FOLIA PARASITOLOGICA (PRAHA) 30: 309–311, 1983.

# CHONIAGNIUM ALGERICUM SP. N. (NEMATODA: STRONGYLIDAE) FROM THE INTESTINE OF AFRICAN ELEPHANT, LOXODONTA AFRICANA (BLUMENBACH, 1779)

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**Abstract.** Nematodes of the genus *Choniagnium* were found in African elephant (*Loxodonta africana*) from Algerian Zoological Garden. On the basis of studies in light and scanning electron microscope these nematodes were identified as a new species, *Choniagnium algericum* sp. n.

The genus *Choniagnium* has been known to include three species, namely *Choniagnium epistomum* (Piana et Stazzi, 1900), *Ch. magnostomum* (Westhuysen, 1938) and *Choniagnium* sp. (Ware 1924). All of them have been recorded in Indian elephant (*Elephas maximus*). During the dissection of an African elephant (*Loxodonta africana*) in Algeria in December 1981, nematodes of this genus were found in its stomach and intestine. They are described in the present paper as a new species, *Choniagnium algericum* sp. n.

## MATERIAL AND METHODS

The nematodes were washed in water and fixed with neutral formaldehyde. Of the total number of 73 specimens, 25 ♂♂ and 25 ♀♀ were measured and examined in a light microscope. Another specimens (6 ♀♀ and 9 ♂♂) were studied by means of a scanning electron microscope (SEM). The worms used for the SEM studies were first measured in Amplival light microscope and photographed with Zeiss Jena standard camera. Each worm was then divided into two parts (anterior and posterior) and the samples were washed in distilled water, fixed in 4 % glutaraldehyde in 0.1 M cacodylate buffer for 2 h at 4 °C and again washed in distilled water in 1 % $OsO_4$ in 0.1 M cacodylate buffer for 1 h. Some of the samples were then saturated with 1 % thiosemicarbaride in 10 % acetic acid for 15 min and washed in 5 % acetic acid and 1 % acetic acid for 15 min and then in distilled water. The latter method was found to be more effective, since the yield of secondary electrons was higher. After dehydration through a graded alcohol series the samples were transferred to a mixture of 100 % alcohol-amyl acetate 3 : 1, 1 : 1, 1 : 3 and to pure amyl acetate and dried by the method of $CO_2$ critical point. They were then put on a double adhesive tape, coated with Pd/Au and examined in a Tesla 300 scanning electron microscope.

## RESULTS

***Choniagnium algericum*** sp. n.

The nematodes are long, round and of yellow colour. The mouth opening is bordered with a rim of processes which are united in a wide base in the lower part. The head is provided with two pairs of long papillae on the dorsal and ventral side (Plate I, Figs. 1–4) and a small papilla (amphid) on each lateral side (Plate I, Figs. 2, 4). The cuticle is transversely striated (Plate VI, Fig. 3).

The male is 15—18 mm long and 0.62—0.76 mm wide. The nerve ring is situated at the distance of 0.9—1.2 mm from anterior end of body. The head diameter is 0.316—0.332 mm. There are two pairs of papillae on the head end (Plate II, Figs. 1, 2). Their length is 0.068—0.072 mm and width 0.034—0.036 mm at base. The anterior end of papillae is tapered (Plate VI, Fig. 2) and measures 0.014—0.015 mm in width. A small papilla is situated on each of the lateral sides (Plate I, Fig. 2; Plate II, Figs. 1, 2). These papillae (amphids) are provided with an opening. The mouth opening of the worm is oval (Plate I, Fig. 2), measuring 0.026—0.030 mm in longer diameter. The width of the mouth opening varies. Groups of 31—32 lobes united at the base are situated on lateral sides, their total number being 62—64. The depth of mouth cavity is 0.74—0.82 mm. The oesophagus is 1.3—1.6 mm long and 0.27—0.32 mm wide. The bursa copulatrix is 0.96 mm wide (Plate III, Figs. 1, 2) and consists of two lateral lobes with ribs and one dorsal lobe. The spicules (Plate III, Figs. 2, 4) are 1.6—1.8 mm long, tapering towards the distal end and united when evaginated. A conical process is situated on the ventral side of cloaca (Plate III, Figs. 3, 4). Two small, symmetrical papillae (openings of phasmids) are situated on the dorsal side of the dorsal lobe of bursa copulatrix (Plate IV, Fig. 2). When the spicules are invaginated (Plate IV, Figs. 1, 4 and Plate VI, Fig. 1), the opening of cloaca is covered with microvilli.

The female is 29—32 mm long and 0.70—0.85 mm wide. Its head end (Plate II, Figs. 3, 4) differs from that of the male in a crescent-shaped deepening at the site of head vesicle which arises on its lateral side at the site of head vesicle during the preparation of SEM material. The diameter of the head is 0.45—0.50 mm. Two longitudinal ribs (Plate VI, Figs. 3, 4) run on the sides of transversely striated cuticle behind the head end. The mouth cavity (Plate II, Figs. 3, 4) measures 0.89—0.92 mm in deapth. The nerve ring is situated 1.2—1.3 mm and excretory pore 2.03—2.07 mm from anterior end of body. The oesophagus is 1.4—1.5 mm long. The vulva (Plate V, Figs. 1—3) is situated 0.6—0.8 mm from posterior end of body. A spherical cuticular process is present on the posterior lip of vulva. Its tip is provided with a strawberry-shaped process (Plate V, Fig. 1). The anus (Plate V, Figs. 3, 4) is situated 0.26 to 0.34 mm from posterior end of body. The anal opening is crescent-shaped and directed posteriorly. The eggs measure 0.046—0.058 × 0.026—0.028 mm. The tail end of young female is conical and with pointed tip (Plate VI, Fig. 4).

**Differential diagnosis.** The new species *Choniagnium algericum* differs from the three known species from Indian elephant in several characters. It bears two pairs of long papillae and one pair of amphids, whereas the other species possess three pairs of papillae of equal length.

The male of *Ch. algericum* is 15—18 mm long, whereas that of *Ch. epistomum* is 15.04—17.80 mm (Baylis 1936, Ershov 1943, Khalil 1932, Lane 1914, 1915), of *Ch. magnostomum* 19.0—21.0 mm (Skryabin et al. 1952) and of *Choniagnium* sp. 9 mm long. The length of spicules is 1.6—1.8 mm in *Ch. algericum*, 2.18—2.38 mm in *Ch. epistomum*, 2.3 mm in *Ch. magnostomum* and 0.6 mm in *Choniagnium* sp. The male of *Ch. algericum* possesses two symmetrical papillae on the dorsal side of the dorsal lobe. When the spicules are invaginated, the cloacal opening is provided with microvilli and with a conical process on the ventral side.

The female of *Ch. algericum* has a crescent-shaped deepening on the lateral side of head end at the site of head vesicle. The body length of female is 29—32 mm in *Ch. algericum*, 15—19 mm in *Ch. epistomum*, 21.0—22.3 mm in *Ch. magnostomum* (according to Yorke and Maplestone 1926) and 9 mm in *Choniagnium* sp.

**Host:** *Loxodonta africana* (Blumenbach, 1779)
**Localization:** small intestine
**Locality:** Zoological Garden, Algeria



Holotype (male) (Coll. No. 676) and 57 paratype specimens are deposited in the collections of the Institute of Parasitology, Czechoslovak Academy of Sciences, České Budějovice.

## *CHONIAGNIUM ALGERICUM* SP.N. (NEMATODA: STRONGYLIDAE) ИЗ КИШКИ АФРИКАНСКОГО СЛОНА, *LOXODONTA AFRICANA* (BLUMENBACH, 1779)

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**Резюме.** При вскрытии африканского слона (*Loxodonta africana*) из зоопарка в Алжире обнаружены в пищеварительном тракте нематоды, относящиеся к роду *Choniagnium*. На основе изучения этих нематод при помощи светового и сканирующего электронного микроскопов описан новый вид *Choniagnium algericum* sp.n.

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Received 2 December 1982.
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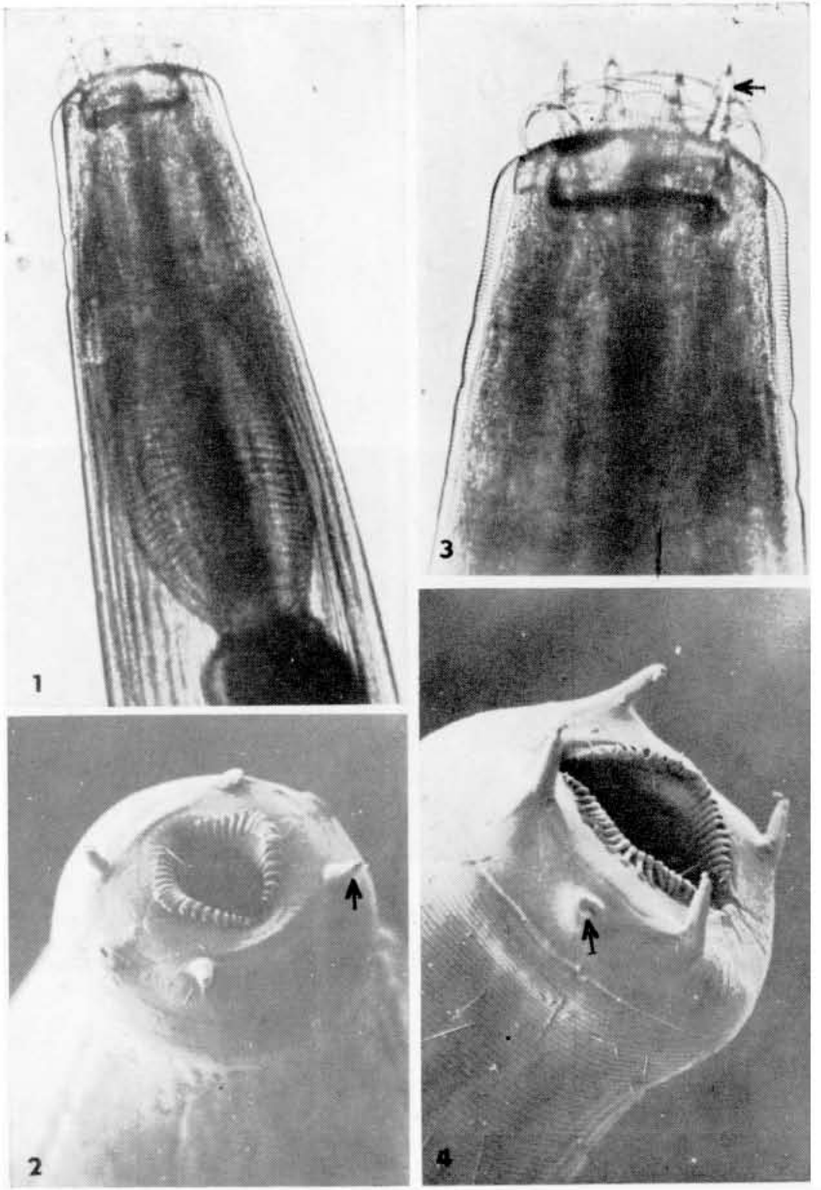


**Fig. 1.** Head end of male from stomach of elephant. Four conical papillae terminated with a point and band of laminae bordering the mouth cavity are visible in the mouth capsule (native, × 102). **Fig. 2.** The same sample observed in SEM. There are 61 laminae around the opened mouth opening and a pair of pointed papillae (arrow) on the margin of mouth capsule, situated ventro-laterally and dorso-laterally, and 1 pair of amphids situated laterally ($OsO_4$, × 600). **Fig. 3.** Mouth capsule, papillae and lateral alae on male head (native, × 176). **Fig. 4.** Head of male from stomach. An amphid (arrow) is situated on lateral side (thiocarbohydrazide, × 810).



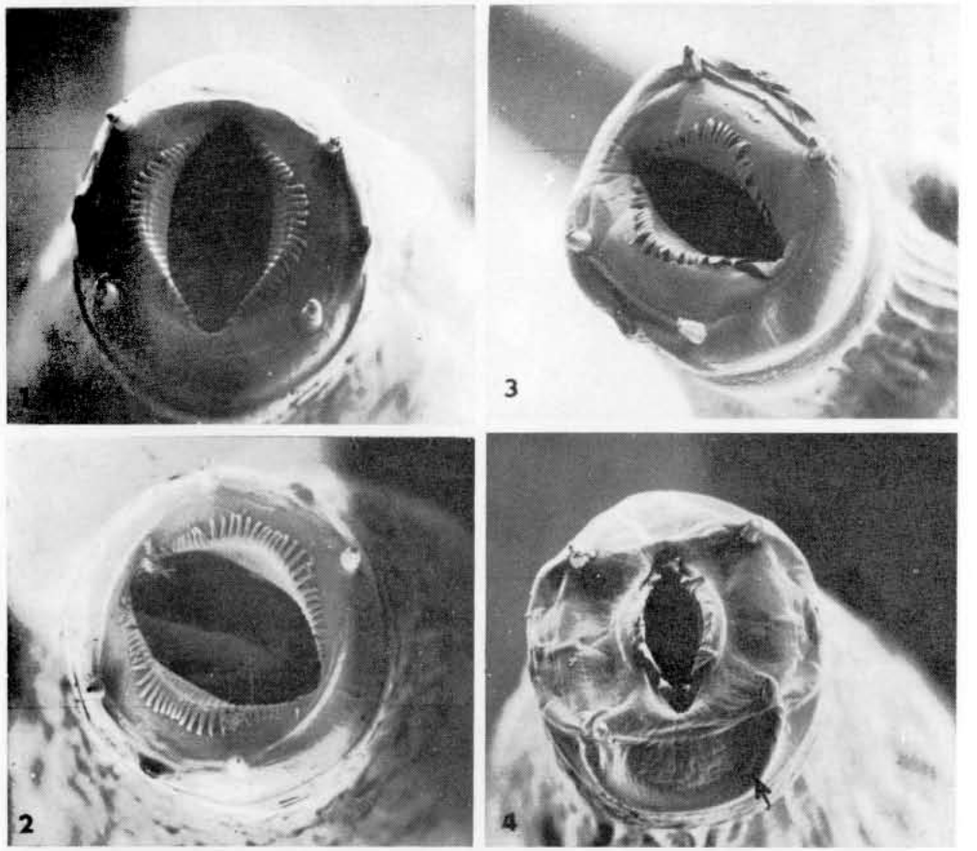


**Fig. 1.** Head of male from stomach ($OsO_4$, × 700). **Fig. 2.** Head of male from intestine (thiocarbohydrazide, × 1000). **Fig. 3.** Head of female from stomach (thiocarbohydrazide, × 600). **Fig. 4.** Head of female from intestine. A cuticular fold (arrow) is visible on the lateral side ($OsO_4$, × 500).

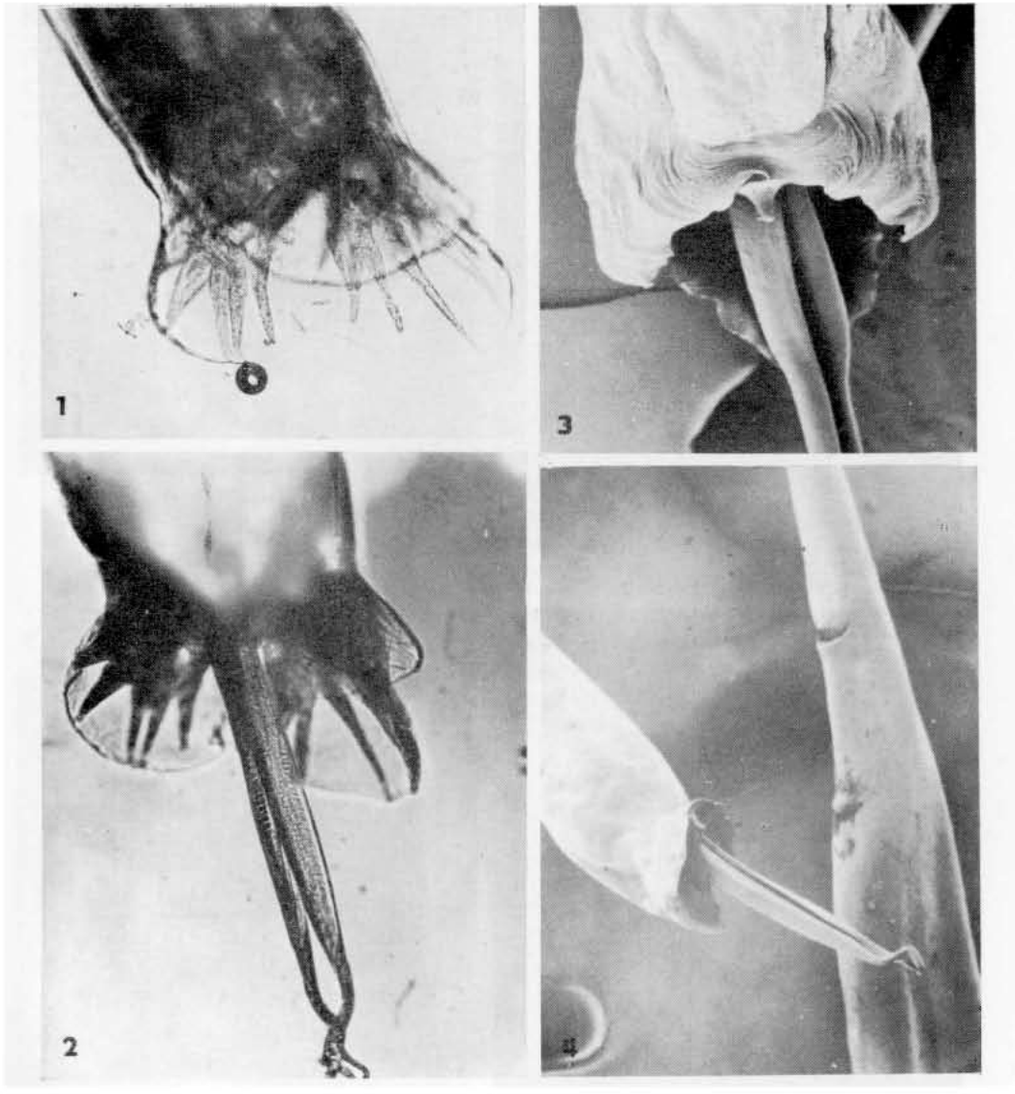


**Fig. 1.** Bursa copulatrix of male from stomach (native, × 300). **Fig. 2.** Bursa copulatrix of male from intestine (native, × 435). **Fig. 3.** Bursa copulatrix of male from intestine. A conical process is situated between spicules (thiocarbohydrazide, × 350). **Fig. 4.** Tail end of male and female from intestine (thiocarbohydrazide, × 30).



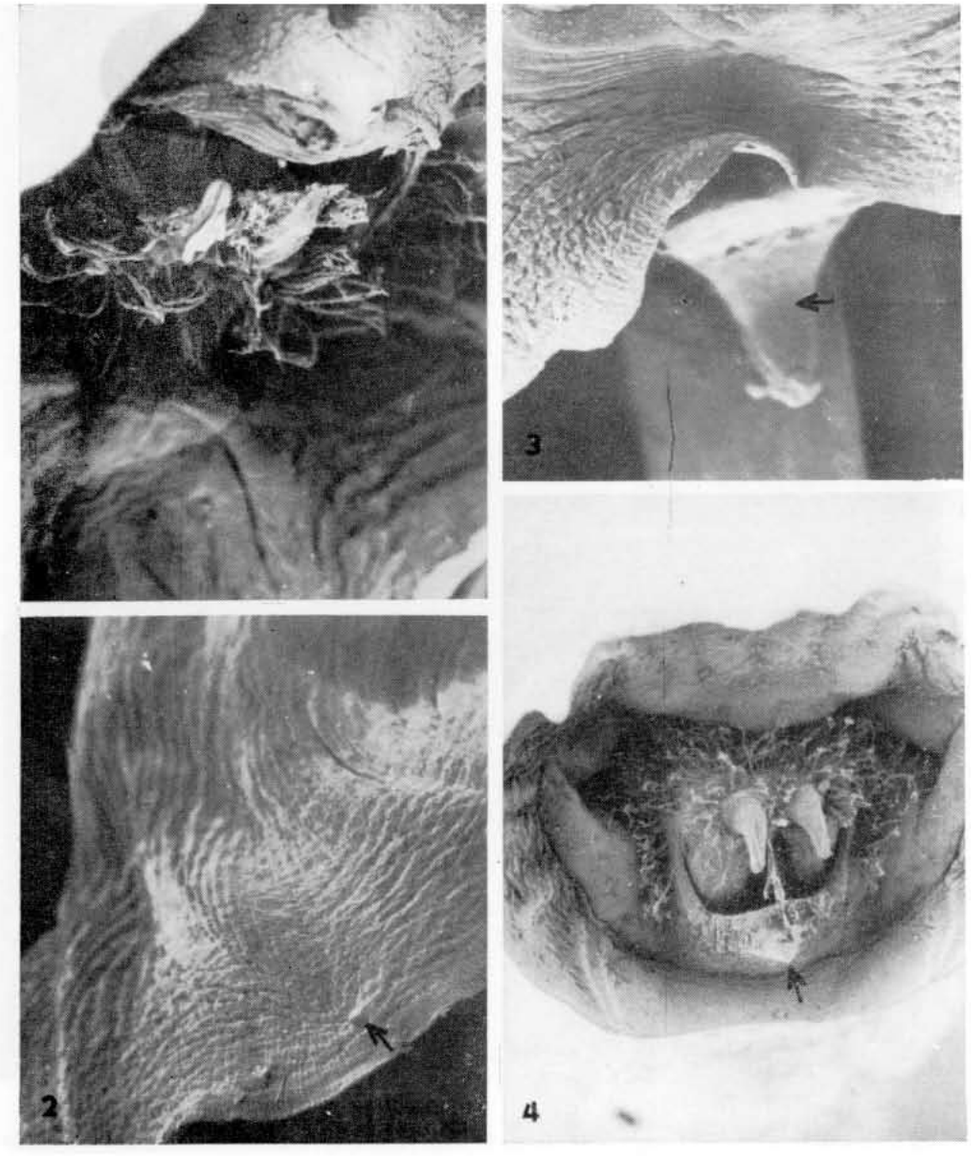


**Fig. 1.** Invaginated spicule in bursa of male from stomach. Cuticular villi are situated inside cloacal opening ($OsO_4$, × 1050). **Fig. 2.** Surface of dorsal lobe of bursa with 2 small papillae (arrow) at the periphery ($OsO_4$, × 1000). **Fig. 3.** Conical process (arrow) on ventral side of cloaca of male from intestine (thiocarbohydrazide, × 1260). **Fig. 4.** Bursa copulatrix of male from stomach; cuticular folds are visible around invaginated spicules and a cuticular process (arrow) is situated at the periphery of cloaca ($OsO_4$, × 500).

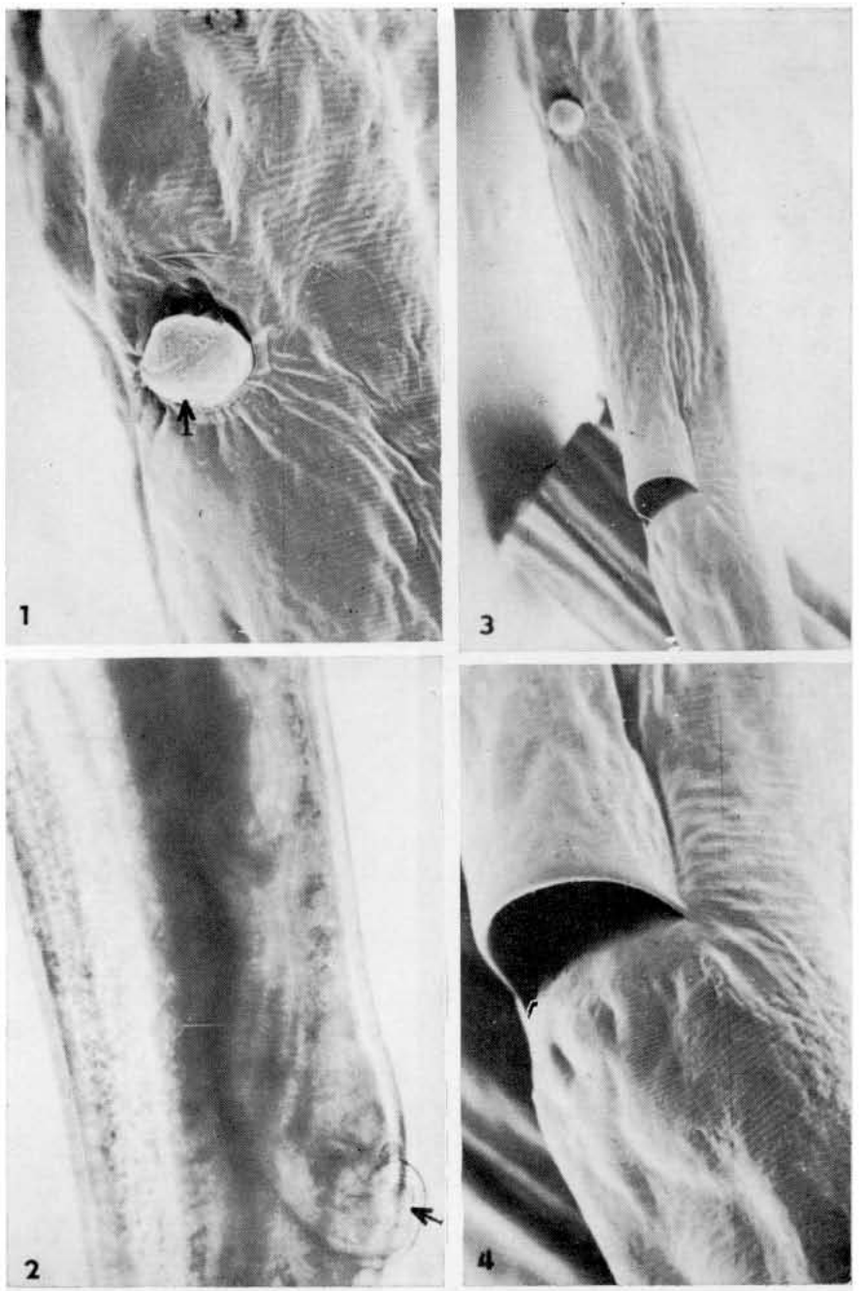


**Fig. 1.** Vulva of female from intestine. Cuticular process (arrow) is visible on posterior lip of vulva (thiocarbohydrazide, × 500). **Fig. 2.** Vulva of female from intestine. Spherical process protrudes above the cuticle (arrow) (native, × 450). **Fig. 3.** Vulva and anus of female from intestine (thiocarbohydrazide, × 150). **Fig. 4.** Anus of female from intestine (thiocarbohydrazide, × 500).



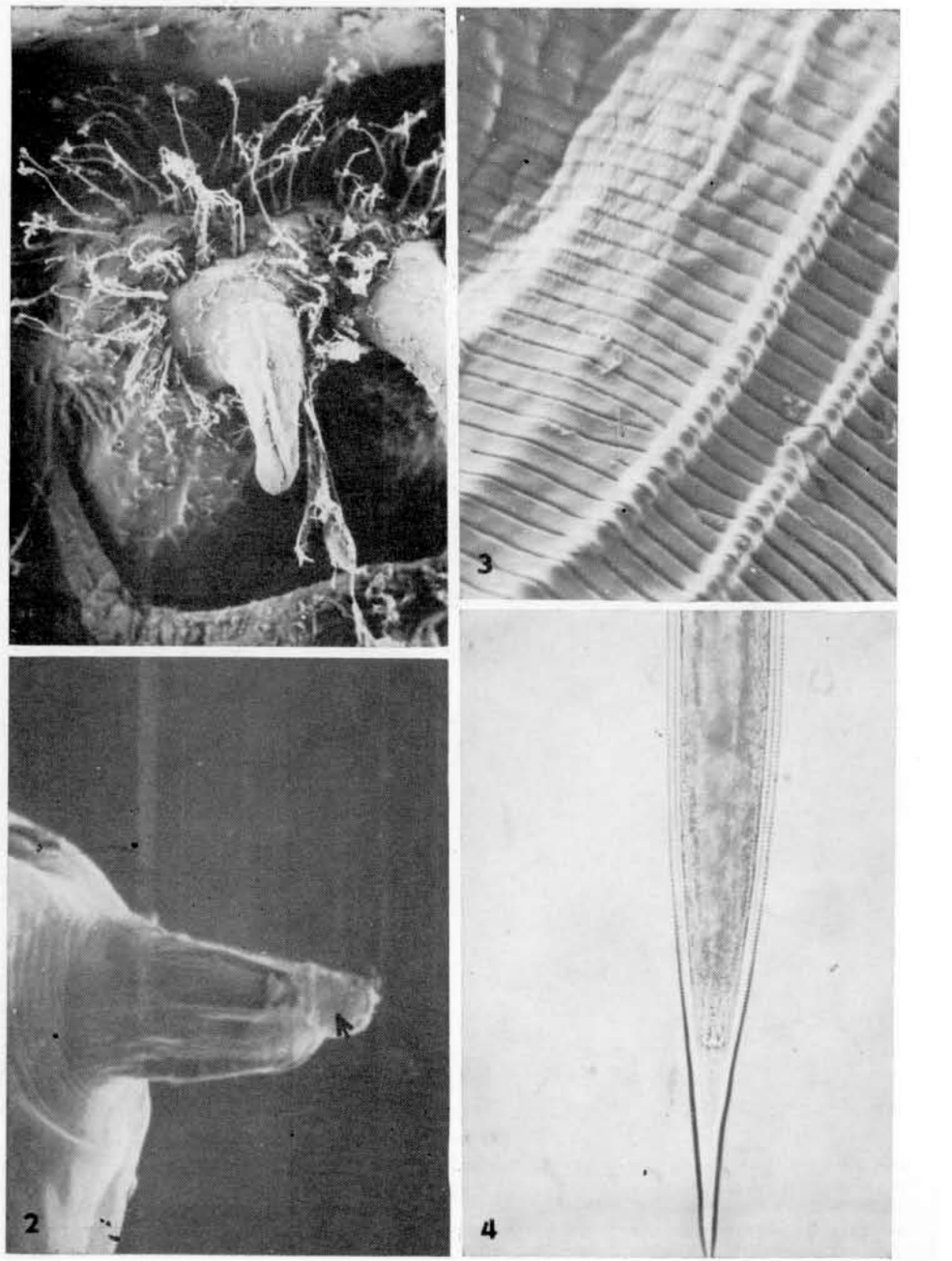


**Fig. 1.** Cloaca of male from stomach with invaginated spicules surrounded with cuticular microvilli (thiocarbohydrazide, × 1250). **Fig. 2.** Tapered tip of ventral head papilla in male ($OsO_4$, × 3500). **Fig. 3.** Two longitudinal ribs on transversely striated cuticle of female ($OsO_4$, × 1500). **Fig. 4.** Tail end of young female terminated with a tip (native, × 65).