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Cruise report, "Heliotrope"

Svein Løkkeborg

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Background

A collaboration agreement was established between Scapeche and Institute of Marine Research (IMR) during spring 2016, and a contract was signed 9.6.2016. The collaborative project is a part of the two-year French project Pasamer, which objective is to develop an autoline fishery for hake and black scabbard. The project is based on fishing trials carried out on board “Heliotrope”, which is a former trawler that has been rebuilt and fitted with Fiskevegn automatic longline system.

The role of IMR in the project is to give advice on the use of autoline in general and to assist in the development of a longline fishery targeting hake and black scabbard. Specific tasks to be carried out by the personnel of IMR are:

- Consulting meeting with Scapeche before the fishing trial
- Participating in 12-day fishing trial on board “Heliotrope”
- Consulting meeting with Scapeche after the fishing trial
- Prepare a cruise report describing observations made during the fishing trial and recommendations for future work.

Consulting meeting with Scapeche before the fishing trial

The meeting was held at Colag Hotel in Lochinver (Scotland) on the 25. June, 2016. The IMR personnel Svein Løkkeborg was informed by Francois Theret about the project Pasamer. This included information such as rebuilding of “Heliotrope” for longline operation, installation of the Fiskevegn autoline system, the longline gear used on board the vessel and the training of the skipper and crew. Earlier trials to float longlines off the bottom was discussed. In these trials different sizes of floats and weights have been tested. The floats and weights are attached to the longline during setting, and depths sensors have been used to record the height of the longline above the sea bed. More experiments with floated lines are planned for the present fishing trial. In addition, experiments with monofilament snoods will be carried out. A briefing with the skipper and the observer on board “Heliotrope” was also made to discuss the plan for the cruise.

Participating in 12-day fishing trial on board "Heliotrope"

The fishing trip started from Lochinver on the 28. June, 2016 and ended in Lorient on the 7. July, 2016. Fishing operations were carried out on three different fishing grounds. The two first fishing grounds were north of the Hebrides and the third was south of Ireland (Table 1). The longlines were baited with a combination of squid and mackerel baits.

Table 1. The positions and depths of the three fishing ground where "Heliotrope" fished during the trials.

Fishing ground	Latitude	Longitude	Depth (m)
1. North of Hebrides	59 50.9	6 24.5	400-700
2. North of Hebrides	59 37.0	6 34.8	260-700
3. South of Ireland	50 12.8	7 54.8	38-100

Floated longlines

One magazine of 9 longlines (120 hooks each) were set with weights (8.4 kg in air, 7.3 kg in water) and floats (8 l, 5.55 kg buoyancy force) on the first fishing ground. The distance between each float and weight was 135 m (90 hooks), and the floated longlines were set at 450 m depth. The depth sensor recordings showed that the floats lifted the longlines 50-60 m above the sea bed. A similar trial with weights and floats was carried out on the second fishing that was located approximately 15 nautical miles further south. The floated longlines were set at 300 m depth, and the depth recordings showed that the sections of the longlines with the floats were only 10 m above the sea bed, indicating strong currents in this area. The 10-mm longline used on board "Heliotrope" is much more exposed and vulnerable to current than the thinner longlines used in the traditional hake fishery.

Monofilament snoods

Monofilament snoods were tested on the last fishing ground. On three magazines, some of the traditional multifilament snoods were replaced with monofilament snoods. The catch results did not indicate that the monofilament snood gave increased catch rates. However, this was a preliminary trial that involve a low number of hooks. The loss of monofilament snoods was high because the loop attached to the swivel often broke.

Consulting meeting with Scapeche after the fishing trial

A debriefing meeting was held at the Scapeche office in Lorient on the 7. July. Based on the observations and experiences made during the fishing trip, two issues were discussed:

- Improving the autoline system to target hake
- Improvements to make "Heliotrope" more efficient.

The recommendations given below are based on this discussion and earlier studies testing different gear parameters.

Discussion and Recommendations

Autoline system to target hake

The longline gear used by the Spanish vessels to target hake differs from the autoline systems in many respect:

- The mainline material (monofilament) and dimension (thinner)
- The snood material (monofilament), dimension (thinner) and length (longer)
- The hook type and size (smaller)
- The bait (mainly sardine)
- The setting method (floated off bottom).

All these gear parameters may have an effect on the catching efficiency for hake, and some of them are likely to be more important than the others. Smaller hooks have been shown to be more efficient than larger hooks for several groundfish species (Bjordal and Løkkeborg 1996; Erzini et al. 2001; Ingolfsson et al. in prep.). The catching efficiency of the small hake hook should therefore be compared with the larger EZ-hook used by autoliners. This comparison should be carried out on board a vessel using the Spanish semi-pelagic longline design to target hake. The hake hook cannot be used in an autoline system, and if this hook type proves to much more efficient for hake than the EZ-hook, the autoline system is inappropriate for targeting hake. Erzini et al. (2001) compared the catching efficiency of four hook sizes and demonstrated that catch rates for hake decreased significantly with increasing hook size.

Monofilament mainline, long snoods and sardine baits are other gear characteristics that are incompatible with the autoline system. Herrmann et al. (2016) tested the effect of hook size, snood length and snood diameter and found that ticker snood resulted in a significant decrease

in catch efficiency for hake. However, the effect of mainline diameter and material was not tested in this study.

No hake were caught on the fishing trip with the lines floated off bottom, indicating that the gear design used is inefficient in catching hake. Based on findings from previous studies on performance of different longline gear designs, factors such as mainline and snood diameter and material, hook size and bait type are the most likely explanations. Thus it is reasonable to conclude that a viable hake fishery cannot be developed based on the autoline system. However, a semi-automatized system based on the Spanish semi-pelagic longline design may prove to a viable approach (see Herrmann et al. 2016).

Improvements to make "Heliotrope" more efficient

"Heliotrope" was originally built as a trawler and her seaworthiness is far from optimal for longline operation. An efficient high-sea longline vessel can set and haul longlines under very rough sea conditions. Due to safety issues "Heliotrope" must stop fishing under rough conditions which affects the number of fishing days when at sea and thus the efficiency. Furthermore, the boat is not equipped with freezing facilities which affects the length of each fishing trip. Norwegian autoline vessels stay at sea fishing for longer than a month before the frozen catch is landed. The fish caught on board "Heliotrope" is landed every 9 days and sold at the fresh-fish market. Long distances between the fishing grounds and landing sites (e.g. Lorient) result in many days steaming without fishing.

A dedicated crew is needed to operate a fishing vessel in an efficient and financially viable way. Longline fishing is not a traditional fishing method in France and crew members have to be trained the skill of longline operation. This is a long-lasting process, partic ular with respect to autoline fishing as the fisherman has to stay at sea for long periods and often work hard under rough sea condition. The changes involved in shifting from a traditional fishing method to new fishing practices are demanding and challenging.

Thus, key words for successful autoline operation are the working conditions (i.e. a modern, seaworthy vessel with nice accommodations), experienced and clever skipper and mate, and dedicated crew members. Finally, catch quotas of high-value fish species are a prerequisite for a profitable fishery which will attract the most skillful fishermen.

Literature

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