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PRELIMINARY INVESTIGATION OF THE "WIGGLER" SUPPLY

IN GUN AND PINE LAKES, BARRY COUNTY

by

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Several brief field investigations have been made during recent years following complaints of the removal by commercial bait dealers of "wigglers" (nymphs of the burrowing mayflies) from Pine and Gun Lakes, Barry County. Institute Report No. 617 by Dr. Moffett discussed the problem on Pine Lake based upon a visit to this lake on May 16, 1940. Dr. Brown made another trip to this lake on February 20, 1941 and gave his findings in Institute Report No. 647. On February 10, 1944 I made a brief examination of wiggler removal operations on Gun Lake and reported the results to Mr. Westerman in a letter dated February 11, 1944. At that time it was suggested that a check of conditions in this lake and in Pine Lake be made during May of this year.

On May 23 and 24, 1944, Mr. O. H. Clark and I visited Gun and Pine Lakes. Mr. Ross, who operates a resort on West Gun Lake, made a boat available to us for this study. The site of wiggler digging this past winter was readily located since the shelter used by one of the commercial operators had sunk through the ice and had not yet been removed.

Using a clamshell dredge (Ekman) which takes a six-inch square sample of the upper bottom mud, we examined the fish food supply within a radius

sunken

of about 200 yards of the/shelter. Air temperature was 65°; water 65° at 1 p.m. The following table shows what was found in four scoops of the dredge at each point sampled. Since a coarse mesh screen (about 10 meshes to the inch) was used to sieve the bottom, only the larger fish food forms were retained. Use of this sized mesh speeded up examination of the samples and made possible the study of a larger number than if a finer screen had been employed. Since principal interest centered in the abundance of the nymphs of large burrowing mayflies, it was considered unnecessary to use a finer screen.

Emergence of the burrowing mayflies had just begun. A few adults were seen on the bushes along the shore near the Ross resort.

Table 1

Field analysis of Ekman dredge samples from

West Gun Lake, Barry County, May 23, 1944

(At each station sample consisted of four separate dredgings and the total covered one square foot of bottom)

Location of sample (distances estimated)	Depth of water	Bottom type	Vegetation	No. of burrow- ing mayflies	Other large fish food organisms
100' N.E. of shelter	4' 2"	Soft marl	Sparse <u>Chara</u>	5	8
150' E. of shelter	4' 0"	" "	None	12	3
200' E. of shelter	4' 0"	Soft marl	Dense <u>Chara</u> ¹	4	2
50 yds. N. of shelter	4' 4"	Marl	Sparse <u>Chara</u>	6	4
100 yds. N.W. of shelter	4' 6"	Shell marl	Sparse <u>Chara</u>	9	15
Half way between Ross Resort and shelter	3' 8"	Marl	Sparse <u>Chara</u>	3	1

¹ Mixed with small amounts of Ceratophyllum and Potamogeton.

It will be noted that the number of burrowing mayfly nymphs per square foot ranged from 3 to 12 with an average of 6.5 and that the largest number was generally found closest to the shelter, which presumably represented the center of commercial digging. Also that a bottom of soft marl with a sparse cover of Chara (called "moss" by the fishermen) produced more mayflies and other food organisms than did the one sample taken in heavier vegetative cover. Whether this is the preferred habitat of the mayflies cannot be stated on the basis of the small number of samples, but from the reports of those who dig this bait it would seem to have some significance. The bait diggers interviewed on several occasions elsewhere agreed that they generally found the most wigglers in soft marl bottom having few plants rather than in the dense plant beds.

A brief examination of East Gun Lake was made later in the afternoon off shore from the bathing beach of the Yankee Springs Park "Day Use Area." Mr. Parks, in charge of this park, kindly provided a boat for this purpose. Because of the high wind which came up later in the afternoon our study of this area was very limited. It was noted however that conditions were not very favorable for burrowing mayflies along this portion of the shore since there is less shoal and the bottom contains more gravel and less soft marl. One square foot sample taken about 300 feet east of the bath-house in five feet of water over a bottom of marl and gravel with a sparse Chara cover yielded one burrowing mayfly and 6 other food organisms. Emergence of smaller mayflies of the non-burrowing type had been quite heavy recently as the grass and shrubs near the bath-house were black with adults and cast skins were floating on the surface. A few of the larger burrowing mayfly adults were also seen.

Considering the area of Gun Lake (reported as 4,000 acres in "Michigan Lakes and Streams Directory") and the relatively small portion of the area worked by commercial bait diggers (estimated last winter at about forty acres), it would not seem that the removal or disturbance of this portion of the fish food supply in the lake would have much significance. However, it is possible that the habitat suitable for burrowing mayflies in lakes is limited and that the damage done to these forms is more severe than would appear by a comparison of the acreages. A thorough study of the habits and habitat requirements of burrowing mayflies in both trout streams and in lakes would be a very desirable future research project. If we knew more about the usual distribution, abundance and requirements of these important fish food organisms, it would be easier to assess the possible damage done by commercial digging. The study of these forms in trout streams might suggest ways in which their habitat could be increased.

Pine Lake was visited on May 21. We inquired of the operators of Shelp's resort on this lake but they had no complaint to make of the wiggler removal. At Tubb's resort we talked with Mr. E. A. Tubbs, the proprietor, who stated that he had been on the lake for 21 years. A public road ends at the lake near his resort and this is used by fishermen for access to the lake and by commercial bait diggers in winter. It was his opinion that the moss (Chara) had decreased in recent years in front of his resort where much of the bait digging had been done, and he believed this was due to the wiggler removal. Also he thought that the supply of wigglers had been decreased by these commercial operations. Apparently he takes some bait for his own use and had experienced difficulty in getting his supply in the past few winters. However, he admitted that he was not sure that this digging had caused any depletion of wigglers since during the period he had been living at the lake he had noted a rise and fall in the number of adult mayflies emerging from the lake before any

commercial digging had been done. Some years the flies would be so thick as to be a considerable nuisance; other years there seemed to be very few.

Twenty-five samples totaling five square feet of bottom were examined at various points out from the Tubbs' dock. The air temperature was 66°; the water 66° at 11 a.m. The results are given in Table 2.

Table 2

Field analysis of Roman dredge samples from
Pine Lake, Barry County, May 21, 1944

Location of sample (distances estimated)	Depth of water	Bottom type	Vegetation	No. of burrow- ing mayflies	Other large fish food organisms
50' W. of Tubbs' dock	3' 6"	Soft shell marl	None	6	0
150' W. " " "	3' 6"	" " "	"	9	0
300' W. " " "	2'	Firm marl	Dense <u>Chara</u>	0	19
300' toward point south of Tubbs' dock	2'	Soft shell marl	Medium <u>Chara</u>	4	9
100' N.E. of Tubbs' dock	2' 8"	Marl	None	2	1

The range in number of burrowing mayflies per square foot in this portion of Pine Lake was from 0 to 9 with an average of 4.2. Other large fish food organisms, such as dragonflies, damselflies, caddisflies, amphipods and snails, varied in numbers from 0 to 19. It is interesting to note that the single sample from dense vegetation yielded the lowest number of mayflies but the highest number of other fish food organisms. Soft marl bottom without any Chara produced the most wigglers. A comparison of the number of burrowing mayflies taken in the two lakes suggests that wigglers were less abundant in Pine Lake than in West Gun but the area sampled in these lakes may have been too small to be of significance.

Recommendations

(1) Prepare bottom type, depth contour maps of Gun and Pine lakes as soon as possible. A study of these maps will show the area of lake bottom presumably suitable for mayfly production. (Mapping of these lakes is scheduled for this winter.)

(2) Require bait collectors to return to the water all vegetation, shells, etc. after the removal of the bait. This will avoid many complaints concerning this operation and will insure the survival of small mayflies and other unsaleable fish food organisms and may permit some of the plants to become re-established.

(3) As soon as a competent man is available, assign him the study of the normal distribution, abundance and habitat requirements of the burrowing mayfly (and other important lake fish food organisms). With this basic information and with accurate bottom type contour maps of all important public lakes the possible damage done by commercial bait removal could be rather accurately estimated.

INSTITUTE FOR FISHERIES RESEARCH

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