

Abstract:

The ability to individually mark juvenile fishes has important implications for fisheries management. For example, marking age-0 Walleye *Sander vitreus* could provide important information not provided by batch-marking, including individual variation in growth and estimates of length-dependent survival and recruitment. However, the relatively small size of age-0 Walleye in northern temperate lakes has precluded use of many common tagging methods that provide information on individual fish (e.g., various anchor tags, jaw tags). Consequently, we evaluated short-term mortality and retention associated with using 12-mm passive integrated transponders (PITs) to mark age-0 Walleye (total length range = 93–216 mm; mean total length = 157 mm) by conducting 48-h within-lake net-pen trials and 7-d hatchery trials during September–October of 2015 and 2016. We did not anesthetize age-0 Walleye prior to PIT tagging. Our assessment allowed us to determine whether post-tagging mortality and PIT retention varied in relation to implant location (i.e., body cavity or pelvic girdle), fish length, and water temperature. During 2015, mean 48-h mortality rate of age-0 Walleye tagged with PITs in the body cavity was low (mean = 7%; SE = 3%) and did not differ from that of fish marked with only a fin clip (mean = 4%; SE = 2%) and reference fish (mean = 2%; SE = 1%). During 2016, mean mortality rates ranged from 2% (reference fish) to 6% (PIT inserted into pelvic girdle) and did not differ among treatments. During both years, mortality rates for nearly all treatments were highest (> 13%) when water temperatures were $\geq 20^{\circ}\text{C}$, but decreased below 5% when water temperatures were $\leq 17^{\circ}\text{C}$. During 2016, dead age-0 Walleye in both PIT treatments were smaller than fish that survived. During the 7-d hatchery trials, mean mortality rates were higher for age-0 Walleye with PITs inserted into the body cavity (mean = 13%; SE = 4%) than fish that received a PIT in the pelvic girdle (mean = 4%; SE = 1%) and reference fish (mean = 4%; SE = 2%). Retention of PITs was high (> 96%) during all net-pen and hatchery trials. Collectively, our results suggest that fisheries personnel can use PITs to tag age-0 Walleye without anesthesia with the expectations of high initial retention and low mortality. Mortality rates may be minimized by implanting PITs into the pelvic girdle when water temperatures are $\leq 17^{\circ}\text{C}$.

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