Silver Hake Selectivity Experiments Conducted in 1964

by

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Introduction

The Bureau of Commercial Fisheries Woods Hole Laboratory completed three experiments to determine the affects on the catch of silver hake of 2.0 and 2.8-inch nylon cod ends. The first experiment was conducted aboard the Bureau's research vessel Delaware, with the cooperation of the Exploratory Fishing and Gear Research Base in Gloucester, in the near shore waters of the Gulf of Maine. The second experiment was carried out on the commercial fishing vessel Francis R. from Gloucester. The third experiment involved the use of two commercial fishing vessels from Pt. Judith, the Nyanza and David D. On these latter two experiments, the selectivities were measured during normal fishing operations, in order to assure the applicability of results to commercial operations.

In all experiments the nets were similar to or the same as those used commercially. The experimental 2.8-inch cod ends were fished alternately with the smaller meshed cod ends ordinarily used by commercial fishermen.

Summary of Results and Conclusions

The plot of estimated retention ratios for the various cod ends is given in Figure 1. All retention ratios are relative to a base net of 1.2 inches (31 mm.) which appears to retain nearly all sizes of fish available to the fishery.

The retention curve for the 2.0 inch mesh (52 mm.) is rather sharp, the 25 to 100 percent retention ratios extending over a range of about 5 mm. In contrast, the same range of the curve for the 2.8 inch mesh (71 and 73 mm.) is about 10 mm. Thus the larger mesh releases many fish through the size range which constitutes the bulk of the catch (27-36 cm.), but does not release very many more of the fish less than 25 cm. than does the 2.0 inch mesh.

Note that selectivity ratios greater than one do occur. These imply a greater catching efficiency for the larger size mesh.

The summary statistics of catch for the three experiments are listed in Table 1. Of particular interest are the relative catch rates for the various sizes of mesh. In all three experiments, the catch with the 2.8 inch cod end was just about half that with the 1.2 or 2.0 inch cod ends. The 2.0 inch cod end caught nearly as much as the 1.2 inch on the Delaware experiments.

We do not know the relative long term benefits which might be obtained by releasing these fish. However, judging from what we do know about the growth and survival of silver hake, it would be rather optimistic to expect the benefits to compensate for the large immediate loss.

Let us consider, however, the effects of using the 2.0 inch mesh in place of the 1.2 inch mesh. Since the Pt. Judith fishery is particularly concerned, we have calculated the immediate effects for such a change by applying the retention ratios for the 2.0 inch mesh estimated from the Delaware experiments to the average length frequencies of the Pt. Judith catch in 1964 (Figure 2). The weight units are in terms

Table 1.--Data on catch and selectivity of silver hake collected through experiments during 1964.

	Delaware			Gloucester		Pt. Judith	
Mesh size	52/31	52	73	50	71	33	71
Length int. midpoint (cm.)				Numbers caught			
12	136	---	---	---	---	97	---
15	1170	125	59	70	14	422	48
18	2183	417	79	496	82	2558	174
21	1365	313	89	936	125	6815	341
24	3496	793	463	2380	792	12553	2614
27	9084	5239	2424	19640	5842	17111	5828
30	4696	5156	2168	18410	7035	26585	14889
33	3496	5260	2484	7085	4138	11728	11054
36	1558	2380	1222	1275	725	4685	4733
39	586	730	473	192	123	1688	3043
42	229	209	118	---	37	642	1101
45	102	104	89	---	34	212	400
48	76	42	59	---	111	47	200
51	51	42	49	---	20	67	---
54	---	21	29	141	---	---	---
57	---	21	10	---	14	---	9
60	---	---	10	---	---	---	---
Total no.	28228	20852	9825	50625	19092	85210	44434
Total weight							
Kilo's	4472	4254	1975	7713	3176	20417	10662
Pounds	9856	9376	4352	17000	7000	45000	23500
No. tows	20	20	20	4	4	11	10
No. hours	14.7	14.6	14.4	8.0	7.0	12.0	12.1
Wt. per hour (lbs)	670	642	302	2125	1000	3750	1942
Ratio of wt. per hour 1/	---	0.96	0.45	---	0.47	---	0.52
Selectivity:							
50% length (cm.)	15.8	26.4	30.4	---	31.8	---	29.3
Selection factor	3.2	5.08	4.16	---	4.27	---	4.13

1/--Ratio of catch of larger mesh to smallest mesh in each experiment.

of lengths cubed, and do not represent absolute catches, but are proportional thereto.

These data indicate a gain of about 8 percent by weight with use of the 2.0 inch mesh. This is brought about by the apparent increase in catching efficiency, expressed in the retention ratios greater than one, which coincide with the peak length frequencies.

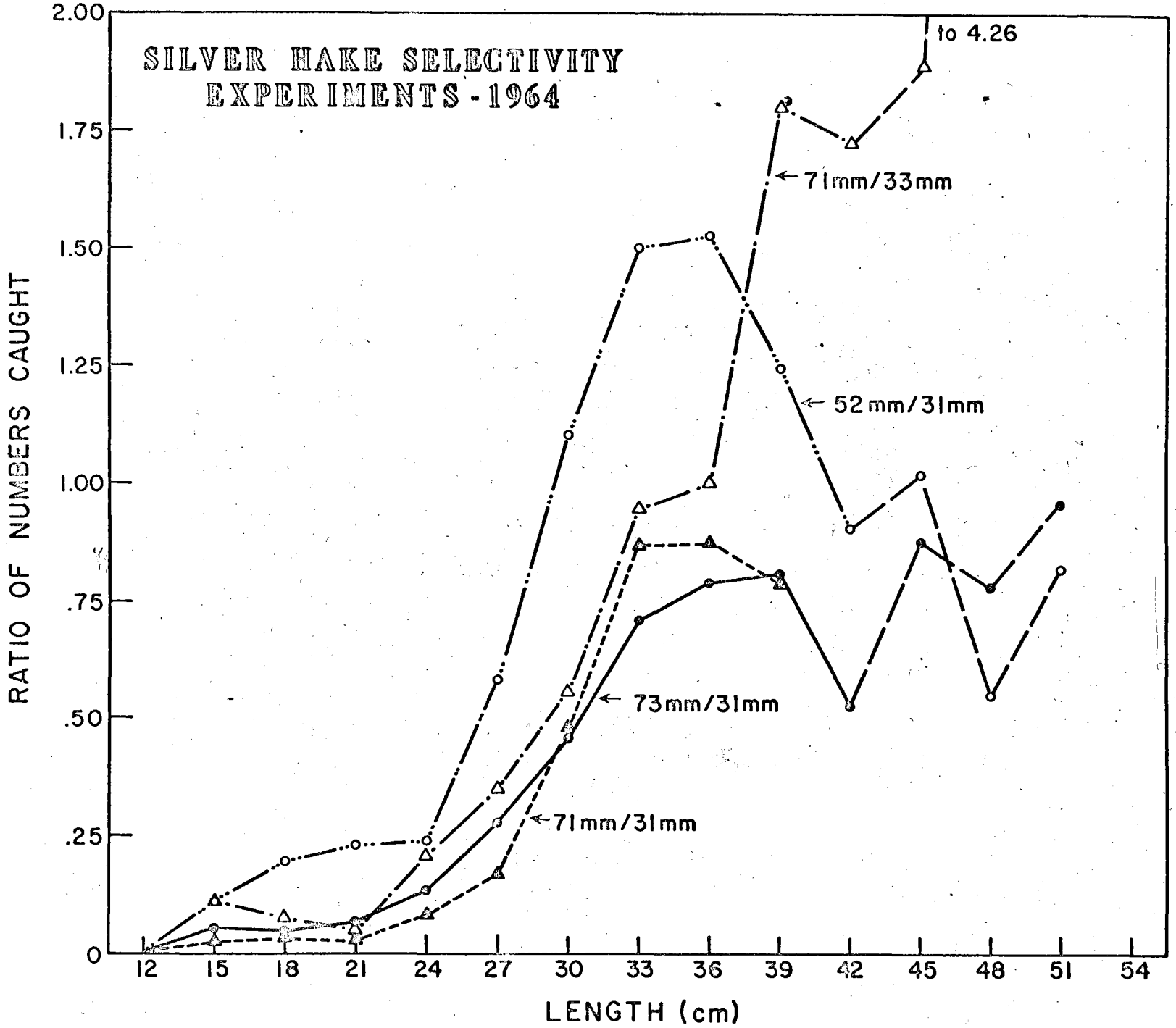

Fig. 1.--Estimated retention curves for silver hake in nylon cod-ends.

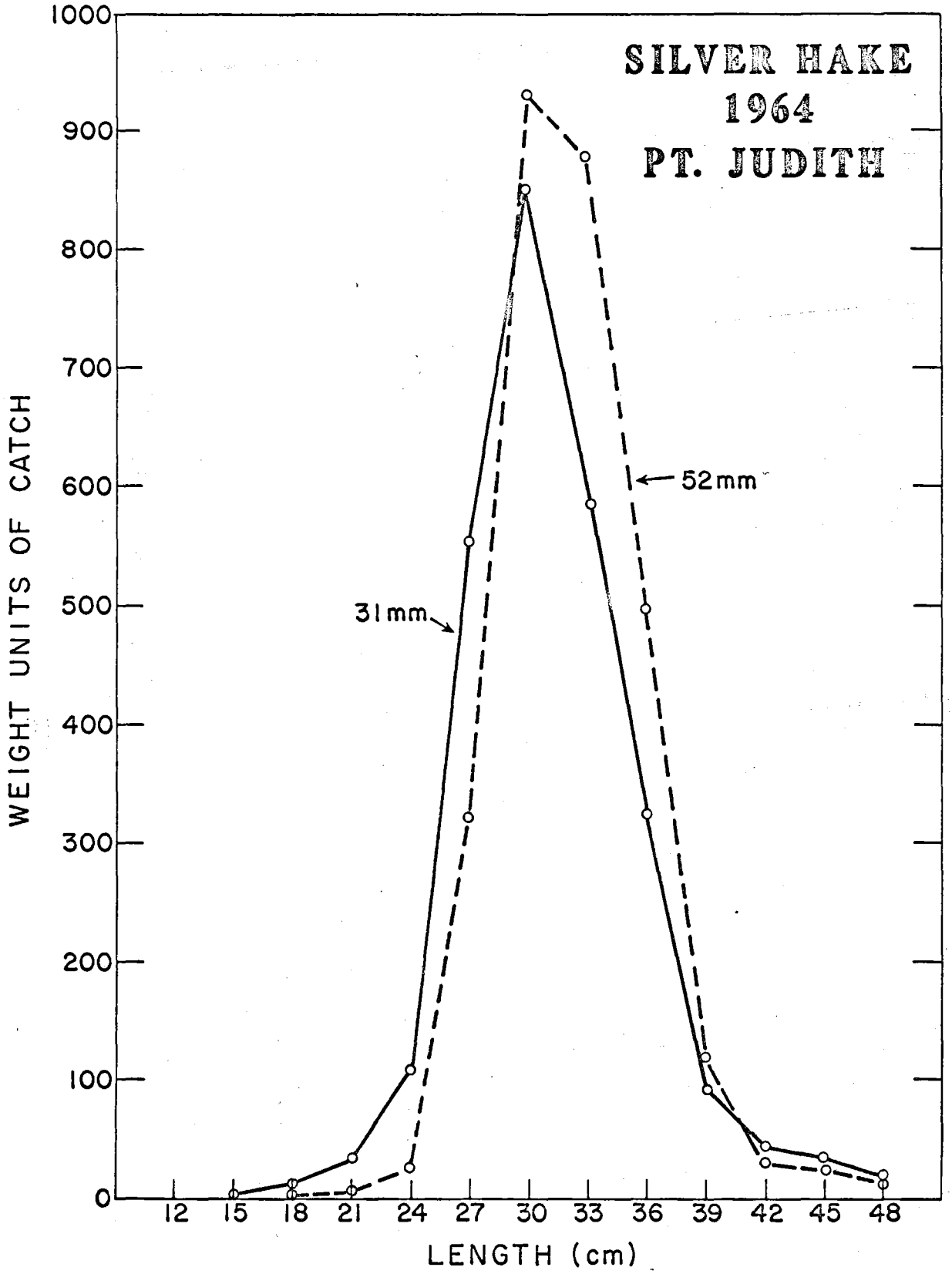

Fig. 2.--Estimated weight at length in Pt. Judith catches of silver hake with 31 and 52 mm. nylon cod-ends.