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MORTALITY OF AQUATIC INSECTS DUE TO FREEZING

Factors influencing the abundance of insects spending all or a part of their life-cycles in fresh water are coming to receive a larger amount of study than formerly, largely because of a better appreciation of the economic importance of such organisms in the food cycle of game fishes. Although the general population level of such insects is in the main regulated by interaction of recognized and more or less predictable ecological factors, the rare occurrence of a sudden, catastrophic change in some part of the environment may drastically reduce the numbers of a particular species, even though normal conditions may return as suddenly as they were banished.

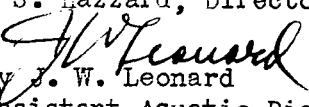
An example of a catastrophe of this sort was witnessed recently in a small (seven acre) pond in Livingston County, Michigan. The last two weeks of March, 1938, were characterized by unusually warm temperatures, which on one occasion rose above 80°F. The warm weather was abruptly broken on the night of April 4, when the temperature dropped to 24°F. Early the following morning, when a visit was made to the pond above mentioned, it was found that all save a small protected portion of the pond's surface was covered with ice which near shore reached a thickness of one-half inch.

The period of ice formation had obviously coincided with the time of emergence of a great number of midges (Chironomus plumosus or near) for around three sides of the pond the ice was thickly dotted with pupae and adults of this species either wholly or partially embedded therein. Mortality appeared to be universal among the pupae and adults which were entirely embedded. One pupa held to the ice only by the extreme tip of the abdomen was alive when found, although its ability to have successfully emerged upon release is open to conjecture. A small number of adults which had apparently completed their emergence before the ice formed lay in a numbed condition on its surface until warmed into activity by the sun, when they were observed to be fed upon by a Tree Swallow, which swooped repeatedly to within a few inches of the ice. By late afternoon, when all the ice had melted, large windrows and rafts of lifeless pupae and adults collected in eddies and small embayments around the shore.

Owing to the tendency of an entire age-group of midges to emerge at about the same time, there exists a strong likelihood that the local population of this economically important midge sustained a severe set-back. A few observations made at about the same time for the next two or three years should settle the question definitely. In any event, it is felt that the present case affords an illuminating demonstration of how disaster to an important fish food organism may strike, do its damage, and disappear, leaving only the briefest record of its nature. It may be that such an occurrence is not uncommon, but goes undetected because no observer was present at the time.

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