Codes of Practice for the Welfare of Crabs, Lobsters, Crawfish and Nephrops

3. Processing Sector

JUNE 2024

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Shellfish Association of Great Britain

Crab & Lobster Management Group (CMG)

Overview of the Codes

This “Code of Practice” is part of a suite of codes that provide guidance on best practice handling and dispatch of live crustacea across the supply chain – from boat to plate. There are five individual codes which are summarised here.

Follow this link to access the other codes.

Guide 1:
CATCHING SECTOR

Guide 2:
WHOLESALE AND TRANSPORT SECTOR

Guide 3:
PROCESSING SECTOR

Guide 4:
RETAIL SECTOR

Guide 5:
FOOD SERVICE SECTOR

PROCESSING SECTOR

Aim of the Codes of Practice

These codes describe best practice for the handling and dispatch of large decapod crustaceans, i.e. crabs, lobsters and crawfish (European spiny lobster, Palinurus elephas) as well as nephrops for the live market. Many businesses are already implementing measures to ensure good standards of welfare. These codes are intended to guide all businesses to meet industry best-practice and to achieve continuous improvement in crustacean welfare.

This section of the codes describes best practice for the processing sector. Further sections describe best practice for the catching (from the moment that crustaceans are brought onto the fishing vessel), wholesale, transport, food service and retail sectors.

The codes have been written for the UK shellfish industry and supply chain and may not be applicable to all species imported from abroad, depending on their usual habitat and physiology.

What is welfare?

The Animal Welfare (Sentience) Act 2022 recognises in law that decapod crustaceans are sentient beings and that the ways in which we treat them may have an adverse effect on their welfare.

Research has shown that large decapod crustaceans are sentient. This means that they could be able to 'feel' things including pain, suffering and distress. If we do things to cause pain, suffering or distress then we say that this is bad for the animal's welfare. If we do things that prevent these feelings then we say that this is good for the animal's welfare.

We have a direct impact on the welfare of crabs, lobsters, crawfish and nephrops by the way we handle them, the conditions in which we keep them, and the way in which we dispatch them.

Who is responsible?

Everyone involved in catching, transporting, processing, preparing and selling shellfish has a role to play in ensuring the best welfare for crabs, lobsters, crawfish and nephrops. Whatever you do in the shellfish industry, you have a responsibility for the welfare of crabs, lobsters, crawfish and nephrops for the whole time that they are under your control and you are responsible for complying with all relevant legislation.

Businesses are encouraged to nominate a senior manager or controller to have oversight of the application of the codes in day-to-day operations and to put in place the appropriate plans, policies, training and monitoring to ensure good crustacean welfare across their supply chain.

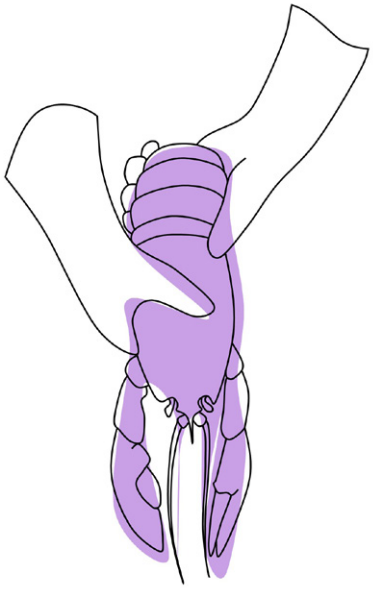
PROCESSING SECTOR - HANDLING

9. Handle with care and respect

Every time that you handle decapod crustaceans you create a risk of causing them physiological stress or physical injury. This has clear welfare consequences.

9.1 You should aim to minimise any handling of crustaceans, working as quickly and as gently as possible.

9.2 You should hold crustaceans by the carapace. You should avoid holding them by the legs or claws



9.3 The correct handling techniques should be demonstrated to anybody that handles crustaceans.

How do you know that you are doing the right things?

Your staff have been shown how to handle crustaceans and you check this regularly.

You review your performance, you identify where improvements could be made, and you set targets for achieving these.

How can you show that you are doing the right things?

You can record and monitor the percentage of the crustaceans that you process which are damaged by handling.

10. Avoid physical impacts and crushing

Even though they have hard shells, decapod crustaceans can suffer internal and external injury and physiological stress by physical impacts (such as dropping) and by crushing. These injuries are a clear welfare issue and can lead to greater mortality.

10.1 Crustaceans should not be thrown or dropped into containers but should be placed carefully into them.

10.2 Containers and boxes of crustaceans should not be dropped or thrown.

10.3 You should avoid stacking of containers of crustaceans in a way that risks crushing the animals in the lower containers.

10.4 Containers should not be so large that the weight of the crustaceans risks crushing the animals at the bottom.

How do you know that you are doing the right things?

Your staff have been shown how to avoid injuring crustaceans.

You review your performance, you identify where improvements could be made, and you set targets for achieving these.

How can you show that you are doing the right things?

You can record and monitor the percentage of the crustaceans that you process which are injured or crushed.

PROCESSING SECTOR - ENVIRONMENT & STORAGE

11. Create the best environment for health and welfare

Gills cannot function properly out of water and temperature, air flow, humidity, vibration and light can all affect crustacean welfare.

11.1 You should protect crustaceans from exposure to rain, snow, temperatures below freezing, wind, sun, light, heat, and vibration.

11.2 Crustaceans should be stored in the dark or with only such dim lighting (ideally red) as needed for staff safety.

11.3 You should aim to prevent crustaceans' gills from drying out [see information box on indicators of stress and physiological challenge].

11.4 You should store species separately.

11.5 It is good practice to minimise the duration of live storage.

11.6 Dry-stored crustaceans should be covered with a piece of wet seaweed, fabric, newspaper or hessian and kept refrigerated at between 4-8°C, avoiding direct contact between ice (if used) and crustaceans.

11.7 If storage (including storage in transport) is for periods in excess of 24 hours then you should monitor live crustaceans that are in your care for signs of stress and physiological challenge .

11.8 You should keep vivier tanks clean and ensure that water quality and temperature are maintained within the correct parameters [see information box on vivier storage].

11.9 You should plan storage and transport to minimise handling and environmental stressors, taking account of risks of delays at all stages in the supply chain.

How do you know that you are doing the right things?

You have made sure that your processes minimise crustaceans' exposure to adverse conditions.

You achieve very low levels of mortality and of indications of stress and physiological challenge.

You review your performance, you identify where improvements could be made, and you set targets for achieving these.

How can you show that you are doing the right things?

You can record and monitor the percentage of the crustaceans you receive which die whilst in your care.

You can record and monitor the percentage of the crustaceans that show signs of stress and physiological challenge whilst in your care.

You can record and monitor the environmental parameters for live storage.

Indicators of stress and physiological challenge

When storing shellfish it is important to recognise indicators of stress and physiological challenge, which are signs of poor welfare. These include:

- Distended membranes between the tail and carapace and at leg joints.
- A reflex separation of one or more limbs (autotomy).
- Rapid tail thrashing (an escape mechanism) in lobsters.
- A lack of limb movement.
- No reaction when limbs are moved.
- No reaction when mouth parts touched.
- No attempt to move or turn over when placed on their sides.

Where indicators are being used to assess welfare, then the proportion of dead animals can also be used as a measure of overall physiological challenge.

Vivier Storage

In-water storage is used throughout the shellfish supply chain: on vessels, in on-shore storage and display, and in transport. The same welfare and environmental criteria apply across all of these, although the way in which they are achieved may differ.

Oxygen: Although shellfish can survive for short periods with reduced oxygen levels these conditions result in waste products accumulating in the body which crabs, lobsters and nephrops find aversive. Oxygen saturation should ideally not fall below 85%. In closed systems, aerate from the bottom of the tank and use a diffuser to generate small bubbles which increase oxygen transfer. Note that aeration, particularly from a compressor or on a hot day, can increase water temperature and consideration should be given to cooling air if needed.

Temperature: Shellfish cannot control their internal temperature so need to be protected both from extreme temperatures and rapid changes in temperature. Cool shellfish use less energy, require less feeding and are less likely to fight with others or moult. Target temperature for storing and transporting crabs, lobsters, crawfish and nephrops is between 4 and 8°C.

Light: Shellfish tend to inhabit low-light environments and are mostly nocturnal. Crabs, lobsters, crawfish and nephrops are averse to high light levels and should be stored in the dark or with only such dim lighting (ideally red) as needed. However, working conditions need to be safe and if required light levels should be increased slowly and minimised to the area required.

Salinity: Shellfish live in fully marine waters which, around the UK, are generally between 32-35‰ (part per thousand) salt, equal to 32-35 grams of salt in one litre of water. If using seawater in a vivier tank then make sure that the source is clean and free from any possible pollutants. For example, seawater from within a harbour may be contaminated with oil or other hydrocarbons. Note that evaporation from the vivier tank can increase salinity.

Noise, vibration, impacts: Whilst there is 'noise' at sea, storage can lead to increased un-natural and unfamiliar sounds, vibration and impact leading to increased stress. Storage facilities should be designed, where practicable, to minimise the noise and vibration from pumps, motors and compressors.

Feeding: Shellfish in vivier tanks at sea should not be fed. This serves to clear the digestive system and purge waste products whilst there is sufficient fresh seawater to do so, prior to overland transport in a vivier lorry where fresh seawater is not available.

Monitoring: Any in-water system will require monitoring, maintenance and record keeping to ensure good welfare standards. In closed systems (i.e. not pumping clean, fresh seawater) the following information should be collected and retained for analysis and future reference:

- Oxygen
- pH
- Ammonia (ammonium)
- Nitrates (nitrites)
- Salinity
- Flow rates
- Stocking density
- Mortality & indicators of stress and physiological challenge
- Temperature
- Water clarity and cleanliness

PROCESSING SECTOR - PROCEDURES

12. Make dispatch as swift and painless as possible

The ways in which we stun and dispatch crustaceans have a direct impact on their welfare. Procedures for the dispatch of crabs, lobsters, crawfish and nephrops should aim to minimise the risk and extent of pain, suffering and distress.

Stunning

Stunning should make crustaceans insensible to (i.e. unaware of) internal and external stimuli, so that they do not feel pain, suffering or distress through the process of dispatch.

12.1 If dispatch is not likely to be instantaneous then it is best practice to stun crustaceans using an appropriate method [see information box on research into stunning].

12.2 Stunning methods should render crustaceans insensible and should occur immediately prior to dispatch [*see information box on signs of apparent insensibility*].

12.3 It is best-practice to use electrical stunning for brown crabs and lobsters [*see info box*].

12.4 You should avoid procedures which are intended to reduce an animal's physical activity but which can in themselves cause pain, suffering and distress. These include placing crustaceans into fresh water (i.e. causing osmotic shock) and freezing.

12.5 You should make best endeavours to avoid processing or cooking crustaceans that have not been stunned or previously dispatched.

Mechanical dispatch

12.6 To mechanically dispatch **crabs** (i.e. to destroy the nerve centres) you should use a double-spiking method [*see information box on spiking crabs*].

12.7 To mechanically dispatch **lobster-like crustaceans** (i.e. to destroy the nerve centres) you should use a whole-body splitting method [*see information box on splitting lobsters*].

12.8 Partial destruction of the nerve centres of **lobster-like crustaceans** may be achieved by splitting the head-only.

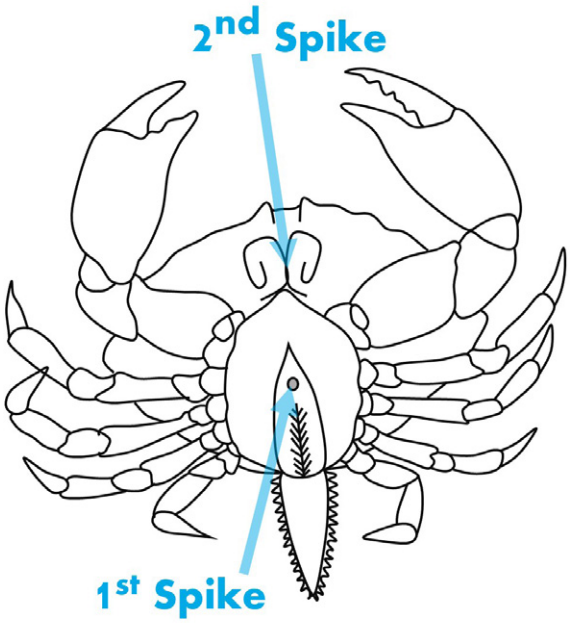
12.9 Mechanical dispatch of **crabs** and **lobster-like crustaceans** should only be undertaken by competent persons.

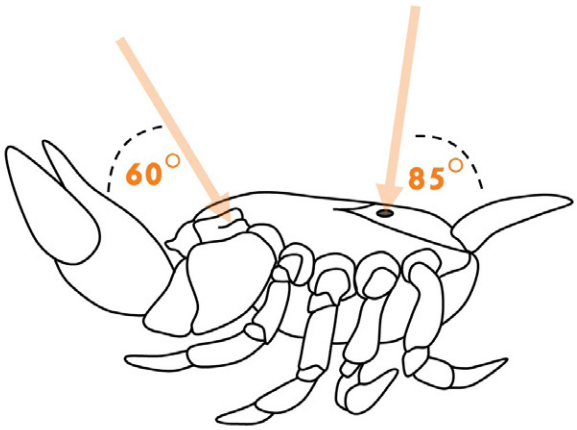
Spiking crabs

It is best practice to stun prior to dispatch.

1. Place the crab on its back on a flat, nonslip surface.
2. Lift the tail flap and insert a pointed spike such as an awl or sharp-pointed knife all the way through the rear nerve centre at an angle of 85° to the horizontal.
3. Repeat this process through the front nerve centre. Insert the spike through the shallow depression at the front of the body at an angle of 60° to the horizontal.

This procedure should be completed as quickly as possible.



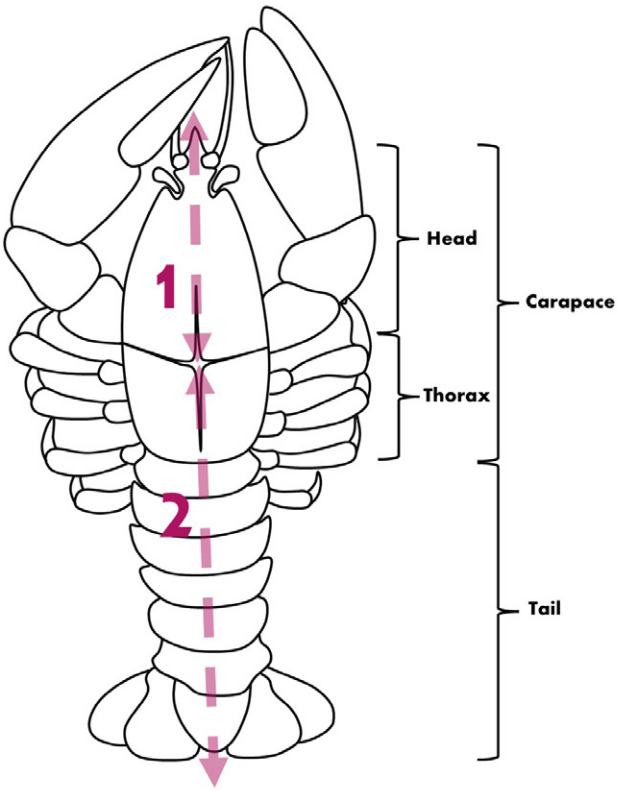


Splitting lobsters

It is best practice to stun prior to dispatch.

Head-only splitting (this will destroy the lobster's first nerve centre).

1. Place the lobster the right-way-up (i.e. legs down, carapace up) on a flat, nonslip surface.
2. Hold the lobster around the carapace with firm pressure. Note the midline on the lobster's carapace.
3. Use a large, sharp knife (preferably as long and deep as the lobster) for the cuts.
4. Place the knife point-downwards on the midline of the head, where the head meets the thorax, with the blade oriented longitudinally towards the mouth parts.
5. Plunge the knife through the lobster's head and rotate the blade of the knife to split the entire head lengthways.



Whole-body splitting (this will destroy all of the lobster's nerve centres).

6. Having split the head (steps 1-5, above), place the knife point-downwards on the midline of the carapace, where the head meets the thorax, with the blade oriented longitudinally towards the tail.
7. Plunge the knife through the lobster's thorax and tail and rotate the blade of the knife to split the entire body lengthways.

This procedure should be completed as quickly as possible.

Other methods of dispatch

Cooking or processing large crustaceans without effective stunning is very likely to result in poor welfare. The practice of chilling crustaceans prior to cooking does not in itself reduce sensibility and is likely to prolong the time taken to lose sensibility.

Dispatch by chilling (either wet (ice) or dry (air)) is also likely to cause suffering and is more difficult to achieve in species from the UK that are acclimatised to lower temperatures.

Whilst evidence on electrical stunning to render insensibility is relatively clear, the evidence of the impacts on welfare of dispatch by electrical means is less so. There are differing reports in respect of crustaceans' survivability to a second, longer delivery of electricity and insufficient evidence of the parameters required to ensure effective and rapid dispatch of the different species and sizes.

Placing marine crustaceans in fresh water to cause death by severe osmotic shock (often referred to as 'drowning') will also likely result in pain, suffering and distress. Osmotic shock is the sudden change in the concentration of solutes around a cell, which causes a rapid movement of water into the cell, resulting in swelling, bursting or a process of cell death known as apoptosis.

Whilst not a common practice in the UK, the use of High-Pressure Processing (HPP) as a method of dispatch for lobster in particular is fairly widespread elsewhere. Further species-specific work is necessary to better understand the impacts of HPP on crustacean welfare.

Research into stunning

Ideally, stunning methods should decrease the crab's, lobster's, crawfish's or nephrops' neural activity (i.e. their awareness) as distinct from their physical activity (i.e. their movement). Air chilling and salt-water ice slurry both reduce physical activity, which in turn allows for a more precise and rapid mechanical dispatch, but they do not render crustaceans insensible.

Current evidence shows that electrical stunning using purpose-built equipment can induce a seizure-like state in relatively large crustaceans such as brown crabs and lobsters. Whilst electrical stunning techniques and equipment are available for the commercial processing of crabs and lobsters, their application to crawfish and nephrops is still under development. Further research into this area is needed.

Signs of apparent insensibility

Stunning should make crustaceans insensible to (i.e. unaware of) internal and external stimuli. Signs of this state can vary between species, but generally include the following:

- No control of limb movement or reaction when limbs or tail are moved.
- No eye reactions when the shell is tapped.
- No reaction when mouth parts are touched.
- No attempt to move or turn over when placed on their sides.

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