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Top Chafing Gear Studies

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At the 1958 Annual Meeting of ICNAF the prevalent use of top chafing gear was recognized. Recommendations from this meeting assigned highest priority in chafing gear studies to covered-net selection trials with the prescribed ICNAF type top chafing gear. During September 3-6, 1958, experiments with top chafing gear were carried out in Subdivision 4W where haddock of adequate size were taken in good quantities by the M. V. Harengus.

These experiments show that topside chafing gear of the same mesh size as the codend, 1½ times the width of the codend and to ICNAF specifications (described below), did not reduce escapement of haddock.

Methods

Twenty-three tows, each of 45-minutes duration, were carried out with a #36 manila trawl (60-foot headline). A new, double-strand, manila codend of 75-yard, 4-ply, untreated twine was used. Mesh sizes of the codend are shown in the following table, as measured in series along the length of the codend with the ICNAF-type wedge gauge.

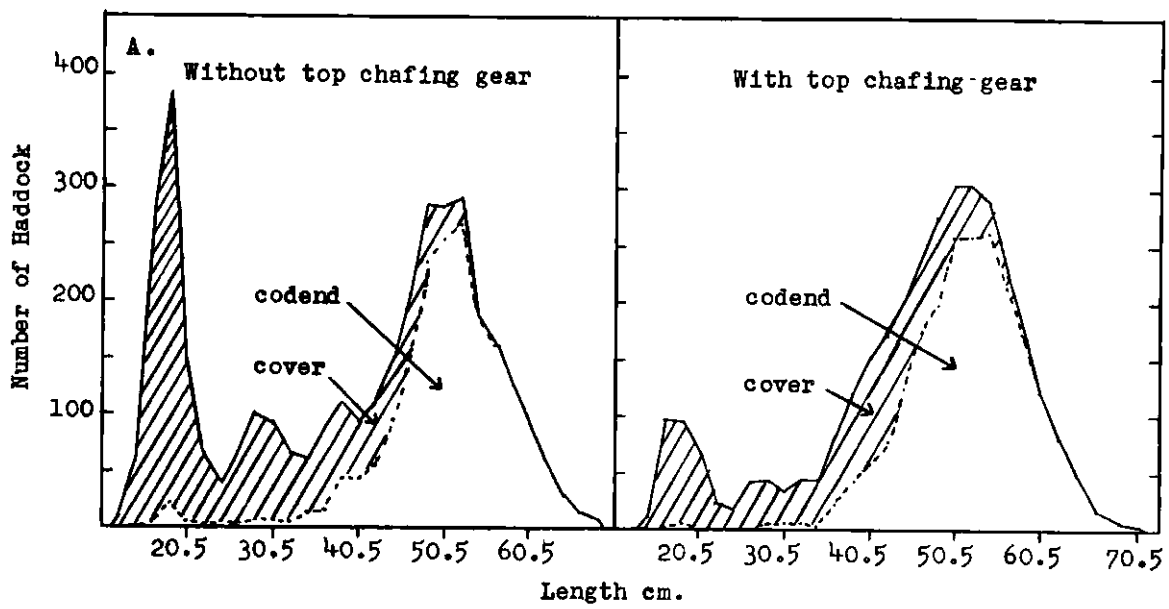
Mesh size of manila codend used for chafing gear experiment

Date	Mesh size			
	No. meshes measured	Aft half (inches)	Forward half (inches)	Average (inches)
Sept. 4/58	76	5	4 3/4	4 7/8
Sept. 5/58	78	5 1/16	4 7/8	5
Sept. 6/58	78	5	4 3/4	4 7/8

Mesh size averaged between 4 7/8 to 5 inches, with considerable variation along the length of the codend. Larger meshes, about 5 inches, were found in the aft half of the codend. Within this portion of the codend the meshes were largest, about 5 1/8 inches in the bag. Since with moderate catches the aft portion of the codend has been shown to be most effective in allowing fish to escape, the codend mesh size of the aft half, about 5 inches, has been used in calculating selection factors.

The topside chafing gear used complied closely with ICNAF specifications. A new piece of double manila netting, 18 meshes long, was attached across the codend 4 meshes ahead of the splitting strap (halving becket) attachment. This piece of netting was attached along the laceage (selvage) to a point 3 meshes from the codline mesh.

Because this netting was new and not subjected to much strain while fishing, shrinkage was excessive. To counteract this, the piece of netting was stretched with the trawl winch after the first tow. Mesh size of the chafing piece became about 4 7/8 inches and inspection on deck indicated that about the 4 aftermost meshes of the codend were clear.



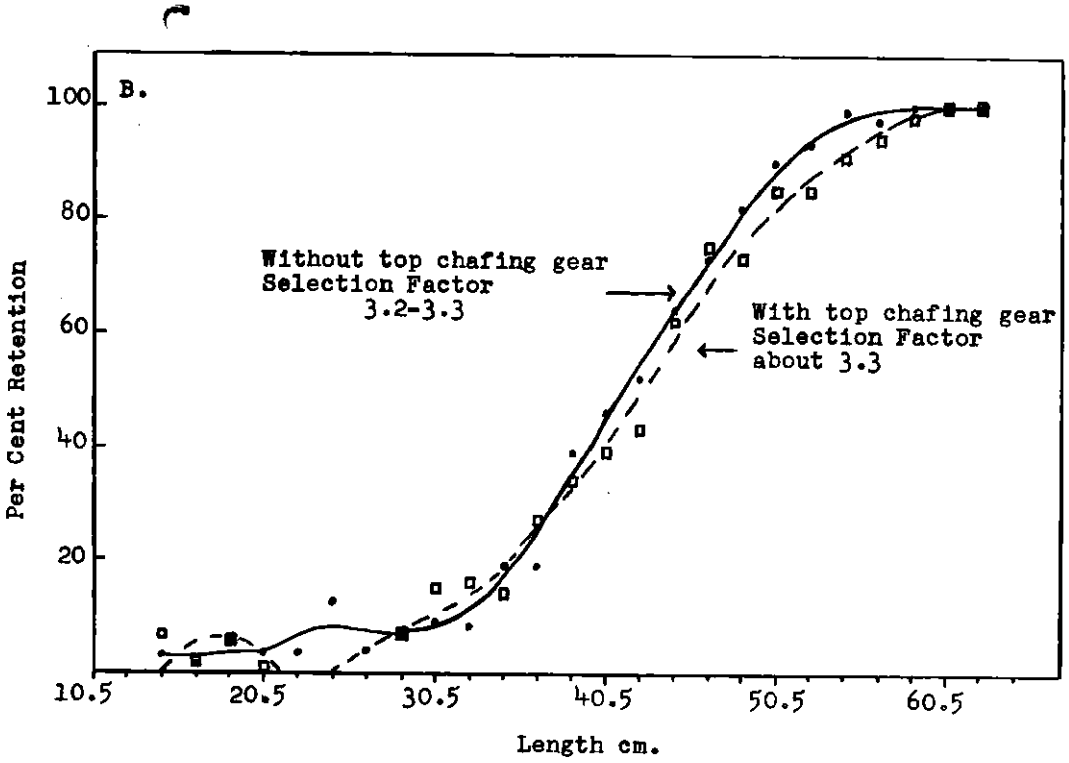


Figure 1. A. Number and sizes of haddock in codend and cover with and without top chafing gear.
B. Selection curves for 5-inch mesh, double-strand manila codend with and without top chafing gear.

The top chafing netting was 1½ times the width of the codend, although the width was probably not wholly effective, since the cover over the whole was only about 1/3 wider than the codend itself. The cover used was of 1½-inch mesh, single cotton.

Twelve successful covered-codend tows without top chafing gear were carried out in sequence (15 tows were made but the first three were discarded). Following these, the topside chafing gear was attached to the codend under the cover and 8 successful tows made. The results are shown in Figure 1.

Catches of haddock averaged about 1,000 pounds per tow. Numbers of haddock within the effective selection range were similar in the two portions of the experiment. However, many more small haddock (mode about 20 cm.) were taken during the trials without chafing gear. Numbers and sizes of haddock retained in the codend and escaping into the cover are shown in Figure 1A for each portion of the experiment. The resulting selection curves for the codend with and without top chafing gear are shown in Figure 1B.

Both selection curves are quite similar in shape and position with a 50% retention length for the 5-inch mesh codend of about 41-42 cm. The selection factor for each is about 3.2 or 3.3.

Discussion

With catches of the size shown, top chafing gear mounted according to ICNAF specifications had no influence on retention within the codend. Since the effective slack of the top chafing gear was less than that specified by ICNAF, the results suggest that netting less than 1½ times the width of the codend might be used.

Netting 1½ times the width of the codend is awkward and bulky on top of the codend. It would seem desirable to use a narrower top chafing gear if it does not affect escapement. It should be remembered that the 1½ times width specified by ICNAF regulation was arbitrarily chosen to provide what was believed to be ample slack. If experimentation shows that this width is more than enough, reduction in width would seem logical.

Previous Canadian experimentation has shown that double-layered codends drastically reduced escapement of both haddock and cod. They have also shown that top chafing gear 10% wider than the codend affected escapement. A chafing gear somewhere between 10% wider and 1½ times as wide as the codend seems likely to be adequate.

To define precisely the minimum effective width may be impractical, since it may depend upon such variables as size of catch, length of codend bag, mesh size, and species of fish. Less extensive experimentation, however, might allow significant reduction in width of specified chafing gear.