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THE FATE OF KIDNEY DISEASE AMONG HATCHERY BROOK TROUT  
STOCKED IN NATURAL WATERS

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**Kidney disease is a bacterial infection of salmonid fishes that has been reported in hatcheries from widely scattered locations in the United States (Wolf and Dunbar, 1956). Mortality from the disease may be high.**

A number of studies concerning the effect of the disease on fish and its control at hatcheries have been conducted (Earp et al., 1953; Wood and Wallis, 1955; Snieszko et al., 1955; Allison, 1958; Wolf and Dunbar, 1959a, 1959b). Snieszko et al. (1955) found that brook trout exposed to infection through contact or by the feeding of infectious material did not develop the infection during an observation period lasting several months. They succeeded in inducing the disease in healthy fish only by intra-peritoneal inoculation with virulent material. Because of this they suggested that a parasitic vector, such as a gyrodactylid trematode, might be involved in the transmission of kidney disease. These observations suggest that an abundance of parasites must be present to effect transmission of the disease from infected hatchery fish stocked in lakes or streams to fish already present there. Wolf and Dunbar (1959b) were unable to infect fish by addition of the bacterium or the bacterium and glass

splinters to the diet, but successfully induced the disease by manual abrasion and autoabrasion in the presence of the bacterium. Thus certain hatchery conditions, such as fish crowded into hard-bottomed raceways, would be conducive to transmission of kidney disease. Since trout in natural waters are seldom so crowded as they are in hatchery ponds and are rarely heavily infested with parasites, it would seem that the possibility of producing an epidemic among salmonids in natural waters by stocking fish infected with kidney disease would be remote. Dr. Ken Wolf (personal communication) reported that kidney disease was diagnosed among brook trout in a stream near the Federal Fish Hatchery at Berlin, New Hampshire, but references in the literature to kidney disease in nature are concerned only with various species of salmon. In the literature no information could be found concerning the fate of infected trout from hatcheries when stocked in lakes or streams, or whether the disease was transmitted from these fish to other trout inhabiting natural waters. The work described here was designed to investigate these questions.

#### Method

Brook trout infected with kidney disease were present at Oden hatchery in the Lower Peninsula of Michigan, and at Marquette hatchery in the Upper Peninsula of Michigan in 1955 and 1956. Presence of the infection was confirmed by autopsy of fish that died, and mortality in both groups was well above that among similar groups of brook trout that were free of kidney disease. Fish from the infected group at Oden hatchery were stocked in a number of lakes in the Oden district. Two small lakes chosen for study, North and South Twin lakes, Otsego County, are located within the area of the Pigeon River Trout Research Station and therefore under observation of the staff. Here, under the provisions of the anglers' permit, all fish

caught from any waters of the research area must be weighed, measured and sexed at a checking station. Thus all fish are observed by a member of the staff and any symptoms of kidney disease could be noted. Also, fish stocked in the lakes are fin-clipped with various combinations to indicate the year of stocking. If infection was transmitted to fish stocked in previous years this fact could be recorded at the checking station.

Fish from the infected group at Marquette hatchery were stocked in certain streams and pot-hole lakes, and collections to check for kidney disease were made several months later, or early the following year, by netting, electric shocking and by poisoning.

Swanzy Lake, Marquette County, was studied because of its accessibility and ease with which fish could be collected. As part of the management program, fish stocked there are fin-clipped according to the year released so, if kidney disease did spread from introduced infected fish, newly infected fish could be identified. Although the lake is located on public property and is open to fishing without special permit, it was on the regular schedule of a creel census clerk who was able to observe many of the fish caught, as well as any mortality of fish that might have occurred.

Conservation Officers of the Marquette area learned the symptoms of kidney disease by observing infected fish at the Marquette hatchery so they would be able to recognize affected fish when inspecting anglers' catches, or observing possible fish mortalities in waters stocked with trout from the infected group.

### Results

Brook trout from the infected groups held at Oden and Marquette hatcheries were stocked in 25 lakes in the fall of 1955 and 1956. Three

of these lakes were checked during the following spring for fish with symptoms of kidney disease.

On April 14, 1956, 37 brook trout were collected from Swanzy Lake. All had been stocked in the fall of 1955 and symptoms of kidney disease were present in three specimens at the time of recapture. Another collection was made on October 10, 1956. This time 18 fish were taken, nine of which had been stocked in 1954 and nine in 1955. Of the 18 fish, one (stocked in 1955) had symptoms of the disease, but the rest did not. Neither the creel census clerk nor the Conservation Officers reported any affected fish or any mortality of fish from any location where infected brook trout had been stocked.

At the Pigeon River Trout Research Station, 17 brook trout were collected on May 31, 1956, from North Twin Lake. Seven of these were from the infected group stocked in the fall of 1955, nine were stocked in the fall of 1954 and one in the fall of 1953. There were no symptoms of kidney disease present among these fish. A group of 7- to 10-inch brook trout from the infected group at Oden hatchery were stocked in South Twin Lake in the fall of 1956. In May, 1957, five fish were collected, four stocked in 1956 and one in 1955. All were negative for kidney disease. In November, 1957, 23 fish were collected here, 14 from the 1955 stocking and 9 from the 1956 stocking. None showed symptoms of kidney disease. None of the fish caught by anglers and checked at the station were observed to have this disease, and neither anglers nor staff members observed any mortality of fish in either lake.

Fish from an infected group of brook trout were stocked in the spring of 1956 in the Peshekee River, Chocolay River, and the East Branch of the Escanaba River, all located in Marquette County, Michigan. On October 22,

1956, 43 brook trout and 8 brown trout were collected from the Peshekee River by an Institute for Fisheries Research survey crew. None of these fish had any symptoms of kidney disease. In June, 1957, 21 brook trout were collected from the Chocolay River and the East Branch of the Escanaba River. None of these trout were infected with the disease. Conservation Officers who patrolled the streams did not see any mortality of fish and none was reported by any of the anglers they contacted.

#### Conclusion

In all, 164 trout were collected from natural waters and examined for kidney disease. There were no instances in which the disease was transmitted from stocked fish to fish already present in the waters. No mortalities of trout were reported from any of the lakes or streams which were stocked with brook trout infected with kidney disease, although some of the waters were regularly visited by Department of Conservation personnel. Therefore, it appears to be unlikely that the stocking of infected brook trout in lakes and streams can result in a widespread mortality due to kidney disease.

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