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FISHERIES RESEARCH BOARD OF CANADA

TECHNICAL REPORT NO. 9

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RETENTION OF PLETCHER GROW-THRU TAGS APPLIED TO YOUNG SALMON

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P. E. K. Symons

This is the fifth Technical Report from the
Fisheries Research Board of Canada
Biological Station, St. Andrews, N. B.

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The Tag and its Application

About 30 grow-thru tags of assorted sizes were obtained from Mr. F. Tony Pletcher, 116 West 44th Ave., Vancouver, B.C., for trial on young Atlantic salmon. This tag, designed by Mr. Pletcher, is simply a thin strip of plastic about 0.3 cm wide, and may vary in length from 2-9 cm. The plastic is cut with an arrow-head shape at one end. (Fig.1). The head has serrated edges shaped in such a way as to impede withdrawal of the tag from its site of insertion beneath the skin. A hole is punched in the center of the head through which connective tissue is supposed to regrow, locking the tag permanently into position. In the tags received, these holes were of two sizes. Inserted, the head is buried and the rest of the tag remains exposed. Advantages of the tag are that it is cheap, easy to apply, easy to recover from the fish, does not seem to hinder swimming of the fish, and, having no irregularities on the exposed portion, is unlikely to get caught on something and be torn off.

Tags are attached by first making a slit in the skin of the anaesthetized fish with a tagging tool, and the tag is then inserted with another tool which utilizes the hole in the arrow-head for keeping the tag from slipping off until the tool

is withdrawn. The tag must be positioned as close under the skin as possible so that it is in contact with the connective tissue between skin and musculature. Although the wound looks bad, there were no mortalities in two batches of 26 and 17 fish tagged and held for 140 and 103 days respectively. Tagged fish appear to behave normally.

Methods and Results

Twenty-six tags were attached to young salmon (10-16 cm fork length) in September, and these fish were then kept in aquaria through which water flowed slowly. Temperatures decreased through the 140 day holding period from 14°C at the start to 4°C at the finish. The fish grew an average of about 0.3 cm/month. After 140 days, only 15% of tags (95% confidence limits: approximately 6-40%) remained attached. The rate of loss was highest over the first 15 days, and then decreased to about 1.4% per day. On the 140th day the four tags remaining attached were pulled off. Judging by the force needed to remove them, and by the manner in which they came away, growth through the hole in the tag's heads apparently had taken place.

Because this was the first experience with this sort of tag, and retention might improve with practice in application, a second trial was started 37 days after the beginning of the first trial. The 17 fish of this second group measured initially 14-19 cm fork length, and averaged 0.2 cm growth per month

over the 103 days of holding. Temperatures during this period dropped from 10.5°C to 4.0°C.

Retention in this second trial was better than in the first, because possibly greater care was taken to ensure that the head of the tag rested in or as close as possible to the connective tissue between skin and musculature. Fifty-three percent (95% confidence limits: approximately 30-80%) of tags remained attached at the end of the trial. Rate of loss during the first 20 days was slightly higher than later, the average loss per day being about 0.7%. The nine tags remaining attached on the 103rd day were pulled off and one was found to be loosely attached. Growth through the hole in the other 8 tags' heads seemed to have occurred, judging by the criteria specified above.

The time at which tissue grows through the hole in the head of the tag is not known, but would appear to occur usually before 100 days. The slight concavity of the line showing the results of trial 2 in Fig. 2, when compared to the eye-fitted straight line, might indicate that the rate of tag loss is decreasing. If this possible decrease in rate of loss is the result of tissue growth through a steadily increasing proportion of tags (it could be a result of decreasing temperature and activity), promotion of fast growth immediately after tagging might result in better retention of tags. Growth could be promoted by holding fish in water of optimum temperature and by providing plenty of food; growth rates up to three times

those recorded for fish in this experiment are possible (Saunders, R.L., unpublished report). On the other hand, increased activity of fish held in warmer water might offset any advantages to be gained from faster growth.

Differences in retention of different shapes, sizes and material of tags could all have arisen by chance. Table 1 summarizes the characters of 41 tags applied (several were applied twice and two broke). It gives the percent retained at termination of holding, approximate 95% confidence limits, and numbers in each class.

Table 1.

Type of tag	% Retained	95% Confidence Limits	Total number of each sort
small hole in head	38	19-64	21
large hole in head	30	12-54	20
short shaft (2-4.5cm)	35	20-63	23
long shaft (5-9 cm)	32	14-61	18
light flexible plastic	43	15-70	14
heavy stiff plastic	30	10-50	27
Second trial only:			
used in first trial	54	22-84	11
not used previously	50	———	6

Differences in size, shape of material of tags appear, at best, to have a minor influence on retention, though such small differences, if real and not random, could be important when thousands of tags are being used. Of the 17 tags applied in the second trial, 11 were ones which had been applied in trial 1 and had come off in the intervening days. The results of the second trial could have been improved if a growth promoting substance was secreted onto the tag during the first application, or could have been worsened if those tags which fell off in the first trial were truly poorer in retention ability. Table 1 shows that the retention of tags applied for a second time in trial 2 was as nearly equal to those applied for the first time as the sample size would allow. Therefore the difference in retention between the two trials appears to have been solely the result of improved technique of application.

Conclusion

The purpose of these trials was to find out if the Pletcher grow-thru tag was retained by the fish sufficiently well during the initial period after application to warrant further consideration as a replacement for tags presently used on Atlantic salmon by the Fisheries Research Board of Canada at St. Andrews, N. B. These latter tags are a Swedish "Carlin" type attached either with steel wire or polyethylene through the back of the fish at the level of the dorsal fin. Bergeron (1959) held 47 Atlantic salmon smolts, and Pyle (1965) 50 brook trout

marked with this type of tag attached with steel wire for one year and for 28 weeks respectively in hatchery troughs. Neither reports detachment of any of these tags over the periods held. Of 36,000 Atlantic salmon smolts marked by F.R.B. personnel with these tags, using a polyethylene attachment, in both 1966 and in 1967, and held 5-6 weeks in hatcheries before release, no tags have been reported lost, though loss of a few tags could have been overlooked. The grow-thru tag with its minimal loss of 0.7% per day shows by comparison such poor initial retention that further testing was considered unnecessary unless improvements can be made. Because of the advantages of this tag, this conclusion is disappointing.

References

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Pyle, E. A. 1965. Comparative tests of three types of vinyl tags on growth and swimming performance of brook trout held in hatchery troughs. Fisheries Research Bull. No. 28. The Nutrition of Trout. Cortland Hatchery Report No. 33 for the year 1964.

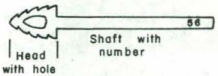

Figure 1. The Pletcher grow-thru tag (actual size) is cut from a single piece of thin plastic. This tag has a large hole in its head; holes in some others were half this size.

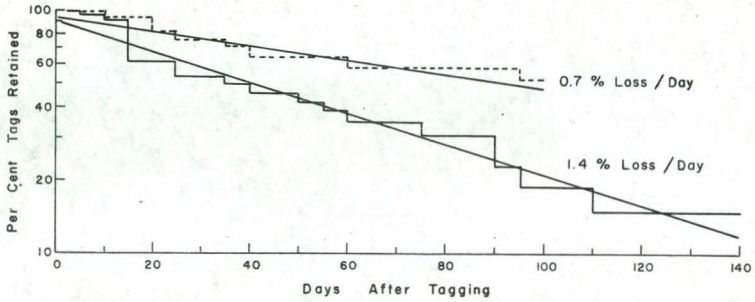

Figure 2. The rate of loss of tags in two trials.