

FISH MANAGEMENT SESSION

AN EVALUATION OF SEVERAL MARKS ON CHANNEL CATFISH, *ICTALURUS PUNCTATUS* (RAFINESQUE)

By Thomas K. Hill¹, Garland B. Pardue
and Barry W. Smith
*Agricultural Experiment Station
Auburn University, Auburn, Alabama*

ABSTRACT

In November, 1969, four groups of channel catfish, *Ictalurus punctatus* (Rafinesque), with 20 fish per group were marked and put in cages in an earthen pond at the Auburn University Agricultural Experiment Station, Auburn, Alabama.

Marking methods consisted of four dyes injected and applied with a tattoo machine, two fluorescent pigments and a hot and a cold brand.

The fish were sampled weekly for a period of 28 weeks and each mark was evaluated on the basis of mark retention and ease of identification.

Blue latex injections, hot brands and cold brands were the most effective marks used in this study.

INTRODUCTION

It is necessary to identify individuals within and between populations of channel catfish, *Ictalurus punctatus* (Rafinesque), for selective breeding experiments. This study was initiated to evaluate several types of marks with the hope that some of them would prove suitable for use in identifying individual fish.

Arnold (1966) listed 12 characteristics that an ideal fish mark should possess. The most important of these are that it should be permanent, have no effect on the fish, should be easily applied and detected, and should have a number of possible variations. No known marking material or method is completely satisfactory, however, the materials and techniques utilized in this investigation appeared from the literature to satisfy many of the requirements for a good mark.

MATERIALS AND METHODS

On 12 November, 1969, three groups of 20 channel catfish were marked and stocked in 1/3 m³ wire baskets in a small pond at Auburn University, Auburn, Alabama. Another group of 20 fish was marked and stocked in a similar basket in the same pond on 25 November. The fish were anesthetized with quinaldine as the marks were applied.

The dyes used in the experiment were injected under the skin of the fish with a 2½ cc disposable syringe with a ⅛-inch needle. The tattoos were applied with a small tattoo machine powered by a 6-volt battery. Fluorescent pigment was sprayed on two groups of fish with a low pressure spray gun with compressed air at 160 PSI. The fluorescent marks were observed with an ultra-violet lamp. An electric brander, with a nickel-chrome wire, with a 12-volt battery as a power source, was used for a hot brander. A mixture of dry ice and ethyl alcohol cooled the branding iron for the freeze-brands.

¹Present Address: Georgia Coastal Plain Experiment Station, P. O. Box 748, Tifton, Georgia 31794.

The fish were offered floating feed daily at the rate of 1 per cent of their body weight. They fed sparingly until 1 December when they ceased feeding altogether. The water temperature remained below 60 F from 1 December until 15 March, 1970. During that period of time, no feed was given to the fish.

The markings were evaluated once each week for 28 weeks and the observations recorded.

Group I

The 20 channel catfish in group I had a mean length of 234.7 mm and a mean weight of 97.9 g. Fast blue liquid latex was used to inject 10 of these fish on the underside of the left mandible and on the left ventral side near the pelvic girdle. Chapman (1957) produced a mark that lasted over a year on juvenile steelhead trout with colored latex. The remaining 10 fish in group I were tattooed under the right jaw and on the right ventral side near the pelvic girdle. All 20 catfish in the group were marked by spraying with orange fluorescent pigment in the manner described by Jackson (1959).

Group II

The mean length and weight of the 20 channel catfish in group II were 237.4 mm and 100.2 g, respectively. Acra violet, an acrylic polymer emulsion, was used as the marking agent on this group of fish. Ten of the catfish were injected under the left jaw and on the ventral left side in the pelvic girdle region while the remaining 10 fish in the group were tattooed in the same two areas on their right sides using acra violet. In addition, all of group II was sprayed with pink fluorescent pigment.

Group III

The 20 channel catfish in group III had a mean length of 226.7 mm and a mean weight of 88.2 g. All of them were injected under the left jaw and on the left ventral side in the pelvic girdle region with chromic oxide, a green pigment, mixed with water. Smith and McLain (1962) injected lamprey with chrome green and produced marks that lasted over 4 years. The consistency of the material used in this study was so thin that it was impossible to effectively produce tattoos on the fish.

Fish in group III were also marked with an electric brander. Moav, Wohlfarth and Lahman (1960) reported good results in marking carp with this technique. The nickel-chrome wire was bent into a V-shape and used to mark 10 of the catfish on the left side of the body and the other 10 on the frontal region of the head.

Group IV

Mercuric sulfide, a bright red compound was mixed with water and utilized to inject the 20 channel catfish in group IV. They had a mean length and weight of 246.6 mm and 107.8 g, respectively. The marking material was placed under the left jaw of the fish and in the pelvic girdle area on the left ventral side. DeBruyn and Kabisch (1961) used mercuric sulfide to successfully mark brook trout.

Group IV fish were also marked with a cold brand. A zero (0) about 1 inch in diameter was put on the right side of the body of each fish with a branding iron of the type used for horn branding of cattle.

RESULTS AND DISCUSSION

No mortality was attributed to any of the marking techniques or to the marking materials used in the study. When the water temperature reached 80 F near mid-May, the fish began to die from *Chondrococcus columanaris*. As a result, the experiment was terminated May 27, 1970. At that time, groups I, II and

III had been marked for 28 weeks and group IV for 26 weeks. The percentage survival of the four groups of fish are given in Table 1.

TABLE I
Survival of Marked Catfish

	Number Stocked	Percentage Survival to 4 Months	Percentage Survival to Termination
Group I	20	100	75
Group II	20	100	40
Group III	20	100	65
Group IV	20	100	30

The fast blue liquid latex was superior to all injected materials and to the acra violet tattoo. The blue latex injections in both the jaw and pelvic girdle regions were visible on 100 per cent of the fish after 28 weeks. In addition, the blue latex injections did not spread under the skin of the fish as did some of the other injections. Eighty-six per cent of the blue latex tattoos were visible on the abdomen while only 43 per cent of the jaw tattoos could be identified.

The chromic oxide injections were also 100 per cent visible after 28 weeks when placed on the abdomen and 92 per cent visible when placed on the jaw. The green color was not as easily detected as was the blue. It did not hold its position well when injected on the abdomen but seemed to spread under the skin as time passed. The jaw injections were broken lines of color, not as distinct as were the blue injections.

The mercuric sulfide injections were bright red and easily seen when injected, but the material had the characteristic of exuding slowly through the skin of the fish. During the weekly examinations, small amounts of the red pigment would come off on the hands of the observer. At the end of 28 weeks, the injection marks were faint on the abdomens and virtually absent from the jaws of the fish.

The fish reacted adversely to the acra violet pigment. Within 2 weeks, the fish began to swell at the site of the mark, both on the jaw and the abdomen. By the 4th week, some of the ulcers ruptured and became necrotic around the edges of the openings. As tissue erosion occurred, the pigment was lost from the fish. The sores gradually healed and by the 20th week, the fish appeared perfectly normal. Small scars remained where the violet marks had been applied both as injections and as tattoos.

The fluorescent pigments were used because many fish could be marked in a short time with this technique. Neither pigment used in this study was satisfactory for marking catfish. When a sample of five fish was examined with an ultra violet light 3 weeks after being marked, all the fish marked with the orange pigment had small sprinklings of the material scattered over their bodies while only 1 of the fish sprayed with the pink pigment had any visible marks. Five weeks after marking, no fluorescent pigment of either color was found on any fish.

The catfish marked with the hot brand averaged 9-inches in length. The method was fast and apparently did not permanently harm the fish. The marks on the sides of the fish did not heal rapidly after application, but the time of year when the fish were branded may have been responsible for this. When the water warmed to 70 F in early April and the fish began feeding, the side brands healed quickly and completely. No infection was observed on any of the branded catfish. Since the head brands were not deep, they healed soon after application.

When the experiment was terminated, every hot brand was still visible. The side brands were more distinct than the head brands, but all of them retained their original size and shape.

The cold brands were also 100 per cent recognizable when the experiment

was ended. The average size of this group of fish was 10 inches when marked. With the 1-inch iron that was used, smaller fish would be difficult to brand.

When the fish began to grow rapidly in May, the cold brands became slightly distorted, however, the mark was still visible after 26 weeks.

CONCLUSIONS

From observations made and data obtained during the experiment, the following conclusions were reached:

1. Fast blue liquid latex is an effective marking material for use on channel catfish. Its lasting quality is better when injected under the skin when compared to tattoos.
2. Hot brands applied to channel catfish with a nichel-chrome wire electric brander retained their size and shape well for 28 weeks. The marks made with the brander on the sides of fish did not heal completely until the fish began to grow in the spring, but head brands healed rapidly.
3. Cold brands appear to be an effective mark for channel catfish in the 10-inch group and larger. The marks were very distinct until the fish began to grow rapidly. After that time, they became slightly distorted but still readable.
4. The two fluorescent pigments, acra violet, chromic oxide and mercuric sulfide are not recommended for use as marks for channel catfish.

LITERATURE CITED

- Arnold, E. N. 1966. Marking fish with dyes and other chemicals. Technical Paper 10 of the Bur. of Sport Fish. and Wildl. 44 p.
- Chapman, D. W. 1957. Use of latex injections to mark juvenile steelhead. *Prog. Fish-Cult.* 19(2):95-96.
- DeBruyn, P. P. H., and W. T. Kabisch. 1961. Experiments on the marking of brook trout by means of dyes and other marking agents. Research Report, Wis. Cons. Dept. 16 p.
- Jackson, C. F. 1959. A technique for mass-marking fish by means of compressed air. New Hamp. Fish Game Dept. Tech. Circ. 17. 8 p.
- Moav, R., G. Wohlfarth, and M. Lahman. 1960. An electric instrument for brandmarking fish. *Bamidgeh* 12(4):92-95.
- Smith, B. R., and A. L. McLain. 1962. Estimation of the brook and sea lamprey ammocete populations of three streams. *Great Lakes Fish Comm. Tech. Rep.* 4:1-18.