

Chemical Marking Of Fingerling Striped Bass Otoliths

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Management Data Series
No. 64
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ABSTRACT

Lapillus otoliths from 25 striped bass (Morone saxatilis) immersed in 250 mg/l of oxytetracycline-HCl (OTC) in June 1988 were examined for OTC-induced fluorescence after 1 year. All lapilli exhibited some degree of induced fluorescence when viewed under UV light.

INTRODUCTION

Striped bass (*Morone saxatilis*) are an important game fish which supported a sport and commercial fishery in the Gulf of Mexico early in this century (Fieldler 1936, Powell 1976). Induced spawning and fry culture techniques for striped bass have been refined to allow routine striped bass fingerling culture (Bonn et al. 1976, Colura et al. 1976, Powell 1976). A dependable supply of fry and fingerlings has resulted in both fresh and salt water stockings in Texas and throughout other gulf states for population enhancement (Moczygemba and Morris 1977, Nicholson 1983, Matlock et al. 1984, Minton 1985).

Striped bass stocked in Texas bays have been primarily fry (22,500,000) and fingerlings < 40 mm TL (1,288,000) (Dailey 1990). Survival estimates of stocked fish are needed to evaluate the success of stocking programs. A reliable method of marking stocked fish is necessary to determine survival. Fingerling fish are difficult to mark due to stress associated with physical marking (Tsukamoto 1985, Lorson and Mudrak 1987).

Fish exposed to tetracycline antibiotics by immersion, injection or ingestion incorporate the antibiotic in newly-formed bone tissue. The antibiotic is subsequently detectable under ultraviolet (UV) light as a golden-yellow fluorescence (Weber and Ridgeway 1962) which provides a physical mark for future identification. Immersion in tetracycline antibiotics has been used to mark larvae and juveniles of a number of fish species (Hettler 1984, Schmitt 1984, Tsukamoto 1985, Bilton 1986, Lorson and Mudrak 1987, Wilson et al. 1987, Muth et al. 1988, Tzeng and Yu 1989). Tetracycline antibiotics have also been fed to fish for marking purposes (Weber and Ridgeway 1962, Choate 1964, Trojnar 1973, Harrell 1983, Wahl and Stein 1987). The objective of this study was to determine marking success after 1 year for striped bass fingerlings (< 40 mm TL) immersed in 250 mg/l of oxytetracycline hydrochloride (OTC).

MATERIALS AND METHODS

About 314,000 striped bass fingerlings were immersed in 250 mg/l of OTC in June 1988. About 174,000 fingerlings were transported from the U.S. Fish and Wildlife Service (USFWS) hatchery near Tishomingo, Oklahoma to upper Trinity Bay in the Galveston Bay system on 2 June 1988. These fish were transported in 10 o/oo NaCl in three approximately 740-liter capacity compartments; 185 g of OTC were added to each compartment to obtain a nominal OTC concentration of 250 mg/l in each compartment. Fish were held in the OTC solution for about 2 h. About 30,000 fingerlings from the San Marcos and Inks Dam USFWS facilities and 110,000 fingerlings from the Oklahoma hatchery were transported to the same location on 9 June. Fish were transported in separate hauling trailers under conditions similar to those on 2 June with the exception of the addition of 25 mg/l of Prolong (Argent Chemical Laboratories, Redmond, Washington) to each hauling compartment for the Oklahoma fish. These two groups of fish were immersed in 250 mg/l OTC by the same methods used on 2 June. After OTC immersion was completed, hauling water was tempered by exchange with bay water until salinity and water temperatures in the hauling trailer approximated those in the bay. Fish were released into the bay, with

the exception of about 100 fish from each group which were retained to monitor marking success and mark retention. Fish from all three groups were transported alive to the Perry R. Bass Marine Fisheries Research Station near Palacios and placed in 575-liter fiberglass tanks. Fish received a diet of chopped shrimp (Peneaus sp.) and floating pellets daily. The 25 surviving fish were sacrificed on 1 June 1989 and lapilli otoliths removed and examined under UV light using a Nikon Optiphot compound microscope equipped with a 380-425 nm excitation filter, a 430 nm diachroic mirror and a 450 nm barrier filter at 100 X magnification.

RESULTS AND DISCUSSION

All lapilli from fish immersed in OTC exhibited some degree of induced fluorescence. However, marks were difficult to detect in some otoliths and were not visible at all in others until they were cleared for 30 days in a solution of 60% glycerine and 40% water. Freshly-removed lapilli exhibited no or very faint fluorescent marks with a few exceptions.

No reports of marking juvenile striped bass by immersion in OTC are available. Harrell (1983) observed 50% marking success 2 months after striped bass fingerlings were fed a ration containing 0.1 g OTC/kg feed for 1 week. OTC was suspended in fish oil and added to feed at the research site. However, when the OTC concentration was approximately 4.4 g OTC/kg feed and OTC was incorporated in the feed at the mill, marking success was 99% after 2 months and 88% after 4 months. Harrell (1983) regarded tetracycline deposition in bone material as evidence of marking success, but did not specify which bone was examined for deposition, nor did he provide feeding rates. Feeding OTC appears to be a suitable method for marking juvenile striped bass. However, immersion in OTC provides more flexibility in marking as fish from any source can be marked in a relatively short period of time.

As lapilli are relatively small compared to sagittae, a dissecting scope is required for otolith collection, and collection requires more time than for sagittae. However, lapilli are easily examined for fluorescence without the grinding or sectioning necessary when examining sagittae. Immersion in glycerine for a short period clears lapilli sufficiently for fluorescence to be detected in the whole structure.

Immersing juvenile striped bass in an OTC solution is a viable method of marking these small fish, as marks were retained for 1 year. However, difficulty in detecting OTC-induced fluorescence indicates further work with OTC concentrations and soak times is necessary to produce a more visible mark. Refinement of otolith processing and storage procedures may also increase detectability of fluorescence.

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