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Monofilament and Multifilament Gillnets for Sockeye - A Comparison

By Randall G. Hansen

Since fishermen are always interested in newer and more efficient ways to catch fish, this pamphlet summarizes the recent experience of a group of gillnetters in the state of Washington in hopes that their findings may benefit other fishermen.

For the past three years, commercial gillnetters in Washington have been experimenting with twisted monofilament nylon gillnets to compare their efficiency with that of the standard crystal multifilament nylon nets that have been in use for the past five or six years. Monofilament gillnet web has been declared illegal, of course, because of its extremely high efficiency. The new twisted monofilament gillnets seem to be almost as efficient, however, and they have the advantage of being legal.

Some fishermen have been somewhat disappointed in the results obtained with this new high-priced gear, but others have been quite satisfied. In 1976, the author of this pamphlet initiated an informal study to pinpoint major differences between twisted monofilament and crystal multifilament gillnets and to predict the possible effects on stocks of Fraser River sockeye.

Three commercial gillnet vessels were outfitted in 1976 with standard 300-fathom-long gillnets, and they fished the entire Fraser River sockeye season with panels of twisted monofilament inserted in the multifilament gillnets. Two of the nets were the usual stretch mesh of 5 1/8-inch size and they were 140 meshes deep. Each had a 5 1/8-inch by 140-mesh-deep by 100-fathom-long panel of six-strand triple-knot twisted monofilament net inserted in the middle of the gillnet between two panels of multifilament net that were identical in size to the twisted monofilament panel. The third gillnet had 5 1/8-inch stretch mesh but was 150 meshes deep. Two panels of six-strand, triple-knot

twisted monofilament that were 5 1/8 inches by 150 meshes deep by 50 fathoms long were inserted between four similar panels of crystal multifilament net.

Twine diameters in all three gillnets were 0.02109 inch and 0.01807 inch for multifilament and twisted monofilament nets, respectively. The color of the multifilament gear in all three gillnets was the standard medium forest green used by most fishermen, while the twisted monofilament gear was light green.

Only one experimental net was used during the 1977 season. It had two panels of 4 7/8-inch by 140-mesh-deep by 50-fathom-long double-knot, twisted monofilament inserted between four panels of the standard 5 1/8-inch crystal multifilament. The 4 7/8-inch twisted monofilament was easily stretched to the legal 5-inch minimum mesh size.

Results achieved during the 1976 season indicated that the twisted monofilament gillnet web was the more efficient gear during calm water daylight and twilight conditions. Fish tended to lead along the multifilament gear until they came to the twisted monofilament gear; then they would dart into it so frequently that there would be a large number of fish where the panels met. During daylight hours in rough or choppy seas, this phenomenon was less pronounced since fish seemed to swim closer to the surface, move faster, and enter the multifilament gear almost as readily as they did the twisted monofilament gear. Daylight cloud cover did not seem to have any effect on the catching efficiency between the two types of gillnet web.

Efficiency of the two types of net was about equal under night conditions, with one exception. On calm nights that were abnormally dark, the multifilament web captured fish more readily than did the twisted monofilament web. Fish normally swim deep under those conditions, and during the test season, they tended to lead along the twisted monofilament net and then dart into the multifilament net. This reaction was probably due to phosphorus luminescence on the gillnets that was more pronounced on the twisted monofilament net.

The most dramatic difference noted between the two types of gillnet web was in the size of sockeye salmon captured. From over 4,000 sockeye sampled, the multifilament nets consistently captured fish that averaged 6.95 pounds during the entire 1976 season, while the twisted monofilament nets captured fish that averaged 6.45 pounds.

The 5 1/8-inch meshes of both types of net initially had mesh perimeters of 10.25 inches, but the average girths of the fish at the gills were 10.75 inches for the multifilament web and 12.46 for the twisted monofilament web. In using a stretch test commonly employed by the Washington State Department of Fisheries, the author established that the twisted monofilament web is more elastic. A 10-pound weight on three meshes of wet net indicated an elastic stretch on the middle mesh from 5 1/8 to 5 3/16 inches on the multifilament net, and an elastic stretch of 5 1/8 to 5 5/16 inches on the twisted monofilament net. This large size for the twisted monofilament was due partially to a permanent stretch of 1/32 inch in the knots after the first few sets when the net was new.

This selective action of the twisted monofilament, given the same mesh size as standard crystal multifilament, could result in overharvest of some small races of large fish such as Chilko River sockeye while fishermen are attempting to capture another race of smaller fish.

The 1977 season results from the experimental net with 4 7/8-inch stretch mesh twisted monofilament panels inserted between panels of 5 1/8-inch stretch mesh multifilament showed that the twisted monofilament captured sockeye salmon that averaged 5.90 pounds, while the multifilament web captured fish averaging just over 6 pounds. It should be noted that substantial catches were made with the twisted monofilament web during the Stewart River (strain) sockeye run early in the season when most of the fish were smaller than the average of the entire Fraser River sockeye run. However, several fishermen who used 5-inch stretch mesh twisted monofilament during the 1977 season indicated that the fish sizes compared closely to the sizes from the standard 5 1/8-inch multifilament nets.

Several other comparisons between the two types of gillnets were also noted. First of all, the stretching and slick surfaces of the twisted monofilament gear caused a higher drop-out rate as the net came out of the water. It is quite possible, therefore, that the drop-out rate in the water could have been higher, especially in rough seas.

It was also noted that fish entangled in the twisted monofilament gear were considerably more difficult to clear than those in the multifilament because of the stiff, wirelike nature of the web; thus picking time was longer with the twisted monofila-

ment gear, given the same number of fish. Scrap fish, such as dogfish and ratfish, entered and tangled in both types of net at approximately the same rate.

And finally, fishermen who have used twisted monofilament gillnets for several years seem to feel that the useful life of the new type web is only half that of the multifilament web, since it is not as strong as multifilament and is quite difficult to mend. Thus, the short life of the twisted monofilament may deter some fishermen from buying it.

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This pamphlet is one of the many publications of the Washington Sea Grant Marine Advisory Program designed to provide citizens with useful information about marine-related products and techniques and also about the wise use and enjoyment of Washington's marine resources.

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