

Blue Whiting

(*Micromesistius poutassou*)

Quality Guide



Blue whiting



Bord Iascaigh Mhara
Irish Sea Fisheries Board

Introduction

Blue whiting (*Micromesistius poutassou*) is a pelagic species closely related to cod, haddock and hake. Although widely distributed in the eastern and western North Atlantic and the Mediterranean, Irish vessels target this species in a small area of its distribution off the Porcupine Bank (VIa, VIIf,VIIfc) and the Rockall Bank (VIb), landing catches for fishmeal and more recently, for human consumption.



Species distribution map for blue whiting (*Micromesistius poutassou*).

Source: FAO

The body colour of fresh fish progresses from a dark blue-grey on the back, through silver on the flanks to a creamy white on the belly, over a general background of pale blue.

Although normally between 25cm and 35cm in total length, the species may reach 50cm. Growth is rapid in the first two years of life and slows down once the fish reaches maturity (2 to 4 years).

Once mature, blue whiting undertake an annual migration in the spring from feeding grounds in the Norwegian sea to major spawning areas off the west of Ireland and Scotland, and minor locations along the Norwegian coast. Spawning occurs from February in the south of the range, to May in the north, at depths from 180m to 360m. A return migration to the feeding grounds takes place after spawning occurs.

Blue whiting form mid-water shoals at depths from 160m to 1500m. Adult fish are most common between 200m and 600m and tend to form characteristic, horizontal layers in the water column as the shoals follow their major food item (meso-pelagic crustaceans) from deep water during the day, to the surface waters at night.

Quality Assessment

The objective assessment of quality is vital to enable industry agree and implement common trading specifications so that fish can be traded in a fair manner. Defining quality is not easy, as it can include a range of factors, which depend on market preferences such as: species, size, capture method, seasonal condition and freshness.

Of major importance to all consumers is freshness, a characteristic, which relates to the degree of spoilage a fish has undergone. Very importantly and unlike many other quality attributes, this is something that the fishing industry has certain control over.

As a result of good manufacturing practices, spoilage at all stages in production and processing can be assessed and minimized. A test used to regularly assess the freshness of blue whiting is the determination of total volatile base nitrogen (TVBN).

TVBN measures the key products of bacterial spoilage (ammonia, dimethylamine and trimethylamine) from a sample of fish and is carried out using specialised laboratory equipment.

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 fish. 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.

Eye



VH

Very High: convex, bright, black pupil.



H

High: convex, black pupil.



M

Medium: flat, dull pupil, slightly cloudy.



L

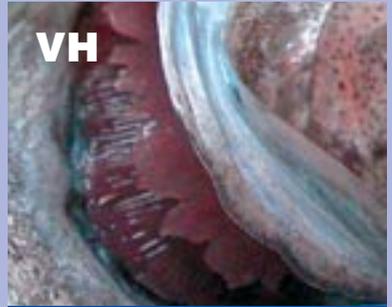
Low: slightly sunken, cloudy.



VL

Very Low: sunken, opaque, cloudy, bloodshot, damaged.

Gill Colour



VH

Very High: bright red, frilly, no mucus.



H

High: good red colour, mucus transparent.



M

Medium: pale red, mucus slightly cloudy and viscous.



L

Low: faded pink or tan, thick, cloudy mucus.



VL

Very Low: brown, very thick, cloudy mucus.

Stomach Contents



Rigor



Sexual Maturity Stages

MALE (TESTES)

STAGE	SIZE	COLOUR	OTHER FEATURE
I (Immature virgin)	Very Small	Translucent	Thin, narrow ribbon
II (Developing virgin)	Length less than $\frac{1}{2}$ body cavity	Becoming opaque, white	Slightly lobed and coiled
III (Early mature)	Length $\frac{3}{4}$ body cavity	Whitish-grey	Strongly coiled, blood vessels visible
IV (Late mature)	Length $\frac{3}{4}$ body cavity, swelling	Opaque, white	Strongly coiled
V (Ripe)	Filling body cavity	Opaque, creamy-white	Tightly convoluted lobes, milt does not flow
VI (Running)	Filling body cavity	Creamy-white	Milt easily extruded
VII (Spent)	Length less than $\frac{1}{2}$ body cavity	White, bloodshot	Crinkled and shrunken

FEMALE (OVARY)

STAGE	SIZE	COLOUR	OTHER FEATURE
I (Immature virgin)	Length less than $\frac{1}{4}$ body cavity	Translucent, white	Small, oval sac
II (Developing virgin)	length $\frac{1}{3}$ body cavity	Reddish-orange or translucent	Small, oval sac
III (Early mature)	Length $\frac{1}{2}$ body cavity	Pinkish-white	Opaque eggs clearly visible
IV (Late mature)	Length $\frac{2}{3}$ body cavity	Whitish-yellow	Opaque eggs clearly visible
V (Ripe)	Very swollen	Pale yellow	Some eggs transparent, not easily extruded
VI (Running)	Very swollen	Transparent	Eggs easily extruded
VII (Spent)	Length $\frac{1}{2}$ body cavity	Bloodshot	Flaccid and shrunken

Examples of Sexual Maturity Stages

Male (Testes)

Stage IV



Stage IV: length $\frac{3}{4}$ body cavity, swelling, opaque, white in colour, strongly coiled.

Stage V



Stage V: filling body cavity, opaque, creamy-white in colour, tightly convoluted lobes, milt does not flow.

Stage VI



Stage VI: filling body cavity, creamy-white in colour, milt easily extruded.

Female (Ovary)

Stage IV



Stage IV: length $\frac{2}{3}$ body cavity, whitish-yellow, opaque eggs clearly visible.

Stage VI



Stage VI: very swollen, transparent eggs easily extruded.

Stage VII



Stage VII: length $\frac{1}{2}$ body cavity, bloodshot in colour, flaccid and shrunken.

Example of Sexual Maturity Stages

Sexual Maturity Stages

Instructions

1. Photocopy the assessment sheet to enable scores to be recorded.
2. Take a random sample of ten fish and score each one separately.
3. Take one fish and assess each quality category i.e. Eye, Skin, Rigor etc. separately.
4. Look at the first category, Eye, and decide which description matches the fish you are examining i.e. Very High, High, Medium, Low or Very Low.
5. When one of the five options has been chosen, place a tick in the shaded box directly below your choice.
6. Now move to the next quality category, Skin and repeat steps 4 and 5, for this category and all following categories for the fish.
7. You now should have one tick for each quality category.
8. Repeat steps 3-6 for nine more fish, ignoring any previous ticks from other fish examined.
9. After examining all ten fish, you should have a total of ten ticks for each quality category.
10. Now look at your columns i.e. Very High, High, in turn.
11. Add all cells in the column and put the resulting figure into the space at the bottom of the column.
12. Multiply this number by the appropriate weighting for the column, which is 5, for example, in the case of the 'Very High' column.
13. Repeat steps 11 to 13 for all columns.
14. Add the multiplied column totals and divide this number by 10 (the number of fish used) to achieve the average numerical quality score for the fish, examined.
15. This numerical score can then be assigned a quality grade.
16. Repeat the same procedure described above for the market specifications.
17. Using the sexual maturity sheet, identify the sex and maturity stage.
18. Note the approximate number of parasites (nematode worms) and their location (fillet, gonad, liver).

FRESHNESS ATTRIBUTES

Worked Example

	VERY HIGH	HIGH
EYE	Convex, bulging, bright black pupil, transparent.	Convex, black pupil.
Results for 10 fish.	//// 5	//// 5
SKIN	Colours vivid, no scale loss, no damage, firm to touch. Mucus watery and transparent.	Colours still bright, some scale loss, mucus transparent.
Results for 10 fish.	//// 5	//// 5
RIGOR	Fish pre-rigor / in rigor, rigid.	Fish out of rigor, still quite rigid.
Results for 10 fish.	//// 5	//// 5
GILL ODOUR	Sharp smell of seaweed, fresh cut grass, metallic.	Milder smell of seaweed, grass, metallic.
Results for 10 fish.	//// 5	//// 5
GILL COLOUR	Bright red, frilly, no mucus.	Good red colour, mucus transparent.
Results for 10 fish.	//// 5	//// 5
BLOOD	Bright red and thin.	Red and thin.
Results for 10 fish.	//// 5	//// 5
COLUMN TOTALS	30	30
	x5 = 150	x4 = 120
Average score = (column 1+2+3+4+5+)/10 = (150 + 120=270)/10 = 27		
Quality score = Average score/30 x 100 = (27 / 30) x 100 = 90%		
QUALITY GRADE	VERY HIGH	HIGH
	> 80%	80 - 61%
Quality grade = Very High (VH)		

Worked Example

Instructions

Blue Whiting Assessment Sheet

Blue Whiting Assessment Sheet

VESSEL NAME	SAMPLING LOCATION
DATE & TIME	HAUL NO.

FRESHNESS ATTRIBUTES

	VERY HIGH	HIGH
EYE	Convex, bulging, bright black pupil, transparent.	Convex, black pupil.
Results for 10 fish.		
SKIN	Colours vivid, no scale loss, no damage, firm to touch. Mucus watery and transparent.	Colours still bright, some scale loss, mucus transparent.
Results for 10 fish.		
RIGOR	Fish pre-rigor or in rigor, rigid.	Fish out of rigor, still quite rigid.
Results for 10 fish.		
GILL ODOUR	Smell of: seaweed or fresh cut grass.	Mild smell of: seaweed or fresh cut grass.
Results for 10 fish.		
GILL COLOUR	Bright red, frilly, no mucus.	Good red colour, mucus transparent.
Results for 10 fish.		
BLOOD	Bright red, blood thin.	Red, blood still thin.
Results for 10 fish.		
COLUMN TOTALS		
	x5 =	x4 =

Average score = (column 1 + 2 + 3 + 4 + 5) / 10 _____

QUALITY GRADE	VERY HIGH	HIGH
	> 80%	80 - 61%

Quality grade = _____

MARKET SPECIFICATIONS

	VERY HIGH	HIGH
FLESH DAMAGE	No visible rips, tears or bruises.	1 - 2 slight defects (e.g. small cuts, tears).
Results for 10 fish.		
STOMACH CONTENTS	Empty.	Less than 50% ingested grey material (scales etc.).
Results for 10 fish.		
INTERNAL (GUT WALL)	Lining fully intact. No staining.	Lining slightly patchy or faded, no staining.
Results for 10 fish.		
COLUMN TOTALS		
	x5 =	x4 =

Average score = (column 1 + 2 + 3 + 4 + 5) / 10 _____

QUALITY GRADE	VERY HIGH	HIGH
	15-13	12-10

Quality grade = _____

SEX (M or F) AND MATURITY STAGE (I, II, III, IV, V, VI,

Fish No.	1	2	3	4
SEX				
MATURITY STAGE				

LOCATION AND ESTIMATED NUMBER OF NEMATODES

Fish No.	1	2	3	4
FILLET				
LIVER				
GONAD				

FAT CONTENT		
ASSESSOR		
MEDIUM	LOW	VERY LOW
Flat, dull pupil, slightly cloudy.	Slightly sunken, cloudy.	Sunken, opaque, cloudy, bloodshot, damaged.
Colours distinct, some springiness, some bruising, mucus slightly cloudy getting thick.	Dull, damaged, a lot of scale loss, mucus thick and cloudy.	Discoloured, dull, flaccid, soft, no elasticity. Mucus thick, discoloured.
Fish out of rigor, not stiff but not limp.	Fish out of rigor, going limp.	Fish out of rigor, limp.
Neutral or very slight hints of: seaweed or fresh cut grass.	Slightly sour.	Very sour, acidic.
Paler red, mucus viscous and slightly cloudy.	Faded pink and tan, discoloured, thick, cloudy mucus.	Brown, very thick, cloudy mucus.
Red, blood beginning to thicken.	Dark red, congealing.	Brown colour, congealed or dry.
x3 =	x2 =	x1 =

Quality score = Average score /30 x 100 _____ %

MEDIUM	LOW	VERY LOW
60 - 41%	40 - 21%	20 - 0%

MEDIUM	LOW	VERY LOW
3 - 5 small defects (e.g. cuts, tears).	> 5 small defects (e.g. cuts, tears) or a single large cut.	Carcass badly distorted, cut or torn.
Greater than 50% ingested grey material (scales etc.).	Less than 50% orange feed (krill etc.).	Greater than 50% orange feed (krill etc.).
Lining slightly patchy or faded. Slight staining of gut wall.	Lining patchy or faded. Gut wall stained.	Lining extremely patchy or faded (almost completely absent) badly stained.
x3 =	x2 =	x1 =

Quality score = Average score /15 x 100 _____ %

MEDIUM	LOW	VERY LOW
9-7	6-4	3

VII)

5	6	7	8	9	10

(i.e. 0, 1-10, 11-20, >21)

5	6	7	8	9	10

Acknowledgements

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FINANCIAL INSTRUMENT
FOR FISHERIES GUIDANCE



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