

attempts to demonstrate the distribution of esterases and the nerve arrangement in *Schistosoma spindalis*, one of the blood flukes of cattle in India.

Mature *S. spindalis* were collected from the peritoneal blood vessels of a freshly slaughtered Indian buffalo, *Bubalis bubalus* L. from the local slaughter house. The worms were washed several times with Tyrode's solution and were immediately flattened and fixed in 10% neutral formalin for 4-6 hr at 5°C. They were then washed with distilled water fixed at 10°C and incubated in different substrates at room temperature. Some worms were incubated in acetylthiocholine iodide (AThchl) to localize acetylcholinesterase (AChE) activity. Some worms were incubated in butyrylthiocholine iodide (BThchl) and O-acetyl-5-bromo indoxyl to localize butyrylcholinesterase (BChE) and non specific esterase (NSE) activities. For the localization of AChE, BChE and NSE, the direct colouring technique^{9, 10} was used. A solution of eserine sulphate (physostigmine- 10^{-5} M) in distilled water was used as inhibitor. Since better elucidation of the gross anatomy of nervous system has been obtained along with the distribution of esterases when techniques were applied to the whole mount preparations^{4, 5} in the present study, the same techniques were adopted.

The results revealed that AChE activity is prominent in the nervous tissue, oral sucker, pharynx, ventral sucker and excretory bladder. Eggs also showed intense AChE activity. The activity of AChE is more than that of BChE (figures 1, 2). As a result of esterase localization the neuroanatomy of *S. spindalis* has been traced.

The nervous system *S. spindalis* consists of a pair of cerebral ganglia which are located far below the pharynx. From each cerebral ganglion, three nerves arise in the anterior region which anastomose into finer branches and innervate pharynx and oral sucker. These three lateral nerves also proceed posteriorly. Two nerves are thick and dorsal in position, one nerve is thin and ventral in position. The thicker nerves are named as dorsolateral nerves and the thinner as median ventral nerves according to their position. All these three pairs of lateral nerves are connected by many transverse nerves. The outermost dorso lateral nerve is ganglionated due to the origin of transverse nerves from it (figure 4). The ventral sucker is innervated by many branches of nerves arising from the median ventral nerve (figure 3).

The female *S. spindalis* has comparatively simple nervous system. Only two lateral nerve cords are present (figures 5, 6). The transverse nerves are not prominent.

The presence of higher AChE activity as against BChE, in the nervous tissue suggests that acetylcholine is the main neurotransmitter in this parasite. When eserine was used as inhibitor in media containing

AThchl, the enzyme activity was completely inhibited suggesting the presence of AChE. In *Paramphistomum cervi* the BChE activity was more than that of AChE⁶. An interesting feature in the nervous system is the location of two cerebral ganglia connected by a small commissure far below the oral sucker and pharynx. In other trematodes, the cerebral ganglia are located immediately below the oral sucker^{4, 5}. The nervous system is not well developed in female when compared to the male in *S. spindalis*. It is not surprising, because the female is always lodged in the gynecophoric canal of the male. It is also interesting to note the intense AChE activity present in the eggs of this blood fluke. The enzyme activity observed is due to the fully developed miracidium that is present in the eggs.

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FIRST REPORT OF THE GENUS *ADENOLAIMUS* ANDRASSY, 1973 (NEMATODA : DORYLAIMIDA) FROM INDIA

WASIM AHMAD AND M. SHAMIM JAIRAJPURI*
Department of Zoology, Aligarh Muslim University,
Aligarh 202 001, India.

*Present address: Commonwealth Institute of
Helminthology, St. Albans, Herts, England.

ANDRASSY¹ proposed the genus *Adenolaimus* for the species, *Adenolaimus dadayi* (type) collected from New Guinea. He placed it under the family Aulolaimoididae on the basis of the three parts oesophagus. Goseco *et al.*² transferred *Doryllium orthum* Thorne, 1939 to *Adenolaimus* and considered

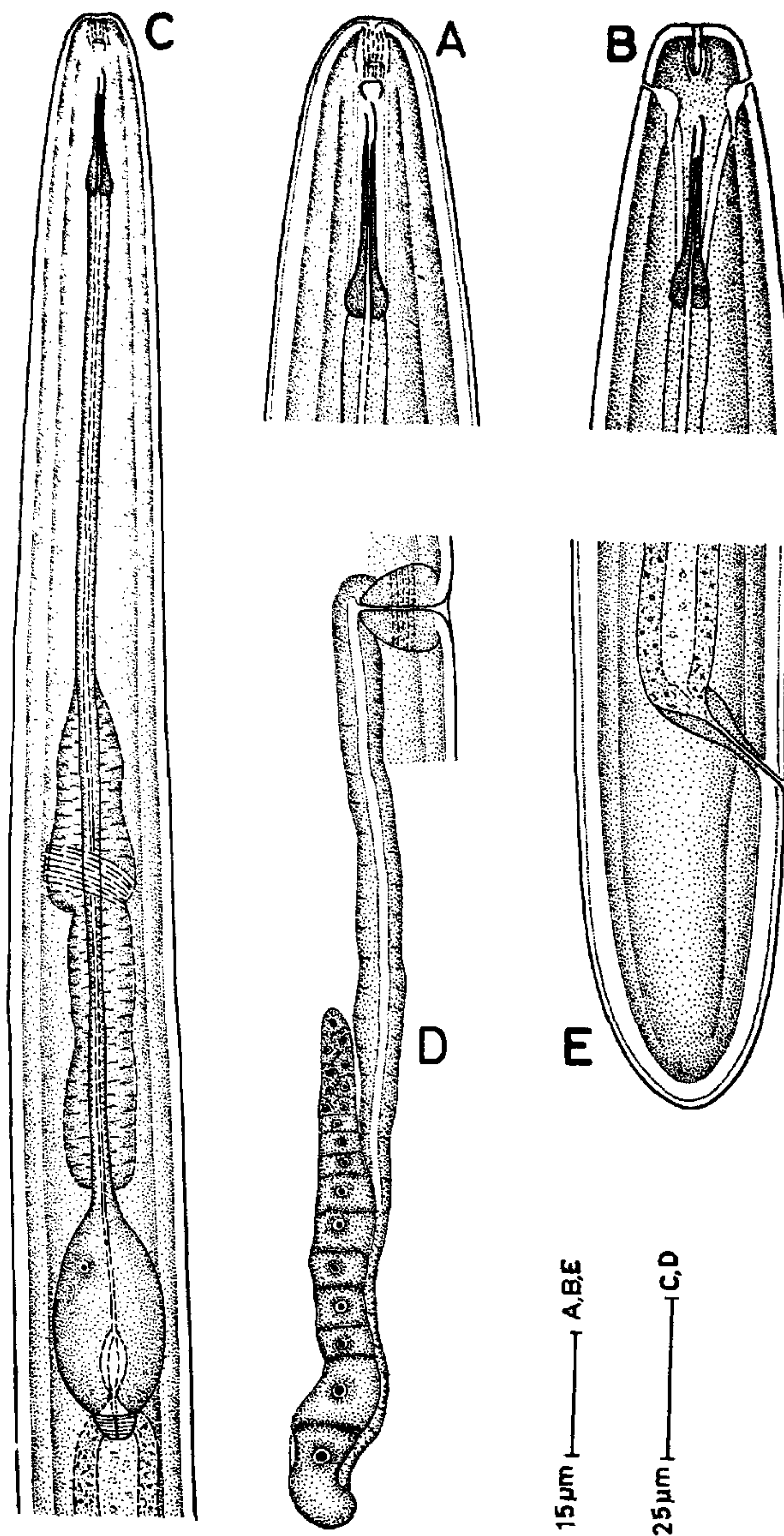


Figure 1. A. Anterior region (lateral); B. Anterior region (dorsoventral); C. Oesophageal region; D. Female gonad; E. Female posterior end.

A. dadayi as its synonym. This genus comprises only two species, both are very rare in occurrence and prefer moist soils. In September 1979 in a soil sample collected from roots of water weeds (unidentified) from Govindghat, District Chamoli, Uttar Pradesh, a few specimens of *Adenolaimus* were found. Upon detailed study these were found to represent the type species and are described and illustrated here.

Adenolaimus Orthus (Thorne, 1939) Goseco *et al.*, 1975

Dimensions:

Female (6): L = 1.00–1.14 mm; a = 34–40; b = 4.7–5.4; c = 35–37; V = 25–27; G₂ = 17–19; odontostyle = 5–6 μm; odontophore = 17–19 μm; oesophagus = 209–220 μm; prerectum = 60–65 μm; rectum 15–16 μm; tail = 27–33 μm; ABD = 20–21 μm.

Description:

Body almost straight upon fixation, tapering slightly towards the extremities. Cuticle and subcuticle finely striated. Lateral chords about one-fourth of body-width at midbody. Lip region continuous, rounded; liplets low. Stoma and pharyngeal walls supported by minute rod-like structures. Amphids small, oval, their apertures 3–4 μm wide. Odontostyle small, arcuate, about half lip-width long. Odontophore flanged, slightly sclerotized. Nerve ring encircling the oesophagus at 135–150 μm from anterior end. Basal bulb set off by a constriction 29–34 μm long and 15–16 μm wide, lumen with valvular chamber. Cardia rounded. Reproductive system mono-opisthodelphic. Vulva transverse. Vagina with wide lumen and distinct muscular walls. Anterior uterine sac completely absent, posterior branch normal. Prerectum about three anal body-widths long. Rectum less than one anal body-width long. Tail tapering uniformly to a blunt terminus, 1.4–1.6 anal body-width long.

Male: Not found.

Remarks: *Adenolaimus orthus* is known only from United States and eastern New Guinea. It is being reported here for the first time from India. The Indian specimens are similar to those reported earlier except that they have a slightly longer oesophagus (oesophagus = 150 μm in holotype).

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CHOLESTEROL METABOLISM IN *LOHITA GRANDIS* GRAY (HEMIPTERA: PYRRHOCORIDAE: INSECTA). EFFECT OF CORPORA ALLATECTOMY AND GARLIC EXTRACT.

SANJAY MANDAL AND D. K. CHOUDHURI
Zoology Department, University of Burdwan,
Burdwan 713 104, India

INSECTS need a dietary supply of sterol for their normal growth¹ due to their inability to synthesize sterols. The intracellular symbiotic flora of insects are also known to supply the required sterols to the host². It is known that in insects, cholesterol is mainly used for the biosynthesis of ecdysone and other steroid hormones^{2–4} and the conversion of cholesterol into such steroid hormones is under the control of prothoracic gland and neurosecretory cells of brain^{5–7}. The present investigation was therefore undertaken to determine the role of corpora-allata in the utilization of cholesterol in different tissues of allatectomized and garlic extract injected *Lohita grandis* (last nymphal instar, both sexes).

Nymphs of *L. grandis* were maintained in the laboratory at 25°C ± 2°C, 70% RH and 12 hr diurnal photoperiod and provided with 10% sucrose solution with the leaf juices on which the insects normally feed. The technique of Slama⁸ was followed for allatectomy. The crude garlic extract was procured from Ranbaxy Laboratories (New Delhi) and was dissolved in double distilled water to obtain 5% and 10% solutions and were injected into the experimental insects at a dose of 20 μl/insect. A control is maintained by injecting the same dose of normal saline. The effect of both allatectomy and garlic extract was noted after 24 hr and 48 hr intervals. Haemolymph was obtained by puncturing the abdomen and collected in an ice-cooled centrifuge tube already coated with phenylthiourea to inhibit tyrosinase activity. The insects were dissected in ringer solution mixed with phenylthiourea to get the required experimental material. Cholesterol content was measured spectrophotometrically by the method of Zaltikis *et al.*⁹.

The results of tables 1 and 2 show that the testis and the fat body in males and higher levels of cholesterol than the ovary and the fat body in females while the cholesterol level in haemolymph of female was higher than that in the males. Allatectomy in both sexes led to an extra accumulation of cholesterol while the opposite was true in garlic extract-injected insects. Crude garlic extract was most effective as compared to the other dilute doses though injection of crude extract resulted in a high mortality rate.

Allatectomy is directly attributed to the absence of juvenile hormone in the body and the close functional

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