STUDIES ON TREMATODE CERCARIAE AT REELFOOT LAKE, TENNESSEE, I.

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The following report is based on a two summer study of the cercariae at Reelfoot Lake, which was undertaken while in residence at the Reelfoot Lake Biological Station studying problems of a parasitological nature. This paper, part I, constitutes a preliminary report of the findings. I wish to thank Dr. C. L. Baker, and the Tennessee Academy of Science for the assistance they rendered in making this study possible. Dr. George R. LaRue rendered valuable assistance in the preparation of the report.

A detailed discussion of the Reelfoot Lake area is hardly necessary in view of the many published studies on this lake during the past several years; most of them appearing in this Journal. However, a brief description, particularly of the collecting areas, seems desirable.

The lake is located in the extreme northwest corner of the state and is approximately ten miles east of the Mississippi River. The lake proper and surrounding basins were formed in 1811 by a geologic disturbance which temporarily altered the course of the river and allowed it to flow into and cover most of the area now occupied by the lake. The topography of the region is such that when the river was later diverted into its present channel there were left numerous pockets of standing water, which form the numerous basins now found in the area. These basins can be observed from the roads around the lake between Tiptonville, Tennessee, and Hickman, Kentucky, by noting where the stands of Bald Cypress, *Taxodium distichum* (L) Richard occur. The two major basins are upper and lower Blue Basins, which together comprise the greater portion of Reelfoot Lake. They are filling in rather rapidly by a combination of silting from the eroding hills to the east and by vegetational encroachment, which is constantly taking place. Some of the smaller basins are temporarily united during a part of the year, but many are permanently separated from Reelfoot Lake and from any of the other basins. From a number of these basins snail collections were made. Below is a list with a general description of these basins.

Goose Basin. Located south of the biological station; quite shallow and muddy.

Yankapin Basin. In reality several shallow basins, southeast of the biological station.

Hanby Pond. An isolated basin near the Kentucky-Tennessee border. Probably the deepest basin visited.

Blue Pond. Another isolated basin, several miles from the main body of Reelfoot Lake, and rather deep in spots.

Isom Lake. Formed in part by the Reelfoot Lake overflow at the south end of the lake; depth variable.

Buck Pond. West of the preceding basin, and nearer the Mississippi River than the other basins; mostly quite shallow.

Brewer Basin. A flooded woods directly east of the biological station, with several feet of standing water all summer.

Other smaller basins were visited, many of which were dry by mid-summer, and for which I could find no generally accepted name. For the most part they were shallow extensions of the other more permanent basins. These were found to be uniformly low in their percentage of infected snails, usually being too small and temporary in nature to support fishes or other vertebrate forms.

A few collections were made from the lake proper along the shallow margins. One collecting point was on Goat Island, directly across from the biological station. This is really the ridge of higher ground between the Bayou du Chien and the Upper Blue Basin. This area has in early summer several small basins, which become completely dry by the middle of the summer. I also made several collections at "Cranetown," the egretry on the west side of the lake. Relatively few collections were made at the south end of the lake, but one such collecting point was at Boyett's Landing.

The vertebrates and invertebrates of the lake, which might act as intermediate and definitive hosts of trematodes, are exceedingly abundant. One not used to such a profusion of wildlife is continually amazed at the enormous numbers of amphibians, reptiles, and nesting birds. Every available habitat seems to be occupied. Studies have also shown that a great variety of fishes exist in the lake. Among the invertebrates which might act as intermediate hosts, crayfishes and dragonflies are particularly abundant. The lake is a temporary stopping point for thousands of migratory waterfowl that use the Mississippi Flyway in spring and fall migrations.

The molluscans that might act as intermediate hosts for trematodes are represented by at least 28 species of gastropods (Byrd, Norton, and Denton, 1940). Byrd (1940) has reported on the larval trematodes from three species of snails: *Helisoma trivolvis* (Say, *Succinea retusa Lea,* and *Physa gyrina* Say, from Reelfoot Lake.

In the present study eight species of snails were examined for larval trematodes, and four of them were found to be infected. The species examined were:

1. *Physa gyrina* Say. Collected from almost all of the localities visited, and particularly in the more stagnant, shallow basins.
2. *Helisoma trivolvis* (Say). Usually more abundant in deeper, less stagnant water than *Physa.*
3. *Viviparus intertextus* (Say). An extremely abundant species, and collected in all basins in the study.
4. *Gastrodonta ligera* (Say). Collected only once, on the west side of Upper Blue Basin near the Warden's shack.
5. *Succinea retusa* Lea. Found in moist situations around all the basins in small numbers, and around a few in rather heavy concentrations.
6. *Campeloma* sp. (crassulum?). Found only in the two deepest basins visited, in Hanby Pond, and in Blue Pond. Abundant.

7. *Polygyra zaleta* (Binney). Probably an abundant land snail throughout the Reelfoot Lake area.
8. *Polygyra multilineata* (Say). Very abundant land snail.

In table 1 are tabulated the results of some of the snail examinations for parasites.

TABLE 1. *Number and percentage of the snail, Physa gyrina, having cercariae*

Collecting Point	Date of Collection	Number of snails examined	Positive crushed snails		Positive Emerged Cercariae	
			No.	%	No.	%
Goat Island	Jun. 7, '49	25	1	4.0	1	4.0
Cranetown	Jun. 26, '49	220	112	51.0	5	2.2
Cranetown	Jul. 5, '49	102	42	41.0	2	2.2
Isom Lake	Jul. 10, '49	198	47	23.7	43	21.7
Total and percentages		545	202	37.0	51	9.3

TABLE 2. *The snails examined and the cercariae found*

Host snail	No. Collected	Kinds of Cercariae found
Physa gyrina	700	7 Xiphidiocercariae 1 Echinostome cercaria 7 Strigeid cercariae
Helisoma trivolvis	150	4 Xiphidiocercariae
Viviparus intertextus	400	1 Xiphidiocercaria 2 Echinostome cercariae 1 Strigeid cercaria
Campeloma sp	35	Uninfected
Gastrodonta ligera	5	One snail infected with a cercaria and a metacercaria of the Brachylaemid type
Polygyra zaleta	2	Uninfected
Polygyra multilineata	3	Uninfected
Succinea retusa	200	Uninfected

It is evident from table 1 that the percentage of infection varies from one collection to another even when the snails are from the same collecting area. It is also noted that there is a great discrepancy between the percentage figures of infection as they refer to snails liberating cercariae and snails that are crushed and examined for developmental and encysted forms. In the latter case the percentage of infection for *Physa gyrina* would be 37 percent, while the figure for liberating cercariae is only 9.3 percent. When a percentage figure is given of infected snails it should be stated whether the figure is based upon crushed snails or upon snails liberating cercariae. These

figures will often be extremely different, especially so when a large number of snails are examined.

During this study twenty-one species of larval trematodes were recovered from the snails. Of this group only five could be definitely assigned to previously described species and three more are probably identical in morphology to already described species of cercariae. The other cercariae found in the study had certain morphologicial peculiarities which did not allow their inclusion in any known species. This group includes eight Strigeid cercariae, seven Xiphidiocercariae, and one Echinostome cercaria. Table 2 summarizes the results secured

In the present study the infection rates for emerging cercariae are much lower than those found by Byrd (1940) for Reelfoot Lake. He reported a 28 percent infection in *Physa gyrina* and a 12 percent infection for *Heliosoma trivolvis*. My figures for emerging cercariae are 9.3 percent for *Physa gyrina* and 8 percent for *Helisoma trivolvis*. None of these is believed to be an accurate figure of the percentage infection for either species of snails. Infection rate is so variable a factor that it is meaningless to express it as a percentage, especially when it is made up from an accumulation of many separate snail collections.

Bibliography

Byrd, E. E. 1940. Larval flukes from Tennessee. I. A new mother sporocyst of a *Leucochloridium*. *Report of the Reelfoot Lake Biological Station*, IV : 117-123.

Byrd, E. E. 1940a. Larval flukes from Tennessee. II. Studies on cercariae from *Physa gyrina* Say, with descriptions of two new species. *Report of the Reelfoot Lake Biological Station*, IV : 124-131.

Byrd, E. E., and R. J. Reiber. 1940. Larval flukes from Tennessee. III. Studies on cercariae from *Helisoma trivolvis* Say, with descriptions of new species. *Report of the Reelfoot Lake Biological Station*, IV : 132-156.

Byrd, E. E., E. M. Norton, and J. F. Denton. 1940. Studies on the gastropod fauna of the Reelfoot Lake region. *Report of the Reelfoot Lake Biological Station*, IV : 157-163.

NEWS OF TENNESSEE SCIENCE

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Kohn, Henry I. (ORNL). 1950. Changes in blood plasma of guinea-pigs during acute radiation syndrome. *Amer. Jour. Physiol.*, 162(3) : 703-708. Sept. 1.

Lichstein, H. C., and J. E. White (Univ. of Tenn.). 1950. Studies on the disappearance of folic acid from bacterial cells. *Jour. Bact.*, 59(6) : 751-754. June.

Pearson, D. E., Max V. Sigal, Jr., and R. H. Krug (Vanderbilt Univ.). 1950. The methoxymercuration of n-allylphthalimide. *Jour. Org. Chem.*, 15(5) : 1048-1054. Sept.

Pearson, D. E., and Max V. Sigal, Jr. Studies concerning the structure of mercuhydrin. *Jour. Org. Chem.*, 15(5) : 1055-1059. Sept.

Platt, R. B., and C. S. Shoup (Emory Univ. and Vanderbilt Univ.). 1950. The use of a thermistor in a study of summer temperature conditions of Mountain Lake, Virginia. *Ecology*, 31(3) : 484-488. July.

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