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METHODS TO REDUCE BYCATCH OF RED KING CRAB (*PARALITHODES CAMTSCHATICA*) IN PASSIVE FISHING GEARS

by

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King crab

The king crab (*Paralithodes camtschatica*) is a new species in the Norwegian fauna. In order to establish a commercially exploitable king crab population in the Barents Sea the Russians transplanted juvenile and adult crabs off Murmansk in the 1960's). The stock of red king crab has increased radically over the past few years, and the crabs are now present by the million. The government's intention is to build up a sustainable resource for future exploitation. The king crabs are therefore protected and only allowed fished through a limited pot fishery with a total quota of 75 000 crabs (2000) shared by Russia and Norway. The quota for 2001 has been increased to 200 000 crabs.

The bycatch of king crab in gillnets, cod pots and on longlines is an increasing problem along the coast of northern Norway (Finnmark). The problems are largest in the eastern part of Finnmark, but the bycatches are spreading westwards in the county. The fishermen are not allowed to land the bycatch and thus the crabs must be put back to sea. The Fish Capture Division at the Institute of Marine Research in Bergen has been working on a project aiming to reduce the bycatch of red king crab in passive fishing gears since 1999. The project's main goal has been to modify stationary fishing gears (gillnets, longlines, cod pots) in order to reduce bycatch of king crab and the damages caused by this species on gear and catch.

Gillnets

The bycatch of king crab is especially high in cod gillnets. Catches of thousands of king crabs on a single gillnet fleet (approximately 400 m length) have been reported several times, and catches of several hundreds are not unusual. Since the king crab is only allowed caught through at limited pot fishery, the crabs caught in the gillnets have to be discarded. The crabs often get crushed in the net hauling system, and are also often crushed by the fishermen to make them easier to disentangle from the net. In the wintertime crabs may freeze to death on deck as large bycatches require long time to be disentangled. This means that discarded crabs are often dead or have considerable damages, and the bycatch may therefore be an important contribution to the mortality in the crab population.

Furthermore, disentangling large bycatches of crabs causes extra work for the fishermen and causes damages on their gear. In addition entangled crabs reduce the net area for the target species. Crabs feeding on fish caught in the net reduce the value of the catch. Thus bycatches of king crab may seriously reduce gear efficiency and profitability. Proper management of the king crab stock and a profitable commercial gillnet fishery for cod require development of gear solutions which will reduce the bycatch. One method to reduce the bycatch is to use norsel-mounted nets floated of the bottom, where the idea is that the crab can pass under the net without entangling.

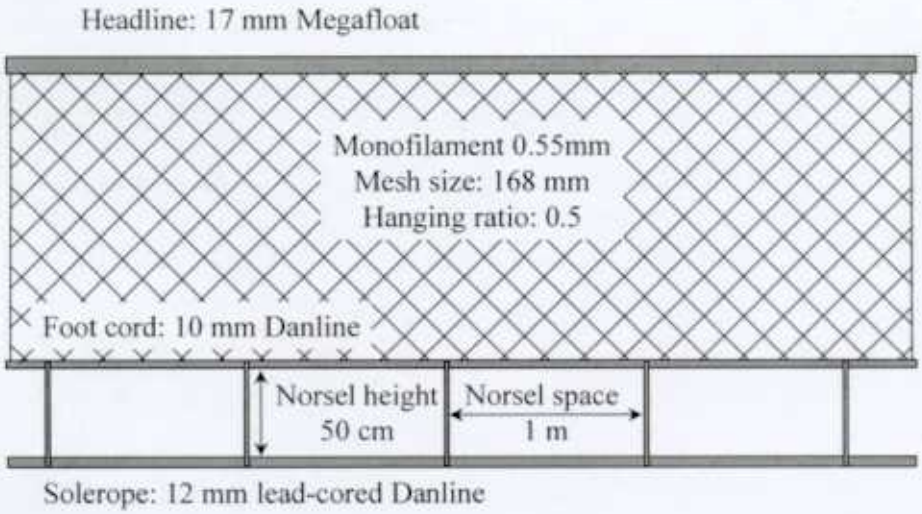

Figure 1 Sketch of a norsel mounted cod gillnet. In addition to the megafloat it was needed to attach extra floats (3 rings per net with a buoyancy of 240 g each) to get the norsels properly stretched.

The use of norsel mounted nets has given somewhat varying results. To avoid bycatch of king crab, it is important that the norsel nets have a sufficient amount of floats in order to get the norsel propely "stretched" so that the nets avoid bottom contact. The bycatch of king crab has been reduced down to an average of 0.8 crab/net. The problem is that the catch of cod in some periods has been considerably reduced as well (up to 65% in numbers and 60% in weight). During IMR's trials in 2001 the norsel nets caught 40% less cod and 60% less crab. The norsel nets caught larger fish so the reduction of cod in weight was only 30%. Several fishermen have tested norsel nets along the coast of Finnmark during the 2001 season, and the results show small differences in the catch efficiency.

Cod pots

Cod pots have been introduced as an alternative to gillnets and longlines and have in some periods shown good catches. The bycach of king crab is also high in the cod pots, but most of the crabs can be put back to sea relatively unharmed. However, large bycatches make the pots difficult to handle and create much extra work for the fishermen. The crab also causes abrasion on the pots, destroys other catch and reduces the catch efficiency. The solution tried here is to mount the pots on norsels lifting the entrances of the pot 0.5 m above seabed (see figure 2).

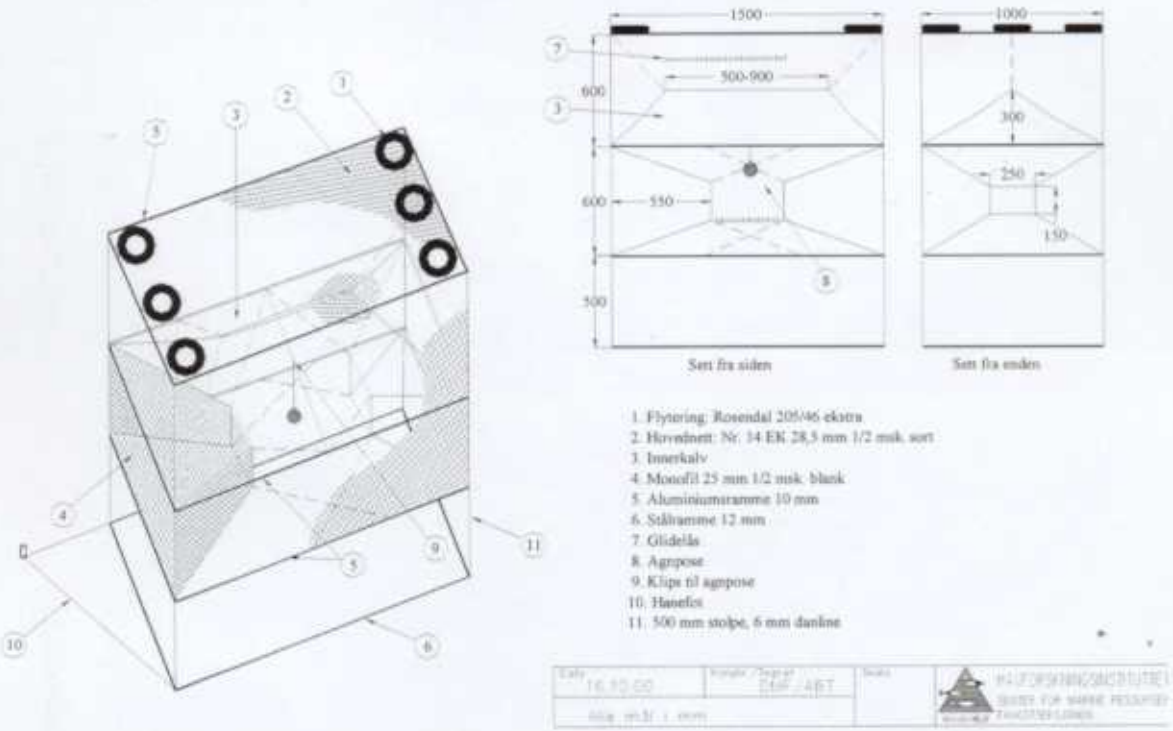

Figure 2 Cod pot mounted on norsels. The pot it self is lifted 0.5 m above seabed by use of norsels.

By mounting the cod pot on norsels the bycatch of king crab were reduced with 83% compared wit the standard bottom set cod pot. The bycatch of crab in norsel-mounted pots were mainly due to a large number of crabs in a few pots. The norsel-mounted pots caught 8% less cod than the regular pot.

Longline

The bycatch of king crab is not particularly high in the traditional bottom longline fishery, and only a few crabs are hooked and damaged. The problem experienced here is that the crabs eat up the baits on the longline and thereby reduces the gears catch efficiency considerably. Additionally the crab feeds on the fish already hooked on the longline. The solution here is use of pole set longlines, where the longline is lifted off the seabed by using floats, sinkers and poles, in such a way that the crabs cannot reach the longline (see figure 3).

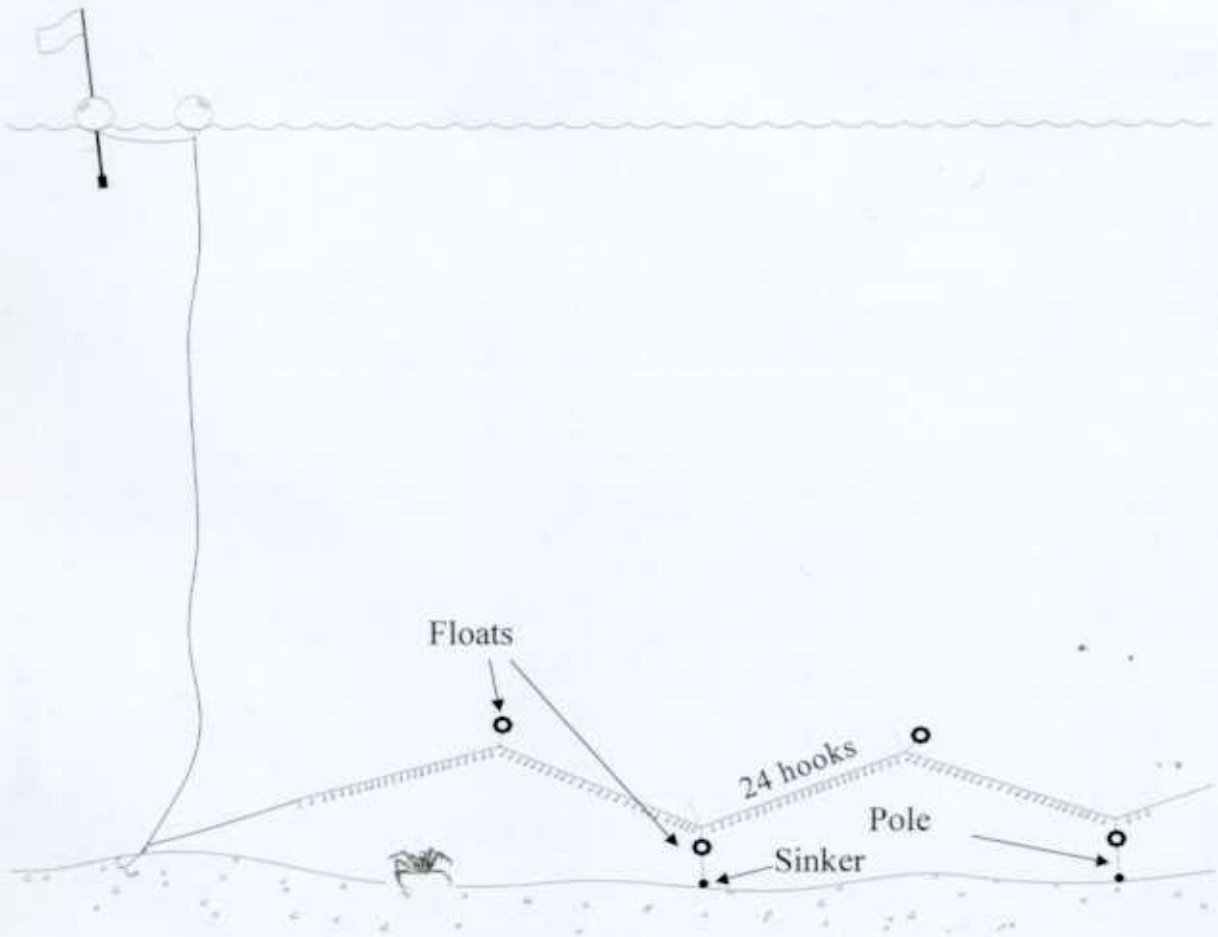

Figure 3 Pole set longline. The longline is lifted off the seabed by using floats, sinkers and poles.

Trials in the Varangefjord during the autumn 2000 showed a bycatch of king crab on bottom set longlines of only 1.6 crabs per 100 hooks, while pole set longline caught only 0.1 crab per 100 hooks. The pole set longline also caught more fish than the traditional bottom set longline. During the trails there was mainly haddock in the area, and the pole set longlines caught about twice as many haddock as the bottom set longline. All the baits were eaten by the crab on fields with high crab density, whilst they were intact on the pole set longline. Pole set longlines caught up to 5.8 as many fish as the bottom set on fields with high crab density. Of the total catch were 14 % of the fish caught on bottom set longlines destroyed by the crab while 4% were destroyed on the pole set longlines.