

BACKGROUND INFORMATION

EUROPEAN AQUACULTURE – FACTS AND FIGURES¹

European aquaculture is mainly composed of 3 large sectors, with different characteristics: shellfish, fresh water fish and marine fish farming. Crustaceans and algae are also grown in the EU, but their production is marginal so far.

1. SHELLFISH FARMING

1.1. Oyster farming

The bulk of oyster production is the cupped or Pacific oyster, *Crassostrea gigas*, which was introduced into Europe in the past 50 years. Native European flat oysters are now produced only in small quantities, since the introduction from the Americas of a protozoan parasite in the late 1970s which significantly affected most flat oyster growing regions of Europe, including France, Spain, the Netherlands, Ireland and the UK.

Juvenile oysters are either collected in the wild or are grown in hatcheries and production takes place via bottom culture on inshore beds with firm substrates or via rack culture where oysters are grown in plastic mesh containers on metal trestles or racks. In France a special treatment ("*affinage*") may be carried out in ponds ("*claires*") for the supply of top quality oysters.

Total oyster production for EU27² was 130199 tonnes in 2004 valued at €295 million. Largely dominated by France, which is also the largest market for oysters, Community production of cupped oysters peaked at 142730 tonnes in 1999 but subsequently significantly decreased. In some part of the Community, for example Ireland, cupped oyster production is smaller but registered an increase in production to 12,089 tonnes in 2005 (nearly six times the 1995 level). Irish production of flat oysters was 1708 tonnes in 2005 compared with 1412 tonnes in 1995³. The native oyster obtains a higher price on the market and many producers mourn the fact that stocks have been decimated.

1.2. Mussel farming

In the Community today there are three types of mussel farming. The largest volume is cultured on ropes suspended from rafts or long lines as in Galicia in Spain and on the east coast of Italy and to a lesser extent in France, the West of Ireland and the UK (West of Scotland). Bottom culture, where vessels are used to relay seed mussels in suitable grow out sites, is used in the Netherlands, Ireland and in the UK (Wales). "Bouchot" culture is a

¹ Most of the data referred to in this document are based on the EUROSTAT official statistical data available up to 2004. Some other sources have also been used and quoted, in particular with respect to more recent data. Data from different sources may sometime lead to some discrepancies and any comparison should be made with caution.

² For the purpose of comparison of data and trends over time, any indication in this document to EU-27 refers to the information available for all present 27 EU Member States, even though some of these Member States were not part of the EU at the date referred to.

³ Source BIM: Status of Irish Aquaculture 2005

method used in France using a series of wooden poles as supports. Young mussels are transplanted onto these poles for on-growing.

Total Community mussel production (EU-27) increased from 367518 tonnes valued at €10 million in 1993 to 589952 tonnes valued at €383 million in 2004. The top producers are Spain, Italy, the Netherlands and France. The level of production has declined in the last ten years in the Netherlands due to a shortage of seed supplies. Access to wild seed for cultivation has been restricted over concerns regarding the impact of seed mussel collection on the availability of food for wild birds. There is also competition for access to collection grounds due to hydrocarbon extraction in the northern part of the Netherlands. New mussel industries have developed in recent years in Greece, Ireland, the UK and Sweden. The oyster and mussel production sectors have been affected by increasingly frequent biotoxin closures linked to algal blooms. There is also an ongoing problem of access to waters free from microbiological contamination of human or animal origin.

1.3. Other shellfish

The "other shellfish" sector is made up of clams, scallops, abalone and sea urchins. The Japanese or Manila clam *Ruditapes philippinarum*, is now the lead species in the Community. Total clam production in 1997 was 49670 tonnes, valued at €149 million, of which Italy accounted for 80%, Spain 11% and Portugal 7% with smaller quantities grown in France, Ireland and the UK⁴. Italian production grew to 50000 tonnes in 1999 but had dropped to 27737 tonnes by 2003,⁵ (Facts and figures on the CFP). The clams are grown in the open in shallow areas with fine sediments principally in the Po Delta area. In other Member States cultivation generally takes place in the inter-tidal zone under mesh covering to protect it from birds. Growth of the clam cultivation using this method has been slower than anticipated. Production of other shellfish in this category is very small at the present time but there are some hopes that production can grow in future as there is a good market for these species.

2. FRESH-WATER-FISH FARMING IN LAKES, PONDS OR BASINS

European aquaculture production is dominated by farming of trout, carp, and some other species in smaller amounts.

2.1. Trout: an intensive but high quality heavy water use product.

Trout production is spread throughout Europe and fresh trout can be bought everywhere. Because of its growth requirements and production performance, rainbow trout (*Oncorhynchus mykiss*) largely dominates European trout production (approximately 95% of the total production).

Almost every Member State has trout farms. Most of them are near to rivers, and use concrete basins or ponds. Some lake cages are also in use. Approximately 220,000 tonnes of portion-size trout are produced and marketed within Europe each year, 85% are produced in the EU (the main producers are Italy and France, followed by Denmark, Germany and Spain). The only big producer of portion trout outside the EU is Turkey.

⁴ Source: [Forward study of Community Aquaculture, MacAlister Elliot and Partners Ltd, Sept 99.](#)

⁵ Source: [Facts and figures on the CFP- Basic data on the Common Fisheries Policy- Edition 2006](#)

After many years of slow but steady increase, in the period 2000-2005 the production of portion trout fell slightly (approximately minus 0.6% per year)⁶, but prices remained good.

Larger size trout over 1 kg are mostly destined for filleting or smoking, but there is also a market for the whole fish, fresh and gutted. Most large trout are portion-size trout spawned and grown in fresh water, then transferred to sea-cages to become large trout. However in some countries the entire cycle to produce Large Trout is carried out in fresh water.

The production of Large Trout in Europe grew regularly from 1998 (where it was 94000 tonnes) to 2002 when it reached 144000 tonnes. The EU produced approximately 40% of total European production of Large Trout. However, Norway alone produces more than the whole EU.

Norwegian and Faroese production collapsed after 2003 (following the imposition of a 20% duty on imports of this fish into the EU). In 2005, production was approximately 100000 tonnes.

2.2. Extensive or semi-extensive aquaculture: carp and associated species.

The total EU production of carps, which is estimated at 72000 tonnes in 2006⁷ is largely dominated by the Common carp (*Cyprinus carpio*) (over 90%). The main areas for EU production are in Central Europe (Czech Republic, Poland, Hungary, and Germany being the biggest producers) where the fish is mostly produced in ponds using traditional extensive or semi-intensive techniques.

In addition, the extensive polyculture techniques practised in carp ponds also allow simultaneous production of other freshwater species such as pike, pike-perch, perch, eels, tench and other small Cyprinids.

Statistics on carp production may not be fully reliable, but the trend over the last six years in the EU is towards a fall in total volumes, in particular in Austria and Poland, but good results in terms of prices with a certain tendency to an increase. On the European continent, non EU "carp" production is almost 145,000 tonnes/year, the common carp and the silver carp being by far the most frequently farmed species. The main producers are the Russian Federation and Ukraine.

The carp group is by far and away the largest fish production in aquaculture on a world scale. 2005 world production was around 19, 5 million tonnes, mostly in Asia⁸.

⁶ [Source: FEAP - Aquaculture Production. AQUAMEDIA 2007](#)

⁷ [Source: FEAP - Aquaculture Production. AQUAMEDIA 2007](#)

⁸ Source: FAO Fishstat.

2.3. Intensive aquaculture in closed systems with water recirculation: Eels and other species

Eel is farmed in intensive systems in the Netherlands, Denmark and Italy. Dutch and Danish farmers use closed water recirculation systems, while in Italy farms are more traditional, with concrete basins and flow-through of water. The ancient form of extensive farming in Italian lagoons has almost completely disappeared.

EU production was around 11,000 tonnes/years until 2001, and then it went down to approximately 8500 tonnes/year from 2002 and has stabilized overall since. But this figure hides major shifts among the main producers; Italian production (once the biggest EU producer) is on a constant downward trend since the late 90's, and Danish production also went down after 2001. These losses have been partially compensated by some increase in Dutch production. However, because of the uncertain supply of young eels, some eel farmers switch production to other species or simply abandon the sector.

Non-European fresh water species, such as Tilapia, catfish and sturgeon are also being produced. Although production amounts as yet marginal compared to trout or carp, the high technology and innovation level of these farms appears highly attractive.

3. MARINE FINFISH FARMING

3.1. Atlantic Salmon⁹

The expansion in output from Atlantic salmon farming has continued over the past 30 years. The Community industry began to develop from the late 1970s onwards. The UK (West of Scotland) and Ireland (West coast) are the main EU producers. Estimated 2006 production was 128,000 tonnes in the UK and 15,000 tonnes in Ireland (although their production peaked in 2003 and 2002 respectively).

Norway remains the dominant world player in salmon farming. Norwegian production reached its highest level in 2006 (597,000 tonnes), whereas other producers of Atlantic salmon in Europe are Iceland and the Faroe Islands. Outside Europe the species is grown in Chile (estimated 371,000 tonnes in 2006), and to a lesser extend in Canada, Australia and USA.

The industry cycle is now regarded as mature and salmon is the sector of European aquaculture which is most subject to globalisation and concentration of ownership. The top seven companies are responsible for 38% of Norwegian production. Six companies are responsible for 66% of UK production. Several European companies are also significant producers in Chile and Canada. Production has tended to surge ahead of market demand periodically.

There are still major environmental bottlenecks for salmon farming to deal with (seallice, escape of farmed fish).

⁹ All statistics from Kontali Monthly Salmon Report, January 07.

3.2. Seabass and seabream

The development of seabream and seabass aquaculture in Greece was probably the biggest success story of the entire EU aquaculture sector; in the decade 1990-99 the average yearly increase in production was nearly 70%, raising Greek output from 3,550 tonnes in 1990 to 57,250 tonnes in 1999¹⁰.

The production of both species continued to increase in the following years almost everywhere, to reach 181,000 tones in 2002. Greece was by far the most significant producer accounting for 57% of all production in 2002, with 44000 tones of seabass and 59000 tones of seabream¹¹.

The high production volumes reached by 2001-2002 led to a major confusion in EU markets for seabass and seabream, with a collapse in prices. The main cause of the price crisis was the imbalance between supply and demand caused by rapid and uncontrolled production growth, without proper planning, market support or promotion, particularly in Greece where some Greek enterprises went bankrupt. Since then, seabream and seabass production has remained stable overall during 2003 and 2004 in Greece, while moderate growth occurred in most other countries. By 2005, production again took off strongly almost everywhere. Spain is an interesting example; with its moderate but regular yearly increase, this Member State is the only European producer which has constantly increased production since 1990.

Despite some ups and downs, average prices for these species have risen during recent years, with good price levels attained in 2006. Production is so far still on the increase.

3.3. Tuna farming.

The activity of blue tin tuna fattening started in the early 1990s in the Mediterranean and the market opportunities opened up by this practice has led to its continued increase ever since (EU, Turkey, Tunisia, Libya, Croatia, Morocco...). Although there has been some recent research results on tuna reproduction¹², this new sector of aquaculture is still only based on the capture of wild fish, including juveniles. Moreover, it has not yet been possible to adapt these caught wild fish to industrial pellet feeding, and fattening is performed using raw wild fish as feed. In the EU the number and capacity of tuna cages increased from 25 farms in 2003 to 37 farms in 2007 (Spain, Malta, Cyprus, Italy, Greece, and Portugal).

The development of tuna fattening has been an additional driver to excessive fishing pressure on wild stocks. Faced with this situation, the International Commission on the Conservation of Atlantic Tuna (ICCAT) recently adopted some measures aimed at better controlling these fattening activities¹³. The reduction in catches foreseen in the blue-fin tuna recovery plan might have a consequence on farming, as there will be less fish available for farming activities. The possible limitation in tuna farms capacity might be discussed in an ICCAT working group meeting planned for July 2007.

¹⁰ FAO Fishstat.

¹¹ University of Stirling - "Study of the market for aquaculture produced seabass and seabream". Stirling 2004.

¹² Cf FP5 Research project REPRODOT for example

¹³ Source ICCAT. [See also ICCAT recommendation 06-07 on blue-fin tuna farming and ICCAT recommendation 06-05 to establish a Multi-annual Recovery plan for blue-fin tuna](#)

3.4. Other marine fish

Intensive water recirculation systems have been used for a number of years now to produce high value species like turbot (or other flat fish). Farms are usually located close to markets. Overall production in Europe remains limited but seems to be growing.

4. EU AQUACULTURE AND WORLD AQUACULTURE PRODUCTION: SOME FIGURES AND ILLUSTRATIONS

Data referred to above originate from different sources and may not necessarily be exactly comparable. The tables and figures below are extracted from official Eurostat datasets.

Aquaculture production in the European Union (EU-27) - Quantities (tonnes live weight)												
Source : Eurostat												
EU-27	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total aquaculture products	999.164	1.104.786	1.183.643	1.230.362	1.254.243	1.377.943	1.431.738	1.401.751	1.389.009	1.340.084	1.387.713	1.382.439
Crustaceans and molluscs	559.737	634.502	691.757	714.860	709.367	817.648	825.264	779.742	741.607	726.881	747.152	756.303
Molluscs	559.498	634.249	691.511	714.535	708.974	817.357	825.013	779.487	741.345	726.603	746.874	756.095
Mussels	367.518	422.964	457.822	498.038	491.971	600.448	603.408	562.516	548.827	546.992	584.538	589.952
Oysters	154.472	157.323	156.178	163.336	160.067	152.134	155.529	148.772	123.960	130.774	129.094	130.199
Clams & arkshells	36.377	52.654	75.945	51.075	54.243	62.630	64.516	67.063	67.377	48.698	33.087	35.764
Finfish*	434.357	465.197	486.786	510.440	539.814	557.235	603.439	618.977	647.359	613.165	640.524	626.095
Freshwater fishes **	344.416	356.036	361.813	361.549	361.802	352.396	356.408	357.848	365.223	332.262	344.394	331.870
Rainbow trout	222.462	231.986	243.085	245.178	247.784	244.055	236.766	237.817	246.264	219.869	221.113	215.561
Carps + other cyprinids	96.617	98.160	96.436	88.447	88.153	82.326	88.576	89.997	89.954	83.272	89.423	83.887
River eels	7.273	7.943	6.819	8.503	8.605	9.686	10.439	10.658	10.151	8.083	8.949	8.892
Tilapias + other cichlids	200	200	320	320	200	200	246	180	200	190	577	473
Marine fishes**	89.941	109.161	124.973	148.891	178.012	204.839	247.031	261.129	282.136	280.903	296.130	294.225
Atlantic salmon	62.317	77.728	83.748	98.920	116.926	127.346	146.139	146.952	162.267	169.476	162.575	172.954
Gilthead seabream	10.560	12.779	17.487	23.751	29.868	37.858	50.137	58.747	63.605	59.646	70.482	62.281
European seabass	12.041	12.753	16.999	19.253	23.739	29.209	37.198	40.849	41.443	39.255	46.969	42.666
Atlantic bluefin tuna	19	NA	15	77	NA	1.959	3.346	3.682	4.446	4.917	3.687	6.673

* Finfish is the aggregate for Freshwater, Diadromous and Marine fish

** Considering the main production methods for diadromous species farmed in the EU, data on Atlantic Salmon has been considered under "Marine" fish, while data for all other diadromous species, in particular the most important such as rainbow trout and eels, have been included under "Freshwater" fish".
NA: not available

Global Aquaculture production - Quantities (tonnes live weight)

Source : Eurostat

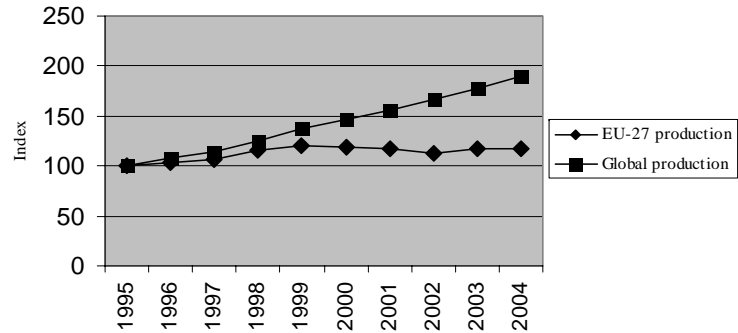
WORLD	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total fishery products	24.453.569	27.775.009	31.195.354	33.795.533	35.841.011	39.083.477	43.000.080	45.657.774	48.555.042	51.971.878	55.183.014	59.408.445
Crustaceans and molluscs	6.552.633	7.723.000	9.332.038	9.606.363	9.777.353	10.505.068	11.665.671	12.591.647	13.533.197	14.519.628	15.919.736	16.922.584
Molluscs	5.618.447	6.717.944	8.230.344	8.488.940	8.558.604	9.143.859	10.154.089	10.771.451	11.396.651	12.125.414	12.650.547	13.242.831
Mussels	1.048.224	985.248	1.108.617	1.095.360	1.115.189	1.337.772	1.446.032	1.370.957	1.445.001	1.700.871	1.755.676	1.860.249
Oysters	1.876.035	2.648.545	3.048.915	3.035.834	3.080.176	3.541.913	3.722.944	3.998.513	4.211.531	4.332.357	4.473.010	4.603.717
Clams & arkshells	629.788	770.649	1.068.460	1.405.503	1.679.724	1.766.090	1.781.326	1.941.474	2.261.837	2.760.242	2.633.441	3.145.414
Finfish*	11.215.803	13.051.113	14.994.371	16.923.211	18.746.417	19.870.297	21.578.074	22.745.340	24.216.187	25.706.918	26.405.269	28.165.040
Freshwater fishes **	10.038.230	11.719.387	13.493.450	15.267.765	16.876.274	17.832.518	19.273.812	20.149.384	21.324.559	22.659.111	23.051.440	24.619.516
Rainbow trout	312.128	334.727	365.240	384.180	427.329	437.989	414.980	447.204	511.470	506.741	496.081	504.876
Carp + other cyprinids	7.490.870	8.767.159	10.406.173	11.999.125	13.236.957	13.930.188	14.948.553	15.452.156	16.275.127	16.673.155	17.376.823	18.303.847
River eels	187.035	187.529	187.822	233.981	233.589	226.120	218.713	232.957	231.006	232.004	232.022	248.099
Tilapias + other cichlids	548.947	593.065	703.086	810.399	931.389	950.698	1.103.784	1.269.924	1.386.235	1.483.309	1.674.620	1.822.745
Marine fishes**	697.519	823.429	998.263	1.120.217	1.330.676	1.465.386	1.655.626	1.895.779	2.118.928	2.282.108	2.526.247	2.691.620
Atlantic salmon	305.610	374.931	465.245	551.906	646.516	688.176	803.837	893.704	1.032.712	1.080.897	1.132.994	1.244.637
Gilthead seabream	13.032	20.570	24.466	33.198	41.472	54.388	67.204	87.288	82.152	77.343	95.263	90.995
European seabass	13.653	14.863	19.475	21.095	27.517	35.129	41.883	52.802	44.824	43.778	52.711	49.103
Atlantic bluefin tuna	19	NA	15	77	NA	1.959	3.346	3.682	4.446	4.917	3.941	6.958

* Finfish is the aggregate for Freshwater, Marine and Diadromous fish

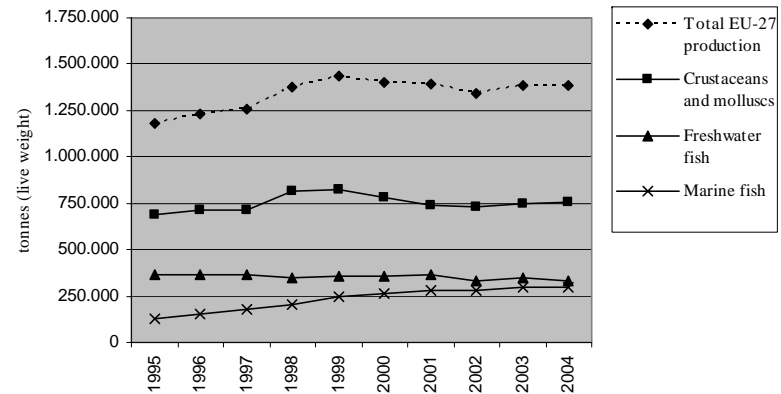
** For better comparison purpose with EU data sets above, data on rainbow trout and "river eels" have been added to the "Freshwater fish" aggregate and Atlantic Salmon has been considered under "Marine fish". Other Diadromous species not farmed in Europe are not included in total fresh water fish neither under Marine fish.

Evolution of the total aquaculture production in EU-27 and in the World

(reference year 1995: Index based on quantity produced)



Evolution of EU aquaculture production (total tonnage)



Evolution of EU aquaculture production (reference year 1995: Index based on quantity produced)

