A FISH DISEASE NEW TO THE SOUTHEAST

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Finding the edges of farm ponds littered with dead and dying bluegills, picking up four-pound bass with their gills decayed away, or having most of the large speckled bullheads eliminated from a pond, finding large crappie floating belly up, or seeing a minnow rearing pond covered with dead and dying minnows all caused by a fish disease, is new to the Southeastern United States.

"Columnaris" disease was first reported in 1922 by Dr. H. S. Davis of the U. S. Bureau of Fisheries, as being responsible for the death of fish. Since that time, there has been an ever increasing number of reports of severe mortality in trout and salmon of the cold water regions of the country, but in all this time the disease has not appeared in the Southeast, at least to be diagnosed as such.

In the spring of 1953, as the water in some of the experimental lakes of the Alabama Experiment Station began to warm up, fish started appearing around the edges in both dead and dying condition. Since all fish were severely fungused around the gills, mouth, and head, it was believed that it was merely an outbreak of fungus; however further investigation revealed that the primary infective agent was *Chrondococcus columnaris,* the causual agent of "Columnaris" disease, with the fungus being only a secondary agent of infection. The outbreak gained momentum as waters became warmer until fish were dying in many ponds on the station. Large bass, bluegills, goldifsh, shiners, and especially bullheads were killed in large numbers.

At the same time, reports began to arrive from surrounding areas in Alabama and Georgia of deaths of fish and requests for help in stopping the outbreaks. Fish deaths in many isolated farm ponds reached alarming proportions. Diseased crappie were discovered floating on the surface of Wheeler Reservoir in North Alabama.

Private hatcherymen in two states reported trouble with a disease that rotted the gills of minnows and killed rapidly. A report of a death of a fish in South Carolina, although not investigated, had the symptoms of "Columnaris" disease. Largemouth fingerlings from a hatchery were also found infected.

The symptoms of "Columnaris" disease are variable. The position of infection varies from the head to the tail and the intensity from small greyish white spots to gross erosion of tissue about the head, or complete loss of the caudal peduncle.

In early cases, the center of infection was the head and gills. Large portions of the gill filaments of bluegills, bass, and bullheads were in a stage of decay, while surrounding areas were unaffected. These areas were usually covered with a dirty brown, sticky, granular material possessing a very characteristic odor that was very evident on lifting a gill cover. In most of these same cases, the snout and the inside of the mouth was also covered with decaying tissue. Also associated with these early cases was fungus. In almost every case in early spring, fungusing of the diseased portions was very severe even before the time of death. So commonly was this fungus associated with the bacterial infection that the appearance of a dead fish with fungused head, gills, and mouth, was automatically laid aside and classified as a death due to "Columnaris" disease.

The amount of tissue degeneration on the head and gills of large Bullheads was almost unbelieveable. In many cases the characteristic shape of the head and mouth of those fish were unrecognizable. It was only in these badly infected bullheads that the gross external body lesions which were common symptoms in cold water fishes, were found.

As the initial outbreak disappeared, only to be followed at later dates by other epidemics, the grossness of the symptoms seemed to be reduced. Especially in minnows was this true. In some of the minnows, during later outbreaks, only a small amount of fin degeneration was present at time of death. Others had only small dirty white splotches on the head when death occurred, with no tissue infection of the gills.

One very serious outbreak of the disease in a minnow-holding pond which brought about the death of thousands of bait fish, showed none of the usual symptoms. There is evidence that the organism is also present in the blood stream of carrier individuals which do not show external symptoms of the disease. It is altogether possible that, when death results with the outward symptoms lacking, the disease is centered in some vital internal organ. Further work along these lines is being carried out at this time.

Since "Columnaris" is a completely new disease to the Southeast, little or nothing was known as to how to combat an outbreak, or prevent its spread. A search of the literature revealed only suggestions of dips and trough flushing treatments with disinfectants and bactericides. As can be readily seen such techniques are out of the question for large farm ponds or a pond containing thousands of minnows.

The literature was helpful in suggesting materials that were known to control the disease. One of the first of these materials to be tried was potassium permanganate; however since the cost of treating a ten-acre pond with 1 to 2 ppm of the material was prohibitive, another method of application was needed. The permanganate was applied in the same manner as rotenone is applied in partial poisoning. A line of the chemical, one pound to 200 linear feet of shore line, was applied from a boat with an outboard motor around the pond keeping about 20 to 30 feet from the bank. By using 3 to 5 applications from 2 days to 1 week apart, the deaths of fish in 15 ponds was greatly reduced, only an occasional dead fish being found subsequent to treatment.

Some promising results were obtained by the use of copper sulphate at the rate of 1 ppm in minnow ponds where the disease appeared. In one case a combination of potassium permanganate and copper sulfate reduced the mortality.

Tests on pure cultures of the causual organism show that Acriflavine in a 0.5 ppm concentration will kill the bacteria in 24 hours, or that a 10 ppm concentration will kill in one hour.

Malachite green also proved toxic to the organism at 1 ppm; however, the toxicity of this material to fish necessitates that it be used only as a dip for short periods of time.