Dublin Bay Prawn

(Nephrops norvegicus)

Handling and Quality Guide

BIM
Bord Iascaigh Mhara
Irish Sea Fisheries Board

Introduction

Nephrops norvegicus, known as prawns, Dublin Bay prawn, Norway lobster, scampi or langoustine, is the most valuable demersal fishery in Ireland.

In 2008, Ireland's quota for prawns amounted to 21% (9,391 tonnes) of the Total Allowable Catch of this species in European Waters, which represented a first point of sale value in excess of €39 million.

The distribution of the Dublin Bay prawn *(Nephrops norvegicus)*.
Source: Food and Agriculture Organization of United Nations (FAO).

Optimal handling and storage practices, at sea and ashore, are essential elements in the management of fish quality and the achievement of maximum return on national and international markets.

Defining prawn quality, however, is not easy. The process includes the understanding and assessment of a range of factors, many of which depend on market preferences such as: size, capture method, seasonal condition and freshness.

Freshness, describes the degree of spoilage a prawn has undergone since capture and is an important indicator for consumers. Very importantly, and unlike many other quality attributes, this is an aspect of quality management, over which the fishing industry exerts significant control.

Sensory assessment remains the most popular method of assessing freshness. This type of assessment uses smell, texture and visual appearance to determine the quality of the prawn.

It is a particularly useful technique as it is low cost and requires nothing other than careful and exact training. It is a widespread and reliable assessment method and provides the foundation for the design and application of this guide.

Nephrops norvegicus

Irish	- **Cloicheán**
English	- **Dublin Bay prawn, Norway lobster**
Spanish	- **Cigala**
French	- **Langoustine**
Portuguese	- **Lagostim**
Polish	- **Homarzec norweski**
Russian	- **дублинская креветка**

Prawns are usually pale orange in colour and can grow to a total length of 24cm.

They inhabit muddy sediment and live in burrows which vary in structure and size. Prawns leave their burrows only to forage or mate and it is at this time that they are available to commercial fisheries.

The ovary of a mature female begins to ripen and changes colour from cream to a dark green over the summer. The pigment change is visible through the carapace, hence the term 'green-head'.

Females tend to remain in their burrows during incubation; this could then explain the reduction of females in the catch over the winter.

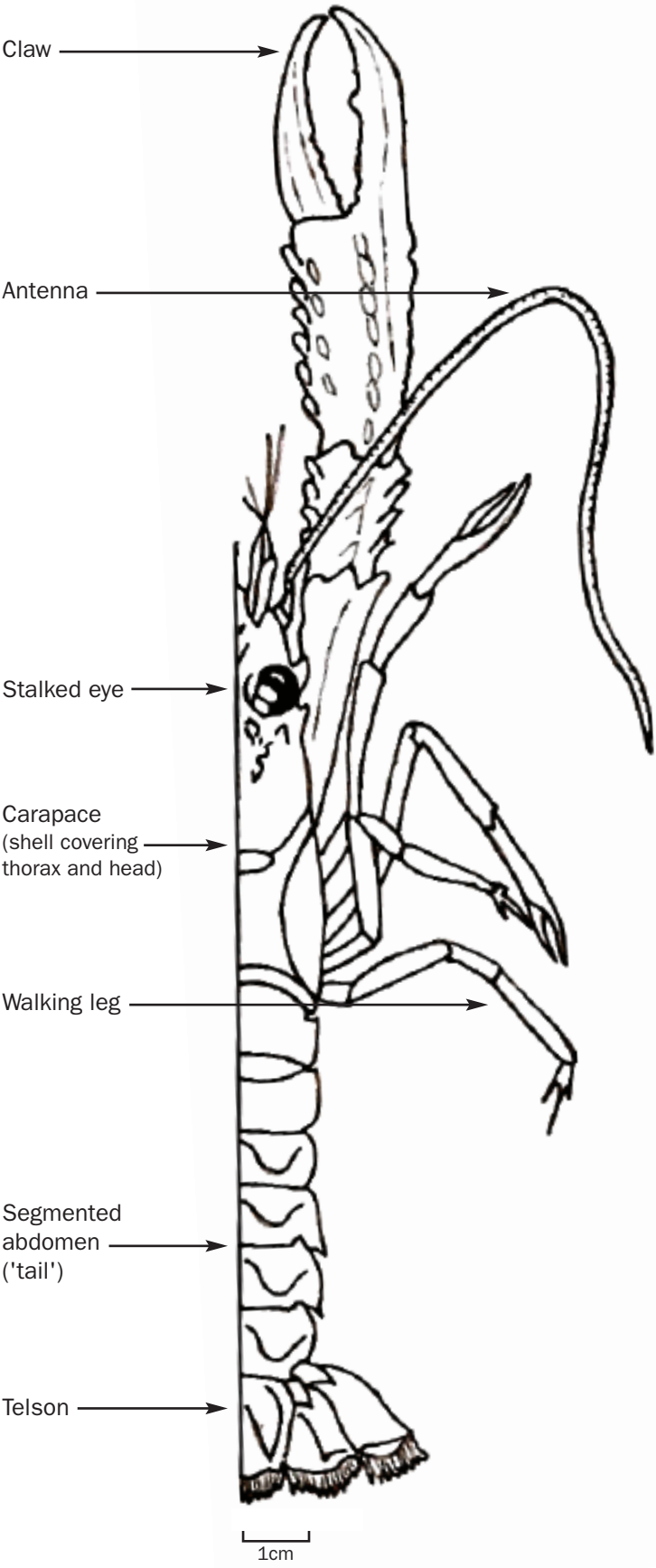
Prawns are caught over a range of depths, from shallow coastal waters to around 800m on the continental shelf.

They are predominately caught using otter board single-rig and twin-rig trawls in the Irish Sea, Celtic Seas and on distinctive grounds such as the 'Smalls' and Aran grounds off the west coast of Ireland.

Conservation measures used to manage prawn fisheries include Total Allowable Catches (TAC), effort control (days-at-sea restrictions), catch composition regulations and gear and mesh-size restrictions. The minimum landing size for prawns from the Irish Sea (VIa and VIIa) is 70 mm total length (i.e. 20 mm carapace length or 37 mm tail length).

The minimum landing size for prawns from the remainder of area VII (i.e. Celtic Sea, Western Waters and the Porcupine Bank) is 85 mm total length (i.e. 25 mm carapace length or 46 mm tail length).

Prawn Morphology



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Summary Recommendations

- Tows should be no longer than 5 hours;
- Board the catch quickly and carefully;
- Grading should be carried out carefully to minimise the need for onshore re-grading;
- Prawns should be thoroughly washed in clean seawater to remove all mud, silt and other debris;
- Washers should be operated correctly and prawns checked after washing for mud, silt or damage;
- It is essential that prawns are dipped with either a non-sulphite or sulphite based melanosis inhibitor to prevent melanosis or blackspot;
- Prawns should be placed in boxes on a layer of ice and covered by a fine mesh 'onion bag' followed by a top layer of ice;
- Freezer and factory vessels must be approved by the Sea Fisheries Protection Authority (SFPA) to permit the placing of products on the market. See BIM's 'User Friendly Guide to Food Safety Requirements for Vessels' (BIM User Friendly Guide Series, No.6.0, 2008);
- Only good quality, intact prawns should be frozen;
- Prawns should be finger-laid into lined or unlined boxes and placed in a blast freezer until their core temperature has reached at least -18ºC (approximately 5 hours depending on the performance of the freezer);
- After blast freezing, prawns should be glazed, with potable (drinkable) fresh water or clean seawater, weighed and packed, and then placed into a storage freezer. The core temperature of the prawns must be maintained at -18ºC;
- Unloading should be carried out as quickly as possible and temperature management must be maintained;
- Live prawns can make a premium price at market, but careful handling is essential to ensure low mortality and commercial viability;
- Prawns should be kept moist and cool throughout their handling and transport;
- Know your market; sexually mature females 'green-head' are accepted with reluctance in the Spanish market but can be sold to the French market at a reduced price.

Boarding

- Make sure the boarding area and hopper are clean and empty;

- Release prawns from the cod-end as close to the hopper or deck as possible;

- Do not stand on the catch in the pound or on the deck;
- Do not leave prawns exposed on the deck, and susceptible to high temperatures or contamination e.g. seagull droppings;
- Keep prawns cool and wet by using either a deck hose or spray chill bar.

Sorting

- Maintain a low temperature during sorting, by running a deck hose in the hopper/pound/and/or adding ice, when necessary;
- Handle prawns as gently as possible;

- Size grade whole prawns according to the number per unit weight (e.g. 20 per kg ; size grade 1);
- Ensure tailed prawns do not include any head parts, internal organs or legs;
- Dispose non-commercial species and offal directly into the sea, or store onboard in watertight tanks;
- Select a crewmember to gut, wash and box marketable fish as soon as practically possible, to prevent spoilage (refer to the BIM species-specific Whitefish Quality and Whitefish Handling Guides).

Size Grades

EC marketing size grades for prawns (from EU Council Regulation (EC) No. 2406/96 'Laying down common market standards for certain fishery products and size grades used by industry for whole and tailed prawns') are outlined below along with the commonly used industry grades.

Whole Prawns

EU Size Grade	Count per kg EU	Count per kg Industry
Size 1	20 and less	1 to 5 6 to 10 11 to 15 16 to 20
Size 2	21 to 30	21 to 25 26 to 30 31 to 35 36 to 40
Size 3	31 to 40	41 to 45 46 to 50
Size 4	Over 40	50+

Tailed Prawns

EU Size Grade	Count Per kg EU	Count per kg Industry	Count per lb Industry
Size 1	60 and less	66 to 88 90 to 110 112 to 132	30 to 40 41 to 50 51 to 60
Size 2	61 to 120	134 to 154 156 to 176 179 to 198 201 to 220	61 to 70 71 to 80 81 to 90 91 to 100
Size 3	121 to 180		
Size 4	More than 180		

Washing

- Wash the deck, hopper, pounds, pound boards, boxes, gutting area, knives, oilskins, aprons and all other equipment with clean seawater after every haul to remove fish blood, scales, offal, dirt and any other fouling substances;

- Ensure prawns are free from mud, sand and other debris;

- Incorrect washing of prawns will reduce the impact and shorten the long term effectiveness of the melanosis inhibitor dipping solution and can lead to contamination issues;

- The two main methods of washing prawns are:
  (1) a fish basket and deck hose, (2) a washer.

  1. Half fill the basket and use a deck hose at low pressure to rinse the prawns by gently agitating the basket;

  2. Fill the washer and wash until all debris has been removed. Be careful not to overfill or leave the prawns for too long as this will cause damage and/or bleaching;

- After the prawns are tailed, wash the tails and place in a clean container;

- Rinse gloves and oilskins frequently during the handling process to minimise contamination.

Dipping Prawns to Prevent Melanosis or Blackspot

In general there are 2 main product categories used for dipping prawns. The first contains sodium metabisulphite (E 223), or the active ingredient sodium hydrogen sulphite (E 222).

The second category contains the active ingredient 4-hexylresorcinol ($C_{12}H_{18}O_2$) (E 586), and is therefore classed as 'non-sulphite' or 'sulphite-free'.

Sodium Metabisulphite

Melanosis or blackspot in crustaceans is a condition, in which the membrane between the shell and the tail muscle darkens as it deteriorates. Melanosis typically begins forming at the base of the legs, spreads over the carapace and proceeds down into the tail region.

Sulphites are some of the oldest and most widespread preservatives used in foodstuffs, however, sulphites, when present in foodstuffs, can cause allergic reactions in vulnerable consumers and can constitute a danger to health. In addition, metabisulphite is regarded as a causative agent of asthma attacks if handled incorrectly. In accordance with these food safety and operational health issues, EU Directive 2003/89/EC, which came into force on the 25th of November 2005, has made allergen labelling a requirement for all sulphite treated foodstuffs, when concentrations exceed 10mg/kg.

There are various commercially available products that have sodium metabisulphite (E 223) or alternatively sodium hydrogen sulphite (E 222) as a constituent, and these are generally easier to use onboard than traditional sodium metabisulphite. In addition, manufacturers claim that when used correctly, they consistently yield lower sulphite residue levels.

Nonetheless, the additive code (e.g. E 223 or E 222) is required on the label even if levels are below the permitted concentration of 10mg/kg. If these additives exceed the permitted concentration the label must state the full chemical name (e.g. sodium metabisulphite or sodium hydrogen sulphite) rather than the additive codes.

Dipping recommendations for sodium metabisulphite

- Wear an appropriate protective mask throughout the dipping process;
- Make up a 4% solution according to the manufacturer's instructions;
- Transfer the metabisulphite powder to the mixing container with a measuring jug. Push the jug below the surface of the water to allow mixing of the powder to occur;
- Immerse washed prawns in the solution for 5 minutes and occasionally agitate;

- Remove prawns after 5 minutes and drain;
- Change the dipping solution after every haul.

For further information please refer to the 'Sodium Metabisulphite in the Workplace Safety Guidelines for the Fishing Industry' guide or poster, produced by BIM.

Non-sulphite alternatives

Non-sulphite alternatives do not, in general, pose the same potential risks to crew or consumers. Unlike sodium metabisulphite, non-sulphite alternatives are not subject to allergen labelling, however, they are classed as additives and will require inclusion on the packaging ingredients list e.g. Pre-packed food should declare in the list of ingredients 'Antioxidants: E 586' or 'Antioxidants: 4-hexylresorcinol', while food sold loose or pre-packed for direct sale requires a ticket, menu, or notice at the point of sale, indicating the category of additives used e.g. 'Antioxidants'.

Residues of 4-hexylresorcinol ($C_{12}H_{18}O_2$) (E 586), in crustacean meat are not permitted to exceed 2 mg/kg (Directive 2006/52/EC).

As with all additives, non-sulphite additives must be used according to manufacturers' instructions.

BIM conducted a study in 2008 on a range of commercially available non-sulphite products e.g. Prawn Fresh™, Crustaxyl® and Everfresh® . This report; 'A Comparison of the Effectiveness of Sulphite Based and Non-Sulphite Based Inhibitors for Retarding Melanosis in the Dublin Bay Prawn *Nephrops norvegicus*' is available at http://www.bim.ie or on request.

Traditional Boxing and Icing

- Ensure boxes are clean, have drainage holes and are in good physical condition;
- Place a layer of ice in the bottom of each box;

- Drain excess dipping solution or seawater from the basket of prawns after washing or dipping before boxing;

- Place an even layer of prawns in each box taking care not to overfill it;

- Place a fine mesh ‘onion bag’ between the prawns and the final layer of ice, and ensure the ice does not extend past the rim of the box. The fine mesh cover minimises damage to limbs as it provides a protective cover when ice is removed during sorting and also helps prevent bleaching.

Food Safety Requirements for Vessels

As running costs and competition from international markets have steadily increased, fishermen have focused attention on adding value to their catch by size grading, packing, filleting and freezing.

Vessels must ensure that appropriate food safety measures are in place.

- There are separate definitions describing freezer and factory vessels in EU Regulations (Regulation (EC) No. 853/2004) with factory vessels having the scope to carry out a wider range of activities than freezer vessels;

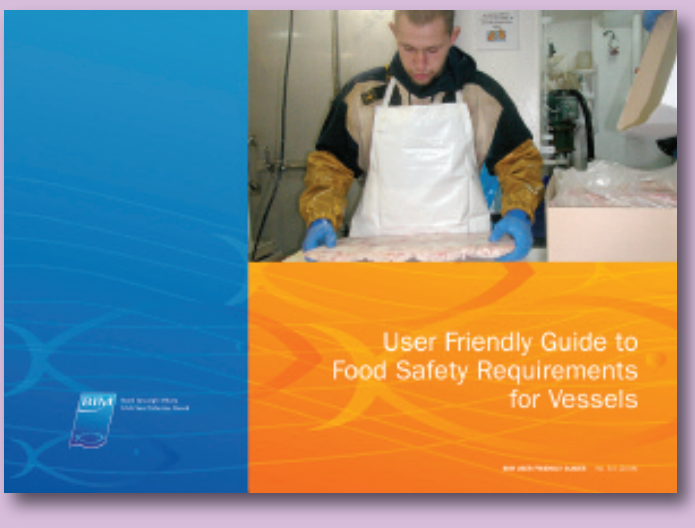
- Freezer and factory vessels must be approved under EU legalisation and food safety legalisation by the Sea-Fisheries Protection Authority (SFPA) to permit them place products on the market;

- For the vast majority of Irish vessels, the food safety requirements are almost identical for both factory and freezer vessels;

- Current onboard practices carry similar food safety risks (e.g. freezing, filleting) and the requirements for gaining approval from the SFPA are similar;

- Traditional vessels that simply gut, wash, grade, box, ice and chill at sea are generally classed as low risk, and therefore, have uncomplicated or straight forward food safety requirements.

More information can be found in the BIM 'User Friendly Guide to Food Safety Requirements for Vessels' (BIM User Friendly Guide Series, No.6.0, 2008), or by contacting BIM Fisheries Development Division, (Tel. +353 (1) 2144 100).



Freezer/factory vessels must have:

- A working Food Safety Management System (FSMS) which includes HACCP;
- An explanation of the batch codes and contact information for customers and transport firms;
- Freezing equipment (e.g. blast freezer) that rapidly lowers the core temperature of prawns to -18°C;
- A storage freezer that can maintain the core temperature of prawns at -18°C;
- The ability to record the storage temperature manually or electronically to show the system is working correctly;
- Freezer maintenance and calibration records, to show appropriate, ongoing management of the system;
- Appropriate traceability records.

Training:

- All crew should undertake a one-day, FETAC approved course on 'Seafood Hygiene Management';
- Crew identified as HACCP team leaders should attend a two-day FETAC approved course on 'Risk-Based HACCP for Seafood';
- All training records must be retained for inspection by the SFPA.

Further information can be obtained by contacting BIM, Marine Services Division (Tel. +353 (1) 2144 100).

Freezing Prawns

- Only good quality intact prawns should be frozen;
- Before freezing, prawns should be washed thoroughly with clean seawater;
- It is essential that prawns are dipped in a non-sulphite or sulphite solution to prevent melanosis or blackspot;
- Prawns should be finger-laid into lined or unlined boxes;

- Boxes should be placed in the blast freezer;
- Prawns must be left in the blast freezer until their core temperature has reached at least -18°C (approximately 5 hours depending on the performance of the freezer);
- Once the prawns are removed from the blast freezer a fine mist of potable (drinkable) fresh water or clean seawater can be sprayed onto the prawns to provide a protective glaze, which helps to prevent dehydration and oxidation during frozen storage;
- Boxes of prawns should be weighed and labelled;
- The label must include the approval number, a batch code, species name, the weight, storage instructions, area caught, the production method (caught at sea) and best before date;
- Frozen prawns must then be placed into a storage freezer, which maintains a core temperature of -18°C;
- Temperature records of the freezer and products, along with the batch code records must be kept.

Live Prawns

Live prawns can make a premium price at market, but careful handling is essential to ensure low mortality and commercial viability.

Fishing methods:

Potting

- Potting has the advantage in that mortality rates are much lower than trawling and the pots can be placed in areas inaccessible to trawling;

- When pots are hauled they should be emptied into a shallow bin of running sea water, which allows the prawns to separate making it possible to pick out individuals.

Trawling

- When trawling for the live market, short tows of less than 2 ½ hours are recommended;
- Prawns should be released from the cod-end as close to the hopper or deck as possible;
- Ice, spray bars or a running deck hose (seawater) can be added to the hopper to keep the prawns moist and cool while they are being sorted.

Grading

- There are three size grades of prawns for the live potted market according to the number of individuals per unit weight i.e. (1-10, 10-15, 15-25 per kg);
- An extra size grade of ' 25+ ' per kg can be used for smaller trawl caught prawns.

Onboard Storage:

Keeping prawns moist and cool during storage reduces their metabolic rate and allows them to gradually excrete waste through their gills. Prawns are less stressed under chilled conditions and mortality levels are, therefore, lowered.

Live potted storage -
Banding and storage in baskets

Banding can be used as an alternative to tube trays to prevent prawns damaging each other.

- The claws of the prawn should be closed shut and banded;

- After the prawns are banded they should be placed in a container, which has a continuous flow of seawater;

- The seawater pipe should be turned off approaching the harbour in case of contamination, low salinity or higher water temperatures;

- Up to 6kg of the live, graded, banded prawns should be placed into plastic baskets;

- Prawns can be held until shipment in a mesh holding box, which needs to be in a depth of seawater at least 40ft to avoid high mortalities;

- Prawns can also be held in an appropriate land-based recirculation system.

Tube trays

Tube trays are made from corrugated plastic and form a series of compartments for storing prawns individually, which prevents damage. In addition, the upright individual cells are said to mimic natural burrows, which reduces stress. Different sizes are available for each size grade.

- Prawns should be sorted and graded and un-banded live prawns placed into the individual cells of the appropriate tube tray;

- Trays of prawns should be placed in tanks with a running deck hose, it is important to have water running through the system with the inflow at the bottom of tank and the outflow at the top;

- If tanks are unavailable, trays should be covered with 'hessian' sacking and hosed down regularly with clean seawater;

- Tanks should not be placed in direct sunlight;

- During the summer when sea surface temperatures are high, ice can be added to the tank to reduce the temperature. The deck hose should be turned off approaching the harbour in case of contamination, low salinity or high water temperatures.

Live trawled storage -

Up to 6kg of un-banded prawns are bulk packed into baskets or un-banded prawns are placed into tube trays, as described above.

Quality

Although quality is one of the fundamental factors that dictate the price offered for prawns, it is not easy to define. The importance of quality attributes varies depending on markets, and can include size, degree of damage, melanosis, 'green-head', capture method, seasonal condition, freshness and more recently responsible fishing practices.

Being able to objectively assess and score the quality of prawns is very important from a sales and marketing perspective.

Certain biological parameters such as softness and 'green-head' occur naturally, and are therefore, difficult to control, apart from avoiding certain grounds at specific times of the year.

Although melanosis is naturally occurring also, the use of melanosis inhibitors, allows fishermen to minimise problems in this area.

The freshness and quality of prawns, as with other fish species, is something that fishermen can control through correct handling.

Objective quality and assessment methods allow producers and buyers to agree and achieve quality standards. A quality assessment sheet for prawns, developed by BIM in consultation with the industry, is included in this guide for this purpose.

'Green-head': Sexually Mature Females

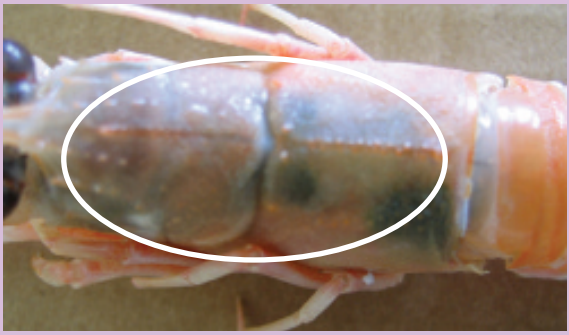
'Green-head' is a commercial term used to describe a reproductive stage in sexually mature females. Once mature, the female ovary begins to ripen and slowly changes colour from cream to dark green through the course of the summer (generally May to August). This colour can be seen through the carapace (thorax) wall and hence the term 'green-head'. During this period, mature females tend to be more active and leave their burrows more readily, resulting in a higher proportion of females in the catch than at other times of the year.

Although this is a natural phenomenon, the Spanish markets are reluctant to accept prawns with 'green-head', and as a consequence, fishermen have to separate the females from the males onboard. The females are then generally de-headed and sold as tails. There are some limited markets in France for whole prawns with 'green-head' although these are usually sold at a reduced price.

After the 'green-head' stage, the eggs are spawned and fertilised in the autumn. They are then carried on the underside of the female's tail (abdomen) as clumps of small green balls, where they remain for the eight to nine months during the incubation period.

As 'green-head' prawns are reproductively mature and are ready to spawn, it is recommended that fishermen avoid fishing effort in areas with a high proportion of females in this state in order to allow spawning to occur.

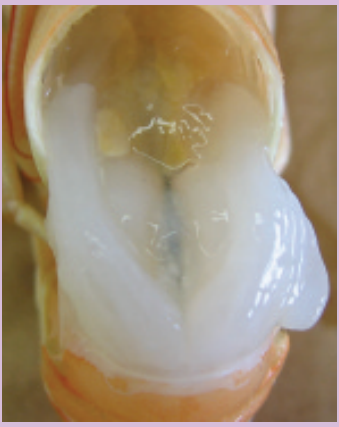
For more information on ‘green-head’ in prawns contact the Marine Institute, Fisheries Services Division (Tel. +353 (91) 387200).



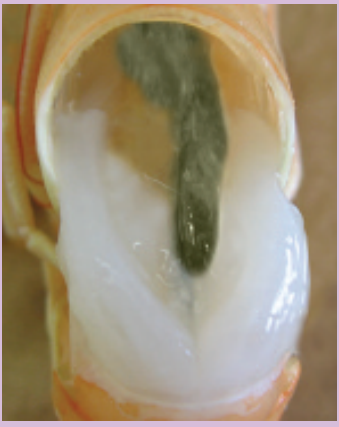
The green pigment of the developing ovaries is visible through the carapace of the female prawn, hence the term ‘green-head’.

Female ovaries –

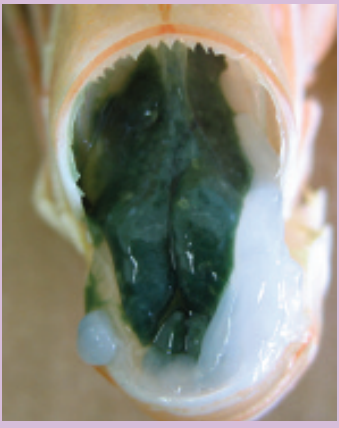
pale cream in colour.



Female ovaries –
medium green in colour.



Female ovaries –
dark green in colour.



Assuring Best Practice

Traditionally, the selling of seafood has been based on mutual trust developed between producers, processors and buyers. Today's consumers however, are more educated, well travelled and affluent, and consequently, more demanding. They now seek assurances that food products, including fish, are responsibly sourced, of good quality and well handled.

To satisfy these demands, international buyers are increasingly seeking assurances from producers and processors. These can be achieved by benchmarking production and processing operations against internationally recognized standards, often using independent, accredited, third-party certifiers. Logos can be used on products, to demonstrate compliance when these standards are met and certification is achieved.

Responsible fishing, in particular, is high on the consumer agenda, and as a result is now a major market driver. Several fishery based 'eco-label' standards are now available; the most popular of which, has been developed by the Marine Stewardship Council (MSC), which some prawn fisheries in Scotland have now achieved. Other ecolabels including 'Friend of Sea' are also establishing themselves in international markets.

BIM's Seafood Stewardship Scheme is a suite of internationally recognized standards developed in consultation with industry, which incorporates the key concerns of buyers and consumers (i.e. quality, responsibility and provenance) and satisfies the food sourcing policies of key retailers. Membership of this scheme is open and available to all industry sectors. For more information on this scheme contact BIM, Fisheries Development Division (Tel. +353 (1) 2144 100).

As further standards and schemes evolve, there is little doubt that the level of documentation required to satisfy the demands of certification will continue to increase.

BIM and the fishing industry have also developed a 'Seafood Environmental Management System for The Irish Catching Sector', which allows fishermen to document responsible practices with regard to the environment and quality. The major advantage of this system is that it can be tailored to provide the necessary documentation for auditing any scheme or certification process. For more information on this scheme contact BIM, Fisheries Development Division (Tel. +353 (1) 2144 100).

Instructions on How to Use the Assessment Sheet

1. Photocopy the assessment sheet to enable scores to be recorded.
2. Take a random sample of five whole or tailed prawns.
3. There are nine quality categories for assessing whole prawns and seven categories for assessing tails.
4. The quality categories to be assessed for prawn tails are denoted by the following symbol.

5. Assess each whole prawn sample under the various quality categories i.e. Eyes, Gills, Damage, Melanosis, Shell Softness, Flesh Appearance, Washing, Boxing and Temperature Control* separately and for tailed prawns under the various quality categories i.e. Damaged Tails, Melanosis, Shell Softness, Flesh Appearance, Washing, Boxing and Temperature Control*.
6. Look at the first quality category for whole or tailed prawns, i.e. Eyes, and decide which quality score description matches the average of the five prawns you are examining i.e. 0, 1, 2, 3, 4.
7. When one of the five quality score options has been chosen, tick the box.
8. Now move to the next quality category for whole or tailed prawns, i.e. Gills and repeat steps 6 and 7 for this category and all following categories for the prawns.
9. You now should have one tick for each quality category.
10. Add up the ticks in each column and multiply by the quality score for that column. Repeat for each column. Add these together to get the total score.

***To take the temperature of your sample insert the temperature probe into the tail meat, allow the reading to settle prior to recording the temperature.**

Whole Prawns	
Grade	**Score**
E	0 - 8
A+	9 - 17
A	18 - 26
A-	27 - 35
B	36

Tailed Prawns	
Grade	**Score**
E	0 - 6
A+	7 - 13
A	14 - 20
A-	21 - 27
B	28

Prawn Assessment Sheet

Worked Example Whole Prawn

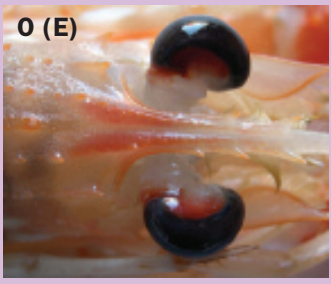
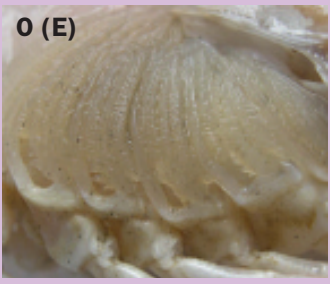
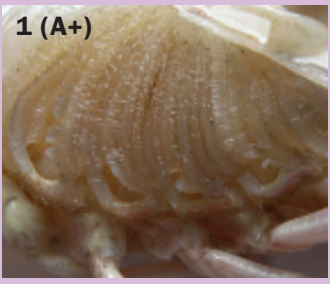
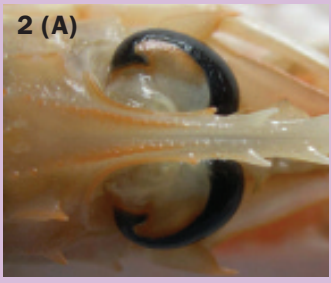
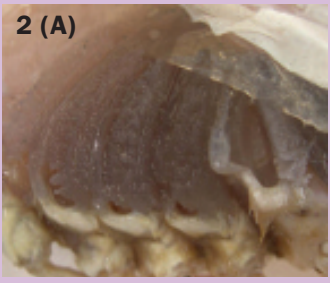
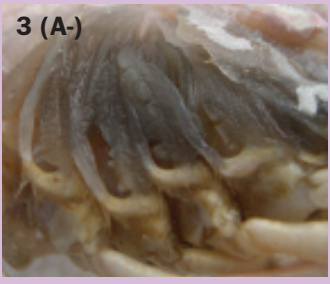
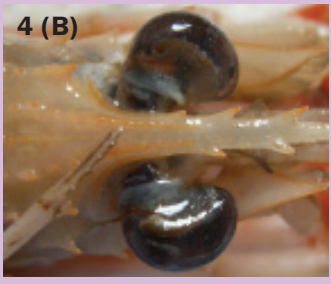
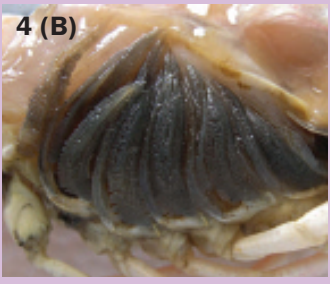
Denotes quality categories that are required when assessing the quality of prawn tails.		0	1
	Eyes	Shiny black bright eyes.	Black eyes.
	Inner Rim	Inner rim bright orange.	Inner rim orange in colour with some fading.
	Eye Stalk	Eye stalk translucent.	Eye stalk translucent.
Whole Prawns		✓	
Whole Prawns	Gills	Translucent.	Colourless to golden hue.
		✓	
Whole Prawns	Damage Whole Prawn (.)	**0%** No damage.	**1-5%** Head, claws and legs attached.
			✓
	Damage Tails	Tails fully intact. No appendages or gut remnants.	Minor damage. Some appendages evident.
Whole Prawns	Melanosis	No melanosis.	Slight blackening of head or shell margins.
			✓
Whole Prawns	Shell Softness	Firm.	Firm.
		✓	
Whole Prawns	Flesh Appearance	Translucent / blue.	Translucent.
			✓
Whole Prawns	Washing	Well washed body and appendages.	Small traces of sand and dirt, uniform in colour.
		✓	
Whole Prawns	Boxing (*)	Iced top and bottom. Not overfilled. Fine mesh 'onion bag' between top layer of ic and prawns. Well graded.	Iced top and bottom. Not overfilled. Fine mesh 'onion bag' between top layer of ice and prawns. Small lumps of ice.
			✓
Whole Prawns	Temperature Control	0 to 2 °C	2.1 to 3.9°C
			✓

Total Score (TS)	(0x4=0 + 1x5=5) **Total Score (TS) = 5**

Whole Prawn	Quality Grades for Whole Prawns	E	A+
		0-8	9-17
	Quality Grade Received	5	

Damaged Tailed Prawns	Quality Grades for Whole Prawns	E	A+
		0-6	7-13
	Quality Grade Received		

Images of Prawn Quality Attributes

Eyes	Gills
	
Shiny black, inner rim bright orange, eye stalk translucent	Translucent
	
Black, inner rim orange some fading, eye stalk translucent	Colourless to golden hue
	
Grey/ black, inner rim orange but faded, eye stalk milky	Greying
	
Grey, dull, some wrinkles, inner rim dark eye stalk creamy/tan	Grey
	
Grey, cloudy, with wrinkles, inner green/black, eye stalk greenie/brown	Very grey/charcoal

Melanosis or Blackspot

No melanosis

Slight blackening of shell margins*

Pronounced blackening of shell margins and legs*

Moderate blackening of shell margins, tail and legs*

Extensive blackening of shell margins, tail, legs and joints*

*Blackening also occurs around the head area of the prawn.

Prawn Assessment Sheet

Quality score: place a tick for the average of the prawns examined under the relevent score and section

Denotes quality categories that are required when assessing the quality of prawn tails.	**Quality Categories**	**0**	**1**
 **Whole Prawns**	**Eyes**	Shiny black bright eyes.	Black eyes.
	Inner Crescent of the Eye	Inner rim bright orange.	Inner rim orange in colour with some fading.
	Eye Stalk	Eye stalk translucent.	Eye stalk translucent.
Whole Prawns	**Gills**	Translucent.	Colourless to golden hue.
Whole Prawns	**Damage Whole Prawn (.)**	**0%** No damage.	**1-5%** Head, claws and legs attached.
	Damage Tails	Tails fully intact. No appendages or gut remnants.	Minor damage. Some appendages evident.
	Melanosis	No melanosis.	Slight blackening of head or shell margins.
	Shell Softness	Firm.	Firm.
	Flesh Appearance	Translucent / blue.	Translucent.
	Washing	Well washed body and appendages.	Small traces of sand and dirt, uniform in colour.
	Boxing (*)	Iced top and bottom. Not overfilled. Fine mesh 'onion bag' between top layer of ic and prawns. Well graded.	Iced top and bottom. Not overfilled. Fine mesh 'onion bag' between top layer of ice and prawns. Small lumps of ice.
	Temperature Control	0 to 2 °C	2.1 to 3.9°C

Total Score (TS)	

Whole Prawns	**Quality Grades for Whole Prawns**	**E**	**A+**
		0-8	**9-17**
	Quality Grade Received		

Tailed Prawns	**Quality Grades for Tailed Prawns**	**E**	**A+**
		0-6	**7-13**
	Quality Grade Received		

2	3	4
Grey/black eyes.	Grey dull eyes with some wrinkles.	Grey/cloudy eyes, with wrinkles.
Inner rim orange in colour but faded..	Inner rim dark.	Inner rim dark green/black.
Eye stalk milky.	Eye stalk creamy/tan in colour.	Eye stalk greenie/brown in colour.
Greying.	Grey.	Very grey/charcoal.
6-10% Head, claws and legs slightly loose, minor damage.	**11-15%** Head, claws and legs loose.	**> 15%** Head, claws and legs very loose with some missing.
Slight damage, slight gut remnants, some appendages present.	Obvious damage, some gut remnants and appendages present.	Obvious damage, obvious appendages present.
Head blackening more pronounced, moderate blackening of segments.	Head and tail blackening evident.	Extensive blackening of head and shell.
Yielding slightly, loss of springiness.	Soft.	Mushy, slimey.
Opaque.	Milky.	Yellowing.
Traces of sand and dirt but not uniform in colour.	Noticeable amounts of sand and dirt.	Very dirty with dirt, mud and foreign objects.
Iced top and bottom, no fine mesh 'onion bag' used. Mixed grades.	Iced top (no fine mesh 'onion bag' used) only. Overfilled. Not graded.	No ice. Overfilled. Not graded.
4 to 5.9°C	6 to 7.9 °C	≥8 °C

(.)
Markets prefer not to have the occurrence of 'green-head' prawns, add 1 point to the over all Whole prawn score. E.g. If Whole prawn scored a 1 but 'green-head' prawns were present, the score received should be increased to 2.

(*)
Clean boxes imperative, if box is extremely dirty and is a possible spoilage risk add 1 point to the over all boxing score. E.g. If boxing scored a 1 but boxes are dirty, the score received increased to a 2.

A	A-	B
18-26	**27-35**	**36**

A	A-	B
14-20	**21-27**	**28**

Acknowledgements

This guide was produced in support of the Irish Fishing Industry by Frances O'Dwyer (BIM) with assistance from Michael Gallagher (BIM), Marianne Green (KFO), Conor Nolan (BIM), Emmet Jackson (BIM), Ian Lawler (BIM) and Joe Rose (Skipper of the Saint Bridget).

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NDP
NATIONAL DEVELOPMENT PLAN

Funded by the Irish Government and part-financed by the European Union under the National Development Plan, 2000-2006

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ISBN 1-903412-26-9
9 781903 412268