

RETENTION AND SURVIVAL RATES ASSOCIATED WITH THE USE OF T-BAR ANCHOR TAGS IN MARKING YELLOW PERCH

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ABSTRACT

We assessed retention and short-term mortality rates associated with tagging yellow perch (*Perca flavescens*) with t-bar anchor tags (FD-94 Floy® tags) by conducting 2- to 4-d net-pen trials. Yellow perch were captured from two South Dakota lakes with trap nets during October 2000 and 2001, when water temperatures ranged from 9° to 13° C. Retention and mortality rates for yellow perch (total length range: 151 - 266 mm) tagged from East 81 Slough during October of 2000 (n=19) were 100% and 5%, respectively. Retention and mortality rates for yellow perch (total length range: 265 - 325 mm) tagged from Pelican Lake during October of 2001 (n=22) were 95% and 0%, respectively. Based on average results, anchor tag retention (mean=97.7%) was high and tagging mortality (mean=2.6%) was low for yellow perch collected and tagged using this sampling approach. Yellow perch tagged in Pelican Lake were significantly larger than yellow perch tagged in East 81 Slough ($t = 13.929$, $df = 19$, $P < 0.001$), but neither size-dependent tag retention ($\chi^2 = 0.885$, $df = 1$, $P = 0.347$), nor size-dependent tagging mortality ($\chi^2 = 1.187$, $df = 1$, $P = 0.276$) was observed.

INTRODUCTION

Since introduction in 1968 (Dell 1968), internal t-bar anchor tags have been extensively used to mark mass numbers of fish that need to be individually distinguishable upon recapture (Muoneke 1992; Pierce and Tomcko 1993; Pegg et al. 1996). To obtain unbiased data, tag retention must be accounted for in biological statistics derived from tagging studies. Several studies have shown t-bar anchor tag loss to be negligible (Cucin and Regier 1965; Curtis 1970; Stobo 1972; Bulak 1983; Franzin and McFarlane 1987; Pegg et al. 1996), while other studies reported relatively high rates of tag loss (Keller 1971; Rawstrom 1973; Wilbur and Duchrow 1973; Ebener and Copes 1982; Tranquilli and Childers 1982; Muoneke 1992).

Mortality associated with tagging process must also be evaluated prior to drawing conclusions based on tagging study results (Bulak 1983; Curtis 1970; Stobo 1972; Tranquilli and Childers 1982). While proper tagging techniques can minimize mortality, inexperience or carelessness could cause increased mortality rates associated with the tagging process.

Severe underestimations of biological statistics for a population can result when tag loss and mortality associated with tagging are not measured (Dryer 1964; Ebener and Copes 1982). Few studies have assessed tag retention and tagging mortality in yellow perch (*Perca flavescens*) (Stobo 1972). As part of a study designed to estimate yellow perch exploitation rates in eastern South Dakota glacial lakes, we determined initial tag retention and mortality rates associated with FD-94 Floy® t-bar anchor tags.

METHODS

Yellow perch were collected in overnight trap net sets when water temperatures ranged from 9° to 13° C. Yellow perch from East 81 Slough (Brookings County) were tagged during October 2000; perch tagged in Pelican Lake (Codington County) were collected during October 2001. Fish were removed from nets and placed in a holding tank supplied with fresh water prior to tagging. All tagged yellow perch were measured to the nearest mm (total length; TL). Tags (Floy® FD-94; 45 mm long with 10-mm anchor) were inserted at a 45° angle with a tagging gun (Avery-Dennison® Mark III) just under the dorsal fin. The tagging gun needle penetrated high on the body and was twisted 90° to allow the t-bar to become locked behind the interneural bones. Sub-samples of tagged yellow perch were held in floating net pens (1 m x 1 m x 10 m) for 2 - 4 d. Tag retention rates (% of fish retaining tags) and mortality rates (% of fish dead) were estimated for each trial.

RESULTS

Retention and mortality rates of yellow perch (TL range: 151 - 266 mm) tagged from East 81 Slough during October 2000 (n=19) were 100% and 5%, respectively. Retention and mortality rates of yellow perch (TL: 265 - 325 mm) tagged from Pelican Lake during October 2001 (n=22) were 95% and 0%, respectively. Yellow perch tagged in Pelican Lake were significantly longer than yellow perch tagged in East 81 Slough ($t = 13.929$, $df = 19$, $P < 0.001$), but neither tag retention ($\chi^2 = 0.885$, $df = 1$, $P = 0.347$), nor tagging mortality ($\chi^2 = 1.187$, $df = 1$, $P = 0.276$) were significantly different in the two trials.

DISCUSSION

Although Rawstrom (1973) observed high initial tag loss, our study supported numerous other studies that recorded high tag retention (Cucin and Regier 1965; Curtis 1970; Stobo 1972; Bulak 1983; Franzin and McFarlane 1987; Pegg et al. 1996). To achieve high tag retention it is important to lock the anchor bar of the tag behind the interneural bones. Tags can be lost if they are improperly inserted, if they rotate so the prongs are no longer perpendicular to the interneural spines, or the width of the tag is smaller than the distance between the interneural spines (Waldman et al. 1990).

The only tag shed in this study was from a 273-mm (TL) yellow perch from Pelican Lake. If the interneural spacing was larger than the width of the anchor (10 mm), the tag may have worked itself out; however, tags were retained in all perch larger than 273 mm (N = 20). Size-dependent t-bar anchor tag loss was seen in striped bass over 592 mm using t-bar anchor tags with a prong width of 10 mm (Waldman et al. 1990). We observed no size-dependent tag loss in yellow perch.

Mortality associated with tagging is expected in all tagging studies but in our study tagging mortality was low, supporting previous work (Bulak 1983; Curtis 1970; Stobo 1972; Tranquilli and Childers 1982; Pierce and Tomcko 1993). We observed no evidence of size-dependent tagging mortality in yellow perch. Most tagging mortality is associated with handling during the tagging process, so if fish are tagged quickly and handled properly, mortality should be minimized.

We found initial FD-94 floy t-bar anchor tag retention to be high in yellow perch. Yellow perch survival rates associated with using these tags was low. Although tag loss and mortality estimates were low, they must be accounted for in tagging studies designed to assess exploitation rates.

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