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LOSS OF ANTIGENICITY IN THE PROGENY OF AN APPARENTLY HEALTHY POPULATION OF BROOK TROUT

Bacterial kidney disease (BKD) is caused by the gram-positive bacterium *Renibacterium salmoninarum* and affects both hatchery-reared and wild anadromous species of salmonids. Control of BKD is difficult, in part, because the organism is vertically transmitted. This transmission is important when considering moving eggs, particularly to geographical areas where the bacterium is not enzootic. The mere detection of *R. salmoninarum*, regardless of prevalence or absence of clinical disease, may require a rigorous effort to contain the pathogen.

INFECTED FISH ARE DETECTED AT THE WHITE SULPHUR SPRINGS NATIONAL FISH HATCHERY

In early 1990, a routine fish health inspection was performed on brook and rainbow trout at the National Fish Hatchery in White Sulphur Springs, West Virginia. Several positively stained cells were detected using anti-*R. salmoninarum* sera and the direct fluorescent antibody test (FAT). Once the bacterium was detected, efforts were made to determine prevalence and to obtain a confirming diagnosis. Spleen, kidney, and ovarian fluid tissues were assayed by FAT, bacterial culture, and an enzyme-linked immunosorbent assay (ELISA). Few FAT-positive cells were seen, and ELISA-positive samples detected were minimally greater than threshold values.

Renibacterium salmoninarum was not cultured, and fish at the hatchery remained asymptomatic. Because this hatchery was shipping 10–12 million eggs annually, the hatchery was depopulated and disinfected in June 1991.

BROOD STOCK AND THEIR PROGENY ARE FOLLOWED FOR PROGRESSION OF THE INFECTION

Before disinfection, about 150 2-year-old (1988 year class) brook trout were transported to the Fish Health Laboratory in Leetown, West Virginia, for study. Five (11.6%) *R. salmoninarum*-positive ovarian fluid samples were detected by ELISA from the 1991 spawners; five (11.6%) separate ovarian fluid samples were positive by MF-FAT and the range of cells per milliliter of ovarian fluid was 110–1,324 cells/mL. In the 1992 spawning of the same brood fish, ovarian fluid samples from 13 (28.9%) fish were positive by ELISA; all of these samples were also positive by the MF-FAT. In all, 29 samples (64.4%) were positive by MF-FAT; the mean was 791.1 cells/mL and ranged from 110 to 2,427 cells/mL. Of the kidney and spleen tissues of the brood fish collected after the 1992 spawn, all samples taken from the females were negative, as well as all kidney samples from the males. There was one positive spleen sample from a male.

Renibacterium salmoninarum antigen was not detected by ELISA in any kidney samples from the first quarterly sample of the progeny from the 1991 spawn. The second sample of 100 fish was 85% positive, or 17 of 20 five-fish pools. This sample had the highest number of positives for the two year classes of progeny. Prevalence decreased to 6% *R. salmoninarum*-positive in the fifth and final sample.

Prevalence of the progeny that resulted from the 1992 spawning was 35, 45, 2, 0, and 1%, respectively, for the five quarterly samples of 100 fish. In 1993, ovarian fluid samples

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were collected from 40 fish of the progeny from the 1991 spawn. These fish were then 2 years old and were the first progeny of the original brood population. Each ovarian fluid sample was assayed by ELISA for presence of *R. salmoninarum* antigen, and all were negative.

BACTERIAL KIDNEY DISEASE DID NOT DEVELOP AND PREVALENCE OF *R. SALMONINARUM* DECREASED

The increase of *R. salmoninarum*-positive ovarian fluid samples at the 1992 spawning compared with 1991 was not reflected in the progeny of those years. Overall, the number of ELISA-positive kidney samples in the progeny decreased as the fish aged within each year class. For each spawn, about 10,000 progeny were reared and maintained throughout the quarterly sampling. The fish remained asymptomatic during this time, as did the original brood fish that were maintained at our facility for nearly 3 years.

The decreased prevalence of *R. salmoninarum* within the progeny from a population of fish determined to be infected with the BKD bacterium might be considered when personnel are confronted with a similar situation involving the health and management of populations of fish. Efforts to rid the bacterium from the population of fish might be implemented, especially for those stocks of fish that would be otherwise irreplaceable.

For further information contact

Clifford E. Starliper or Jeffrey D. Teska
National Fish Health Research Laboratory
1700 Leetown Road
Kearneysville, West Virginia 25430
(304)725-8461