



# COVID-19 IMPACTS ON FARMED SPECIES

FOCUS ON TURBOT AND CAVIAR



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## LIST OF ACRONYMS

<b>APROMAR</b>	Asociación Empresarial de Acuicultura de España
<b>CITES</b>	The Convention on International Trade in Endangered Species of Wild Fauna and Flora
<b>CN</b>	Combined Nomenclature <sup>1</sup>
<b>EU</b>	The European Union as of 1 January 2021, i.e. excluding the United Kingdom
<b>EUMOFA</b>	European Market Observatory for Fisheries and Aquaculture Products
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FEAP</b>	Federation of European Aquaculture Producers
<b>HoReCa</b>	Hotels, restaurants, and catering sector
<b>HS</b>	Harmonised System <sup>2</sup>
<b>MAC</b>	Market Advisory Council
<b>MAPA</b>	Ministerio de Agricultura, Pesca y Alimentación de España
<b>MS</b>	EU Member States as of 1 January 2021, i.e. excluding the United Kingdom
<b>RAS</b>	Recirculating Aquaculture Systems

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<sup>1</sup> Council Regulation (EEC) No 2658/87 of 23 July 1987 on the tariff and statistical nomenclature and on the Common Customs Tariff

<sup>2</sup> World Customs Organization <http://www.wcoomd.org/en/topics/nomenclature/overview/what-is-the-harmonized-system.aspx>

## ***FOCUS ON FARMED TURBOT***

# 1 SUMMARY

- Turbot can be both wild-caught or farmed. Wild turbot is found from the Northeast Atlantic to the Mediterranean. They are mainly caught in the North Sea and the English Channel by EU fleets, with the Netherlands accounting for most of the landings.
- Aquaculture production of turbot was introduced in the 1970's in Scotland, France and Spain. Following techno-biological developments in the 90's, the sector experienced a steady but slow growth in production across numerous European countries (the Netherlands, Germany, Portugal, Romania, Croatia, etc.). Turbot has then also been introduced in Chile and China, whose aquaculture production has increased dramatically since the early 2000's and is now leading the world production by far (85% of volumes).
- In 2019, the world aquaculture production of turbot has been estimated to be 78.058 tonnes<sup>1</sup>. According to FEAP and Eurostat, EU MS produced 11.757 tonnes of farmed turbot in 2019, an increase of 11% from 10.637 tonnes in the year before. The main producers were Spain (mainly Galicia) and Portugal accounting for 98% of EU production and 15% of world production, respectively. A large part of Portuguese production is actually owned by Spanish capital and exported to Spain. Other relevant producing MS were France and the Netherlands, where production is small and highly concentrated around one company. There are currently no estimated data for turbot production for 2020 and 2021, thus at the time of drafting this case study, it is not possible to make quantitative analysis on the COVID-19 impact on production. However, qualitative assessment is provided in this study according to the methodology described below.
- In Spain, stakeholders reported that the crisis did not affect the production stage, as turbot growth cycles follow strict scheduling, and killing is programmed to meet the peak seasons in demand (summer and Christmas), while the worst of the crisis occurred in spring season. However, the Spanish production slightly decreased by 13% in 2020 compared to 2019. In France, the leading turbot company in turbot farming has been constrained to temporary closure of its activities since July 2021 due to financial difficulties partly caused by the pandemic.
- Overall, 2020 saw consistent export volumes of turbot in the EU. The sharp decline in trade at the initial impact of the pandemic, during March and April of 2020, has been offset by the peak export seasons of summer and Christmas. In Spain, turbot used to be sold to the HoReCa segment and other "premium" markets at international level (USA, Asia). As these traditional segments were closed during lockdown periods or experienced logistic problems, main Spanish producers almost completely shifted to the retail market in a few months. So far in 2021, an operator reports that a significant part of turbot production is still sold through retail despite lower sale prices, since the HoReCa sector is still impacted by the low level of tourism activities. This appears consistent with the growth of at-home consumption volumes in Spain in 2020 (+55% compared to 2019). However, this shift caused a slight drop of the average price.
- Based on export data and stakeholders interviewed, the Spanish exports partially shifted from fresh/live turbot to frozen turbot, likely reflecting producers' strategy to handle scheduled killing and low demand from the HoReCa sector. This seems consistent with the decline in prices at export, wholesale and consumption stages.

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<sup>1</sup> Estimation based on a combination of data from FAO, EUMOFA and FEAP.

## 2 SCOPE AND CONTENT

### 2.1 Study scope

This study was carried-out upon request of the Market Advisory Council (MAC) via DG Mare and EUMOFA. In a recommendation, the MAC drew attention to the need for specific studies to assess the impact of the COVID-19 pandemic on the entire seafood supply chain, and in particular on the farmed turbot (*Psetta maxima*, formerly known as *Scophthalmus maximus*) supply chain in the EU. The MAC also wished an evaluation of mitigation measures to develop a strategy to cope with such global catastrophes in the future.

This study thus aims to provide an understanding of the farmed turbot value chain and establish the status for the sector both prior to and during the COVID-19 pandemic. This study also aims to give insight into how stakeholders in farmed turbot producing countries were affected by the COVID-19 pandemic and their course of action in dealing with the consequences.

### 2.2 Methodology

The study is based on publicly available literature, research, news articles and data sources. Stakeholders in Spain, France and the Netherlands were contacted and asked to contribute to the study. 1 interview was conducted with a Spanish stakeholder, and 1 email communication was carried out with a French operator, contributing with both general and specific insights regarding production, trade, and market outlets.

Although the need for this study is found in the sector through the MAC, it has proved difficult to find stakeholders willing to participate in this study. Notably, the main producing company in France is facing a financial crisis and has suspended its turbot related activities since July 2021. This study is subject to inherent limitations with results and recommendations shaped by the input of the interviews and communications.

#### 2.2.1 Brexit

This report analyses data for the years 2010-2020. The UK formally left the EU on 31 January 2020 and entered a transition period that lasted until 31 December 2020. Starting from February 2020, trade data reported by the UK are not available in EUROSTAT. For the sake of consistency, the UK is excluded from the EU aggregate and treated as a third country throughout the whole period in all analyses in this report.

### 2.3 Data

The main data sources for this study concerning production of farmed turbot are FAO, EUMOFA and FEAP, while data from EUMOFA (based on EUROSTAT and IHS Markit – Global Trade Atlas) are used when analysing the international trade flows.

The EUMOFA international trade database includes volumes and values of imports and exports of fishery and aquaculture products from almost 100 reporting countries. EUROSTAT (Comext) data is available through EUMOFA and monitors monthly trade flows within the EU and between EU Member States and third countries. Although both EUROSTAT-COMEXT and IHS data is comprehensive, it must be underlined that imports and exports of goods are reported in line with the Harmonised System<sup>2</sup> (HS) and the

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<sup>2</sup> World Customs Organization <http://www.wcoomd.org/en/topics/nomenclature/overview/what-is-the-harmonized-system.aspx>



**COVID-19 Impacts on farmed species: focus on turbot and caviar**

Combined Nomenclature<sup>3</sup> (CN), which do not include detailed information on turbot products. Notably, they do not specify whether products are wild or farmed turbot. Data on international trade flows trade between EU members, and trade between EU members and third countries are publicly available at MCS<sup>4</sup> level on the EUMOFA website.

The codes used for the analysis of farmed turbot exports from the EU over the period covered by this study are listed below.

CN-8		Description
EU	<b>0302 24 00</b>	Fresh or chilled turbot " <i>Psetta maxima</i> "
	<b>0303 34 00</b>	Frozen turbot " <i>Psetta maxima</i> "

Monitoring the international trade of turbot is challenging as products are exported under codes which only reflect the preservation states of the products: fresh or chilled, or frozen. Both categories only cover whole fishes. Turbot trade also exists in minor quantities for fish in fillets, mostly frozen, but these volumes are not covered by the present analysis as they are included into aggregated codes for flat fishes' fillets. Besides, the codes do not specify whether traded products are wild or farmed fishes.

Corresponding data must therefore be interpreted with care, as they do not distinguish wild catches from farmed turbot exports, and they do not take into account some alternative products to whole fishes, although accounting for minor quantities (live fishes and live or frozen fillets).

The 4 EU producing countries, Spain, Portugal, France and the Netherlands together covered 15% of all world turbot aquaculture production in 2019. Croatia, Denmark and Romania used to farm turbot but their production stopped over the past decade due to technical issues. When considering exports, only data from the 4 major producing countries are used.

## 2.4 COVID-19

COVID-19 is the name given to the infectious disease caused by the most recently discovered coronavirus (SARS-CoV-2), unknown before its outbreak in Wuhan, China, in December 2019<sup>5</sup>. During the first months of 2020, the disease spread around the world and was classified as a pandemic by the World Health Organization (WHO) on 11 March.

In March and April 2020, the number of new COVID-19 infections rose in Europe, and lockdowns were implemented with restrictions on travel, closing of restaurants, cafés, offices, and schools. As May 2020 drew near the number of infections in Europe declined and remained low until mid-July when new cases began increasing again. Since then, COVID-19 cases have risen and fallen with restrictions being relaxed and retightened accordingly. Near the end of 2020 vaccines against COVID-19 were ready for clinical trials, and vaccination programs were started in 2021.

For comparative reasons, 2018 and 2019 are used as base year to determine changes in the market resulting from the COVID-19 pandemic. Although the COVID-19 pandemic is still ongoing, the year 2021

<sup>3</sup> Council Regulation (EEC) No 2658/87 of 23 July 1987 on the tariff and statistical nomenclature and on the Common Customs Tariff. [https://ec.europa.eu/taxation\\_customs/business/calculation-customs-duties/what-is-common-customs-tariff/combined-nomenclature\\_en](https://ec.europa.eu/taxation_customs/business/calculation-customs-duties/what-is-common-customs-tariff/combined-nomenclature_en)

<sup>4</sup> Main Commercial Species are EUMOFA aggregates of CN and HS codes as part of the harmonisation rules. Read more about EUMOFA data management methodologies (<https://www.eumofa.eu/supply-balance-and-other-methodologies>) and harmonisation correlation tables (<https://www.eumofa.eu/harmonisation>).

<sup>5</sup> <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

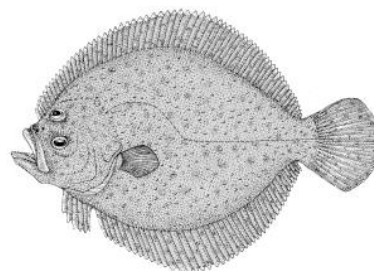
**COVID-19 Impacts on farmed species: focus on turbot and caviar**

has seen lifting of restrictions and has given the market more time to adapt. 2020 is seen as the year with the most prominent COVID-19 effects as this was the year when the initial shock hit the market.

### 3 FARMED TURBOT

Turbot (*Psetta maxima*, formerly known as *Scophthalmus maximus*) is a benthic marine species which lives on sandy and occasionally muddy bottoms, from shallow waters (about 20 m) to a depth of 80 m<sup>6</sup>. Young fish tends to live in shallower areas and may be found inshore in the breaker zone or in shore pools.

In the wild, the geographic distribution is the Northeast Atlantic, throughout the Mediterranean and along the European coasts to the Arctic Circle (in Norway and Iceland). Wild turbot can also be found in most of the Baltic Sea. A subspecies, *Psetta maxima maeotica*, is reported in the Black Sea.



Source: FAO

Turbot aquaculture initiated in the 1970s in Scotland, France and Spain. Production expanded quickly after 1985 in Spain and Portugal with technological developments in juvenile rearing. The industry encountered a crisis in 1992, as production had almost doubled in a year to reach 1.622 tonnes, but without sufficient demand to meet it. Small farms suffered from high production costs and an underdeveloped commercial marketing network. The subsequent restructuration brought a growth of production and an expansion of the number of farming countries: Spain, Portugal, the Netherlands, Denmark, Germany, Iceland, Ireland, Italy, Norway, Wales (UK), France, Romania, and Croatia. The natural distribution of the turbot includes coastal waters of all these countries. Turbot has also been introduced to other regions (notably Chile in the late 1980s) and, more recently, China, where turbot aquaculture has increased dramatically since 2003. Spain, which was historically the major producer worldwide, has since been overtaken by far by Chinese production of farmed turbot.

#### 3.1 Biology

Turbots are large flatfishes with a round shaped body, a large mouth and small eyes. Maximum length is 1 meter but usually 50-80 cm. Turbots are asymmetrical: they lay on their right side and their eyes are on the upper left side. Dorsal and anal fins expand widely over the dorsal and ventral sides without continuing under the tail. The skin is scaleless, but bears scattered bony protuberances on the upper body surface. The underside (right) is whitish, while the coloration of upper side varies to match the fish background. It is usually dull sandy-brown to grey, with darker spots scattered over the body and the fins<sup>7</sup>.

Turbot spawning usually occurs between February and April in the Mediterranean, and from May to July in the Atlantic. Females undergo ovulatory cycles, spawning every 2-4 days. Eggs are pelagic and spherical in shape. Their diameter ranges between 0,9 mm and 1,2 mm. Following embryonic development and hatching (60-70 days), larvae are 2,7-3,1 mm in length. They are initially symmetric but, at the end of the metamorphosis (day 40-50, 25 mm), the right eye moves to the left side, giving rise to asymmetry<sup>8</sup>.

Turbots are carnivorous. Adults feed mainly on other bottom-living fishes (sand-eels, gobies, etc.) and cephalopods, while juveniles rather eat crustaceans and bivalves.

<sup>6</sup> [https://www.fao.org/fishery/culturedspecies/Psetta\\_maxima/en](https://www.fao.org/fishery/culturedspecies/Psetta_maxima/en)

<sup>7</sup> Tyler-Walters, H., 2008. *Scophthalmus maximus* Turbot. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 12-10-2021]. Available from: <https://www.marlin.ac.uk/species/detail/1917>

<sup>8</sup> <https://www.fishbase.in/summary/1348>

Female turbot reach sexual maturity after 3 years and fishes have a maximum lifespan of around 25 years<sup>9</sup>.

## 3.2 Aquaculture and resource management

It takes at least two years to produce a turbot weighing its 1,5-2kg commercial size. The full production cycle involves 2 stages: nursery/pre-growth phase (5g to 60-100g) and growth-out to commercial size. Turbots are hatched in land-based hatcheries and usually grown-out in onshore tanks supplied with open-circuit pumped seawater. RAS (recirculating aquaculture systems) is increasingly being used for on-growing turbot<sup>10</sup>. Open sea culture in flat-bottomed cages is rarely used and considered to be in an experimental stage. This alternative method offers lower production costs, but they are few locations that would meet optimum conditions for on-growing<sup>11</sup>.

Broodstock are maintained in square tanks, where reproductive males (2-3 years old; 2 kg weight) and females (4-8 years old; 3-6kg) are fed on moist pellets. In captivity, broodstock spawning can be obtained by hand-stripping all year-round by manipulating water temperature and the day-night rhythms<sup>12</sup>. Females can produce 5-10 million eggs. Following fertilization, eggs are incubated at a maximum temperature of 15°C, and embryonic development takes 6-7 days. After hatching, larval culture takes 90 days at 18-20°C, to get larvae weighing up to 5-10g. Larvae are fed with rotifers, artemia and phytoplankton until metamorphosis, then juveniles are weaned with dry pellets in tanks with open-circuit pumped seawater at a temperature of 16-18°C. During this phase, fry are graded to maintain uniform size and to eliminate smaller, deformed and poorly pigmented individuals. Once weaned, turbot are nursed for 4-6 months and pre-fattened with dry pelleted feed, introduced manually or automatically, until they reach 80-100g. The second main grow-out stage is turbot growth-up to commercial size for 18-20 months in tanks (25-100 m<sup>3</sup>) or cages, usually at high stocking density (up to 100kg/m<sup>2</sup>). Feeding consists of extruded pellets, introduced manually or automatically. The optimum temperatures for feeding range from 14-18°C, while the extreme range for the culture of turbot is 11-23°C. Fish are harvested manually and killed by placing them into containers filled with ice and seawater.

Main difficulty of turbot farming is controlling diseases outbreaks caused by bacteria and parasites, that requires use of vaccines and antibiotics. Another challenge is investigating breeding optimization to enhance female share in populations, as females reach commercial size faster and would allow to reduce production costs.

The European turbot market has no specific regulations, and there are no limits on trade within EU countries, no minimum sizes, and no withdrawal price. But in some countries, producer organisations have set up voluntary quality schemes. For example, technical specifications of the certification « Label rouge »<sup>13</sup> provide requirements on production practices (diet composition, killing method, minimal growth duration) promoting animal welfare and meat quality. According to FAO<sup>14</sup>, turbot farming demonstrates responsibility, as shown by the implementation of ISP 14001 and the EU EMAS II system in numerous companies. No significant impact on the environment has been reported from the onshore turbot farming.

<sup>9</sup> <https://aquaculture.ifremer.fr/les-Filières/Filière-Poissons/La-decouverte-des-poissons/Turbot>

<sup>10</sup> Martins, C. et al. (2010). New Developments in Recirculating Aquaculture Systems in Europe: A Perspective on Environmental Sustainability. *Aquacultural Engineering* (0144-8609) (Elsevier Sci Ltd), 2010-11, Vol. 43, N. 3, P. 83-93. 43. 10.1016/j.aquaeng.2010.09.002.

<sup>11</sup> [https://www.fao.org/fishery/docs/CDrom/aquaculture/l1129m/file/en/en\\_turbot.htm](https://www.fao.org/fishery/docs/CDrom/aquaculture/l1129m/file/en/en_turbot.htm)

<sup>12</sup> MacKenzie S. and Jentoft S. (2016), *Genomics in Aquaculture*, Academic Press, Elsevier, UK

<sup>13</sup> <https://extranet.inao.gouv.fr/fichier/CDCPNOLA1502.pdf>

<sup>14</sup> [https://www.fao.org/fishery/docs/CDrom/aquaculture/l1129m/file/en/en\\_turbot.htm](https://www.fao.org/fishery/docs/CDrom/aquaculture/l1129m/file/en/en_turbot.htm)

### 3.3 World production of farmed turbot

In 2019, FAO reported a global aquaculture production of turbot of 77.710 tonnes (+10% since 2018), with a total value of 530 million USD (around EUR 466 million). Combining FAO data for third countries, EUMOFA data for European countries, and FEAP data for France in 2018-2019, we obtain a slightly different total production of 78.058 tonnes. The world production has increased rapidly in the last decade, reaching a peak between 2011 and 2013 (82.781 tonnes). The current trend since then has been a slight decrease, although production in 2019 was still 11% higher than in 2010. In 2019, there were only 5 producers of farmed turbot: China, Spain, Portugal, France, and Netherlands. China is by far the largest producer with around 85% of farmed volumes in 2019 (66.300 tonnes), followed by Spain with 8.011 tonnes (10% of the volumes). Chinese production has increased thirteenfold since 2000. A marginal small and decreasing production has also been recorded in Chile, Iceland, and the UK in the first years of the past decade but assumed not to be active anymore in those countries considering the latest available data.

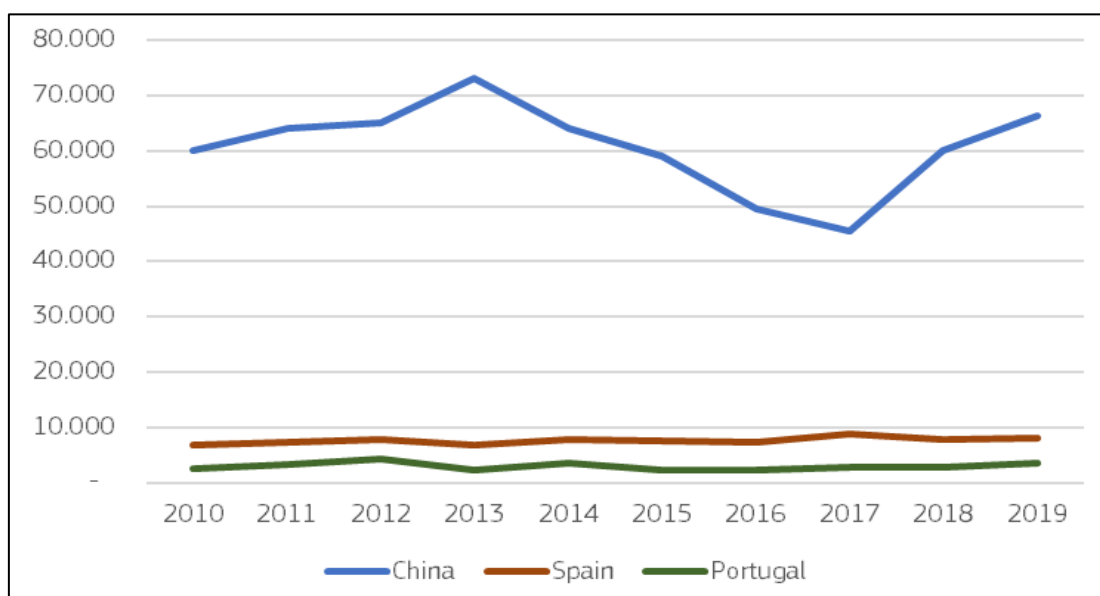
**Table 1: World production of farmed turbot (in tonnes) 2010-2019**

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
China	60.000	64.000	65.000	73.000	64.000	59.000	49.500	45.500	60.000	66.300
EU 27	9.956	11.099	12.596	9.615	11.750	10.193	10.116	11.917	10.637*	11.757*
Chile	292	252	442	107	2	3	0	0	1,89	1
Iceland	46	20	28	58	0	0	0	0	0	0
UK	0.3	0	0	0	0	0	0	0	0	0
Channel Islands	2,8	2,6	1.2	1	1	1	1	1	1	0
<b>Total**</b>	<b>70.297</b>	<b>75.374</b>	<b>78.067</b>	<b>82.781</b>	<b>75.753</b>	<b>69.197</b>	<b>59.617</b>	<b>57.418</b>	<b>70.640</b>	<b>78.058</b>

\*\*Due to rounding there might be small variations between the totals and the sum of data.

Source: FAO, EUMOFA, FEAP

**Figure 1: Production of farmed turbot by main producing countries (tonnes)**



Source: FAO, EUMOFA/Eurostat

### 3.4 EU production of farmed turbot

The EU production of farmed turbot reached 11.757 tonnes in 2019. Most of this volume was produced in Spain (68%) and Portugal (30%). A large part of Portuguese production is actually owned by Spanish capital and exported to Spain. Other producing MS were France and the Netherlands, in much smaller proportions. In both countries, only one company is involved in farmed turbot production. EU production reached a peak in 2012 with more than 12.500 tonnes produced, due to higher production levels in Spain and Portugal. Over the past decade, French production decreased strongly (- 84%) whereas Dutch production has stayed relatively steady. Romania, Croatia and Denmark also used to farm turbot but their production stopped a few years ago due to technical issues. According to the information gathered for this study, the setback to production in several MS (e.g. Croatia) is to a large extent due to the poor results obtained from the farming of turbot in sea cages (rather than in tanks), whereas a decade ago this production method was considered to be the main development opportunity<sup>15</sup>.

**Table 2: Production of farmed turbot in EU (in tonnes) 2010-2019**

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Spain	6.882	7.337	7.758	6.900	7.767	7.464	7.306	8.771	7.858	8.011
Portugal	2.424	3.197	4.406	2.353	3.588	2.302	2.388	2.745	2.663	3.580
Netherlands	250	260	180	100	100	100	100	100	-	100
France	394	300	250	255	279	300	300	300	116	65
Croatia	-	-	-	-	1	7	1	-	-	-
Denmark	6	5	2	7	-	-	-	-	-	-
Romania	-	-	-	-	16	20	20	-	-	-
<b>Total</b>	<b>9.956</b>	<b>11.099</b>	<b>12.596</b>	<b>9.615</b>	<b>11.750</b>	<b>10.193</b>	<b>10.116</b>	<b>11.917</b>	<b>10.637</b>	<b>11.757</b>

\*Due to rounding there might be small variations between the totals and the sum of data.

Source: EUMOFA/Eurostat/FAO, FEAP

### 3.5 Processing and marketing

Farmed turbot may be sold dead or live (to a much lesser extent). Most frequently, harvested turbot are placed into containers filled with ice and seawater for transport to processing units, and packed in polystyrene boxes, covered with a layer of ice and plastic film<sup>16</sup>. Turbot is traditionally marketed as fresh and whole fish weighing between 1,5 and 2 kg. Apart from Spain, turbot is generally gutted before sale. Large fish can be filleted (skin-on or off) and sold in vacuum packs<sup>17</sup>. Minor quantities of fillets are frozen for exports. However, turbot presents a challenge to producers in relation to fillet yield, which is much lower than Atlantic salmon, meaning that the production cost per 'edible' part of the fish is even higher<sup>18</sup>. This is one of the reasons why whole fish is still the main presentation. Furthermore, the demand of the European market has recently changed, increasing for smaller portions ranging between 500 and 750 g.

There is also a small market for live turbot, mostly to supply restaurants in Asian markets through long distance exports.

<sup>15</sup> Source: EUMOFA (2018), Turbot in the EU – Case study, Price structure in the supply chain for Turbot – Focus on France, Spain and the Netherlands

<sup>16</sup> Source: [https://www.fao.org/fishery/docs/CDrom/aquaculture/l1129m/file/en/en\\_turbot.htm](https://www.fao.org/fishery/docs/CDrom/aquaculture/l1129m/file/en/en_turbot.htm)

<sup>17</sup> Source: <http://en.aquaculture.ifremer.fr/Sectors/Fish-sector/Discoveries/Turbot>

<sup>18</sup> Source: <https://www.seafish.org/responsible-sourcing/aquaculture-farming-seafood/species-farmed-in-aquaculture/aquaculture-profiles/turbot/sources-quantities-and-cultivation-methods/>

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When sold on the domestic markets, the supply chain of farmed turbot is short. For the HoReCa market, the products are sold by the farm directly to the wholesaler located on the wholesaler market. In Spain, the main EU producing country, there are no intermediaries between farmers and supermarkets. The “platform stage” covers only one stakeholder and focuses on logistical operations, and flows are optimized between farms and large-scale retailers.

## 4 INTERNATIONAL TRADE

This chapter aims to establish the status quo of turbot exports: the discrepancies between export volumes and values when comparing 2020 to previous years are discussed in the chapter on market changes due to COVID-19 (see § 4.2).

### 4.1 Exports

Spain is the largest EU exporter of turbot both in volume and value, making up 46% of total EU export volume and 42% of total EU export value in 2020. Portugal exported 32% of the total EU volume and covered 30% of the value. The Netherlands covered 20% of total EU exports in volume and 25% in value, however most of Dutch exports concern wild-caught turbot since it is the main EU fishing country for this species. France exported 2% of the total EU volume, covering 3% of exports value (a significant share of these exports is also likely to concern wild-caught fish).

In 2020, the highest unit price was achieved by France at 17,18 EUR/kg, which is nevertheless a 20% decrease from 21,48 EUR/kg in 2019. The Netherlands had the second highest unit price in 2020 with 10,22 EUR/kg, which is an 8% decrease from 11,14 EUR/kg in 2019. Portugal and Spain achieved near similar unit prices of 7,30 EUR/kg and 7,13 EUR/kg, a decrease of 7% and 25% respectively since 2019.

In 2020, turbot exports were dominated by live/fresh products, which accounted for 87% of export volume, and frozen turbot, which covered 13% of export volume.

**Table 3: Total exports of turbot\* from major producing EU countries (volume in tonnes, value in EUR 1.000)**

Country	2017		2018		2019		2020	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Spain	4.996	40.994	4.664	45.578	4.900	46.423	4.714	33.604
Portugal	2.411	16.720	2.647	21.850	3.233	25.477	3.285	23.972
Netherlands	2.166	24.907	1.825	22.018	1.820	20.268	2.006	20.509
France	349	5.600	297	6.302	257	5.523	159	2.735
<b>Total</b>	<b>9.922</b>	<b>88.222</b>	<b>9.432</b>	<b>95.749</b>	<b>10.210</b>	<b>97.690</b>	<b>10.164</b>	<b>80.821</b>

\* Includes all product types, whether farmed or wild-caught, and whether live or fresh or frozen

\*\* Due to rounding there might be small variations between the totals and the sum of data.

Source: EUMOFA elaboration on EUROSTAT-COMEXT

Live/fresh turbot products achieved the highest unit price of 8,80 EUR/kg, a 10% decrease from the price of 9,77 EUR/kg in 2019. Frozen turbot experienced an even more sharp decrease of 62% in unit price, achieving 2,44 of EUR/kg in 2020 while the price was 6,36 EUR/kg in 2019 and 6,79 EUR/kg in 2018. According to an interview with APROMAR<sup>19</sup>, the extremely low value of Spanish frozen turbot exports however raises question and may suggest a statistical error. Indeed, according on the association, once

<sup>19</sup> Asociación Empresarial de Acuicultura de España, or Spanish Aquaculture Business Association



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the fish is frozen, fish farmers would rather hold on to it and sell it progressively than sell it immediately if there is no sufficient demand.

**Table 4: Total exports of turbot by preservation state (volume in tonnes, value in 1.000 EUR) from major producing countries (ES, PT, FR, NL)**

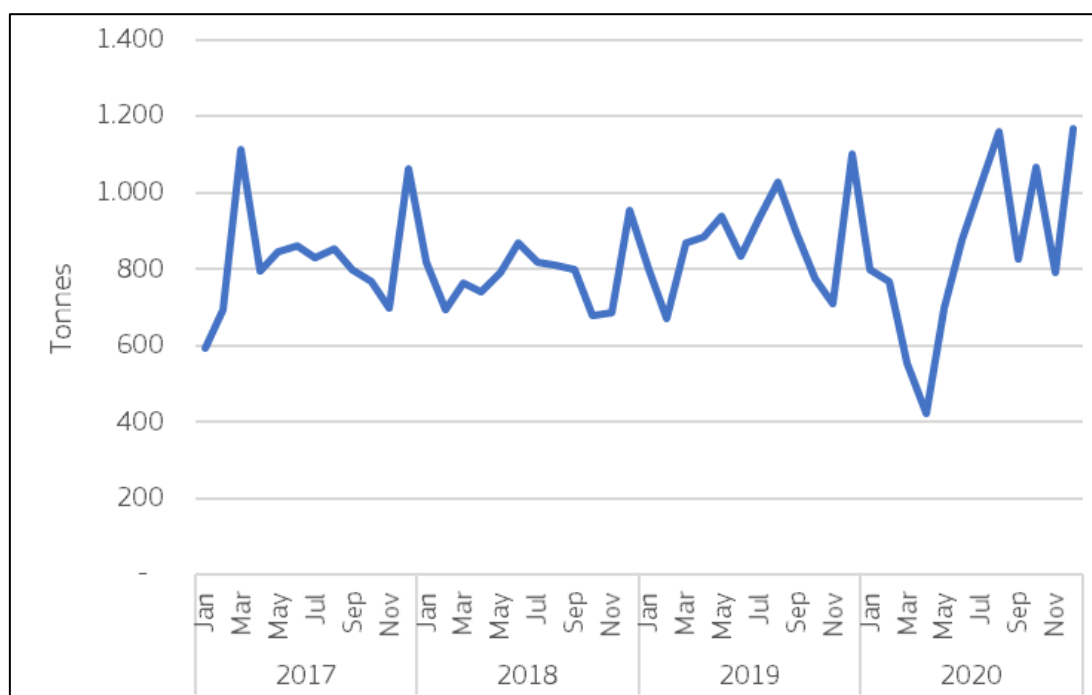
Country	2017		2018		2019		2020	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Live/fresh	9.471	85	8.884	92	9.598	94	8.806	78
Frozen	451	3	549	4	612	4	1 357	3
<b>Total*</b>	<b>9.922</b>	<b>88</b>	<b>9.432</b>	<b>96</b>	<b>10.210</b>	<b>98</b>	<b>10.164</b>	<b>81</b>

\* Due to rounding there might be small variations between the totals and the sum of data.

Source: EUMOFA elaboration of EUROSTAT

A clear seasonality can be seen in the exports, with peak periods in summer and December. According to the APROMAR association, this trend reflects the seasonality of demand, which is particularly high during the touristic and Christmas seasons.

**Figure 2: Total exports of turbot\* by month and year (tonnes) from major EU producing countries (ES, PT, FR, NL)**



\* Includes all product types, whether farmed or wild-caught, and whether live or fresh or frozen

Source: EUMOFA elaboration of EUROSTAT

#### 4.1.1 Spain

Trade data for turbot is not available before 2012 but Italy, France, and Portugal have traditionally been the largest export markets for Spanish turbot. Since 2017, exports to Portugal have been growing, concomitantly to a decrease in exports to Italy. In 2020, both export countries seemed close to achieve equal volumes: 1.891 tonnes of turbot were exported to Italy (-10% compared to 2019) while 1.391 tonnes were exported to Portugal (+35%). In 2017, the most important Spanish farm shut down in the

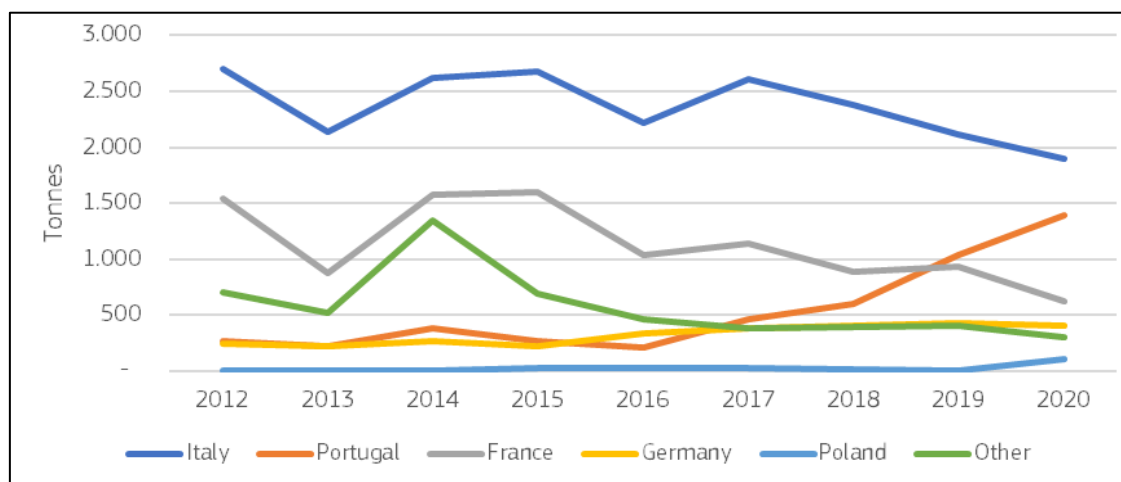


**COVID-19 Impacts on farmed species: focus on turbot and caviar**

summer, which may have given rise to a restructuring of the sector<sup>20</sup>. In Spain, nearly all of turbot volumes originate from aquaculture production.

The majority of Spanish exports are live or fresh whole or gutted turbot. In 2020 this represented 79% of exports. Frozen whole or gutted turbot represented 21% of Spanish export of this species in 2020.

**Figure 3: Spanish exports of turbot\* by main destinations (volume in tonnes)**



\* Includes all product types, whether farmed or wild-caught, and whether live or fresh or frozen

Source: EUMOFA elaboration of EUROSTAT-Comext

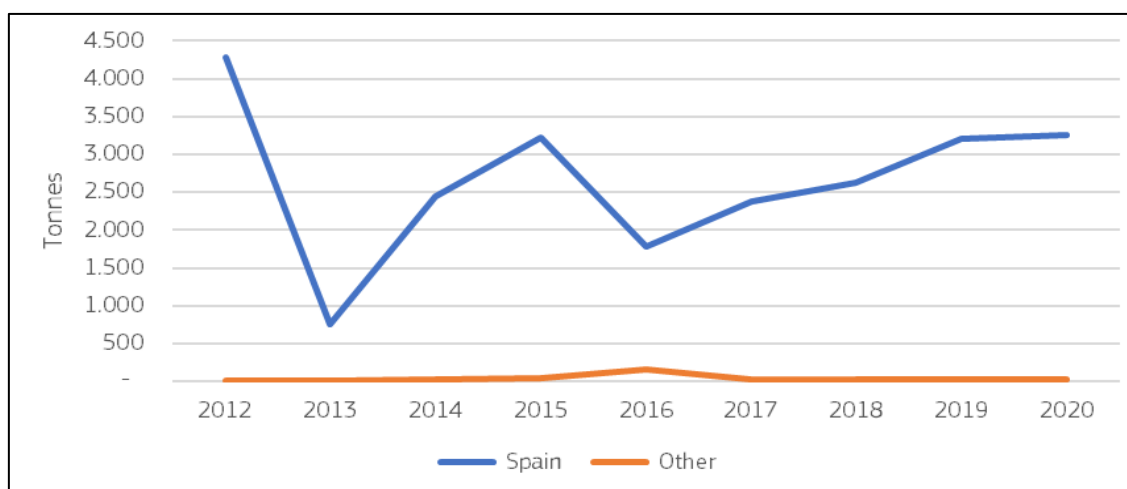
<sup>20</sup> EUMOFA (2018), Turbot in the EU – Case study, Price structure in the supply chain for Turbot – Focus on France, Spain and the Netherlands

### 4.1.2 Portugal

In 2020, Portugal reported 3.285 tonnes of turbot exports. Both currently and historically, almost all Portuguese turbot exports go to Spain. In 2020, Portugal reported turbot exports of 3.262 tonnes to Spain, representing 99% of the total export volume of this species. Portuguese exports are still below the peak level of 2012 (4.275 tonnes) which coincided with a peak of production, but they show a globally positive trend since 2013 (year-to-year average increase of 10%), except a drop in 2016.

In 2020, 99% of turbot exports from Portugal were live or fresh, either whole or gutted. The remaining 1% was exported frozen, either whole or gutted.

**Figure 4: Portuguese exports of turbot\* by main destinations (tonnes)**



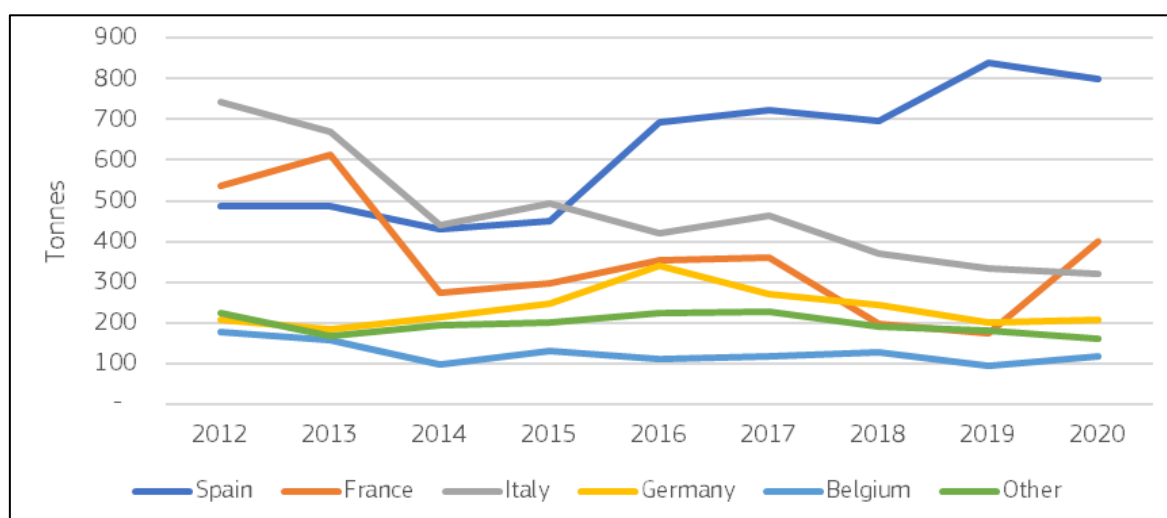
\* Includes all product types, whether farmed or wild-caught, and whether live or fresh or frozen  
Source: EUMOFA elaboration of EUROSTAT-Comext

### 4.1.3 The Netherlands

Most of the Dutch exports concern wild-caught turbot as the farming sector is very small and mostly destined to supply the domestic market. Almost all Dutch turbot exports were destined to European countries in 2020. Spain was the main destination, covering 40% of export volume but only 37% of export value in 2020. France followed, receiving 20% of the total export volume and value in 2020, overpassing Italy and Germany that year and thus recovering its historical second partnering position of 2012-2013. Over the 2012-2020 period, Dutch export volumes to Spain have been multiplied by 1,5 while exports to Italy have been divided by two.

The majority of Dutch turbot exports in 2020 were live or fresh whole or gutted turbot, 84%, and the remaining 16% were frozen turbot, whole or gutted.

## COVID-19 Impacts on farmed species: focus on turbot and caviar

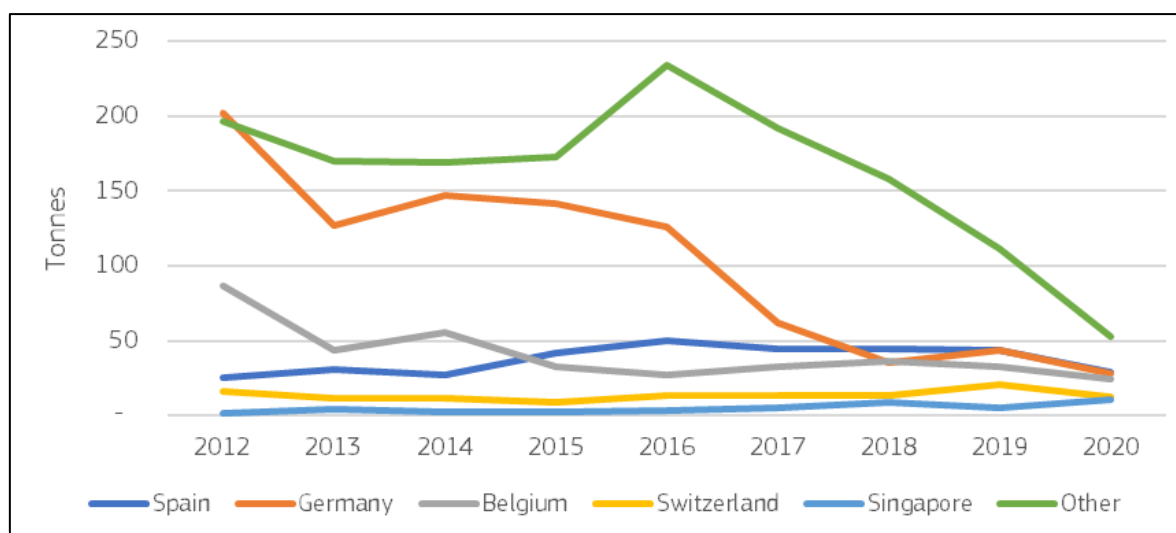
**Figure 5: Dutch exports of turbot\* to main destinations (tonnes)**

\* Includes all product types, whether farmed or wild-caught, and whether live or fresh or frozen

Source: EUMOFA elaboration of EUROSTAT-Comext

#### 4.1.4 France

In 2020, France exported a total of 159 tonnes of turbot. Of this, 19% of the total volume and value were destined to Spain. 18% of export volume, covering 21% of export value, went to Germany. French exports also supplied Asian markets, with 7% of volumes destined to Singapore and 4% to Hong Kong (covering 6 and 7% of exports value). It is likely that a significant share of these exports concern wild-caught fish.

**Figure 6: French exports of turbot\* to main destinations (tonnes)**

\* Includes all product types, whether farmed or wild-caught, and whether live or fresh or frozen

Source: EUMOFA elaboration of EUROSTAT-Comext

## 4.2 Consumption

In all EU market, turbot is a product particularly destined to be consumed in restaurants. However, turbot market features and consumption habits vary throughout the MS covered by the analysis.

In **Spain**, turbot is more and more purchased for at-home consumption through large scale retailers/supermarkets and fishmongers. Supermarkets mostly sell farmed turbot, as supply is more stable in quality and volumes and the product is considered as offering a better value for money. This is also related to the fact that catches of turbot are very low in this country and that it is not a traditional fish. Specialised retailers and fishmongers may purchase turbot from fish farmers directly or from wholesalers (Mercas) while restaurants mainly buy it from wholesalers.

In **France** and the **Netherlands**, turbot is mainly consumed out-of-home. The foodservice sector is supplied in turbot through specialised wholesalers and cash-and-carry, but Dutch restaurants may also purchase it directly from the farm. Consumption in France and the Netherlands rely to a larger extent on fishery. In France, turbot is typically sold as whole fish to restaurants (gutted or not) and then prepared in the restaurant. It is considered as a premium species, following a product segmentation with higher prices targeted by national production (compared to imported turbot) and wild catches (compared to farmed turbot). French farms seek high-quality range products through the Label-Rouge scheme. In the Netherlands, farmed turbot is sold whole, dead or live (to supply Asian restaurants). Minor quantities are filleted (skin-on or off) from larger turbot. Exports are very limited and most production goes to the domestic market.

Regarding seasonality, turbot may not be on sale all year round but only during specific period such as Christmas in French large-scale retailers. On the Dutch market, the main season for turbot is from September to November. During this period, first-sale volumes reach their peaks and prices fall to their lowest levels at the beginning of autumn but can strongly increase in December when demand is high (during Christmas season).

## 5 IMPACT OF COVID-19 ON THE MARKET

### 5.1 Aquaculture production

Aquaculture production data on turbot for 2020 is only available for Spain. Spanish volumes of farmed turbot (at fattening stage, for commercial destination) were down by 13% compared to 2019, while the production value decreased by 27% on the same period.

**Table 5: Spanish production of turbot at fattening stage, for commercial destination  
(volume in tonnes, value in EUR 1.000)**

	2017	2018	2019	2020
<b>Volume</b>	8.691	7.995	8.588	7.504
<b>Value</b>	58.925	59.635	66.690	48.903

\*Aragón: commercial production no value data available

Mainland Balearic Islands: no data

Castilla y León: no value data

Source: MAPA, database of aquaculture production

The APROMAR association confirmed a slight but marginal decrease in Spanish Turbot production in 2020. According to stakeholders, COVID-19 had limited impact on production itself, as turbot product cycles are long and could not be interrupted or extended due to technical constraints (density, level of oxygen etc.). According to the association, fish killing schedule during the COVID-19 period was maintained, and turbot that could not be sold were likely frozen immediately. Besides, the association pointed out that the COVID-19 crisis occurred in the spring, which is not the peak production period, as fishes are programmed to be mature when demand is highest (in the summer and between October and January).

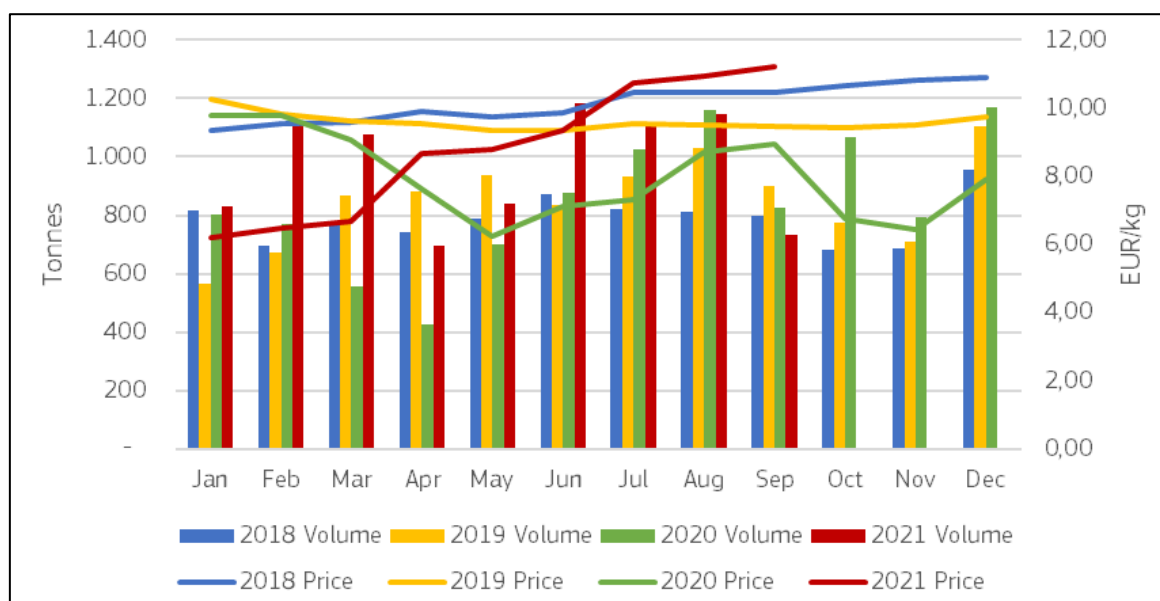
In France, the turbot sector is suffering a severe economic crisis. The leading company France Turbot Ictus (FTI), belonging to the Gloria Maris Group, announced the temporary stoppage of its turbot production activities (juveniles and fattening) in July 2021<sup>21</sup>. The situation is due to two successive events. In February 2019, a power surge interrupted the water circulation systems in the ponds, causing the death of nearly all the livestock. In March 2020, the COVID-19 crisis forced the closure of restaurants and international export markets, which account for 90% of France Turbot's sales revenue. The company was not able to sell its production with the same upgrading level. According to the operator's statement, its turbot production in 2019 was about 200 tonnes.

<sup>21</sup> Source: communication with the operator

## 5.2 International trade

The peak season for exports, which usually occurs in May, June, July, August, September, and December reached higher peaks in 2020 compared with previous years, even recording exceptionally high volumes in October. The dynamic exports reported from June 2020 onwards offset the sharp drop in volumes in March, April, and May. Overall, the total export volumes from the main EU producing countries (ES, PT, FR, NL) in 2020 were only 0,5% down compared to 2019 and 7,8% higher than in 2018.

**Figure 7: Total monthly exports of turbot\* from major producing countries (ES, PT, FR, NL) by volume (left, tonnes) and average price (EUR/kg, right)**



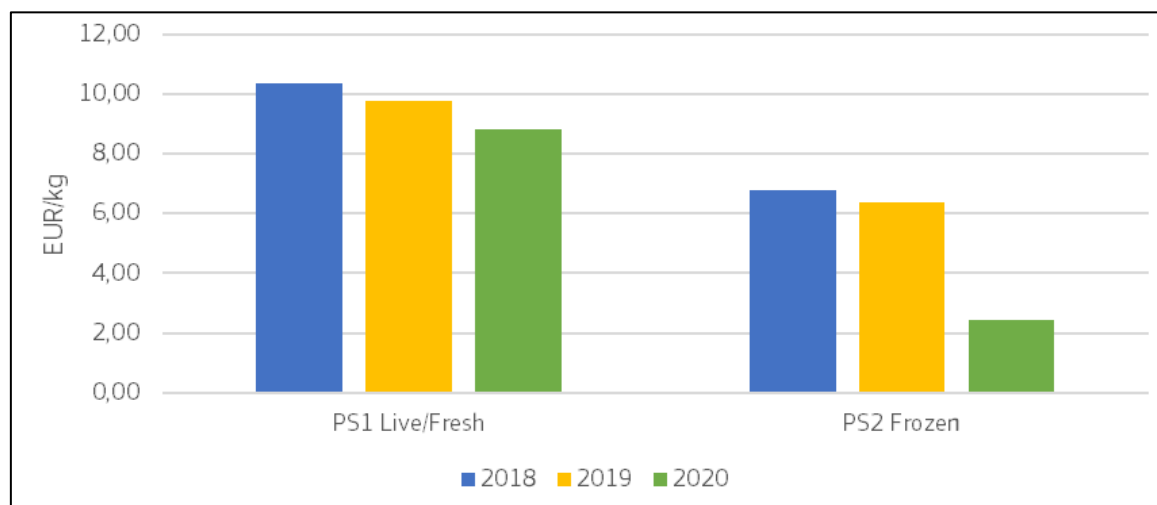
\* Includes all product types, whether farmed or wild-caught, and whether live or fresh or frozen  
Source: EUMOFA elaboration of EUROSTAT

In 2020, Portugal and Spain achieved near similar export prices of 7,30 EUR/kg and 7,13 EUR/kg, a decrease of 7% and 25% respectively from 2019.

The price trend for live, fresh turbot has been fluctuating since 2017, for example it rose by 15% from 2017 to 2018 and decreased by 6% from 2018 to 2019. Following the recent trend, the price decreased by 10% between 2019 and 2020 (from 9,77 EUR/kg in 2019 to 8,80 EUR/kg in 2020).

The unit price of frozen turbot products dropped by 62% from 2019 to 2020, according to Eurostat/Comext data. However, the validity of such a sharp decrease is seriously questioned by the APROMAR association. In the meantime, frozen export volumes recorded an exceptional twofold increase (from 612 tonnes in 2019 to 1.357 tonnes in 2020). Indeed, live/fresh turbot are typically destined for the HoReCa segment, and demand for this product decreased when restrictions were introduced. Surplus volumes of fresh turbot have probably been processed into frozen fillets.

**Figure 8: Average unit price (EUR/kg) of turbot\* exports from major EU producing countries (ES, PT, FR, NL)**



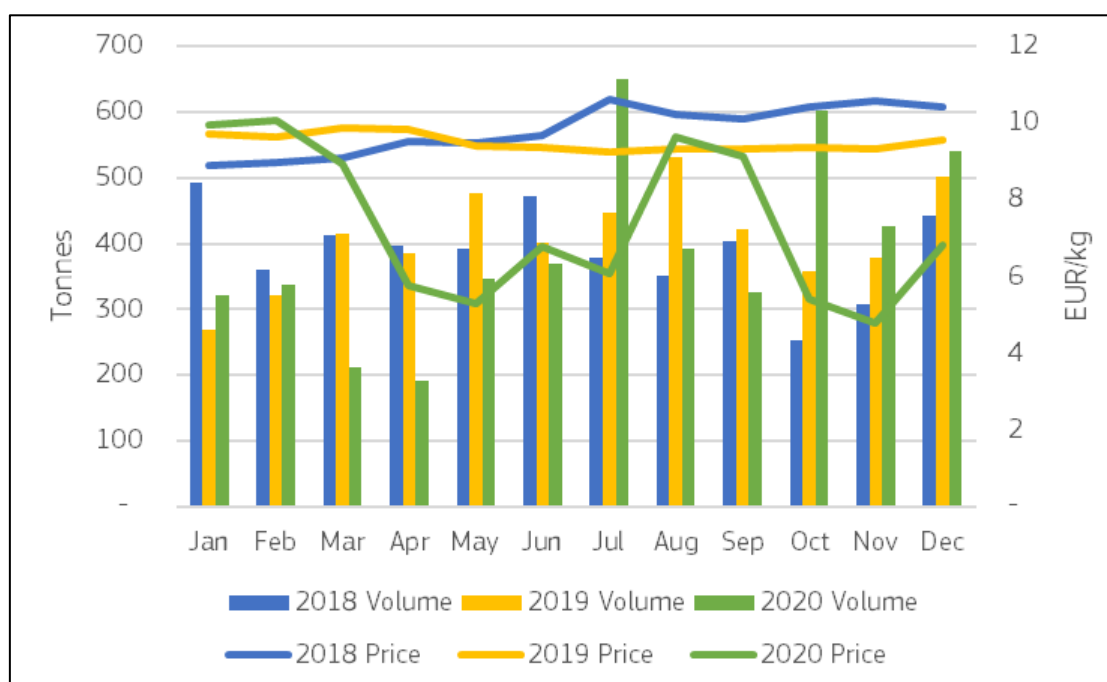
\* Includes all product types, whether farmed or wild-caught

Source: EUMOFA elaboration of EUROSTAT

### 5.2.1 Spain

Compared to the previous years, volume of turbot exports from Spain followed a different seasonal pattern in 2020. Peak volumes were generally reached in March, between May-August and in December. In 2020, export volumes dropped in March and April (-50% lower than the same period in 2019 and 2018) concomitantly to the beginning of the COVID-19 crisis, but peaked in July, October, and December. They were 2% and 18% higher in June-July-August 2020 than the same period in 2019 and 2018, respectively. It also has to be noted that export data demonstrate a partial shift from live, fresh turbot to frozen turbot in export volumes in 2020. According to APROMAR association, this is probably explained by the fact that part of the fish that could not be sold fresh during the shutdown was frozen instead. The association reports that the drop in export volumes of fresh turbot in the first half of 2020 has even been compensated by the increase in exports of frozen turbot.

Conversely, the value of exports in June-July-August 2020 was 20% and 16% lower compared to the same period in 2019 and 2018 respectively. For the whole year 2020, the volume of Spanish exports was only 4% lower than in 2019, while the export value decreased by 28%, due to a fall in exports value between March and April (-54% compared to the same period in 2019). This is also consistent with the substantial decrease in Spanish production value of farmed turbot at fattening stage, for commercial destination, recorded in 2020 by MAPA (see 4.1). However, the sharp drop in price of Spanish frozen turbot exports recorded by Eurostat/Comext data is seriously questioned by the APROMAR association, who does not confirm such a trend.

**Figure 9: Evolution of the monthly volume and unit price\* of Spanish turbot\*\* exports**

\*As reported by exporter countries

\*\* Includes all product types, whether farmed or wild-caught, and whether live or fresh or frozen

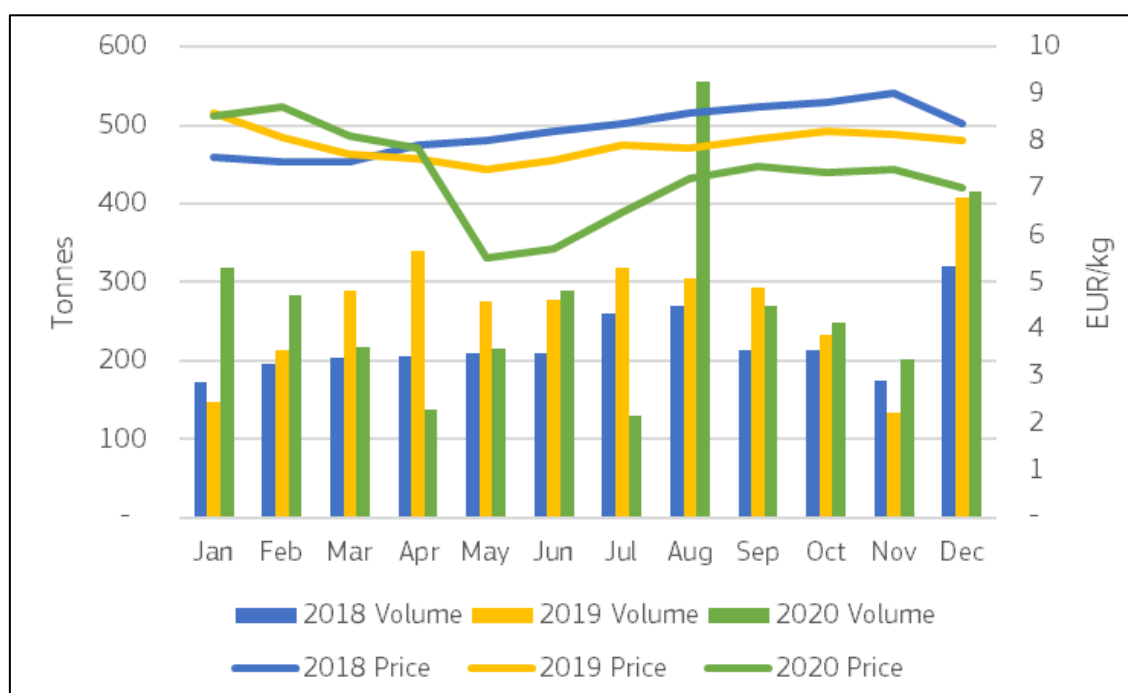
Source: EUMOFA elaboration of EUROSTAT

### 5.2.2 Portugal

Similarly, to Spain, Portuguese exports have fluctuated widely along the year. Compared to the previous two years, they were significantly lower in March-April (-77% and -13% compared to the same period in 2019 and 2018 respectively) and July (-59% and -50% compared to the same period in 2019 and 2018 respectively). But they bounced back in June and especially August, reaching 556 tonnes in August (83% higher than in 2019) and then maintained dynamic levels on the last months of the year. The value of exports followed the same trend. In July, it was 66% and 61% lower than in 2019 and 2018 respectively, while it rocketed to levels 68% and 73% higher in August, before recovering equivalent values to the previous two years.

The total of Portuguese turbot exports in 2020 was 3.285 tonnes, an increase of 2% compared with the total export volume of 3.233 tonnes in 2019. In total, the value of exports decreased by 6% during the same time period, due to lower prices especially in spring.



**Figure 10: Evolution of the monthly volume and unit price\* of Portuguese turbot\*\* exports**

\*As reported by exporter countries

\*\* Includes all product types, whether farmed or wild-caught, and whether live or fresh or frozen

Source: EUMOFA elaboration of EUROSTAT

## 5.3 Wholesale and consumption in Spain

### 5.3.1 Wholesale

The following figure presents prices available at wholesale stage for fresh (non-frozen) farmed turbot from Mercamadrid wholesale market. In 2019, wholesale prices ranged between 9,97 EUR/kg and 11,62 EUR/kg. In 2020, they were always lower, around 7,90 EUR/kg most of the year, with the exception of a brief increase in February and March at 10,30 EUR/kg.

Detailed analysis of weekly turbot auction sales in Madrid wholesale market<sup>22</sup> show that in April 2020, low demand and market prices were a challenge for farmers targeting the HoReCa segment. The Spanish turbot farmer Stolt Sea Farm reported being hit hard by the widespread shutdown of restaurants and hotels. The company planned to reduce feed to slow biomass growth and, in case of overstock, harvest the poor growers and freeze part of the stock. In week 20 (11-17 may), turbot prices increased. Fish species typically consumed out of home were still not in demand on the Spanish market as restaurants were still closed. Prices of wild turbot dropped significantly over the previous two weeks (27 april-10 may) against higher sales quantity. Despite prices of farmed turbot on that period had trended on a historical low level, sales remained stable – on the same level as in the previous two years. Prices for turbot have been reported stable in weeks 21 and 23, and increasing in weeks 24-25.

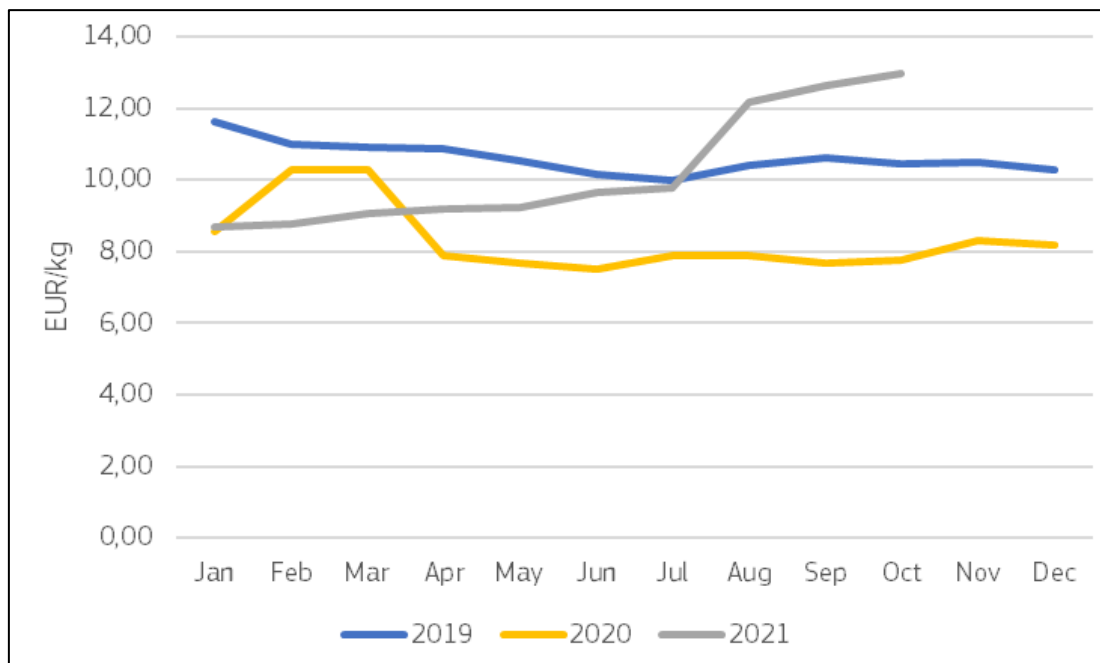
According to an interview with the APROMAR association (Spanish business association of aquaculture), turbot sector has been specially affected during the first months of the COVID-19 crisis, due to the fact that turbot used to be mainly marketed through the HoReCa channel. The activity recovered more slowly than other sectors, but the two well-established main producing compagnies managed to completely

<sup>22</sup> EUMOFA, 2020, Coronavirus response – EUMOFA's weekly data and trends analysis, Bulletin collection

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switch to the retail market in only a few months. So far, a significant part of turbot is still sold through retail despite lower sale prices, as the HoReCa sector is still impacted by the low level of tourism activities.

**Figure 11: Evolution of the monthly most frequent price of fresh farmed turbot at wholesale stage (Mercamadrid market)**



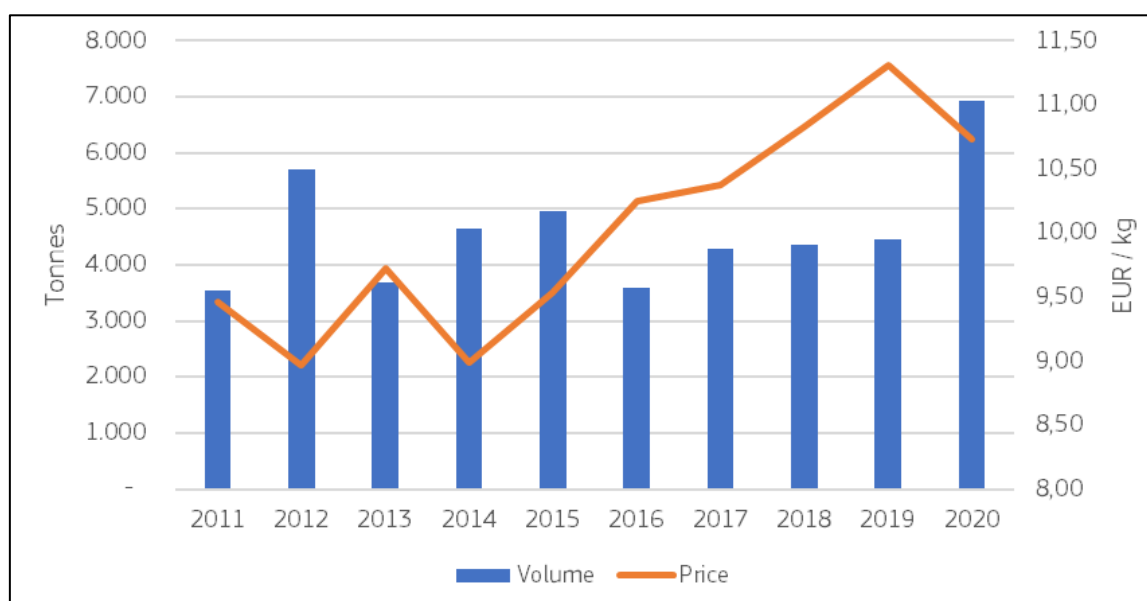
Source: Mercamadrid

### 5.3.2 Consumption

National data on consumption at home<sup>23</sup> show that the consumption of turbot nearly doubled (+96%) between 2011 and 2020, while the total consumption of fresh fish increased by 11%. The increase in consumption is also significantly higher than the increase in production, despite rising prices (+13%). The main explanation is likely to be the shift of the national farmed turbot production from HoReCa to large scale retailers increasing household consumption. For prices it is likely to be caused by the increasing share of prepacked fillets/cuts resulting in a higher average price.

While, in 2016, data and feedback from retailers indicated that the market for turbot could have reached maturity, and consumption remained steady between 2017 and 2019, the year 2020 recorded a different pattern. **Consumption volume of turbot significantly increased (+55%) while average prices decreased of 5%.** According to APROMAR association, the increase in household consumption is likely explained by a substantial shift in turbot volumes from HoReCa market to the retail sector, as HoReCa traditionally accounts for most of the turbot market in Spain. Besides, as pointed out by the association, turbot demand follows some seasonality and is highest in the summer and between October and January. The worst of the COVID-19 crisis occurred in the spring: hence it did not affect the demand peak periods.

<sup>23</sup> <https://www.mapa.gob.es/es/alimentacion/temas/consumo-tendencias/panel-de-consumo-alimentario/series-anuales/>

**Figure 12: Consumption trends for turbot, volumes and price 2011-2020**

Source: data from MAPA (Annual reports on consumption at home)

**Figure 13: Evolution of Spanish turbot consumption 2019-2020**

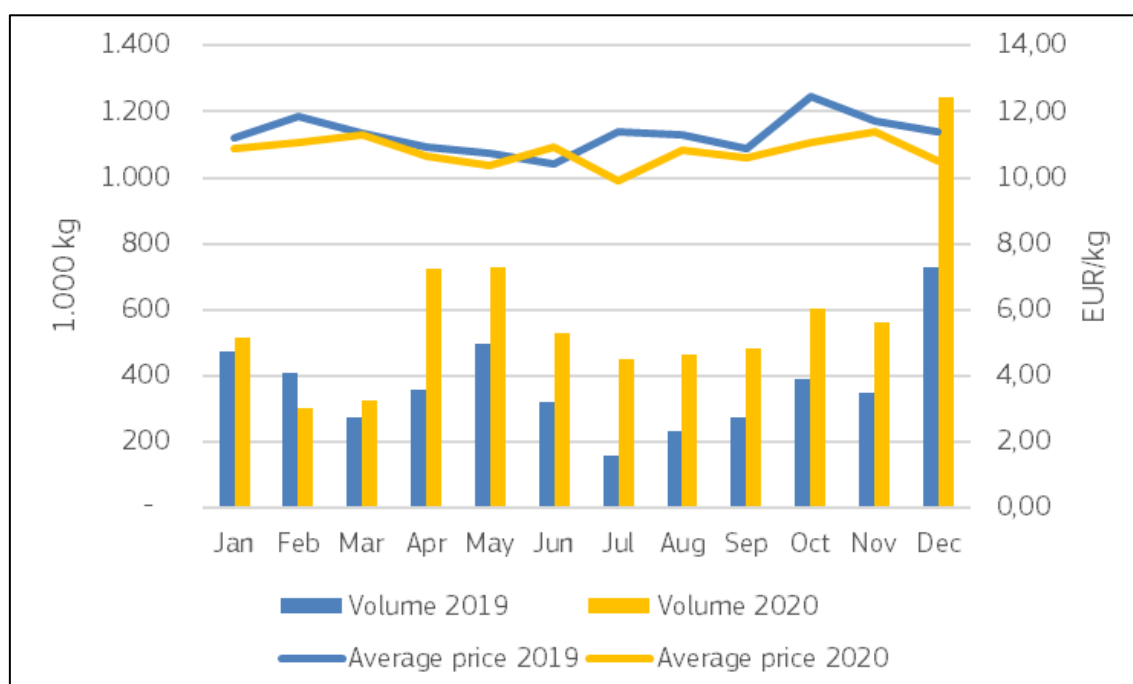
	Domestic consumption of turbot	Evolution 2020/2019
<b>Volume (tonnes)</b>	6.928,88	55,1%
<b>Value (EUR 1.000)</b>	74.395,82	47,3%
<b>Per capita consumption (kg)</b>	0,15	54,8%
<b>Per capita expenditure (EUR)</b>	1,61	46,9%
<b>Volume market share (%)</b>	0,02	0,01
<b>Value market share (%)</b>	0,09	0,02
<b>Mean price (EUR/kg)</b>	10,74	-5,1%

Source: Based on MAPA 2021<sup>24</sup>

As shown in the following figure, the monthly volumes of turbot consumption in Spain in 2020 were always higher than the previous year (except for February). On average, the growth of monthly volumes between 2019 and 2020 was 63%, with consumption peaks in April, May and December. The average monthly consumption price was slightly lower in 2020 (10,79 EUR/kg) than in 2019 (11,30 EUR/kg).

<sup>24</sup> Ministerio de Agricultura, Pesca y Alimentación, 2021, INFORME DEL CONSUMO ALIMENTARIO EN ESPAÑA 2020

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**Figure 14: Evolution of the monthly volume and price of turbot consumption in Spain**

Source: data from MAPA (Annual reports on consumption at home)

## 6 CLOSING REMARKS

The COVID-19 pandemic represented a shock for the turbot sector in 2020. The pandemic disrupted the supply chain, tested the robustness of the sector, and forced innovation. Spanish and French producers found more or less successful new ways to market and sell their products: production of prepacked products, shift to the retail sector.

Farmed turbot in Spain and France is mostly marketed as a premium product to the HoReCa segment. Hence, businesses have been hardly hit by a drop in sales in March-April-May 2020 caused by the closure of HoReCa segment and international trade. According to the APROMAR association, the two large well-established Spanish companies managed to completely shift their sales towards the retail sector in the course of the following months. This reorientation strategy seems to be confirmed by the increase in turbot domestic consumption in Spain in 2020 (+55% in volumes). In France, however, the small unique farm was forced to suspend all its turbot aquaculture activities since July 2021, due to financial crisis and a lack of commercial outlets.

In volumes, exports of fresh turbot from the main producing MS have also experienced a drop during the first semester, which was overall compensated by trade peaks in July and October-November-December. The annual export volumes from main EU producing countries remained finally similar in 2020 and 2019.

Data on EU production of farmed turbot is not available for 2020 and 2021. According to Spanish operators, production stage was not affected by the COVID-19 crisis, since turbot growth cycles follow a long-term fixed schedule that cannot be interrupted. Besides, the worst of the crisis occurred in the spring season, while fishes are programmed to reach maturity during the peak demand periods, in the summer and Christmas season. Export volumes demonstrate a partial shift of fresh to frozen turbot products in 2020, which likely reflects a strategy from producers to manage their stocks in low-demand periods. On the other hand, the drastic fall in prices of Spanish frozen turbot exports reported by Eurostat-Comext (from 7,79€/kg in 2019 to 1,11 €/kg in 2020) could not be interpreted and may originate in a statistical error. In 2021, the Spanish HoReCa sector has not fully recovered due to a low level of tourism activities, therefore a significant part of turbot production is still marketed through the retail sector.

## ***FOCUS ON CAVIAR***

## 1 SUMMARY

This study was carried out at the request of the Market Advisory Council (MAC) and can be considered an extension of the previously published EUMOFA study, [The Caviar Market production, trade, and consumption in and outside the EU \(2021\)](#). The MAC drew attention to the need for specific studies to assess the impact of the COVID-19 pandemic on the entire seafood supply chain. The sturgeon caviar market was prioritised, as caviar is mainly distributed by the HoReCa sector.

Caviar is roe from sturgeons. Historically, sturgeons were harvested in the Caspian Sea and their roe sold as caviar, mainly by Russia and Iran. Overfishing of sturgeon has almost led to the extinction of several of these species. Aquaculture production of sturgeon has gradually increased since the first FAO recorded harvest in 1984 to the beginning of the 2000s, at which point it started increasing rapidly year by year. In 2019, the world aquaculture production of sturgeon was about 120.750 tonnes<sup>1</sup>. Nearly all caviar on the market today is harvested from farmed sturgeon.

According to the Federation of European Aquaculture Producer (FEAP), EU member states produced 164 tonnes of caviar in 2018, an increase of 12% from 146 tonnes in the year before, and a 55% increase from 106 tonnes in 2015 when FEAP first recorded production volumes. The largest producers were Italy, France, Poland, and Germany, accounting for 84% of total production in 2018. Global production of caviar in 2018 has been estimated at 380 tonnes<sup>2</sup>. There are currently no estimations for caviar production for 2019, 2020, and 2021, thus at the time of writing, quantitative analysis on the COVID-19 impact on production is not possible. However, a qualitative assessment is provided in this study according to the methodology described below.

COVID-19 is the name given to the infectious disease caused by the most recently discovered coronavirus (SARS-CoV-2). During the first months of 2020, the disease spread around the world and was classified as a pandemic by the World Health Organization (WHO) on 11 March<sup>3</sup>. In March and April 2020, the number of new COVID-19 infections rose in Europe, and lockdowns were implemented with restrictions on travel, closing of restaurants, cafés, offices, and schools.

Overall, 2020 saw lower exports and imports of caviar. The sharpest decline in trade was seen during the initial impact of the pandemic, in March and April 2020. Logistical problems, as well as a decline in demand are explaining factors. As the year progressed and the peak season of Christmas drew closer volumes increased to approach pre-pandemic levels. During the first half of 2021 the trade of caviar seemed to be higher than ever before. As there is no production data available it is unsure how production was affected, but several stakeholders report postponing their spring harvest.

Caviar has previously primarily been sold to the HoReCa and other “luxury” segments such as the airline industry. As traditional market outlets closed during lockdown periods, retail became an important point of sale for producers. In addition, many producers appealed to domestic consumers to purchase caviar produced nationally. This strategy appeared to have had some success. However, the competition from cheaper Chinese caviar remains a major issue for other caviar producers.

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<sup>1</sup> Note that FAO has updated their database adjusting quantities. Production numbers listed in the previous report are higher than the current reported numbers.

<sup>2</sup> First World Caviar Forum, 7<sup>th</sup> May 2019.

<sup>3</sup> <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>

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Many producers of caviar innovated during the pandemic period, finding new ways to market and sell their products. Solutions created, such as web shops, are likely to continue post-pandemic.



## 2 SCOPE AND CONTENT

### 2.1 Study scope

This study was suggested by the Market Advisory Council (MAC). The MAC drew attention to the need for specific studies to assess the impact of the COVID-19 pandemic on the entire seafood supply chain. The sturgeon caviar market was prioritised as caviar is mainly distributed by the HoReCa sector.

EUMOFA recently (2021) published a study on the caviar market, [\*The Caviar Market: production, trade, and consumption in and outside the EU\*](#). This study can be seen as an extension of the previous publication with some inevitable overlaps. This study focuses especially on the change in trade on a month-to-month basis for the years 2018, 2019, 2020, and 2021 as well as stakeholder's experience when dealing with a large market shock.

### 2.2 Methodology

This report follows the methodology set forth in [\*The Caviar Market: production, trade, and consumption in and outside the EU\*](#), published by EUMOFA in 2021. The study is based on publicly available literature, news articles, data sources in addition to the recently published EUMOFA caviar study. One interview with a stakeholder was conducted to confirm the findings in this report.

### 2.3 Data

#### 2.3.1 EUMOFA – EU Trade Data from EUROSTAT-Comext

EUROSTAT (Comext) data available through EUMOFA monitors monthly trade flows within the EU and between EU Member States (MS) and third countries. As established in the previous analysis, the CN code 16043100 refers to caviar from sturgeons.

In accordance with the methodology in *The caviar market: production, trade, and consumption in and outside the EU (2021)*, a floor price of 100 EUR/kg was used, meaning transactions with a unit price lower than 100 EUR/kg were disregarded. Pursuant to the 2018 and 2021 EUMOFA caviar reports, stakeholders have indicated that this threshold might be too low.

European stakeholders (producers and distributors) have indicated that caviar is traded with a “floor price” ranging from 300 EUR/kg to 500 EUR/kg, depending on the species from which the caviar was produced, the country of origin, and the volumes sold. While stakeholders indicated a floor price of 300 EUR/kg for their caviar products, some old products from storage could be sold at far lower prices. Furthermore, the average price of EU imports from China has dropped from more than 400 EUR/kg in 2014 to just above 200 EUR/kg for the past three to four years.

### **2.3.2 EUMOFA - Data from IHS Markit on Trade Between Third Countries**

EUMOFA collects monthly trade data reported by third countries from IHS Markit. These data have been used when assessing production and consumption in other regions. In line with the methodology used for EUROSTAT data, HS code 160431 (caviar) has been used in the analysis. However, other products in addition to sturgeon caviar are traded using this HS code. Between 2014 and 2020, the yearly total export volume from 27 non-EU countries was between 300 and 1.300 tonnes. To exclude caviar products most likely from species other than sturgeon, and to ensure a consistent methodology throughout the report, trade flows with an average price below 100 EUR/kg have been disregarded. Data on trade flows between third countries are publicly available at MCS<sup>4</sup> level on the EUMOFA website.

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<sup>4</sup> Main Commercial Species (MCS) are EUMOFA aggregates of CN and HS codes as part of the harmonisation rules. Read more about EUMOFA data management methodologies (<https://www.eumofa.eu/supply-balance-and-other-methodologies>) and harmonisation correlation tables (<https://www.eumofa.eu/harmonisation>).

### 3 CAVIAR

Caviar is roe from sturgeons. Historically, sturgeons were harvested in the Caspian Sea and their roe sold as caviar, mainly by Russia and Iran. The most well-known and highly prized caviars are Beluga from the beluga sturgeon (*Huso huso*), Osetra from the Danube sturgeon (*Acipenser gueldenstaedtii*)<sup>5</sup>, and Sevruga from the starry sturgeon (*Acipenser stellatus*). All species originate in Eurasia, primarily in the Caspian Sea, the Black Sea and connected rivers. While these three species are the most well-known, most of the caviar on the market today is from several other sturgeon species. More common varieties are from the white sturgeon (*Acipenser transmontanus*), or the shortnose sturgeon (*Acipenser brevirostrum*) with more highly prized caviar originating from Siberian sturgeon (*Acipenser baerii*) and the beluga-like kaluga sturgeon (*Huso dauricus*).

Caviars differ in qualities and the grade, and thereby the price, is determined by factors such as pearl size, texture, colour, lucidity, uniformity, separation, fragrance, firmness, taste, and maturity.

Overfishing of sturgeon has almost led to the extinction of several of these species. Globally, the largest capture was recorded in 1977 at 31.800 tonnes. Since 1998, international trade in all sturgeon species and related products has been regulated under CITES<sup>6</sup>. In 2006, Romania, as the first of several countries, introduced a ban on sturgeon fishing in the Caspian and Black Sea<sup>7</sup>. In 2019, a total global capture of 289 tonnes<sup>8</sup> was recorded.

The first FAO-recorded harvest from aquaculture was in 1984 at 150 tonnes. Since then, production gradually increased until the beginning of the 2000s, at which point it started increasing rapidly year by year. In 2019, the world aquaculture production of sturgeon was about 120.750 tonnes<sup>9</sup>. Today nearly all caviars on the market are harvested from farmed sturgeon<sup>10</sup>.

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<sup>5</sup> Also known as the Russian sturgeon

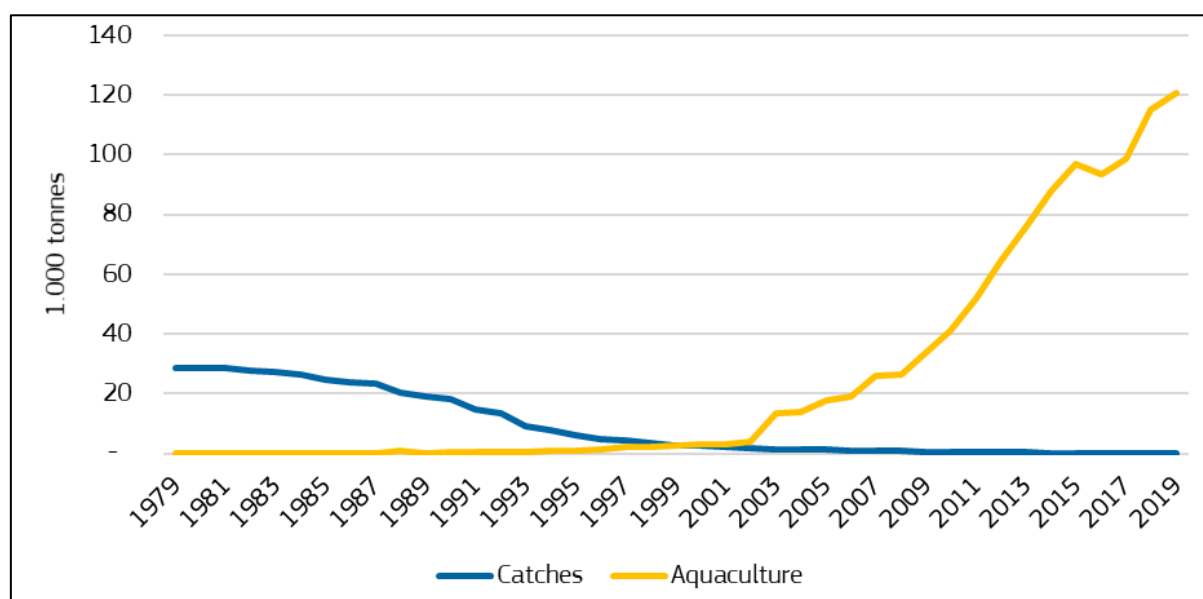
<sup>6</sup> The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement between governments aimed at ensuring that international trade in specimens of wild animals and plants does not threaten their survival.

<sup>7</sup> [https://wwf.panda.org/wwf\\_news/?72960/Romania-takes-the-lead-in-restoring-sturgeon-fisheries-in-the-Danube](https://wwf.panda.org/wwf_news/?72960/Romania-takes-the-lead-in-restoring-sturgeon-fisheries-in-the-Danube)

<sup>8</sup> The FAO database actually recorded a catch of 1.185 tonnes. On closer inspection 896 tonnes of Sturgeon capture was reported by Denmark, a country which previously have not had any catch of the specie. The Danish Fishery Ministry was contacted and confirmed the number of 896 tonnes was incorrect as there was no catch of Sturgeon by Denmark. 896 tonnes has therefore been removed for the FAO reported catch.

<sup>9</sup> Note that FAO has updated their database adjusting quantities. Production numbers listed in the previous report are higher than the current reported numbers.

<sup>10</sup> This section is taken from the EUMOFA report [The caviar market: production, trade, and consumption in and outside the EU](#) published in 2021. Some of the numbers and figures are updated with data from 2019.

**Figure 1: Catches and aquaculture production of sturgeons globally**

Source: FAO

Exploiting sturgeons for caviar production is costly because it takes many years for female sturgeons to reproduce. Included in the cost is also the process of selecting females for caviar production. The sex can be determined after an average of three years of farming, depending on the species, using ultrasound. During this period, both male and female sturgeons are reared, and after the determination of sex, the males are harvested.

To harvest the caviar, female fish are monitored using ultrasound to determine if they are ready to spawn, and if the eggs are ready for harvesting. Females that are near harvest are purged in separate tanks with fresh, colder water, and taken off feed for four to six weeks<sup>11</sup>. This mimics the natural breeding habits of the fish and prevents undesired flavours in the eggs. After purging, the fish are slaughtered, and their egg sac is removed. Once removed, the egg sac is rolled by hand over a sieve/metal grate to separate the eggs from the surrounding membrane. A control process then takes place to remove discoloured eggs and other impurities as well as to determine the size of the eggs. The eggs are salted by hand and either immediately placed in cans that are weighed down to press out excess air, allowing the caviar to absorb salt, or directly placed in small cans placed under vacuum. Caviar that is only lightly salted is entitled *malossol* and has a short shelf life, but higher value. Additives such as Borax and LIV-1 can be added in small amounts to the caviar to extend the shelf life, in addition to pasteurising the caviar<sup>12,13</sup>.

According to FEAP, EU MS produced 164 tonnes of caviar in 2018, an increase of 12% from 145,8 tonnes in the year before, and a 55% increase from 106 tonnes in 2015 when FEAP first started recording production volumes. The largest producers were Italy, France, Poland and Germany, accounting for 84% of total production in 2018. The global production of caviar in 2018 has been estimated at 380 tonnes<sup>14</sup>. There are currently no estimations for caviar production for 2019, 2020, and 2021 making quantitative analysis on the COVID-19 impact on production impossible.

<sup>11</sup> <https://roadsandkingdoms.com/2018/farmed-russian-sturgeon-caviar-in-the-united-states/>

<sup>12</sup> <https://caviar-aquatir.de/faq/>

<sup>13</sup> <https://www.careliancaviar.com/our-caviar/interesting-facts-about-caviar>

<sup>14</sup> First World Caviar Forum, 7<sup>th</sup> May 2019.

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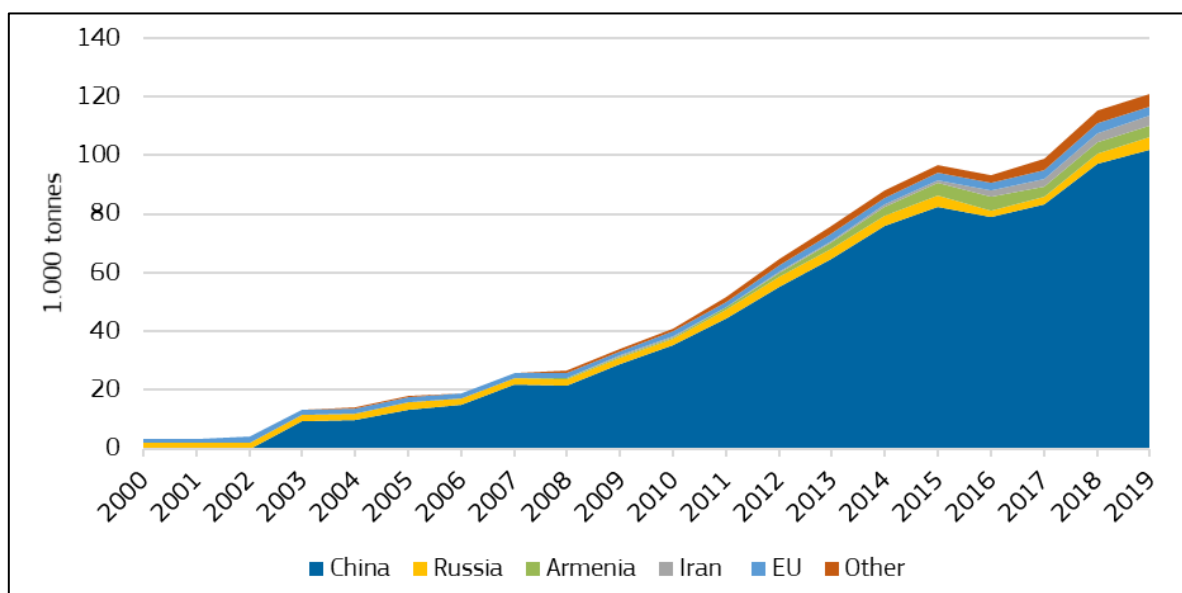
**Table 1: Caviar production by MS as reported by FEAP members (tonnes)<sup>15</sup>**

Producing MS	2015	2016	2017	2018	Growth (2015-2018)
Italy	35	38	43	54	54%
France	23	30	37	45	96%
Poland	10	15	20,4	24	140%
Germany	17	15	16,1	15	-12%
Spain	4	6	5	7	65%
Bulgaria	6	7	8	6	0%
Belgium	3	3	3,8	5	67%
Finland	4	4	3,5	5	25%
Latvia	0	0	3	3	N/A
Netherlands*	2	2	1		-100%
Hungary	2	3	2		-100%
Greece			2		N/A
Austria*			1		N/A
<b>Total</b>	<b>106</b>	<b>123</b>	<b>145,8</b>	<b>164</b>	<b>55%</b>

\*Currently does not have any caviar producers as FEAP members

Source: FEAP

Over the past 20 years, there has been a steep growth in aquaculture production of sturgeons, mainly driven by China. According to FAO, global production was 4.100 tonnes in 2002, half of which took place in Russia and the remaining part in the EU. In 2003, world production more than tripled when China reported a production of over 9.000 tonnes. Since then, Chinese production has increased by tenfold to over 102.000 tonnes in 2019. In 2019, China accounted for 85% of global sturgeon production, followed by Russia at 3% (4.021 tonnes), and Armenia at 3% (4.000 tonnes).

**Figure 2: Sturgeon production by top producing countries (1.000 tonnes)**

Source: FAO

<sup>15</sup> FEAP only collects information from its members. Therefore, if a sturgeon producer is not a member of FEAP their production is not taken into consideration. The numbers present in the table may therefore not fully represent the caviar production in MS.

## 4 INTERNATIONAL TRADE

This chapter gives an overview over the caviar trade since 2018, focusing on the changes during the initial impact of COVID-19 in the first quarter of 2020 compared with 2019 and the first six months of 2021.

### 4.1 Extra-EU Exports

In 2020, EU MS exported a total of 33 tonnes of caviar at a value of roughly EUR 23 million to third countries. This is a decrease of 7% in volume and 4% in value as compared with 2019, but an increase of 10% and 11% respectively when compared with 2018. So far in 2021, EU MS have exported 33 tonnes of caviar for 15 million EUR. This is an increase of 79% and 77% respectively compared to the same months in 2020, and an increase in volume of 37% and value of 34% compared to 2019.

In 2020 and 2019, France exported the highest volume of caviar. However, in other years, Italy exported the highest volumes although at lower values than France. This trend seems to have resumed so far in 2021. In regard to prices, the highest prices were achieved by exports to Middle Eastern countries such as Oman, Saudi Arabia, Iraq, and Qatar, in addition to smaller countries such as Andorra and smaller island states.

**Table 2: Extra-EU exports by exporter country (volume in kg, value in 1.000 EUR)**

	2018		2019		2020		2021*		% change 19-20	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
France	12.309	8.136	16.362	10.213	14.665	9.373	8.639	5.592	-10 %	-8 %
Italy	14.786	5.872	14.400	5.784	13.718	5.526	9.611	3.435	-5 %	-4 %
Germany	9.201	4.404	10.033	4.509	8.444	3.950	6.193	2.717	-16 %	-12 %
Poland	5.710	1.151	8.499	1.819	6.071	1.477	4.320	1.017	-29 %	-19 %
Netherlands	364	148	440	176	1.415	621	1.485	797	222 %	253 %
Greece	0	0	381	143	1.423	505	1.103	375	273 %	252 %
Other	2.721	1.185	3.716	1.585	4.068	1.705	2.108	1.204	9 %	8 %
<b>Total</b>	<b>45.091</b>	<b>20.896</b>	<b>53.831</b>	<b>24.229</b>	<b>49.804</b>	<b>23.157</b>	<b>33.459</b>	<b>15.136</b>	<b>-7 %</b>	<b>-4 %</b>

\*Until July 2021

Source: EUROSTAT

Japan and the United States have over the last years been the primary destination for EU caviar exports, both receiving 26% of the volume in 2019, 22%, and 27% respectively in 2020, and 17% and 39% respectively in 2021. The highest weighted average prices were achieved by exports to Oman, Saudi Arabia, and Andorra.

## COVID-19 Impacts on farmed species: focus on turbot and caviar

**Table 3: Extra-EU exports by destination country (volume in kg, value in 1.000 EUR)**

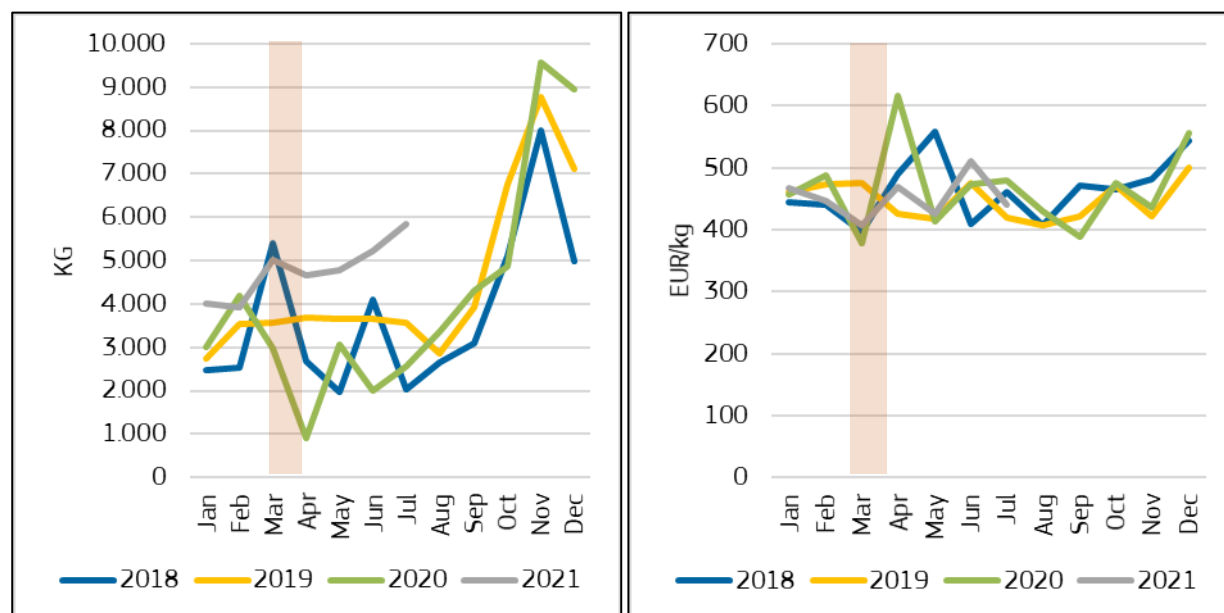
	2018		2019		2020		2021		% change 19-20	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Japan	10.039	4.750	13.986	6.321	11.069	5.262	5.721	2.783	-21 %	-17 %
United States	11.598	4.676	13.773	5.416	13.484	4.975	13.051	4.539	-2 %	-8 %
United Arab Emirates	4.865	1.159	5.395	1.444	2.028	828	2.221	820	-62 %	-43 %
Switzerland	4.095	2.086	4.870	2.363	4.272	2.294	1.872	1.043	-12 %	-3 %
Hong Kong	3.338	1.890	2.914	1.507	2.037	1.134	1.394	785	-30 %	-25 %
Singapore	48	28	2.005	400	0	0	0	0	-100 %	-100 %
Other	11.527	6.513	12.003	7.210	16.914	8.666	9.200	5.166	41 %	20 %
<b>Total</b>	<b>45.510</b>	<b>21.102</b>	<b>54.946</b>	<b>24.662</b>	<b>49.804</b>	<b>23.157</b>	<b>33.459</b>	<b>15.136</b>	<b>-9 %</b>	<b>-6 %</b>

\*Until July 2021

Source: EUROSTAT

As seen in **Errore. L'origine riferimento non è stata trovata.**, exports from the EU dropped sharply from February to April in 2020. Comparing the volume for March and April to previous years, they were 46% lower than in 2019 and 52% lower than in 2018. Exports in March and April 2021 are 149% higher than in the previous year. Despite the overall decline in exported caviar, the exported volumes and values during the Christmas season of 2020, November and December, were higher than the previous two years.

Although the volume of exports decreased for the initial lockdown period (March-April), the weighted average prices were 11% higher than in 2019 and 12% higher than in 2018. The reason for this seems partly to be very high export prices achieved by sales to India, St. Maarten, French Polynesia, Thailand, and Qatar. However, the volumes to these states were small. Additionally, less caviar from China, which is generally sold at lower prices, on the global market could explain the increase in global prices.

**Figure 3: Extra-EU Export by Volume (kg, left) and Weighted Average Prices (EUR/kg, right)**

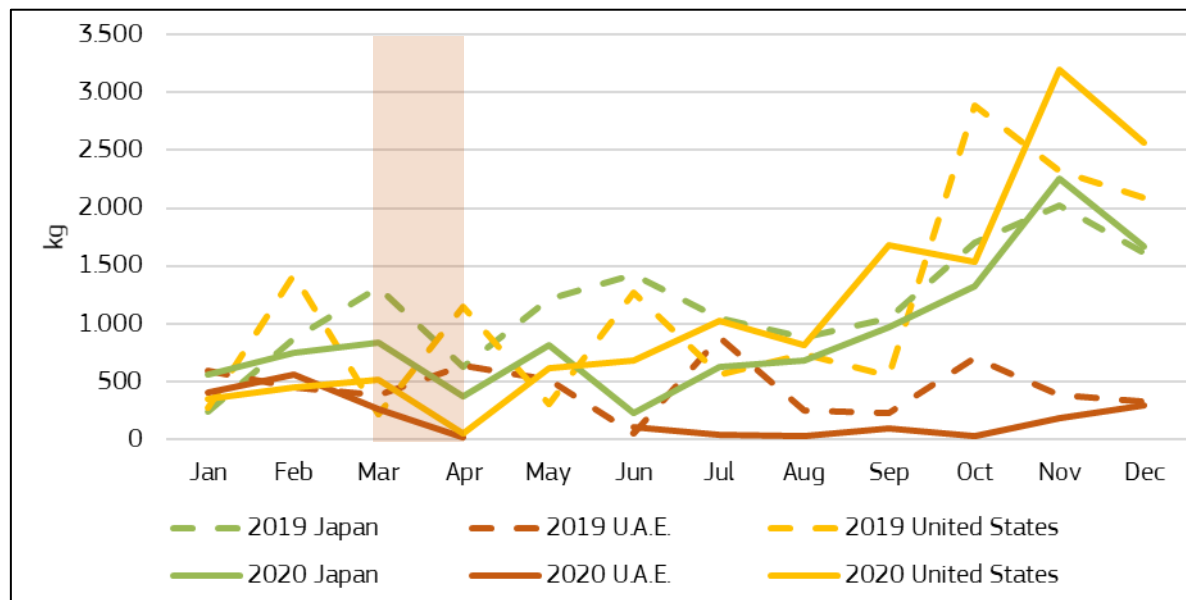
Source: EUROSTAT

Looking at the four top destination countries in terms of volume for 2019, Japan, the United States, the United Arab Emirates (U.A.E.), and Hong Kong, total export volumes were down compared to 2020.

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According to a stakeholder, the U.A.E. is a global caviar export zone where producers send their products as an entry point to new markets. As caviar is typically exported by belly freight on passenger planes, logistical problems are also a likely contributing factor to lower exports, in addition to reduced demand from traditional product outlets.

**Figure 4: Extra-EU Export to main destinations per month in 2019 and 2020 (volume in kg)**



Source: EUROSTAT

## 4.2 Extra-EU imports

In 2020 EU MS imported a total of 46 tonnes of caviar from third countries. This was a 6% less than in 2019 but 29% more than in 2018. During the first six months of 2021, EU imports of caviar were 74% higher than in 2020 and 41% higher than in 2019 for the corresponding periods. Germany, France, and Belgium are the major caviar importing MS covering 78%-89% of total EU imports in the years 2018-2021.

**Table 4: Extra-EU exports by importer country (volume in kg, value in EUR)**

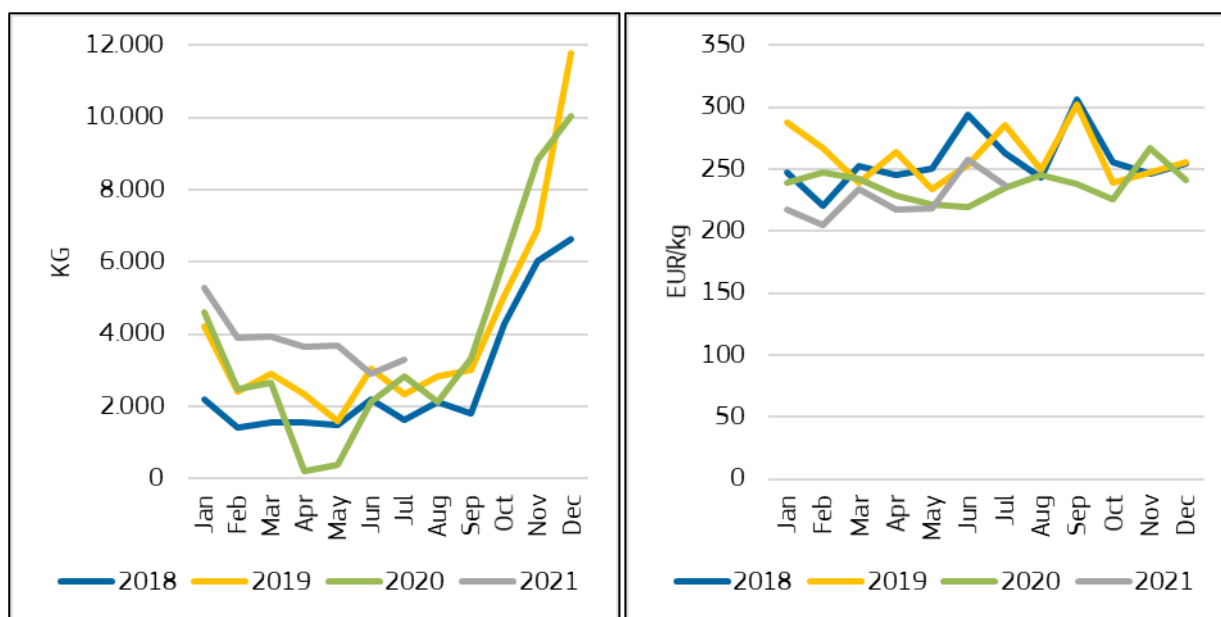
	2018		2019		2020		2021*		% change 19-20	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Germany	13.064	2.886.363	16.387	3.662.791	18.024	3.926.395	9.336	1.870.305	10 %	7 %
France	10.431	3.117.011	16.864	5.136.111	14.695	4.126.822	6.802	1.859.125	-13 %	-20 %
Belgium	5.200	1.198.176	8.750	1.997.074	8.122	1.806.739	7.528	1.582.075	-7 %	-10 %
Luxembourg	2.486	653.918	3.051	814.290	2.079	543.492	947	215.054	-32 %	-33 %
Spain	1.469	435.504	2.292	626.951	1.326	364.004	820	216.810	-42 %	-42 %
Italy	59	60.452	621	151.430	557	122.438	471	90.791	-10 %	-19 %
Other	232	73.333	510	148.192	924	212.080	736	159.322	81 %	43 %
<b>Total</b>	<b>32.941</b>	<b>8.424.757</b>	<b>48.475</b>	<b>12.536.839</b>	<b>45.727</b>	<b>11.101.970</b>	<b>26.640</b>	<b>5.993.482</b>	<b>-6 %</b>	<b>-11 %</b>

\*Until July

Source: EUROSTAT



## COVID-19 Impacts on farmed species: focus on turbot and caviar

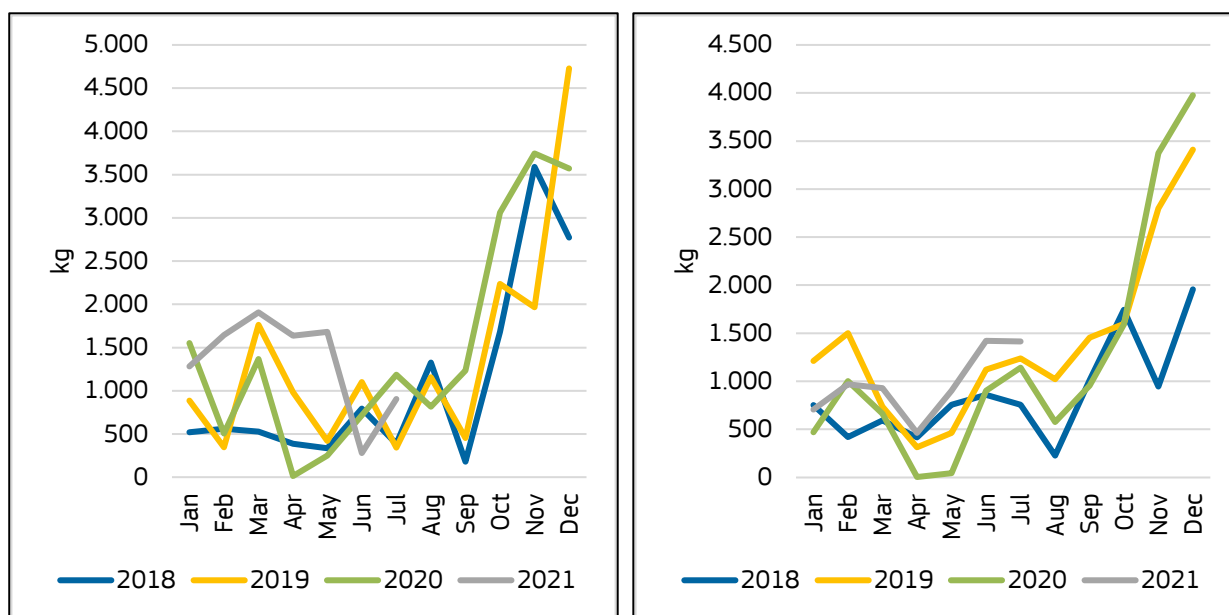
**Figure 5: Extra EU imports by volume (kg, left) and weighted average price (EUR/kg, right)**

Source: EUROSTAT

Germany was the largest importer of caviar in 2020 and maintained this position during the first half of 2021. The majority of these imports (91-98%) were from China. In contrast to most of the other importing MS, Germany imported more caviar in 2020 when compared to 2019 as imports from China increased by 9%. However, it should be noted that during the initial shock of the pandemic (March and April 2020), the volume of imports from China was 51% lower than the same months in 2019, with no imports of caviar at all in April. The increase in total volume can be attributed to higher imports in January 2020 as well as the rest of the year after July. During the first six months of 2021, German imports were 70% higher than the corresponding months in 2020, and 55% higher than in 2019.

France was the largest importer of caviar in 2019, but second behind Germany in 2018, 2020, and the first semester of 2021. Unlike Germany, the import volume of caviar was lower for every month in 2020 compared with 2019, with the exception of November and December. It was the months of April and May that saw the most dramatic reduction in import volumes, which dropped from 313 kg in April 2019 to 2 kg in April 2021 and from 462 kg in May 2019 to 44 kg in 2020. Imports in March were only 10% lower, as volumes from China remained steady, but no imports were received from Uruguay.

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**Figure 6: Imports of caviar to Germany (left, volume in kg) and France (right, volume in kg)**

The largest partner country for extra-EU imports is China, covering between 84% and 90% of all imports since 2018. As China provides nearly all of the EU caviar imports, the import trends can largely be explained by changes in this country (see chapter on International Trade – Exports).

**Table 5: Extra-EU imports from partner country (volume in kg, value in EUR)**

	2018		2019		2020		2021*		% change 19-20	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
China	29.328	6.920.301	43.230	10.464.879	38.481	8.733.451	23.586	5.126.817	-11 %	-17 %
Uruguay	1.408	432.410	1.519	442.689	1.299	353.742	997	276.550	-14 %	-20 %
Israel	674	315.796	1.397	645.726	967	435.064	14	7.992	-31 %	-33 %
Madagascar	3	1.899	733	203.851	1.913	363.674	1.674	386.684	161 %	78 %
United States	187	99.435	682	206.431	133	42.037	0	0	-80 %	-80 %
Iran	726	339.493	527	318.583	637	332.486	143	52.289	21 %	4 %
Other	615	315.423	387	254.680	2.297	841.516	226	143.150	494 %	230 %
<b>Total</b>	<b>32.941</b>	<b>8.424.757</b>	<b>48.475</b>	<b>12.536.839</b>	<b>45.727</b>	<b>11.101.970</b>	<b>26.640</b>	<b>5.993.482</b>	<b>-6 %</b>	<b>-11 %</b>

\*Until July  
Source: EUROSTAT

## 4.3 International Trade – Exports

With the exception of a few minor exporters such as Ukraine, Switzerland, Denmark, and Bahrain, all caviar exporting nations saw a decrease in export volume in 2020 compared with 2019.

China is the largest exporter of caviar in the world. Since 2019, China's share of total export volumes has risen from 83% in 2018 to 91% during the first six months of 2021. However, the average weighted price of exports from China were low, usually hovering around 200 EUR/kg. Over the past four years the highest average weighted prices were achieved by Japan, ranging from around 2.000 EUR/kg to nearly 3.000 EUR/kg. These exports were all destined for the United States or Hong Kong.

**Table 6: Total exports of caviar by all exporter nations (volume in kg, value in EUR)**

	2018		2019		2020		2021*		% change 19-20	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
China	128.500	26.226.984	139.839	29.206.184	122.607	24.503.714	115.611	24.155.307	-12 %	-16 %
Uruguay	4.799	1.606.934	9.323	2.741.658	6.950	1.971.160	4.712	1.520.942	-25 %	-28 %
Russia	8.273	1.959.932	7.864	2.277.508	1.972	572.995	2.383	656.785	-75 %	-75 %
United States	9.516	1.648.895	4.493	880.974	771	144.769	227	44.174	-83 %	-84 %
Belarus	811	392.252	1.356	573.638	1.005	330.107	464	139.403	-26 %	-42 %
United Kingdom	419	207.104	1.115	435.510	882	358.811	534	120.043	-21 %	-18 %
Other	2.633	3.736.224	1.838	2.718.373	3.148	4.672.475	3.434	1.684.813	71 %	72 %
<b>Total</b>	<b>154.952</b>	<b>35.778.325</b>	<b>165.828</b>	<b>38.833.845</b>	<b>137.335</b>	<b>32.554.031</b>	<b>127.364</b>	<b>28.321.466</b>	<b>-17 %</b>	<b>-16 %</b>

\*Until September 2021

Source: IHS Markit

### 4.3.1 China

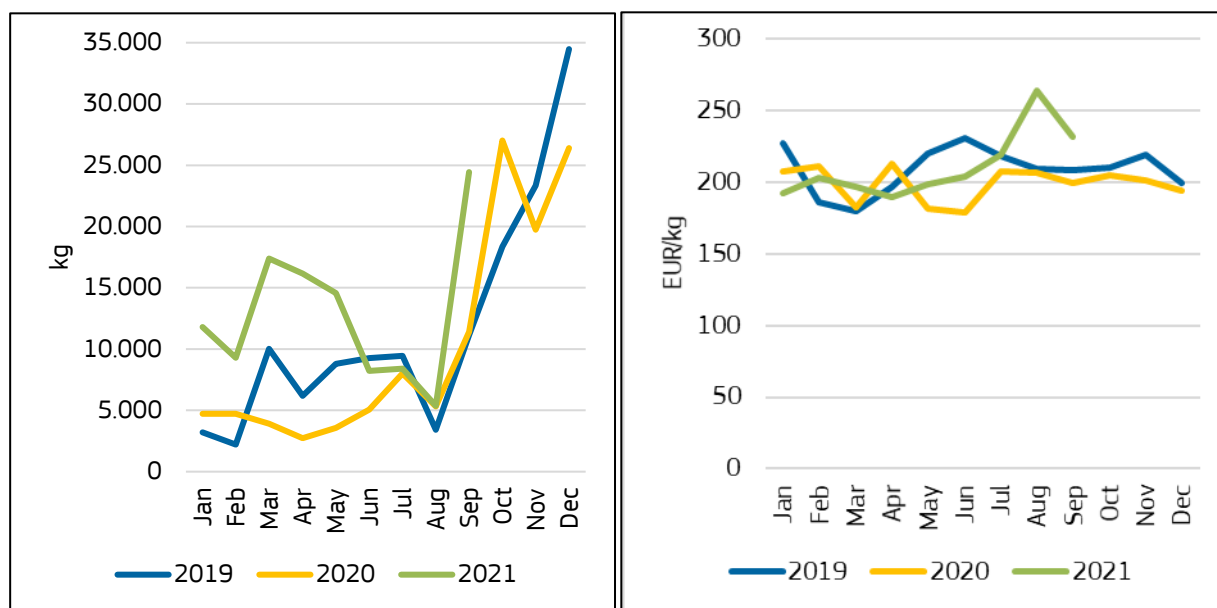
The Chinese company Kaluga Queen is estimated to produce one third of the world's caviar and is thereby the largest producer of caviar in the world. In 2019, Kaluga Queen provided caviar to 22 of the the 27 3-star Michelin restaurants in Paris and supplied Lufthansa Airlines<sup>16</sup>. COVID-19 resulted in a shortfall of international orders. To compensate, efforts were made to promote Chinese-produced caviar to domestic customers. Stakeholders report increasing domestic consumption of Chinese-produced caviar, which offset some of the impact from reduced exports. However, Kaluga Queen is reported to have produced 20% less caviar in 2020 than the year before<sup>17</sup>.

Chinese exports of caviar in 2020 were 12% lower than in 2019, and 5% lower than in 2018. During the first half of 2021, the export volume was 134% higher than the corresponding period in 2020.

<sup>16</sup> <https://daxueconsulting.com/caviar-market-in-china/>

<sup>17</sup> <https://news.sky.com/story/caviar-for-the-masses-china-certainly-thinks-so-12170403>

## COVID-19 Impacts on farmed species: focus on turbot and caviar

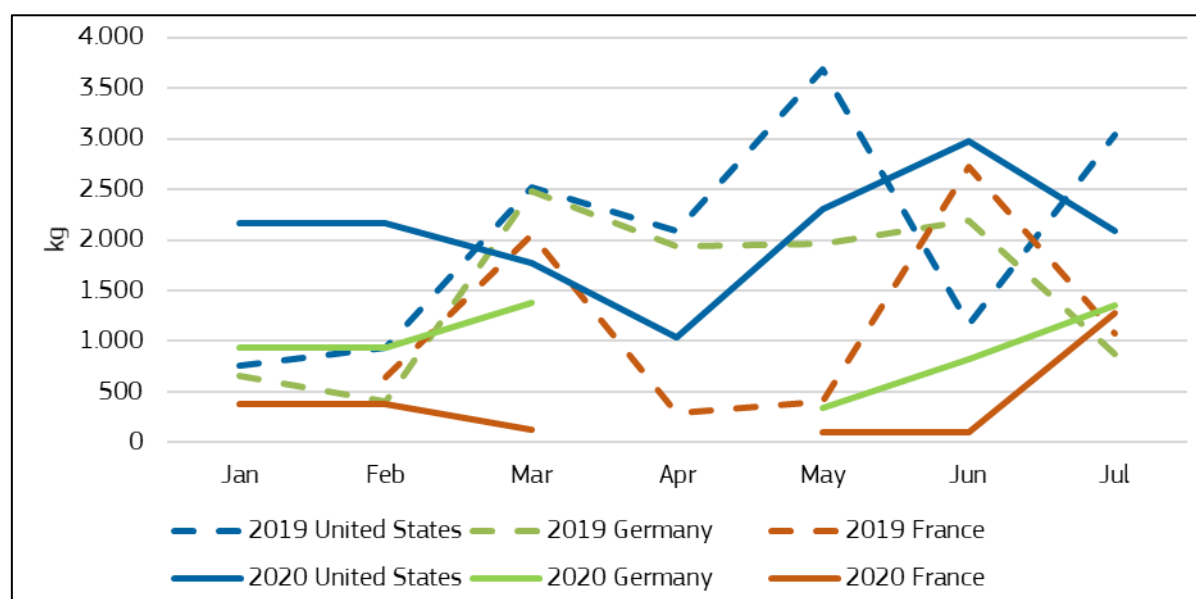
**Figure 7: Chinese exports of caviar by volume (left, kg) and weighted average price (EUR/kg, right)**

Source: IHS Markit

Chinese exports are primarily destined for the United States, Germany, and France. Together, these three destinations have made up between 60%-65% of total exports since 2018. The United States is the largest destination for Chinese exports of caviar. In contrast to most other destinations, the volume exported to the US was 10% higher in 2020 than in 2019. However, during spring 2020 (March – May) total exports to the US were 36% lower than in the same period in 2019. Chinese exports to the second and third largest markets, Germany and France, completely stopped in April. Overall, China's caviar exports to Germany and France from March to May 2020 were lower than in 2019 by 73% and 92% respectively.

Normally, caviar is transported as belly freight on passenger planes in cool-boxes with synthetic ice and must endure no more than 2 days of travel. This caused some logistical problems for exports of caviar as air transport was reduced during the first wave of COVID-19 and may explain why exports to several markets stopped.

## COVID-19 Impacts on farmed species: focus on turbot and caviar

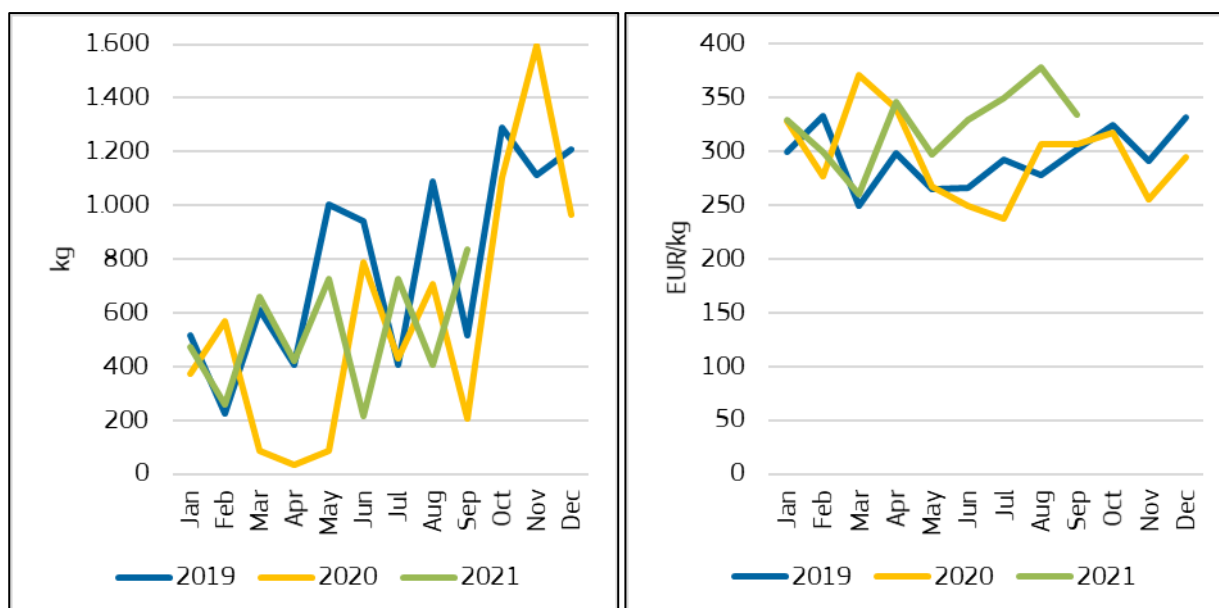
**Figure 8: Chinese caviar export to major markets by volume (kg) in 2019 and 2020**

Source: HIS Markit

**4.3.2 Uruguay**

Uruguay saw a sharp drop in exports (90%) during the months of March, April, and May 2020 compared to the same months in 2019. Overall, total exports in 2020 were 25% lower than in 2019, but 45% higher than in 2018. During the first six months of 2021, the export volume of caviar from Uruguay was 44% higher than in 2020, but 17% lower when compared to 2019.

The United States, Russia, and France are the main destinations for Uruguayan exports of caviar. Since 2019, these three destinations have made up between 63% and 73% of exports.

**Figure 9: Uruguay exports of caviar by volume (left, kg) and weighted average price (EUR/kg, right)**

Source: IHS Markit

## 5 STAKEHOLDER EXPERIENCES DURING COVID-19

According to stakeholders, between 40% and 70% of the revenues from caviar sales are usually generated in December, prior to the Christmas season. As the lockdown periods began in late March and April, the effects did not immediately hit the caviar sector severely as the high season was over. Some stakeholders reported that they slowed the marketing of their product during the first wave of the pandemic, waiting for the winter high season. Other stakeholders, such as Rova Caviar in Madagascar, postponed the spring harvest of 2020 due to supply chain challenges<sup>18</sup>. Although sales of caviar resumed as the year progressed, stakeholders report missing a whole season of breeding and selling fry abroad as air freight was grounded<sup>19</sup>.

As the closure of the HoReCa segment threatened pre-holiday sales, French producers joined together to form the Aquitaine Caviar Association, which covers 70% of the French caviar production. The Association issued a manifesto “Demand French Caviar” signed by politicians, chefs, and journalists prior to the winter of 2020 to encourage French consumers to buy domestically produced caviar<sup>20</sup>. Other promotional actions included advertisements for French caviar and interviews about the situation in the media. In addition to mitigating the impact of COVID-19, French producers also hoped to shift domestic demand away from cheaper Chinese imported caviar towards their own product.

The Caviar Association considered the domestic mobilisation campaign largely successful. During the first wave of the pandemic, the Association estimated that the closure of the HoReCa segment would result in a sales reduction of between 35% and 40%<sup>21</sup>. The actual sales reduction in 2020 was only 10% – roughly 5 tonnes less caviar than the previous year. The Association also estimates that around one hundred jobs were saved as potential layoffs were prevented.

In Russia, sellers of caviar reported generally stable conditions with some increased demand for sturgeon caviar during the pandemic. Russian stakeholders offer two explanations. Firstly, consumers who were not economically affected by the pandemic continued to purchase caviar. Secondly, demand from the average consumer shifted away from travel and vacations to accessible luxury items such as caviar which could be enjoyed at home. In addition, sturgeon caviar is traditionally considered to have health benefits, reputedly helping recovery from illness as a “natural medicine”<sup>22</sup>.

Not all caviar producers were shielded from the full force of the pandemic. A stakeholder in Uruguay who was already struggling declared bankruptcy as the pandemic brought a fall in demand from their main customers in the restaurants, hotels, cruises, and the tourism industry<sup>23,24</sup>. In the United States, Tsar Nicoulai Caviar reported losing 50% of its revenue as sales dropped<sup>25</sup>. To overcome the reduction in income for the latter, the owners and top managers of the business did not take salaries to avoid

<sup>18</sup> <https://african.business/2020/06/economy/harvest-on-ice-at-africas-first-caviar-farm/>

<sup>19</sup> <https://www.italiaatavola.net/alimenti/pesce/2021/6/29/caviale-italiano-si-fa-largo-con-commerce-degustazioni/78148/>

<sup>20</sup> <https://caviar-aquitaine.org/fr/wp-content/uploads/2020/12/Manifeste-Caviar-dAquitaine-2020-1.pdf>

<sup>21</sup> <https://www.agro-media.fr/actualite/caviar-francais-une-baisse-limitee-a-10-des-ventes-pour-2020-48557.html>

<sup>22</sup> <https://www.mk.ru/economics/2021/04/08/v-rossii-vyros-spros-na-chernuyu-ikru-i-fuagra.html>

<sup>23</sup> <https://www.visionmaritima.com.uy/noticias/pesca-y-acuicultura/criadero-de-esturiones-con-riesgo-de-cierre-por-deudas/>

<sup>24</sup> <http://www.elacontecer.com.uy/38344-2021-02-08.html>

<sup>25</sup> <https://www.sfchronicle.com/restaurants/article/Too-celebratory-for-a-pandemic-California-s-15222247.php>

**COVID-19 Impacts on farmed species: focus on turbot and caviar**

layoffs, in addition to selling some of the male sturgeon for meat. In Russia, pandemic restrictions meant fishers were unable to come to work, thereby lowering the total catch in 2020<sup>26,27</sup>.

One Italian stakeholder reports that around two thirds of sales normally go to catering, with the remaining one third to mass distribution, while in France it is estimated that half the production goes to restaurants. The closure of the HoReCa segment during the COVID-19 pandemic was offset by a boom in retail sales. An American stakeholder already selling to the American supermarket chain Whole Foods, said continued sales there were crucial to the survival of the business<sup>28</sup>.

Many producers now offer direct sales to their customers through web shops. Although some producers already had a running web shop, one stakeholder saw the need to change the advertising to something more “pandemic-appropriate,” moving away from images of people eating caviar together, hugging, and eating caviar off the back of each other’s hands<sup>29</sup>. In the web shop, customers can buy tins of caviar, in addition to accessories such as mother-of-pearl caviar spoons, gift boxes, or other complimentary products such as blinis, spirits, etc. One stakeholder reported online sales accounting for a sales growth of 30-40%<sup>30</sup>. Some producers report that skipping the wholesaler intermediation is more satisfying both for the producer and for the customers in terms of price and profit. Direct sales allowed for direct contact with the customers, although there were some logistical issues.

The COVID-19 period saw innovation among producers. Some producers created new packaging to market the product in larger quantities in supermarkets and to make the product more affordable. In China, packaging centred around specific holidays where splurging is normal, such as Valentine’s day or Mid-Autumn Day (a festive day celebrated in China) Many companies have also created “Click and Collect” solutions as a new direct marketing channel to consumers. Other stakeholders, such as Caviar Giaveri in Italy, expanded their operations to include gastronomical tours with tasting of their different caviar products together with champagne, and tours of their facilities and production. In the United States, a similar concept is offered by Tsar Nicoulai Caviar who have collaborated with a local winery for a combined tasting experience<sup>31</sup>. As many luxury restaurants are closed, it appears many consumers buy and savour luxury foods, such as caviar, at home. In the United States Passamore, a seller of caviar, has expanded on its members-only caviar club, where members can recreate restaurant experiences at home<sup>32</sup>.

In China, Kaluga Queen (the world’s largest producers of caviar) launched a livestream campaign on the Chinese online shopping platform Taobao which set a new record for the most expensive transaction of agricultural products as it sold 18 kg of caviar<sup>33</sup>. Other steps taken to increase domestic consumption by Kaluga Queen include using influencers, such as celebrities, to market their products in live streams, TV programs and commercials, and social media.

<sup>26</sup> In 2019 a total of 106 tonnes of sturgeon was captured in Russia. At the time of writing, numbers for 2020 were not yet available.

<sup>27</sup> [https://www.fishnet.ru/news/promysel\\_i\\_pererabotka/obem-promyshlennogo-rybolovstva-v-astrahani-sokratilsya-na-200-tonn-iz-za-pandemii-covid-19/](https://www.fishnet.ru/news/promysel_i_pererabotka/obem-promyshlennogo-rybolovstva-v-astrahani-sokratilsya-na-200-tonn-iz-za-pandemii-covid-19/)

<sup>28</sup> <https://www.sfchronicle.com/restaurants/article/Too-celebratory-for-a-pandemic-California-s-15222247.php>

<sup>29</sup> <https://www.sfchronicle.com/restaurants/article/Too-celebratory-for-a-pandemic-California-s-15222247.php>

<sup>30</sup> <https://www.italiaatavola.net/alimenti/pesce/2021/6/29/caviale-italiano-si-fa-largo-con-commerce-degustazioni/78148/>

<sup>31</sup> <https://octopus-panda-pwqz.squarespace.com/tasting>

<sup>32</sup> <https://www.sfchronicle.com/restaurants/article/Too-celebratory-for-a-pandemic-California-s-15222247.php>

<sup>33</sup> <https://www.alizila.com/alibaba-618-use-digital-tools-to-help-farmers/>

## 6 CLOSING REMARKS

Overall, 2020 saw lower exports and imports of caviar. The sharpest decline in trade was seen during the initial impact of the pandemic, in March and April 2020. Logistical problems, as well as a decline in demand are explaining factors. As the year progressed and the peak season of Christmas drew closer volumes increased to approach pre-pandemic levels. During the first half of 2021 the trade in caviar seemed to be higher than ever before. As there is no production data available, it is unclear how production was affected, but several stakeholders report postponing their spring harvest.

Caviar has previously primarily been sold to the HoReCa and other “luxury” segments such as the airline industry. As traditional market outlets closed during lockdown periods, retail became an important outlet for producers. In addition, many producers appealed to domestic consumers to purchase caviar produced nationally. This strategy appears to have had some success. However, the competition from cheaper Chinese caviar remains a major issue for other caviar producers.

Many producers of caviar innovated during the pandemic period, finding new ways to market and sell their products. Solutions created, such as web shops, are likely to continue post-pandemic.



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