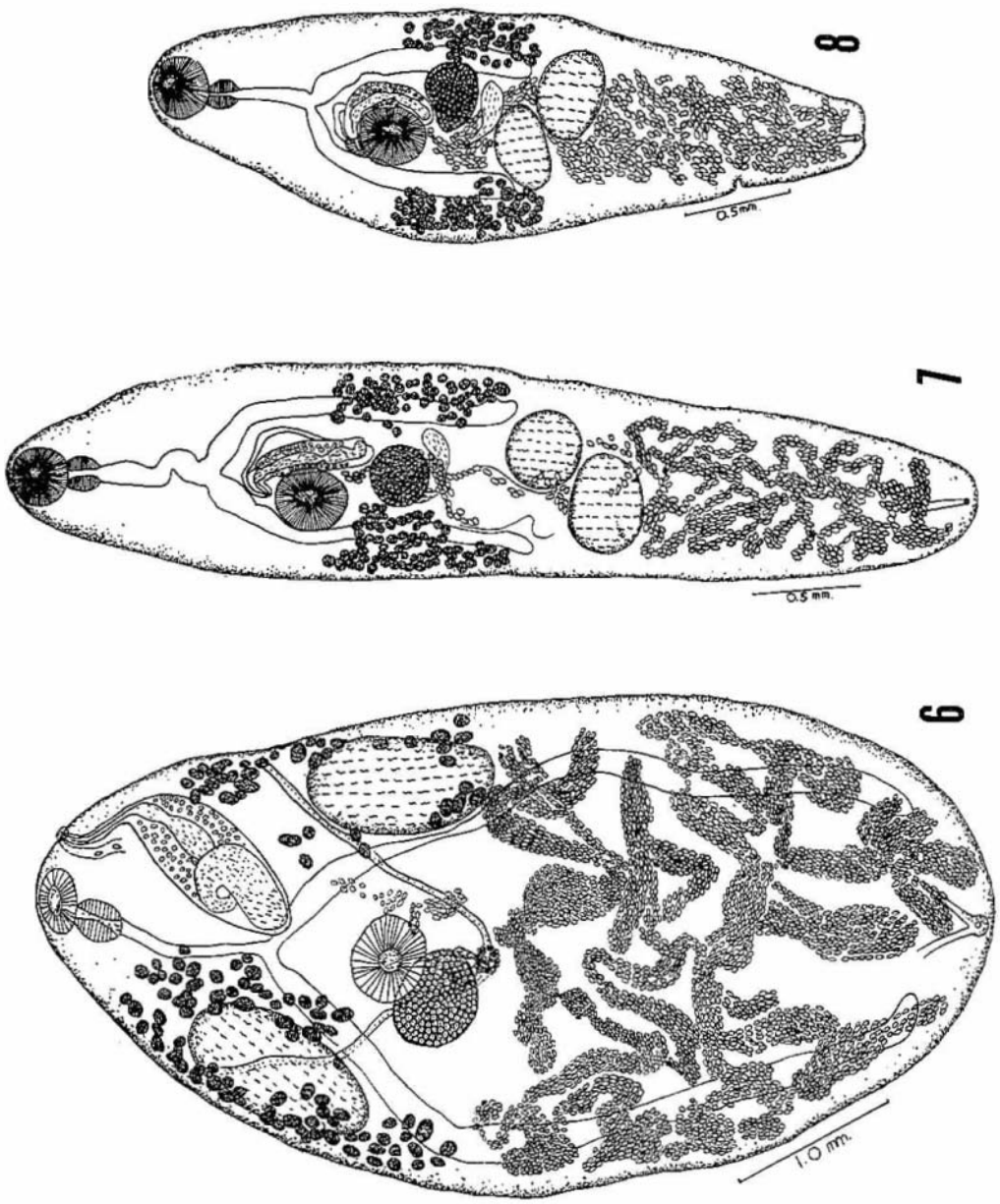
Fig. 6 *Mehraorchis tigrinarum* Gupta, 1954 Ventral view.

Figs. 7-8. *Tremiorchis ranarum* Mehra et Negi, 1926.

Fig. 7. Dorsal view. Vitellaria extending up to anterior end of anterior testis.

Fig. 8. Dorsal view. Vitellaria extending up to anterior end of hind testis.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