

The Genetic Variability of *Myxobolus cerebralis*, the causative parasite of the Whirling Disease

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Host-parasite interactions in the natural landscape can be understood by studying the genetic structure of both the parasite and the host. In particular, one can learn about parasite invasion strategies. The causative agent of whirling disease *Myxobolus cerebralis* (Myxozoa: Myxosporea) is native to Eurasia but has spread to more than 25 states of USA. It is in the forefront of research because of dramatic decline of wild rainbow trout in the intermountain west. *Myxobolus cerebralis* completes two separate developmental pathways involving two hosts, a salmonid fish (several species) and the aquatic oligochaete *Tubifex tubifex*. The interaction of invertebrate host taxa with the parasite is critical for whirling disease dynamics. Although *M. cerebralis* has been detected in river drainages throughout the United States, disease severity among wild fish populations has been highly variable. Previous studies have concluded that *M. cerebralis* has little genetic variability and variation in the disease incidence among wild fish populations is not related to different strains of the parasite, but this has not been verified for the Madison River, Montana. In addition morphological properties of *M. cerebralis* spores can lead to misidentification of the parasite, because it can vary considerably. Previous intraspecific comparison studies focused on variability among samples from North America and Europe. They found almost identical sequences among all studied samples. We are examining the genetic variability of parasite from the Madison River, MT to support or refute the idea that variation in the parasite does not contribute to fish disease variability. We also determine if there are cryptic species of the parasite in the Madison River.