

DEVELOPMENT OF STANDARD PROTOCOLS FOR PIT TAGGING JUVENILE LAMPREYS

Matthew G. Mesa*, Elizabeth S. Copeland, and Helena E. Christiansen

U.S. Geological Survey, Western Fisheries Research Center, Columbia River Research Laboratory, 5501 Cook-Underwood Road, Cook, WA, 98605, mmesa@usgs.gov

The ability to mark and tag fish is one of the most important and useful techniques available to fisheries managers and researchers. We previously developed a fast, safe, and effective technique for PIT tagging juvenile (macrophthalmia) Pacific lamprey (*Entosphenus tridentata*). Here, we used this technique to test the short-term survival of PIT-tagged juvenile lampreys in freshwater at different temperatures and their long-term survival in seawater. For the freshwater experiment, lampreys were acclimated to 9, 12, 15 or 18°C. From 105-120 lampreys per temperature were PIT-tagged and about an equal number of fish were anesthetized and handled but not tagged (control fish). During the 40 d test, no tags were lost and incisions healed well with few abnormalities. Survival was highest at 9°C (97% for both groups), lowest at 12°C (36% for controls and 28% for tagged fish), and intermediate at 15°C and 18°C (64 and 67% of controls and 79 and 73% of tagged fish survived). The poor survival at 12°C was unexpected since our previous study showed survival of 72-78% at this temperature. At all temperatures, most of the fish that died had an aquatic fungal infection. The initial size of tagged fish that died was significantly smaller than values for fish that survived at all temperatures except 12°C. In general, lampreys 150 mm in length and greater survived well and could be easily tagged, suggesting a size threshold for tagging of near this size until handling procedures are improved. For the seawater experiment, juvenile lampreys were collected at John Day Dam, PIT-tagged or handled only (controls) and held in freshwater for seven days at the dam, and then were transported to our Marrowstone Marine Laboratory and slowly transitioned to seawater. Five tags were shed in the first four days after tagging, but thereafter, no tags were lost. Two fish died during the first week, and no further mortality occurred until day 94 (1 August). Since then, mortality has increased steadily to about 15% and 28% in the two tanks at Marrowstone. This experiment is still ongoing but early results suggest that rearing in seawater reduces fungal infection and improves survival of juvenile lampreys. Results from our freshwater experiment indicate that it would probably be safe to work with young lampreys at 9-10°C but not at temperatures of 19°C or higher. To determine whether it will be safe to work with young lampreys at temperatures in between these extremes, however, will require resolving two issues: (1) the disparate results in our two experiments at 12°C; and (2) the proximate cause of fish mortalities in our study, which we suspect were due to fungal infections. The high incidence of fungal infection in juvenile lampreys held in freshwater may be linked to the stresses of capture and transport, anesthetic solutions, handling and captivity, or some combination thereof. Good long-term survival in seawater suggests that tagging of juvenile lampreys with PIT tags or other tags of similar size is feasible if early fungal infection can be appropriately controlled—and our future work is targeted directly at this issue.