

Shellfish aquaculture in the EU



What is shellfish aquaculture?

Shellfish aquaculture is the cultivation and harvest of aquatic invertebrates, including **molluscs** such as mussels, oysters and clams, **echinoderms**, such as sea urchins and sea cucumbers, and **crustaceans** like shrimps.

Various farming techniques exist for this type of aquaculture, depending on the species farmed as well as the geographic location of the farm.

Benefits of sustainable shellfish farming

Most shellfish are low-trophic species that require little or no feed and have a **low environmental footprint**. Bivalve molluscs, in particular, are filter feeders that help to **improve water quality** by removing pollutants, excess nutrients (e.g. nitrogen) and organic matter from the water. At the same time, this reduces sediment loads and improves water clarity, allowing sunlight to penetrate and support the growth of sea plants.

By improving water quality, bivalve molluscs create **favourable habitats** for other species such as crabs, worms and juvenile fish.

Challenges for shellfish farmers

Shellfish diseases Shellfish, especially filter feeders such as bivalve molluscs, may be exposed to infectious pathogens that enter their aquatic environment. Of particular concern is the potential spread of **norovirus** originating from sewage contaminated waters, as well as **emerging diseases due to climate change**. To protect the health of shellfish and consumers, farmers in coordination with EU Member State authorities are obliged to manage and prevent the risk of outbreaks.

Water quality Physical and chemical conditions, such as **temperature, oxygen concentration and salinity**, must be optimal to ensure shellfish are healthy and can thrive. This is particularly the case for bivalve molluscs. Moreover, public health should be protected. For this reason, EU Member States are expected to protect and, if needed, improve the quality of water where bivalve molluscs are grown. This includes designating areas for the protection of economically significant bivalve mollusc farming and regular monitoring of the level of microbial and chemical contamination and possible presence of marine biotoxins¹.

Predators and other biological threats Shellfish farms can experience significant loss from the presence of predators such as **fish, birds, starfish, spider crabs and the blue crab**, a highly voracious invasive species. Another threat to shellfish production is the phenomenon known as **red tide** – harmful blooms of microscopic algae that produce toxins. Though the toxins are not harmful to shellfish, their presence makes shellfish unfit for human consumption.

Access to seed/spat Many bivalve mollusc farms rely on the supply of seed (spat) from **nurseries or wild harvest**. The availability of seed can vary from year to year, and in some regions the seed mortality rate has risen due to acidification of sea waters and salinity changes.

¹ Commission Implementing Regulation (EU) 2019/627 of 15 March 2019 laying down uniform practical arrangements for the performance of official controls on products of animal origin intended for human consumption in accordance with Regulation (EU) 2017/625 of the European Parliament and of the Council and amending Commission Regulation (EC) No 2074/2005 as regards official controls (OJ L 131, 17.5.2019, p. 51–100)

The 'Strategic guidelines for a more sustainable and competitive EU aquaculture for the period 2021-2030' promote:

diversification of EU aquaculture towards non-fed and low-trophic species with a lower environmental footprint (e.g. farming of molluscs and other invertebrates);

diversification of production methods with a lower environmental impact, such as integrated multi-trophic aquaculture where molluscs are farmed together with algae or finfish species for mutual and ecological benefits;

research and innovation on shellfish health and diseases.

Economic performance in 2021

Shellfish production accounted for **30%** of the total aquaculture turnover in Europe.

Oyster, mussel and clam species accounted for **99%** of the total volume and value of EU shellfish aquaculture production.

€1.27 billion in turnover

↑25% from 2020

France, Italy and Spain led the EU in the shellfish aquaculture sector's economic turnover.

Production in 2021

Shellfish production accounted for **49%** of the total aquaculture sales volume in the EU.

553 000 tonnes in sales volume

↑4% from 2020

Spain, France and Italy were the top producers in shellfish aquaculture.

Top 5 species in 2021*

	Production volume (tonnes)	Production value (million euros)
Mediterranean mussel	287 243	211.5
Blue mussel	137 560	264.8
Pacific cupped oyster	90 302	446.7
Japanese carpet shell	25 042	230.2
Grooved carpet shell	5 296	86.9

* Source: EUMOFA dashboard

Apart from molluscs, other species include **crustaceans** such as **shrimps and prawns**, of which Atlantic ditch shrimp (Spain) stands out in terms of production volume.

In 2020, the EU was the 5th largest producer of oysters (2% in the world). Source: EUMOFA – Oysters in the EU

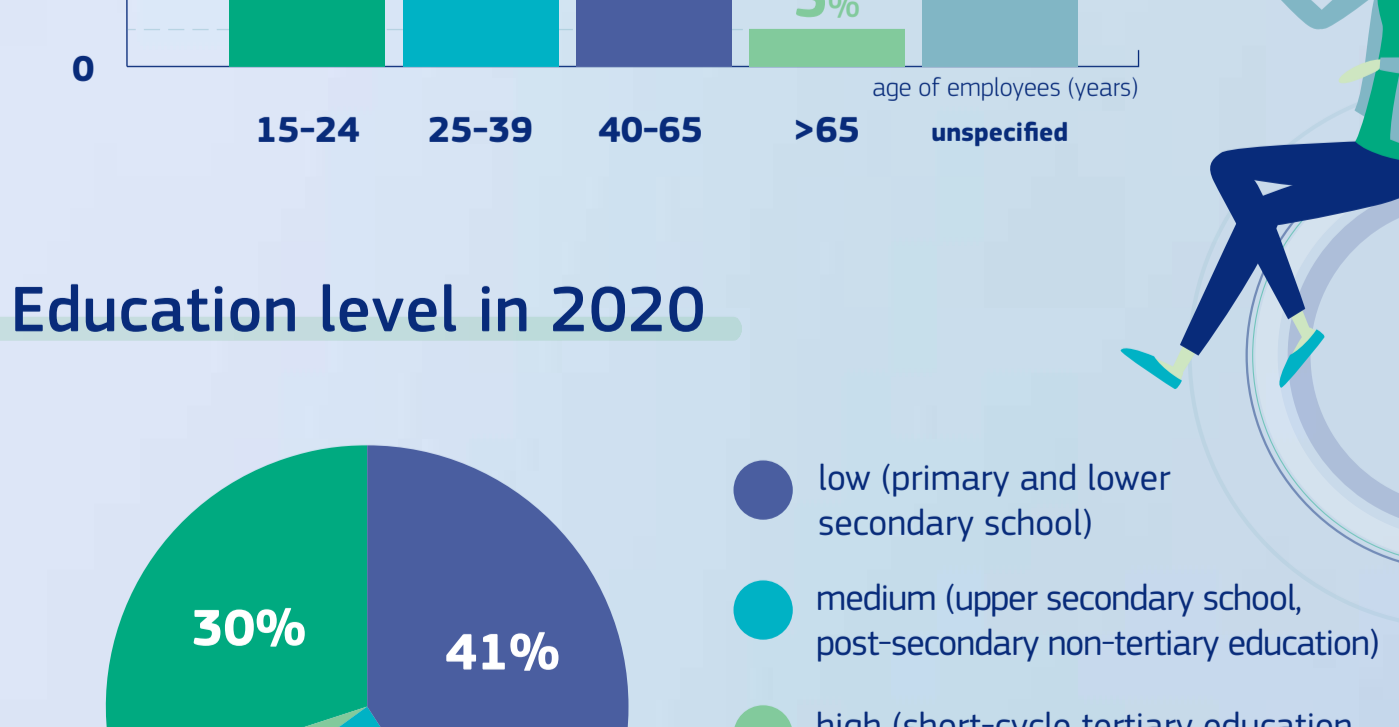
In 2020, the EU was the 2nd largest producer of mussels (20% in the world, following China (43%)). Source: EUMOFA – Mussel in the EU

Organic shellfish production in 2020

Organic shellfish production – mainly **mussels and oysters** – has seen significant increase in Denmark, Ireland, Germany, the Netherlands, Italy, France, Spain and Bulgaria. However, market growth is inhibited by somewhat limited incentives for producers in terms of price premium or customer demand, as well as the complexities involved in complying with regulations.

Certified **organic mussel production** reached **41 936 tonnes** in 2020 with the Netherlands, Italy, Germany and Ireland leading the way. The total volume of certified **organic oyster production** was **3 328 tonnes**, 98% of which was produced in France.

Organic mussel production (% of total national mussel production volume in 2020)



Top EU producers of organic certified mussels

Country	Tonnes	Year
the Netherlands	7 978	2020
Italy	7 759	2018
Germany	6 500	2020
Ireland	5 180	2020
Denmark	4 819	2020
France	3 135	2020
Spain	3 104	2020
Bulgaria	3 000	2019

41 936 tonnes of organic mussels → **10%** of total EU production

France – 3 178 tonnes of organic oysters

Source: EUMOFA Organic Aquaculture in the EU – Final report 2022

Main farming techniques for bivalve molluscs

Various farming techniques for **bivalve molluscs** exist that depend on the species farmed and the farm's geographic location.

Raft culture is carried out at depths over 8-10 metres using floating platforms with hanging ropes that form a matrix. Molluscs are attached to the ropes and covered with a biodegradable net that progressively disappears as the molluscs fix themselves to the rope naturally. Each row in the matrix corresponds to a particular harvest, which is collected at the appropriate time and replaced. This allows continued production throughout the year.

Long line culture in sheltered bays uses a main rope of several hundred metres that is suspended by flotation devices. From the main rope, hang vertical seeded ropes or baskets. This technique requires more space, which is not always available due to competing water uses near the coasts. However, it allows the culture of molluscs in shallow waters where rafts would not be suitable.

Bottom cultivation is carried out in intertidal zones. **On-bottom culture** entails growing molluscs directly on the sediment of the seabed in an optimal location. **Off-bottom culture** involves suspending molluscs above the sediment from fixed structures such as poles or tables. In Ireland, for example, a traditional method of **bag and trestle** is used to farm mussels. When the mussels are exposed by the tide, their population density and health can be monitored. In France, larval mussels are collected on ropes, which are then wound around large wooden posts known as **bouchot**. The mussels are alternately emerged and submerged during the tidal cycle, allowing them to consume various nutrients throughout the water column. This specificity gives a unique taste to bouchot mussels, which are registered in Europe under the quality scheme 'Traditional Specialities Guaranteed'.

Most EU mussel production occurs in Galicia, Spain, where rafts are the main technique. Bottom cultivation is common in France, the Netherlands and Ireland, using techniques such as bouchot, on-bottom beds, and bag and trestle. Long line cultivation in shallow coastal waters is common in Italy, Ireland and the Netherlands.

Oyster cultivation is dominated by France, followed by Ireland and Portugal. Bottom cultivation is widely used, and rafts to a lesser extent.

The main EU clam producers are Italy, Portugal and Spain where bottom techniques are widely used and rafts to a lesser extent.

EU quality schemes for shellfish: Geographical indications and traditional specialties

The EU registers quality schemes that recognise and promote the geographical or traditional aspects of specific products. Two of the quality schemes are based on geographical indications (GIs), namely the **Protected Designations of Origin (PDOs)** and **Protected Geographical Indications (PGIs)**. A third scheme – the **Traditional Specialities Guaranteed (TSG)** – recognises the traditional aspects of products.

As of September 2023, the EU's registry includes **11 quality schemes** for shellfish.

Country	PDO	PGI	TSG	Total
Croatia	oyster, mussel			2
France	mussel	oyster, scallop, whelk	mussel	5
Italy	mussel			1
Spain	mussel			1
Sweden	oyster, mussel			2

Source: EUMOFA – The EU Fish Market 2023

Socio-economic importance of shellfish farming

Shellfish farming is tied to the local history, traditions and even the landscape of certain regions in Europe, where women have significantly contributed to the rural economy.

For example, the **Spanish** region of Galicia has a long tradition of **mussel production** and is Europe's top aquaculture producer of mussels today. Local **women mariscadoras** (shellfish gatherers) have played an important role in supporting the sector and the Galician economy.

In **Italy, clam farming** plays an important socio-economic role in Northern Emilia-Romagna and Veneto. In these regions, many family-based businesses are run by **female producers**, many of whom used to work in the textile industry.

Employment in 2020

40 600 people were directly employed

17 000 were full time equivalent jobs

6 200 enterprises

90% small businesses (under 10 employees)

Top 5 employers in 2020

Country	Enterprises	Employees	Full time equivalent
France	2 214	14 823	8 118
Spain	2 210	14 520	6 058
Italy	398	6 848	1 823
Ireland	280	1 754	909
Portugal	654	1 299	749

Gender in 2020

77% male

23% female

Did you know? In Galicia, Spain, women 'shellfish on foot' (*mariscadoras*) are of great social, cultural and economic importance. In 2022, out of 3 614 registered shellfish gatherers, **2 702** were women (**75%**).

Age in 2020

Education level in 2020

Nationality in 2020

84% nationals of their own country

16% mainly workers from other EU Member States

Source: STECF Economic report 2022

Data sources

- Scientific, Technical and Economic Committee for Fisheries (STECF) The EU Aquaculture Sector – Economic report 2022
- European Market Observatory for Fisheries and Aquaculture Products (EUMOFA) Organic Aquaculture in the EU – Final report 2022
- European Market Observatory for Fisheries and Aquaculture Products (EUMOFA) – The EU Fish Market 2023
- European Market Observatory for Fisheries and Aquaculture Products (EUMOFA) dashboard

European Climate, Infrastructure and Environment Executive Agency (CINEA)