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SCIENTIFIC BREAKTHROUGH HELPS COMBAT TROUT DISEASE

A major weapon in the fight against whirling disease--a trout-killing infection that is devastating in some wild trout populations--has been developed by researchers at the University of California-Davis, the U.S. Fish and Wildlife Service and the Whirling Disease Foundation announced today.

Mr. Karl Andree and Professor Ronald Hedrick at the university's School of Veterinary Medicine isolated genes specific to the parasite causing whirling disease, allowing scientists to apply a special DNA-based test as a diagnostic tool. The research leading to this advance was funded by the U.S. Fish and Wildlife Service, the Whirling Disease Foundation, Trout Unlimited, and the Montana Department of Fish, Wildlife, and Parks.

"This opens up a promising new era in our efforts to protect America's prime trout fisheries from whirling disease," said John Rogers, Acting Service Director. "It gives fishery managers an early warning system that should enable them to detect this disease early and help control its spread."

Whirling disease, caused by a microscopic parasite introduced to the United States in the 1950s, is believed responsible for the decimation of trout populations in some of America's most renowned trout streams, especially in the Rocky Mountain West. In recent years, whirling disease has been associated with an estimated 90-percent decline in Montana's upper Madison River wild rainbow trout population as well as disastrous rainbow trout losses in Colorado's South Platte, Gunnison, and Colorado rivers. This has alarmed scientists and anglers alike, spurring several intensive research efforts.

Andree and Hedrick isolated genes from *Myxobolus cerebralis* (the parasite causing whirling disease), allowing the use of a modern diagnostic test known as the Polymerase Chain Reaction (PCR). The test can also detect infections in the parasite's other host, the aquatic worm *Tubifex tubifex*. The PCR test amplifies even very small amounts of the parasite's DNA, allowing its detection at much lower levels than previously possible.

Refining the PCR method may also allow non-lethal diagnostic testing of trout in the future, which scientists consider increasingly important in the face of dwindling wild trout populations in some locations. With the new discovery, the PCR method can also indicate the parasite's existence in a given body of water.

According to Beth MacConnell, the Service's top whirling disease biologist stationed at the Bozeman Fish Technology Center in Montana, the discovery will be a crucial component of all future whirling disease research. "The new diagnostic tool provides speed, accuracy, and sensitivity we simply didn't have before," she said.

The spores of *Myxobolus cerebralis*, released when infected fish die, are ingested by *Tubifex* worms, which live in mud. Inside the worm, the parasite takes on a new form, becoming capable of infecting young salmonids, especially rainbow trout, before their cartilage hardens to bone. *Myxobolus cerebralis* gets into the cartilage near a fish's organ of equilibrium and multiplies very rapidly, sometimes into the millions, pressuring the organ and causing the victim to swim erratically, losing its ability to forage or to escape predators.

The new test is already being used by Professors Robert Ellis at Colorado State University and Stuart Knapp at Montana State University to analyze infections.

The quantitative sensitivity of the PCR tool is being measured in Dr. Ellis' lab. The results of this work will allow fishery managers to determine the levels of infection in streams. The data obtained from this research will be correlated with young-of-the-year fish surveys to determine the ratio of mortality levels to levels of infection.

Dr. Knapp's laboratory is using the PCR method to test *Tubifex* worms taken from dozens of Montana streams. Results will provide information on the seasonality of whirling disease, which may help scientists develop new management strategies for combatting it.

The whirling disease parasite has been detected in at least 21 states: California, Colorado, Connecticut, Idaho, Maryland, Massachusetts, Michigan, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, Ohio, Oregon, Pennsylvania, Utah, Virginia, Washington, West Virginia, and Wyoming.

In addition to the $200,000 the Service provided for this research, in 1996 the agency joined the National Fish and Wildlife Foundation; the Montana Department of Fish, Wildlife, and Parks; and the Whirling Disease Foundation to provide a

$195,000 grant for construction of a whirling disease research laboratory at Montana State University. A secure, contained facility was needed to study whirling disease-infected organisms to determine fish and worm genetic factors that promote or limit parasite growth and investigate methods to control the disease in infected watersheds. In addition, the Service has intensified its research efforts to combat whirling disease at its Bozeman Fish Technology Center.

The Whirling Disease Foundation is co-sponsoring a national symposium on whirling disease March 6-8, 1997, in Logan, Utah. "This symposium will provide the opportunity for the latest research findings on whirling disease to be shared with the research community and the public," said Dr. Karl Johnson, Science Director of the Whirling Disease Foundation.

Presentations will include reports on the range of the infection and distribution of the *Tubifex* worm, results of comparative studies of the sensitivity of different fish species to the disease, methods for filtering and quantifying the fish-infective state of the parasite from water samples, and investigations into the initial interactions between the parasite and the two hosts included in its life cycle.

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