

INSTITUTE FOR FISHERIES RESEARCH  
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REGENERATION OF CLIPPED FINS BY TROUT

This problem was attacked because of the possible bearing it might have on fin-clipping as a method for mass markings of fish in the field. Rainbow, brook, and brown trout were obtained from the U. S. Fisheries Station at Northville, Michigan. The fish were kept in 30-gallon, glass-sided aquarium tanks in the aquarium room at the University of Michigan Museum of Zoology.

On November 23rd, 1934, the dorsal and adipose fins were removed from seven fingerling rainbow trout. Seven others were marked by removing the anal and adipose fins. These fish lived until the 11th of December, 1934, when they were killed accidentally during regeneration of the filterbed of the water system.

On the 17th of December, 1934, another lot of fish was secured from Northville and placed in the aquaria. They were allowed to become accustomed to their new habitat for three days, and on the 21st of December, 1934, were marked in the following manner.

Tank A	No.	Fin Clipped	
Rainbow	7	Dorsal	) All adipose fins removed
"	6	Anal	
Brook	1	Dorsal	
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Tank B			
Rainbow	6	Dorsal	1 both dorsal and anal
"	6	Anal	
Brook	1	Dorsal	All adipose fins removed
"	1	Anal	
Brown	1	Dorsal	

In the clipping operation a pair of sharp dissecting scissors was employed. The fins were cut as close to the body and as cleanly as possible. The fish swam un- certainly for 30 seconds or so after being returned to the water, but seemed to recover from the shock in a short time. Their swimming ability did not appear to be affected. The wounds resulting from the clippings healed in less than a week and were not sources of infection. The fins in the vertical plane (with the exception of the caudal) were chosen for clipping (rather than the pectorals or the pelvics) because it is the author's belief that these fins are of but slight importance in swimming and therefore the excision of these would interfere little with natural movements.

In order to determine the amount of regeneration, the clipped fins were measured, using a pair of dividers. The measurement was made along the anterior margin from the edge of the pigmented skin at the base of the fin to the outer extremity of the regenerated portion, the measurement being recorded in millimeters. Unfortunately all the fish could not be kept alive for the same period of time, as some became badly affected by "popeye" and fin rot, and others died off from the effects of high water temperatures early in the summer of 1935 despite attempts to keep the water of the aquaria well-regulated. For this reason, measurements on the fins were performed from specimens which were preserved immediately on death. As the fin-rot seemed to affect the caudals most severely, standard lengths were recorded. A tabular summary of the results follows:

Species	Fin Clipped	No. of Fish	Av. Std. Length	Av. Days Before death	Av. Amt. of Fin Regeneration in mm.	Av. Amt. of Fin Regeneration per day in mm.
Rainbow	Dorsal	22	6.217	90.27	.464	.0051
"	Anal	18	6.188	93.72	1.232	.0131
Brook	Dorsal	2	7.250	120	1.500	.0125
"	Anal	1	7.375	185	4.000	.0022
Brown	Dorsal	1	7.375	120	8.000	.067

In most cases the adipose fin did not regenerate; in a few cases a slight bump would protrude where an extra layer of scar tissue had been laid down, but it never approached

anything like the original proportions. In the case of the one brown trout, the dorsal fin had regenerated 8.00 mm., but this was for only a small portion of the fin length (10 of 25 mm.), while the remainder had risen only 2 mm. over the pigmented skin.

Conclusions:

The above results, especially those of the rainbow trout, indicate that the anal fin regenerates about twice as fast as the dorsal fin. This may have been caused by not cutting deep enough into the basal elements of the anal fin rays. Despite the comparatively speedy regeneration shown in the anal fins in this experiment, the fins as a rule do not approach their original size, and if the adipose is always clipped in addition to the anal or dorsal fin, a fish may then be identified with certainty as a marked fish<sup>1</sup>. The experiment showed that the fish would be readily recognizable over a period of 6 months, and probably longer. The general results would indicate further that this method of marking may be adapted to mass experiments where collective data of not too detailed a nature are desired.

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<sup>1</sup> Marsh, Millard C., and Cobb, John N. - 1909. The Fisheries of Alaska in 1908. Rep. of the Comm. of Fisheries for 1908. Doc. 645, pp. 57-59.

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