

## EXPERIMENTS ON CYSTICERCI OF *TÆNIA PISIFORMIS* BLOCH AND OF *TÆNIA SERIALIS* GERVAIS \*

JAMES E. ACKERT  
Kansas State Agricultural College.

The life histories of the dog tapeworms, *Tænia pisiformis* Bloch and *Tænia serialis* Gervais, are understood, but to what extent other vertebrates than the usual hosts constitute suitable environments for the development of the ingested cysts of these tapeworms is a question that deserves further consideration. This question, together with the custom of feeding to chickens the common wild rabbit (*Lepus floridans mearnsi* Allen) and the hare or jack-rabbit (*Lepus campestrus* Bachm.), led the writer to carry on some experiments to ascertain whether *T. pisiformis* and *T. serialis* will develop in fowls.

As is known, the common wild rabbit or cottontail is the intermediate host of *T. pisiformis*. The larval form (*Cysticercus pisiformis* Zeder) develops in the peritoneal cavity, omentum, and mesentery. In eastern Kansas a high percentage of the cottontails is infected with these cysticerci; Scott (1913) examined sixty-four cottontails taken in this vicinity and found this cyst in nearly 84 per cent. of them. All of the rabbits used in these experiments contain *Cysticercus pisiformis*.

The chickens used in the experiments were kept from the time of hatching in a fly-proof enclosure and fed upon food free from animal tissues. In the first experiment, the cysticerci were removed from the omenta and mesenteries of the rabbits and fed at once to the fowls, care being taken to prevent injury to the cysts before they were swallowed. *Cysticercus pisiformis* was fed to three chickens. To the first, five on July 8 and sixteen on July 10. To the second, five on July 8 and ten on July 10. To the third, twenty-three on July 13. Two months later (September 5, 8 and 12, respectively) an examination of these chickens failed to reveal a tapeworm.

It is known that the intermediate host of *T. serialis* is the hare or jack-rabbit, although the cottontail occasionally harbors the multiple cyst, *Coenurus serialis* Gervais, of this cestode. The seat of infection is in the connective tissue, particularly intermuscular, of the head, neck, thorax, loins and limbs.

---

\* Contribution No. 6 from the Zoological Laboratory, Kansas State Agricultural College. Experiments by aid of Adams fund.



In the second experiment, the multiple cysts (with one exception) were not removed from the loins of the hares until the latter had been dead twenty-four hours. During this time, however, the lowest temperature of the surrounding air was approximately 40° F. In all probability, the cysts were not subjected to a temperature sufficiently low to impair their vitality, for Ransom (1914) has demonstrated that a prolonged (six days) temperature of 15° F. is required to kill *Cysticercus bovis* in beef. Nor is it at all likely that the length of time was sufficient to seriously lessen the vitality of the cysticerci, as Baillet (1863) has found that *Cysticercus pisiformis* maintains its vitality for as many as eight days after it has been exposed to the air. Multiple cysts were removed from the hares and fed to three chickens. To the first, one on July 8 (immediately after the death of the hare). To the second, twenty-four on December 12. To the third, twenty-two on December 12. On September 5, January 16 and 30, respectively, these chickens were examined and in no case was a tapeworm found.

In looking up the literature on these two cestodes, the writer was surprised to find so many records of attempts to infect mammals with the cysticerci of these tapeworms. Moniez (1896) fed cysticerci of *T. serrata* to two human volunteers and no tapeworm developed. In 1898, Galli-Valerio swallowed six of these cysts without developing a tapeworm. Hall (1914) ingested three *Cysticercus pisiformis* from a freshly killed rabbit with no results. In 1913, Scott fed *Cysticercus pisiformis* to swine and in no case did a tapeworm develop. The failure of attempts to infect swine, fowls and man with *T. pisiformis* indicates that this tapeworm is somewhat specialized with reference to its host.

So far as the writer has been able to ascertain, *T. serialis* has not been reported from man. Galli-Valerio (1909) ingested two living scolices from *Coenurus serialis* without experiencing any discomfort and without becoming infected. Hall (1910) failed to develop a tapeworm after swallowing three living scolices from this cyst. Hence, it appears that *T. serialis* cannot develop in man. The attempt of Thomas to infect cats and ferrets by feeding to them the larvæ of *T. serialis* failed, according to Hall (1910). And Scott (1913) on feeding these cysticerci to pigs was likewise unable to infect them.

#### SUMMARY

From the experiments reported in this paper it appears that *T. pisiformis* and *T. serialis* will not develop in fowls. Previous investigations show that *T. pisiformis* fails to develop in man and in swine, and that *T. serialis* does not develop in man, swine, cat and ferret.



## REFERENCES

Baillet, C. 1863. Recherches sur un cystique polycéphale du lapin et sur le ver qui résulte de sa transformation dans l'intestin du chien. *Mem. acad. imp. de Toulouse*, 6 s., 1: 452-482.

Galli-Valerio, B. 1898. Notes helminthologiques et bacteriologiques. *Centralbl. f. Bakteriol.*, 1 Abt., 23: 939-944. 1909. Notes de parasitologie et de technique parasitologique. *Centralbl. f. Bakteriol.*, 1 Abt., Orig., 51: 538-545.

Hall, M. C. 1910. The Gid Parasite and Allied Species of the Cestode Genus *Multiceps*. *Bur. An. Ind., Bull.* 125; 68 pp. 1914. Experimental Ingestion by Man of *Cysticerci* of Carnivore Tapeworms. *Jour. Parasit.*, 1: 42-44.

Moniez, R. 1896. *Traité de parasitologie animal et végétale*. Paris, 680 pp.

Ransom, B. H. 1914. The Destruction of the Vitality of the *Cysticercus Bovis* by Freezing. *Jour. Parasit.*, 1: 5-9.

Scott, J. W. 1913. The Viability of Certain *Cysticerci* in Pigs and in Young Dogs. *Science*, n. s., 37: 263.



## SOCIETY PROCEEDINGS

---

### THE HELMINTHOLOGICAL SOCIETY OF WASHINGTON

The twenty-second regular meeting of the society was held at the residence of Mr. Hall on October 29, Mr. Hall acting as host. The evening was devoted to an informal discussion of zoological and medical topics.

MAURICE C. HALL, *Secretary*.

The twenty-third regular meeting of the society was held at the residence of Dr. Pfender on December 17, 1914, Dr. Pfender acting as host and Dr. Stiles as chairman.

Dr. Sweet was elected a foreign corresponding member of the society.

Dr. Ransom presented a paper by Ransom and Hall, entitled *The Life History of Gongylonema scutatum*. Encysted larval nematodes were found by the senior author in the body cavity of *Aphodius femoralis*, *A. granarius*, *A. fime-tarius*, and *Onthophagus hecate* at Bethesda, Maryland. Certain morphological characters suggested the possibility that they were the larvae of *Gongylonema*. Furthermore, dissections of larval beetles of these and related species disclosed the presence of free nematode embryos which agreed exactly with embryos taken from the eggs of *Gongylonema scutatum*. Nematode larvae similar to those discovered at Bethesda were found in *Aphodius coloradensis*, *A. vittatus*, and *A. granarius* in El Paso County, Colorado. The feeding of these larvae to sheep resulted in infestations with *G. scutatum*. Eggs of *G. scutatum* were fed to *Aphodius* spp. and to Croton bugs, *Ectobia germanica*. In the course of two days free embryos of *G. scutatum* were recovered from the insects; later, other stages were found, and at the end of a month the final encysted larval stage was present. Small dung beetles belonging to the genus *Aphodius*, appear to be the most common hosts.

Dr. Cobb presented a very unusual note, dealing with a new species of free-living nematode, which has been made the subject of some experiments and observations arising from the presence in its intestinal cells of the substance rhabditin, described in a former paper presented before the society. It has been found possible to rear several successive generations of this nematode on agar made up with only those traces of nitrogen contained in tap water and "pure" agar. Simultaneously it has been determined that the nematode is aerophagous, and Dr. Cobb exhibited to the society a preparation in which the living nematode was shown actively ingesting air. The nematode can take in its own volume of air in the course of an hour or two, the air passing into the esophagus being visible as bubbles taken in at the surface of the nutrient medium, to which the nematodes resort from time to time. This ingested air may be followed as it passes quickly through the esophagus and as far as the anterior portion of the intestine where it is rapidly and completely absorbed, each bubble of air as it reaches the intestine requiring only two to three seconds for its absorption. The obvious conclusion suggested by the development of several generations of this nematode on a "nitrogen-free" medium and its habit of swallowing air, is that the nematode, among other things, has the power of fixing atmospheric nitrogen. The cultures were not free from bacterial contamination, though the contamination was not heavy; it was possible by frequent transfers of the nematode to keep them in relatively pure media. The most significant feature of the observations is the undoubted ingestion and absorption of relatively large quantities of nitrogen. The development of the nematode under the conditions named does not appear to reduce very materially the amount of rhabditin.



Dr. Cobb also exhibited to the society some mounts of free-living nematodes, showing elaborate structures and a remarkable trigger-like process anterior to the cloacal aperture in the male.

Mr. Foster presented a paper entitled *The Use of Vermifuges in the Treatment of Swine*. He finds *oleum chenopodii* very satisfactory, comparing very favorably with *santonin*. Coal tar creosote was not found to be satisfactory.

Mr. Hall presented a paper entitled *A Note on Syngamus laryngeus* from Cattle and Carabao in the Philippine Islands. This paper records the parasite for the first time since its description by Railliet from Annam.

Mr. Hall also presented a note on the ingestion of ascarids by man. An employee of one of the big packing houses in Chicago, a so-called "Polack," working at the gutting bench in the hog room, was in the habit, according to Dr. Woodruff of the U. S. Bureau of Animal Industry, of slitting open the intestines of hogs, where they could be seen distended with *Ascaris suum*, taking a handful of these worms and eating them down in several bites. Dr. Woodruff states that the man showed no visible evidence of ill effects from this habit, which is rather remarkable, as, aside from the esthetic repugnance which would be sufficient to make the average person sick, ascarids have certain toxins which often affect helminthologists unpleasantly on merely working with these worms, some persons developing a hypersusceptibility which makes the presence of the worms in the same room intolerable. The case must be regarded as an individual idiosyncrasy, suggestive of mental defects, physiological disturbances, or some such pathological condition. In this connection it may be noted that all reports that the inhabitants of any section of Italy are in the habit of eating ligules have met with strong and indignant denials on the part of the Italian helminthologists.

Dr. Stiles gave a talk on sanitary conditions in the southern United States, emphasizing the good effects to be anticipated in dealing with problems of this sort in a quiet, personal way and avoiding unpleasant, undesired, and unmerited newspaper notoriety.

Dr. Pfender gave a very instructive demonstration of the use of radiography, illustrating his points by stereoscopic radiographs and the use of the fluoroscope.

MAURICE C. HALL, *Secretary*.

The twenty-fourth regular meeting of the society was held at the residence of Mr. Chambers on Jan. 28, 1915, Mr. Chambers acting as host and Dr. Cobb as chairman.

Dr. Stiles gave an extended discussion of sanitary conditions in the South, with especial reference to the respective merits of the pit privy and the so-called "umbrella privy".

Mr. Chambers exhibited a figure of a new free-living nematode from Panama, the worm being provided with three jaws, each of which is armed with three rows of retrorse teeth.

Dr. Cobb exhibited a Baker collapsible microscope.

The secretary presented a note by Mr. Crawley in regard to the protozoa found in the cloaca of frogs, with special reference to variations in *Opalina*.

MAURICE C. HALL, *Secretary*.



Ackert, James E. 1915. "Experiments on cysticerchi of *Taenia pisiformis* Bloch and of *Taenia serialis* Gervais." *The Journal of parasitology* 1(3), 151–155.  
<https://doi.org/10.2307/3271118>.

**View This Item Online:** <https://www.biodiversitylibrary.org/item/87019>

**DOI:** <https://doi.org/10.2307/3271118>

**Permalink:** <https://www.biodiversitylibrary.org/partpdf/316145>

**Holding Institution**

University of Toronto - Gerstein Science Information Centre

**Sponsored by**

University of Toronto

**Copyright & Reuse**

Copyright Status: Not provided. Contact Holding Institution to verify copyright status.

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.