



ARBEIDSNOTAT

Prosjekt nr.

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PROSJEKTITTEL: LINE	GÅR TIL:	Orientering	Utsalelse	Behandling	Etter avtale
NOTATET GJELDER: Fishing experiment with different types of shrimp flavoured artificial baits in longlining for spawning cod, April 1989.	Seksjonsleder Steinar Olsen				
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1 INTRODUCTION

This report describes a fishing trial with an artificial bait flavoured with a combination of synthetic chemicals and an aqueous shrimp extract. This bait has proven to be about as efficient as natural shrimp in longline fishing for cod during the spring fishery (Løkkeborg and Bjordal 1987, Løkkeborg et al. 1988). In the present study different flavours of this bait type were tested in the spawning season.

2 MATERIAL AND METHODS

2.1 Fishing ground and gear.

The fishing trial was conducted from April 10 to 18, 1989, on a commercial longliner (M/S "Bjørnsvik") operating at Moskenesgrunnen off the coast of Lofoten (Northern Norway) at 120-195 m depth.

A semi-pelagic monofilament longline, floated 4-35 m above the bottom was used (see Løkkeborg and Bjordal 1987). The soaking time was two days.

2.2 Experimental design.

The artificial baits were supplied by Whitney Marine Laboratory, University of Florida. They were prepared by incorporating feeding stimulants into a polyurethane foam covered with a surface coat. Two of the bait types tested had no surface coat. Bait types flavoured in five different ways were tested:

Type I. Natural shrimp extract in the foam and synthetic shrimp mixture in the surface coat. This bait is the reference and has been tested in previous trials (Løkkeborg and Bjordal 1987, Løkkeborg et al. 1988)

Type II. Natural shrimp extract in the foam, with no surface coat.

Type III. Synthetic shrimp mixture both in the foam and the surface coat.

Type IV. Modified synthetic shrimp mixture in the foam and the surface coat. The nucleotides were left out of this mixture.

Type V. Synthetic shrimp mixture in the foam, with no surface coat.

The baits were cut into a size of 35 x 20 x 3 mm, and their real size when fishing was 39.5 x 23.5 x 6.0 mm.

The experiments were based on paired comparisons between one of the artificial baits and natural shrimp bait. The experimental longlines were baited with the two baits in clusters of about 50 similarly baited hooks. To prevent wetting of the artificial baits prior to setting, thin plastic sheets were laid between the baits and the longline. Three or four skates containing about 290 hooks each were set in each comparison.

During hauling of the gear the fate of each hook (species of hooked fish, loss of bait, entanglement, loss of hook) and the total length of cod and haddock were recorded.

3 RESULTS

The catch consisted mainly of cod (*Gadus morhua*), but included also species such as haddock (*Merlanogrammus aeglefinus*), torsk (*Brosme brosme*) and saithe (*Pollachius virens*).

Artificial baits of all types gave significantly lower catch rates than natural shrimp bait (Table 1). The catch rates were from 40% to 80% lower for the artificial baits. The highest catch rates were achieved with artificial bait of Type II (natural extract in the foam, no surface coat) and of Type IV (modified synthetic mixture in the foam and the surface coat), whereas Type III (complete synthetic mixture in the foam and surface coat) and Type V (complete synthetic mixture in the foam, no surface coat) gave the lowest catch rates.

All artificial baits caught cod of higher mean length than natural shrimp bait. These differences were, however, not significant.

The numbers of haddock caught were low both for artificial and natural baits. Pooled across all comparisons, artificial baits caught 2 haddock and natural bait caught 15 haddock.

The bait loss of artificial baits varied from 1% to 6%,

whereas the loss of shrimp bait varied from 17% to 43%.

4 DISCUSSION

The results achieved in the different comparisons are somewhat surprising and difficult to explain. There are, however, two factors that are of importance when trying to explain these results. First, natural shrimp bait soaked for 48 h prior to baiting gave about the same catch rate as fresh shrimp, indicating that olfactory stimuli are not of great importance in attracting the cod to a pelagic longline (Johannessen 1984). The taste of the bait is, however, probably important to trigger the approach and attack response towards the baited hook. Second, the catch on artificial bait relative to that on natural bait has shown to be higher at higher total catch rate, indicating that the catchability is influenced by the total catch rate or fish density (Løkkeborg et al. 1988).

The artificial baits of Type II and V were made to test the importance of the surface coat, and their catchability should be compared to Type I and Type III, respectively. The results indicate that the surface coat, which is made to prolong the release of attractants, does not improve the catchability of the bait. The explanation may be that a prolonged release of attractants is not important in the fishery for spawning cod. These cod are migrating and fish will come into contact with the gear even if the baits are releasing attractants below the thresholds for detection. An alternative explanation may be that the attractants in the coat are not lasting long enough to be effective. Higher total catch rate and higher bait loss for natural bait when testing Type II bait than Type I bait explain the higher catch rate for this bait.

The results for artificial baits of Type III and IV indicate that the nucleotides make no positive contribution to the catching power. On the contrary, the results indicate a negative effect. However, also in this comparison the total catch

rate and the bait loss for natural bait were higher when testing Type IV bait than when testing Type III bait. Furthermore, when testing Type IV bait larger fish were caught. The artificial bait has in earlier fishing trials proven to be more efficient for larger cod (Løkkeborg and Bjordal 1987, Løkkeborg et al. 1988).

The highest catch rates were obtained for artificial baits that had natural shrimp extract in the foam (Type I and II), whereas except for Type IV bait, completely synthetic artificial baits (Type III and V) gave low catch rates. This indicates that a natural extract may be important for the catchability of the bait or that the synthetic mixture is lacking some of the stimulating compounds.

5 REFERENCES

- JOHANNESSEN, T. 1984. Fishing experiments with different longline baits for cod, February 1984. Int. Coun. Explor. Sea Ad Hoc Working Group on Artificial Bait and Bait Attraction. Hirtshals 1984.
- LØKKEBORG, S. and Å. BJORDAL 1987. Testing of artificial bait in longlining for cod and haddock, April 1987. Field Rep. inst. Fish. Tech. Res. Bergen, 01.06.87.
- LØKKEBORG, S., B. TOTLAND and J. T. ØVREDAL 1988. Testing of shrimp flavoured artificial baits of different sizes in longlining for cod and haddock, April 1988. Field Rep. inst. Fish. Tech. Res. Bergen, 30.05.88.

Table 1. Numbers and mean lengths of cod caught on shrimp bait and artificial baits.

Type of bait	Hooks fished ^a	Number caught	Catch per 100 hooks	Difference ^b	Mean length
Shrimp bait	563	49	8.7		65.0
Art. bait, Type I	557	21	3.8	-56.7%***	67.1
Shrimp bait	436	58	13.3		63.0
Art. bait, Type II	419	33	7.9	-40.8%*	67.4
Shrimp bait	429	69	16.1		60.4
Art. bait, Type III	415	9	2.2	-86.5%***	61.6
Shrimp bait	420	81	19.3		65.4
Art. bait, Type IV	380	44	11.6	-40.0%**	68.1
Shrimp bait	426	56	13.1		62.1
Art. bait, Type V	424	11	2.6	-80.3%***	65.8

^a Number of hooks recorded during hauling excluding entangled and lost hooks.

^b The difference in catch rate between artificial and natural bait calculated as the percentage of the catch rate for natural bait. A significant difference in catch rate was tested by binomial test (* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$).