

has been checked by dissection and also confirmed by Dr. G. Mandahl-Barth.

B. VERDCOURT

P.O. Box 5166, Nairobi,
Kenya Colony. May 17.

¹ Cridland, C. C., *J. Trop. Med. (Hyg.)*, 58, 1 (1955).

² Mandahl-Barth, G., *Ann. Mus. Roy. Congo Belge, Sc. Zool.*, 32, 115 (1954).

Anatomy of *Polystoma integerrimum*

THE remarkable dimorphism of the monogenetic trematode *Polystoma integerrimum* has been the subject of a number of investigations, principally by Zeller^{1,2} and Gallien³. The descriptions of the neotenic (branchial) form given by these authors show several important discrepancies, and in view of this a re-examination of the species was undertaken.

Previously undescribed details of the anatomy of the normal or bladder form are as follows:

The material from which the anchors are formed is produced by clusters of secretory cells. The caudal suckers are supported by radiating cuticular bars which pass through the tissue of the sucker wall. Cuticular rays are known to form part of an intricate framework supporting the sucker in related genera, but have not been observed in *Polystoma*.

A median intestinal process extends forward beneath the pharynx and communicates with the buccal tube, forming a continuous canal underlying the pharynx and oesophagus and providing an alternative passage between oral cavity and intestine. For this passage the term 'bucco-intestinal canal' is suggested. The animals occasionally expel intestinal contents through the bucco-intestinal canal when disturbed; perhaps residual products of digestion are normally voided from the gut in this manner. Vital staining with methylene blue reveals a complex nerve ring surrounding the canal.

The male and female genital ducts have a syncytial lining, which is ciliated except in the terminal portions of the female canal holding the shelled egg. The cilia penetrate to the base of the epithelium; their activity resembles the flickering motion of the flames of the excretory system.

The ovary comprises a small anterior proliferative zone and a large posterior portion in which ripe oocytes are stored. The posterior portion of the ovary has an epithelial wall; each of the oocytes is enclosed in a delicate envelope formed from membranous extensions of the free border of the epithelium.

Two distinct groups of unicellular glands are associated with the ootype. The cells of the smaller group produce a deeply staining secretion, and their ducts open in a restricted region at the proximal end of the ootype. The secretion may play some part in egg capsule formation. The cells of the larger gland mass form a coarsely granular secretion which is faintly cyanophilous and gives a strong positive reaction to Steedman's alcian blue test for mucin⁴. The numerous, tightly bunched ducts empty through the entire ootype wall. The lubricating property of the mucin may facilitate the moulding of the egg capsules and the passage of the shelled egg along the uterus.

In the neotenic adult also the anchors are formed from the product of small secretory cells, and the suckers are supported by cuticular rays. The bucco-intestinal canal is present in both the neotenic adult and the larva. The oocytes of the branchial form are

enclosed in membranous envelopes continuous with the ovarian epithelium. Both types of unicellular gland associated with the ootype differentiate in the neotenic form.

The definitive spermatozoon of the neotenic adult resembles the late spermatid of the normal adult.

It was found during the present investigation that, contrary to earlier accounts, there is no communicating canal between the testis and the female ducts of the neotenic adult. The vas deferens is present as in the normal form; this duct was observed by Zeller but was not described by Gallien. Although not previously identified, the genito-intestinal canal is present and functional as in the normal adult. The vagina and long winding uterus of the bladder form are not represented in the branchial form.

The histological appearance of the genital ducts of the branchial form is similar to that of the corresponding ducts of the normal adult.

During normal development the uterus and vagina are the last of the genital ducts to be differentiated, and the young normal form closely resembles the neotenic adult.

Since there is no duct connecting male and female organs in the branchial form, internal self-fertilization does not take place. Sperm bundles are found in the female ducts of solitary neotenic adults, and therefore external self-fertilization must occur, insemination being effected through the ovo-vitelline duct. When two neotenic adults parasitize the same tadpole cross-fertilization through the gonopore may occur. Thus, *within the one species* the copulatory function presumably is transferred from the vagina to the ovo-vitelline duct as a result of neotenic development.

The completed study of the anatomy of *Polystoma integerrimum* will be published later, together with notes on the life-history and relationships of this species and observations on related genera.

JOAN B. WILLIAMS

London School of Hygiene and
Tropical Medicine,
Keppel Street, London, W.C.1.
May 22.

¹ Zeller, E., *Z. Wiss. Zool.*, 22, 1 (1872).

² Zeller, E., *Z. Wiss. Zool.*, 27, 238 (1876).

³ Gallien, L., *Trav. Sta. Zool. Wimereux*, 12, 1 (1934).

⁴ Steedman, H. F., *Quart. J. Micro. Sci.*, 91 (4), 447 (1950).

Potato Blight and Leaf-Roll Virus

OBSERVATIONS on the potato variety Ulster Supreme made at Cambridge in 1956 indicated that blight (*Phytophthora infestans*) was present on approximately twice as many tubers derived from plants infected with leaf-roll virus as on those from neighbouring virus-free plants (virus-free being used in this communication to mean free from visible symptoms of virus disease). The appearance of potato blight in August 1957 made possible an examination and comparison of the foliage of virus-free and leaf-roll infected plants. At an early stage in its development it was apparent that the primary foci of infection were often associated with patches of plants infected with leaf-roll virus and that some plants within these patches were completely destroyed at a time when surrounding virus-free plants were only slightly or moderately blighted. Leaves picked on three occasions from an area showing 50 per cent leaf-roll infection, from the same level of the crop