Charity Registered in England & Wales No 1159690
Charitable Incorporated Organisation

Humane Slaughter Association

Technical Note No 24

Humane Harvesting of Halibut

Summary

There is a legal and moral responsibility to prevent “any avoidable pain, distress or suffering” during harvest. Careful planning reduces the risk of potential welfare problems. Mechanical and electrical stunning can prevent or reduce suffering during the killing stages. Humane harvest may also improve the quality of the end product.

Humane Slaughter Association
The Old School. Brewhouse Hill
Wheathampstead. Herts AL4 8AN, UK
t 01582 831919
f: 01582 831414
e: info@hsa.org.uk
w: www.hsa.org.uk
Registered in England Charity No 1159690 Charitable Incorporated Organisation

Legislation

Many countries have legislation protecting the welfare of farmed animals. In Europe, Council Regulation (EC) 1099/2009 on the Protection of Animals at the Time of Killing provides specific protection for animals during killing and related operations. A common requisite of most countries' legislation is that all vertebrate animals (including fish) are spared avoidable pain, distress or suffering.

Harvesting methods

Halibut are currently grown in both sea-based cages and land-based pump ashore facilities. The choice of harvesting system will therefore depend on local resources and set up. Harvesting involves fasting, crowding, grading, transport and killing. All these processes are potentially distressing to the halibut as they involve novel, intrusive and sometimes threatening events. A well planned harvest will minimise such distress.

Fasting

Withdrawal of food for up to 72 hours prior to harvesting allows emptying of the gut in order to reduce changes in water quality due to fouling and contamination of the flesh by gut contents during subsequent harvest procedures. There is no additional benefit from fasting fish longer than 72 hours, but weight loss, stress and lower product quality may result.

Crowding

Halibut are predators and therefore value their personal space. When crowding flatfish, it is important to make sure that the crowding density does not result in too many fish lying on top of each other as this causes deaths by suffocation. The bottom net should be taut to prevent localised bunching or 'death spots'. Underwater cameras or divers are useful for monitoring fish behaviour during crowding in sea cages. Halibut are sensitive to high levels of daylight and are likely to bunch up at the bottom if an overhead covering net is not provided. Additionally, the cover provides protection against aerial predators. Water quality is likely to deteriorate rapidly during crowding therefore additional oxygen or compressed air should be provided. Use of clean nets and fasting the halibut will also reduce the detrimental changes in water quality. When crowding in offshore tanks, care should be taken to prevent physical injuries to the fish. Use of sharp-edged crowding gates or contrasting colours should be avoided. Sharp edges may result in mechanical damage and contrasting colours may frighten the fish making them harder to manage. Moving the gate slowly is more efficient as the fish are less likely to struggle and attempt escape. Sufficient water level should be maintained such that all fish are wholly immersed. Change in fish behaviour, eg vertical swimming or jumping out of water, may indicate poor water quality. An oxygen meter is indispensable during crowding. Crowding should be synchronised with the subsequent harvest processes such that the fish do not stay in a crowd for longer than is necessary.

Transport and grading

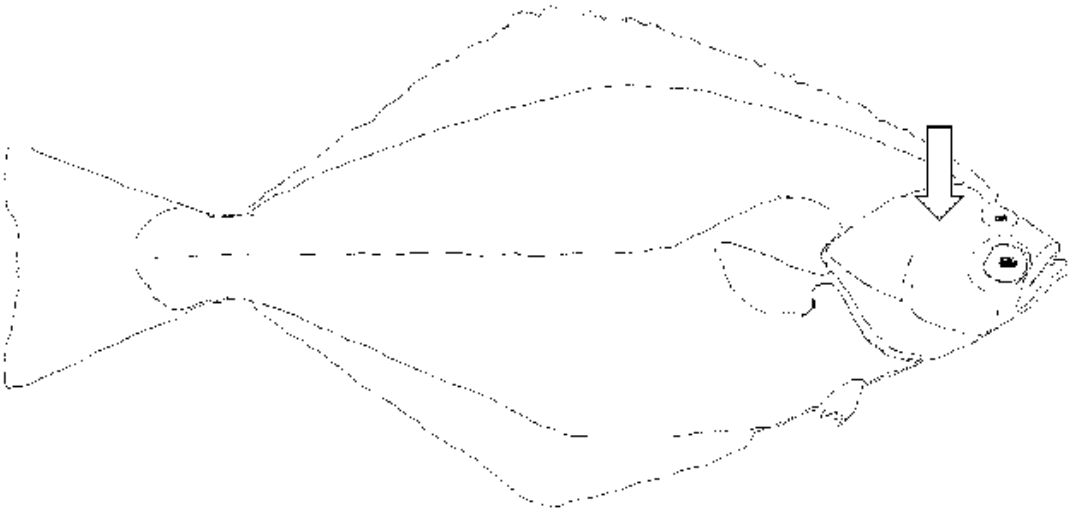
When transporting and grading halibut, it is important that the fish are held out of water for no longer than 15 seconds. Overhead cover will minimise the distress caused by exposure to light. Dry handling should be avoided as it results in de-slimed, damaged and stressed fish. When transporting halibut in crates, a wet cloth covering the top will reduce distress. Providing good water quality and supplemental oxygen during and after grading and transport will result in faster recoveries. Calm and quiet should always be maintained when handling fish out of water as sudden noises can set a whole table of halibut jumping in an attempt to escape.

Killing

The killing process is potentially painful and detrimental to the welfare of halibut. Traditionally, halibut are killed by severing the gill arches and bleeding on ice. This process is inherently painful and subjects the fish to avoidable suffering. However, now, most farmers stun the fish prior to bleeding. Stunning is any process that renders the fish unconscious and insensible to pain. Current legislation requires that any stunning method should be immediate or if slow acting, should induce unconsciousness without causing discomfort or pain.

Percussive stunning

Traditionally, halibut are stunned by a blow to the head with a blunt instrument. This method works by transferring energy to the brain causing it to crash against the skull or suffer mechanical stress. This results in a seizure-like state during which the brain is unresponsive. The success of mechanical stunning is dependent on the velocity, shape, surface-area and positioning of the blow. Correct application of sufficient force may result in an irrecoverable stun, whereas incorrect application potentially leads to injury and pain for the fish. In right handed (dextral) fish, the blow should be delivered behind the top eye, about the same distance behind the eye as the distance between the eyes, on an imaginary line from the top eye to the middle of the tail fin as indicated by the arrow in the diagram below.



A mirror image position should be applied for left-handed (sinestral) fish. This position is approximately above the largest portion of the halibut brain and is most likely to result in a good stun with less chances of causing ‘pop-eye’. A good stun should result in immediate loss of rhythmic gill motion, small quivers of the whole body interspaced with strong muscular jerks (tonic and clonic cramps) and cessation of all responses to handling. If there is any doubt that the fish has been effectively stunned, another blow should be delivered without delay. The stun may be delivered by a handheld captive bolt device designed for chickens and this will ensure a consistent velocity of the blow. However, it may physically damage the quality of the fish. Care should be taken to minimise the length of time the fish are held out of water prior to stunning.

Carbon dioxide

Halibut are sometimes killed by immersion in a carbon dioxide (CO_2) saturated bath. Halibut exhibit vigorous escape responses when exposed to CO_2 water-baths. This method causes avoidable distress and is therefore discouraged. Food grade chemical anaesthetics such as Eugenol (clove oil extract) may be used as an alternative to humanely kill halibut. However, the use of chemical anaesthetics to kill fish bound for human consumption is not allowed in the UK under current legislation.

Electrical stunning

Electricity may be used to stun halibut prior to killing. Exposure to sufficient current results in an aroused and non-responsive brain state during which the fish is insensible to pain. Electrical current may be delivered through a water bath or by directly applying electrodes on the fish (so called ‘dry stunning’). Water bath stunning is preferable as the fish remain in water and therefore do not suffer as much stress from anoxia as dry stunned fish. Moreover, dry stunning increases exposure to light and the likelihood of mechanical damage to the skin. However, dry stunning requires less electrical power, has consistent effects and may reduce the amount of product damage. It is essential that electrical stunning parameters result in immediate insensibility (the fish should lose rhythmic breathing and eye roll as well as exhibiting tonic and clonic convulsions after a 1 second stun). Inadequate electrical parameters may result in immobilisation without loss of sensibility which may cause pain and distress to the fish. Electric fields of 1 Vcm-1, 50 Hz sinusoidal AC, applied in seawater for durations longer than 10 seconds have been shown to result in a good stun. In dry stunning, 80 V applied across the head (from top to bottom) for 10 seconds is suitable for fish up to 10 kg in weight. There is a risk of product damage from electrical stunning but recent studies have not found significant loss in product quality after electrically stunning halibut.

In order for any stunning method to deliver good welfare, it must either kill the fish or result in insensibility that persists until the fish dies from bleeding or another killing process. It is therefore important that halibut are immediately bled by cutting the gill arches after stunning. Halibut have a relatively low oxygen requirement therefore killing by anoxia or in ice without bleeding may result in the fish recovering from the stun. Moreover, bleeding is thought to improve the colour, keeping quality and taste of halibut fillets. It is therefore recommended that all stunned fish are bled without delay.

It is essential that any stunning and killing methods are backed up by a contingency plan to deal with machine failures. Where machines are used for harvesting, specific personnel should be trained and competent at operating and maintaining the equipment. The fish welfare officer should ensure that all staff working on the harvest can recognise signs of distress as well as indicators of incorrect stuns. Proper prior planning and good communication will minimise the distress caused to fish during harvest.

.
DISCLAIMER OF LIABILITY
In no circumstances can the HSA accept liability for the way in which the equipment in this leaflet is used: or for any loss, damage, death or injury caused thereby, since this depends on circumstance wholly outside the HSA's control

Last updated : April 2018

Further Reading

Council Regulation (EC) No 1/2005, of 22 December 2004
Official Journal of the European Union, 5/1/005