COLD BRANDING FOR FIELD USE IN MARKING JUVENILE SALMONIDS

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MILD HEAT BRANDS FOR MARKING JUVENILE SALMONIDS have been reported by Groves and Novotny (1965). The thermal branding method has been modified by Fujihara and Nakatani (1967) for laboratory work by using a cold medium.

We have used cold branding to mark juvenile chinook salmon (Oncorhynchus tshawytscha) and steelhead trout (Salmo gairdneri) in the field as part of a behavioral study. Using SCUBA and snorkeling, we have observed the branded fish under water.

The branding tools described by Groves and Novotny (1965) are cooled in acetone and dry ice (mixture at -78° C.). The thoroughly cooled applicator is placed between the lateral line and dorsal fin of the anesthetized fish for about 3 seconds. Then the tool is re-cooled and applied to the opposite side of the fish.

The cold brand freezes the integument of the fish and produces a mark that is readily visible in 2 to 3 days (figure 1). Most of the marks are not visible for 1 to 2 days, but usually all become dark and readable after 2 to 3 days and remain dark for 5 to 6 weeks.

Holding the branding tool on the fish for more than 3 seconds (5 to 7 seconds) produces a brand that remains dark up to 3 months but is initially blurred and difficult to read. The longer application of the tool apparently freezes the epidermal layers of the fish for some distance from the actual tool-skin contact and produces a fuzzy brand that becomes distinct in about 2 weeks.

FIGURE 1.--Three-day-old cold brand on a 73-millimeter steelhead.

Double-digit brands were successfully applied to juveniles between 37 and 185 millimeters in length. Two sizes of the branding tool were used. Applicators with 3.5-millimeter numerals were used on fish that measured less than 50 millimeters, and 6-millimeter numerals on larger fish.

Our tools were numbered consecutively from 0 to 9, but we found some numbers difficult to read in the field. For example, when fish are being observed from a distance of several feet with diving gear, the numbers 0, 6, and 9 are easily confused.

A portable box containing the necessary equipment makes it possible to mark and release fish at the point of capture within

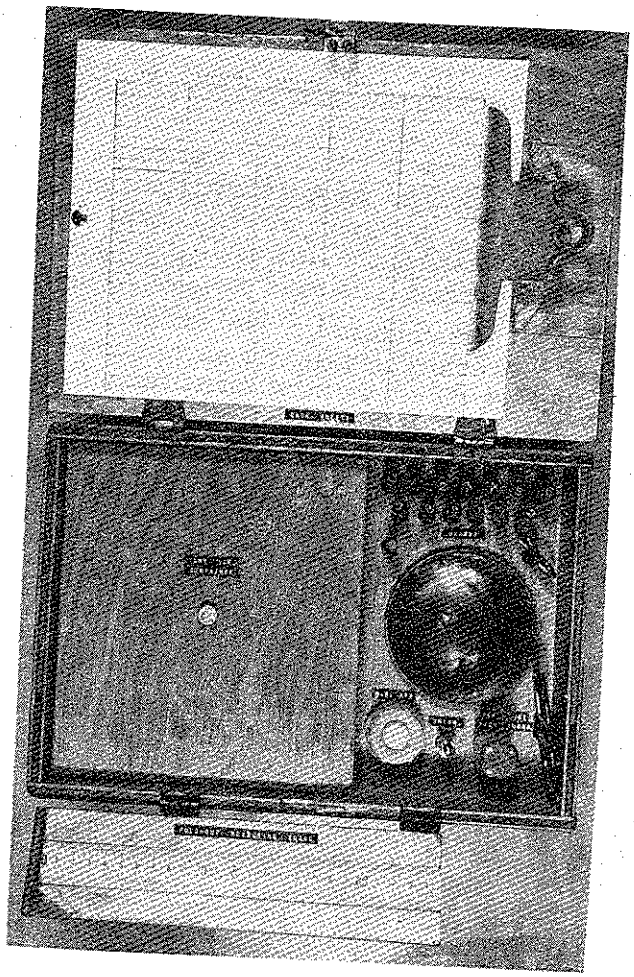

FIGURE 2.--Detail of the branding box.

a few minutes. The box we use (figure 2) is 9 by 12 by 14 inches in size and holds the branding tools, mixing container, M.S. 222, ice tongs, ice pick, thermometer, fold-out measuring board, and an insulated container capable of holding 12 pounds of dry ice. The ice, if not used excessively, will last about 4 days in the field.

Laboratory comparisons by Fujihara and Nakatani (1967) of hot and cold branding revealed advantages and disadvantages of both methods; we found the production of consistently clear, readable hot brands difficult even under laboratory conditions. Groves and Novotny (1965) recommended applying the hot brand to the fish for 1.5 seconds; we found that a small deviation in fish-tool contact time either produced a faint and unreadable mark or burned the fish, sometimes causing a lesion.

Consistently visible cold brands are easy to apply in the field, where it is difficult to maintain precisely controlled conditions. Holding a cold tool on a fish for 2 to 5 seconds produces a clear brand that initially is dark. In about 6 weeks, the mark becomes light and loses its value for individual identification underwater. One pale cold brand was still readable out of the water 5 months after application.

Cold branding is satisfactory for marking small fish when individual identification is required in the field for short-term behavioral studies.

Literature Cited

Fujihara, M. P., and R. E. Nakatani. 1967. Cold and mild heat marking of fish. Progressive Fish-Culturist, vol. 29, no. 3, p. 172-174.

Groves, Alan B., and Anthony J. Novotny. 1965. A thermal-marking technique for juvenile salmonids. Transactions of American Fisheries Society, vol. 94, no. 4, p. 386-389.

A flagellated protozoan, Bodomonas sp., was responsible for heavy mortality in goldfish (Carassius auratus) and light mortality in largemouth bass (Micropterus salmoides) at the Warm Springs, Georgia, National Fish Hatchery in 1966. This is the first time this parasite has been reported as causing trouble in the United States. However, the organism found on the goldfish at Warm Springs is very similar to, and could well be, the organism known as Cryptobia branchialis in Russia.