

Trawled *Nephrops* can experience high levels of stress and damage; however, modified catching regimes can reduce damage and improve the survival of live animals. With increasing pressure on limited resources industry needs to maximise quality. This leaflet summarises joint trials undertaken by Seafish and Seafood Scotland that investigated quality issues associated with trawled *Nephrops*.

Introduction

Trawling for *Nephrops* exposes the animals to stresses including swimming, struggling, mechanical damage and overcrowding in the net. These stresses can cause physiological changes and physical damage, which can affect quality and reduce survival.

Over recent years tow times have increased leading to suggestions that the quality of trawled product has diminished. In addition, the trawling sector has recently become interested in the high value live market and has been attempting to supply product of suitable quality.

Against this background and the need to maximise quality, work was carried out to study the effect of trawling on *Nephrops* quality. The purpose of the work was to collect quantitative data that could be used to guide future harvesting strategies.



Hauling a Twin rig *Nephrops* trawl



Codend being hauled aboard vessel

inshore group Key Features

Quality of trawled *Nephrops*



Nephrops amongst contents of cod end

The trials

Two separate quality trials were carried out aboard a typical twin rig *Nephrops* trawler. The first looked at types of damage whilst the second studied stress and survival of live animals. Both trials investigated the effect of long and short tows.

RESULTS

Damage

To ascertain how much damage was caused by trawling, *Nephrops* were examined for visible damage as soon as they came out of the codend and after the normal vessel handling procedures.

In the trial trawling caused high levels of damage to approximately 50% of animals, evident mainly as lost claws and squashed or punctured tail segments. The rostrum (nose) and carapace (head) sustained least damage. Further damage caused by grading, washing and iced storage aboard the vessel was limited indicating that most injuries occurred during trawling.

Shorter tows of one and a half hours caused 6% less damage overall than the five hour tows, and 7% fewer animals that were “severely damaged”. Although the differences in damage were significant they were small, suggesting that most damage occurs when animals encounter the gear and move towards the cod end. The trials also suggest that small animals are more susceptible to damage since 13% of small animals were highly damaged compared with 6% of larger animals. More work is needed to assess the impact of size on damage.

Given these results future research to reduce damage should focus on the design, deployment and operation of trawl gear.



Contents of cod end in hopper



Boxes of iced *Nephrops* in vessel fishroom



Sample of damaged *Nephrops*

Stress



Taking blood samples

Blood constituents such as lactic acid and blood cell counts provide a good indication of stress in *Nephrops*. These and other substances were measured to quantify levels of stress caused by trawling and to establish whether longer tows were more stressful.

The analyses showed that although trawling caused high levels of stress, the length of the tow time made little difference. This suggests that time spent within the cod end was much less stressful than encountering the gear and moving down the net. These findings contrast markedly with the low levels of stress found in creel caught animals.

The results were encouraging - after 7 days storage ashore 70-75% of the animals taken from a one and a half hour tow with a twelve hour storage time aboard the vessel survived, compared with a survival rate of just 15-50% for those animals taken from a five hour tow and stored onboard for only one and a half hours.

Many dying animals, however, displayed signs of initial tail necrosis, which adversely affects the texture of the tail meats and could impact on product quality.

Overall, the work has shown that good survival of live trawled *Nephrops* depends upon adopting short trawl times and longer storage times in seawater aboard the vessel.

Economics/industry considerations

Although shorter tow times cause less damage any financial benefits would need to be assessed against the increased costs of gear wear, and lost fishing time due to extra shooting and hauling.

In addition, any increased financial benefits of supplying live trawled *Nephrops* would need to be weighed against the costs of equipping the vessel with live holding facilities, gaining the requisite expertise to maximise survival, and altering vessel practices to handle live animals. It would be necessary to ascertain any differences in the long term market value of live trawled *Nephrops* compared with live creel caught animals.



Live trawled *Nephrops*

Further work looking at the effect of trawling on *Nephrops* damage is being scheduled by Seafish and Seafood Scotland. The trials will investigate the effect on levels of *Nephrop* damage by reducing fish bycatch using a modified *Nephrop* trawl. They are part of a programme to investigate the effect of selective devices on reducing damage.



inshore group Key Features Quality of trawled Nephrops

Conclusions

The trials undertaken in this study showed that trawling for *Nephrops* can cause considerable damage in certain conditions, with most of the damage occurring prior to the animals being brought aboard the vessel. Damage included lost claws and punctured or squashed tail segments, and varied according to the length of tow time, animal size and moult stage. Further research on damage should focus on the design and deployment of the gear, and whether the major cause is interaction with the gear and its deployment or from the *Nephrops* aggressive behaviour.

It is apparent that a considerable proportion of trawled *Nephrops* can be kept alive for a sufficient time to access live markets. However, quality issues concerning intrinsic condition and the occurrence of 'necrotic tail syndrome' would need careful consideration and require further investigation.

These trials allow us to propose a best practice for securing maximum survival and minimum stress of live animals. Tows should be less than one and a half hours duration and animals removed from light and heat. Animals should be allowed a recovery period of twelve hours or more in seawater before re-handling.

Several skippers in the Scottish prawn trawl fleet have already implemented this best practice, landing a consistently good quality product for the live market. However, their success has required extensive investment from them in terms of modified fishing operations, improved onboard handling techniques and appropriate onboard storage facilities, but one that has paid dividends.

Further information



Further information on this area of work, this project and how to obtain copies of the full reports will soon appear on the Seafish website.

www.seafish.org.uk

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