

**Selected Factors Affecting Rate of Loss of Fine-Fabric Floy Tags
when Applied to Yearling Brown and Rainbow Trout**

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Abstract.—We tested the potential suitability of FD-68B fine-fabric Floy tags for determining relative survival or angler recovery of different strains of small yearling rainbow trout *Oncorhynchus mykiss* and brown trout *Salmo trutta*. We determined tag loss in small inland lakes for up to 37 months after tagging. We determined effects of Floy tagging, fin clipping, and tag color on brown trout mortality and effect of tag color on tag loss rates for up to 7 months. Rainbow trout lost tags at a rate of approximately 1% per month over 37 months. Brown trout lost tags at a rate of 1.6% per month over 37 months. Relative survival of three rainbow trout strains through 30 months was accurately ranked based on tag recovery. However, due to tag loss, relative survival through 30 months of three brown trout strains was not accurately ranked based on tag recovery. Significant differences in survival among brown trout strains were detected based on fin clip recoveries but no differences could be detected when survival was estimated from tag recoveries. Inverse relationships between tag loss and trout total length (TL) at tagging appeared to be a major cause of variation in tag loss between different trout strains. Small brown trout (<16.5 cm mean total length) tagged and stocked into a shallow, weedy spring pond lost 54% of their tags within 101 d after stocking during 1990 and 57% within 210 d after stocking during 1991. High tag loss by these trout was attributed primarily to their small size at tagging and anatomical location of tag insertion. Our data suggested that insertion of tags beneath

the posterior half of the dorsal fin, where pterygiophores are smaller than the anterior half, contributed to poor tag retention. Brown trout tagged with orange or brown tags, lost tags at the same rate over a 210 d period. Daily mortality rates of four groups of brown trout: fin clipped and tagged with orange tags, fin clipped with brown tags, fin clipped only, and unmarked fish, were not significantly different through 210 d of residence in the spring pond.

Our findings suggested that fine-fabric Floy tags were poorly suited for evaluations of relative survival or return to creel of different trout strains or species when tagged trout were < 17-cm long at tagging. Tag loss varied by species and strain of trout, size of fish, and anatomical location of tag insertion. Because of this variability, differences in the numbers of tags returned from different strains or species could not be readily attributed to performance differences between groups. Fine-fabric Floy tags may be suitable for short-term evaluations of angler harvest of rainbow trout (≥ 17 cm TL) in lakes where most fish are caught within the first six months after stocking.

Introduction

Michigan Department of Natural Resources (MDNR) has annually stocked approximately 2.7 million trout into inland lakes and streams in recent years (Anonymous 1993, 1994). Over 90% of these trout are yearlings with rearing and stocking costs of about 75 cents per fish. Fishery managers must choose between an array of species and strains of trout and attempt to stock those that will best satisfy specific management objectives, which usually center around providing or increasing angler harvest. Managers frequently have little quantitative data available to guide these decisions. Access-site catch surveys are often used to help measure the success of stocking programs, but may be labor intensive and expensive.

Some managers use voluntary angler returns of Floy anchor tags (Floy Tag and Manufacturing Co., Seattle) as an economical alternative to access-site catch surveys to assess angler catches of stocked trout (Dexter 1991). However, to use this method it is necessary to know the rate at which tagged fish lose tags. Rate of tag loss depends upon factors such as species tagged and tagging technique (Dunning et al. 1987, Ebener and Copes 1982, Keller 1971, Mourning et al. 1994, Muoneke 1992). Because yearling trout stocked in Michigan are often quite small, we elected to test fine fabric rather than conventional (regular diameter monofilament) FD-68B Floy anchor tags. Fine fabric tags have a shorter maximum length (3.8 cm) and smaller diameter monofilament. Hence,

they are injected with a smaller diameter needle than conventional tags and should cause less tissue damage when injected. They also should produce less hydraulic drag than conventional tags.

Tag color might also affect tag loss rates and mortality if brightly colored tags promoted attacks by fish or avian predators. Tag loss attributed to attacks directed at tags by brown trout *Salmo trutta*, rainbow trout *Oncorhynchus mykiss*, and Pacific salmon *Oncorhynchus sp.* has been previously reported (Lister and Harvey 1969, Smith and McPherson 1981, McAllister et al. 1992, Brewin et al. 1995). Such attacks have also been reported to cause injury, and in some instances mortality, to individuals tagged with brightly colored (red) tags (German and LaFauce 1955). Other investigators have concluded that yellow external tags attract piscivorous fish resulting in increased mortality of tagged fish (Lawler and Smith 1963, Armstrong and Blackett 1966). Many anglers who observed orange tags applied to trout, for an evaluation of their performance in a stream (Dexter 1991), hypothesized that the tags would induce higher predation mortality by avian predators.

Our primary objective in this study was to measure tag loss rates for FD-68B fine-fabric Floy tags to help assess their suitability for evaluations of trout survival or harvest rates. We used different strains of small yearling rainbow and brown trout. We also evaluated whether or not tag loss was affected by fish size at tagging, tagging technique (insertion of tag