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Life History of Protostrongylus (Synthetocaulus) rufescens.

A. and M. HOBMAIER. (Introduced by K. F. Meyer.)

From the Laboratory of the State Fish and Game Commission, George Williams Hooper Foundation for Medical Research, University of California.

Synthetocaulus rufescens produces extensive lung lesions and is economically one of the most important lungworms; consequently a study of the intermediate host was undertaken.

The body of the embryo is small and filariform. The cuticula shows very fine transverse striations. The width of the body is 16-20μ near the centre of the bodily length. Both extremities are gradually tapered. Near the head it is reduced to 8.3μ. The entire embryo measures from 300 to 325μ. The oesophagus measures about 145μ and shows 2 bulbous enlargements corresponding to the embryo of other lung-worms. The opening of the excretory duct is located 87-95μ while the genital rudiment is situated about 200μ from the tip of the head. The intestinal tube breaks through the cuticula 40-42μ from the tip of the tail. The tail is slightly curved and is separated and recognized by a very small dorsal indentation. It is without any appendix on the back.

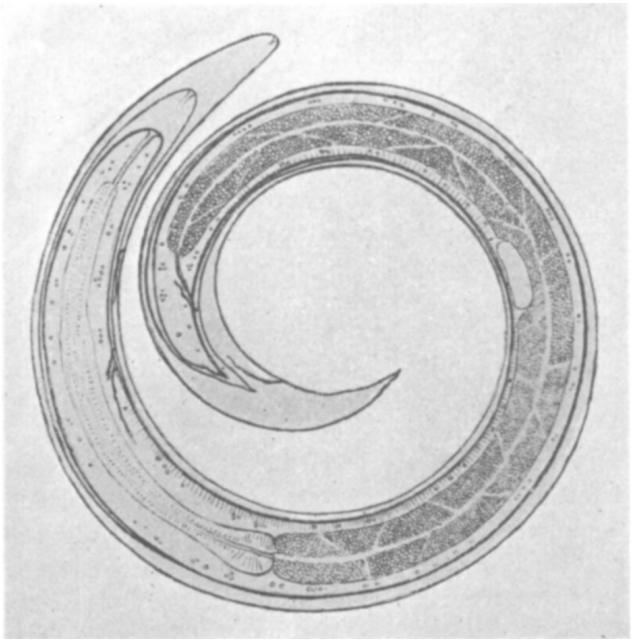
Biology and Morphology of the Larvae. The viability is the same as that of the embryos of *Mullerius capillaris*. They are rapidly killed by complete desiccation. In clear water they remain alive for more than one year. In artificial culture the presence of infusoria is of little consequence, while rotifera may destroy the embryos in a few days.

Continuous observations for indefinite periods never reveal changes in the structure of the embryo in the free state or any indications of a transformation into the larval stage. Obviously the embryo has to pass through an intermediate host. In former publications it was shown that the development of the *Synthetocaulus* is completed in several species of snails which act as intermediate hosts. *Protostrongylus (Synthetocaulus) rufescens* probably develops in a similar manner. Several unsuccessful experiments have been conducted with aquatic snails and with geophilous snails. The intermediate hosts of *Synthetocaulus (Mullerius) capillaris* failed to yield larvae of *Synthetocaulus rufescens* when fed with embryos of this lungworm.

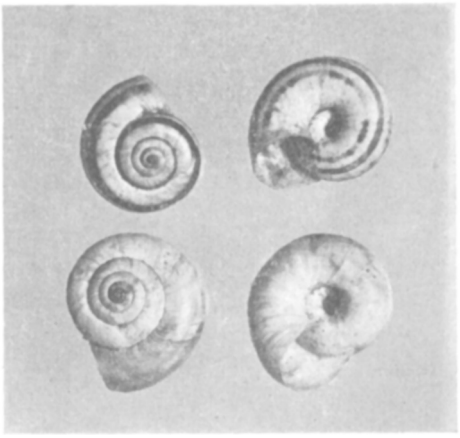
However larvae were secured when the experiments were conducted on the genus *Helicella*. It is very interesting that the inter-

mediate hosts of *Mullerius capillaris* are snails which prefer a shaded or half shaded environment, while those of *Protostrongylus rufescens* belong to the dry geophilus snails.

The following species belong to the genus Helicella: *helicella, helicopsis* and *candidula*. Experiments were conducted only with



Protostrongylus rufescens; fully developed larva stage in the dry-geophilus snail *Helicella ericetorum*. Natural size 560-620μ.



Helicella ericetorum, intermediate host of *Protostrongylus rufescens.* Dorsal and ventral face of striated and non-striated form.

Helicella ericetorum, *Helicella obvia*, and *Hellicella bolli*. Future studies will include other species of Helicella.

The embryos enter the snail by way of the mucous glands of the foot. Histologic sections of the foot reveal the mode of penetration of the embryos and the transformation into larvae. A small tubercle-like proliferation is formed around the worm as an expression of a reaction to the invasion. The development of the embryo into the larva is quite similar to that of *Mullerius capillaris*. It is completed 12-14 days after infection of the snails. Many changes in shape and size of the parasite characterize the 2 moultings. The cuticula appears separated but it is not shed. The twice moulted embryo represents the infective larva.

The middle sheath is usually attached to the larva; but it may also be completely separated or it may form a tail and a head cap when the worm retracts the head or tail. The non-pigmented, transparent larvae show a distinct intestinal tube. The dimensions are as follows: Greatest width of the finely striated body is 40-45μ; the length 560-620μ; opening of the excretory duct 100μ posteriorly to the head; length of the eosophagus 200-220μ, of the intestinal tube 300-350μ, anus to tip of tail 50μ. The genital rudiment approximately 160 to 180μ posteriorly to the eosophageal ending.

The development in the mammals is the same as that formerly described for other lungworms. The moult in the mesenteric glands of the host, and the pathological anatomy will be discussed in a consequent paper.

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Poliomyelitis Virus. Results of Treating with Certain Chemicals and with Heat.*

B. HOWITT. (Introduced by K. F. Meyer.)

From the George Williams Hooper Foundation for Medical Research, University of California, San Francisco.

Vinson and Petre[1] demonstrated that the virus causing mosaic disease of tobacco was "in many ways analogous to that of a chemical substance," since it could be precipitated by certain dyes and chemicals without loss of virulence and could be recovered uninjured

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[1] Vinson and Petre, *Botan. Gaz.*, 1929, **87**, 14.