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Full scale tests of improved longline gear

by

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#### Abstract

A new type of bottom set longline was tested in full scale fishing trials during the cod fishery off Finnmark (Northern Norway) in November-December 1984. This gear differed from traditional longline, by being rigged with swivel-mounted monofilament gangions and a new hooktype.

Compared with traditional gear, the new longline gave an improved catch rate of 72% (average).

#### 1. INTRODUCTION

The term "full scale trials" is used to indicate that the experiments are conducted on a commercial longliner during a normal fishing operation.

## 2. MATERIAL AND METHODS

These trials were conducted on a 63-foot longliner, during the cod-fishery off the coast of Finnmark, November-December 1984.

Compared with traditional gear, the new type of longline were rigged with a different type of hook and monofilament gangions mounted to swivels on the mainline. The gear parameters are given in table 1, and the hooks, and rigging is shown in fig. 1.

Table 1. Gear parameters for new- and traditional longline.

GEAR - PARAMETERS	TRAD. LONGLINE	NEW LONGLINE
MAINLINE		
- Material	Spun polyester	Polyamid
- Colour	Grey-brown	Red
- Diameter	5 mm	4.7 mm
GANGION		
- Material	Polyamid/multifilam.	Polyamide/monof.
- Colour	Green	Green
- Diameter	1.8 mm	0.80 mm
- Length	50 cm	55 cm
- Mounting	Knotted	Swivel
HOOK TYPE		
- Quality	Mustad Harwich 7295	M. O'Shaugnessy 34184
- Size	Nr. 7	Nr. 4/0
HOOK SPACING		
	1.6 m	1.6 m
HOOKS PR. TUB OF GEAR		
	300	300

The tubs of experimental gear were set randomly between tubs of standard gear. During hauling, the catch (number of marketable fish) per tub was recorded for both types of gear. The results are based on data from 9 fishing trips during the period Nov. 14th to Dec. 9th, 1984.

### 3. RESULTS

The catch was recorded as the number of fish of marketable species. However, cod and haddock were dominant and the species composition was most likely close to what was found during fishing trials on the same vessel in Oct./Nov.: Cod (61%), haddock (35%) and other species (4%). Average length for cod and haddock were 62.8 cm and 49.7 cm respectively (Bjordal, 1984).

The main results are given in table 2.

Table 2. Results : Amount of gear, number of fish and catch rates (number of fish per 100 hooks) for the two types of longline.

DATE (1984)	STANDARD LONGLINE			EXPERIMENTAL LONGLINE			Catch increase exp.line %
	No.of hooks	No.of fish	Catch rate	No.of hooks	No.of fish	Catch rate	
Nov. 14	2700	234	8.7	2400	394	16.4	88.5
17	1800	197	10.9	5700	1004	17.6	61.5
20	8400	1016	12.1	6300	1359	21.6	78.5
23	8700	944	10.9	6900	1228	17.8	63.3
27	6300	507	8.0	6600	892	13.5	68.8
30	6900	508	7.4	7200	801	11.1	50.0
Dec. 5	12000	868	7.2	9000	1000	11.1	54.2
7	11100	792	7.1	9900	1316	13.3	87.3
9	12300	990	8.0	9900	1443	14.6	82.5
TOTAL	70200	6056	8.6	63900	9437	14.8	72.1

As shown in table 2, the catch rates of the experimental longline were superior to those of the traditional gear, with an average catch increase of 72.1 per cent.

#### 4. DISCUSSION

This comparative fishing trial clearly shows that the catch efficiency of the new type of longline is superior to that of the traditional gear.

The high catching power of the new gear is assumed to be a combined effect, mainly due to the following gear parameters: New-rigged gear, swivel-effect, monofilament gangions and a more effective hook type. The relative importance of these factors on the total effect is not clear, but will be discussed on basis of earlier findings.

##### Newrigged versus old gear.

It is well known that new-rigged longline gear is more effective than old gear. One reason for this might be sour or rotten smell from old gear due to bait remnants. However, it is not known if this repels or attracts fish to the longline. The main reason for decreased catching power of old longline is more likely due to worn (weak) gangions and reduced hook quality, which will increase the possibility of catch loss and reduce the hooking probability. In an earlier experiment, new rigged gear was found to have a 27% higher catch efficiency compared with old gear, (Bjordal 1982).

##### Swivel-effect

Longline with swivel mounted gangions have been tested in earlier trials (Bjordal, 1982, Huse and Karlsen, 1977) without finding any significant differences in catching performance compared with traditional rigging. It is therefore reasonable to believe that the swivels have had a

positive, but not dramatic effect on the increased catch performance of the new line. Further, the twisting of gangions around the mainline was totally avoided due to the swivels, which is clearly beneficial for handling and baiting the gear.

#### Hook-design

The new hook has a different shape, a sharper point and a smaller barb compared to the standard hook. Earlier investigations have shown that these qualities give a significantly increased catch rate (Huse, 1979, Johannessen et.al., 1984). It must therefore be assumed that the new hook design has contributed to the improved catch rate of the new gear.

#### Monofilament gangion

The use of monofilament gangions has proven to give increased catch performance of longline gear. Compared with multifilament gangions, Huse and Karlsen (1977) obtained a 30% catch increase of cod using monofilament gangions while Bjordal (1983) obtained a 44% increase in the longline fishery for tusk and ling.

The use of monofilament gangions is therefore assumed to have contributed significantly to the positive result. The superiority of monofilament as a longline material is in earlier works mainly explained by the transparency of the material. Another obvious reason seems to be that the monofilament gangions are more easily broken when dehooking the fish. This leads to a higher rate of replacement of new hooks on lines rigged with monofilament gangions.

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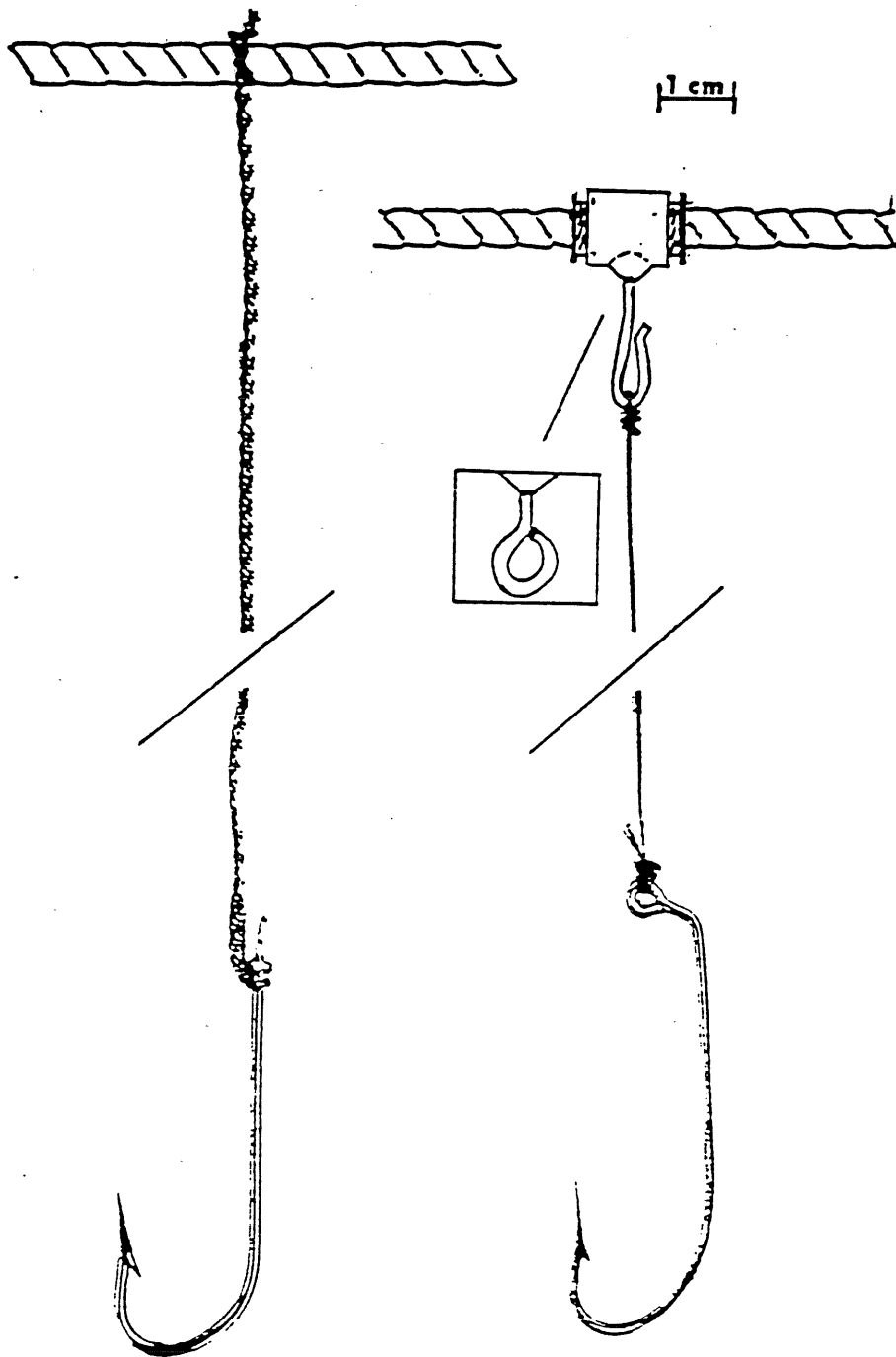


Fig. 1. Standard longline (left), and new longline with swivel, monofilament gangion and new type of hook. The swivel is made of stainless steel and the experimental gear had swivels both with open - and closed (inserted) eye.