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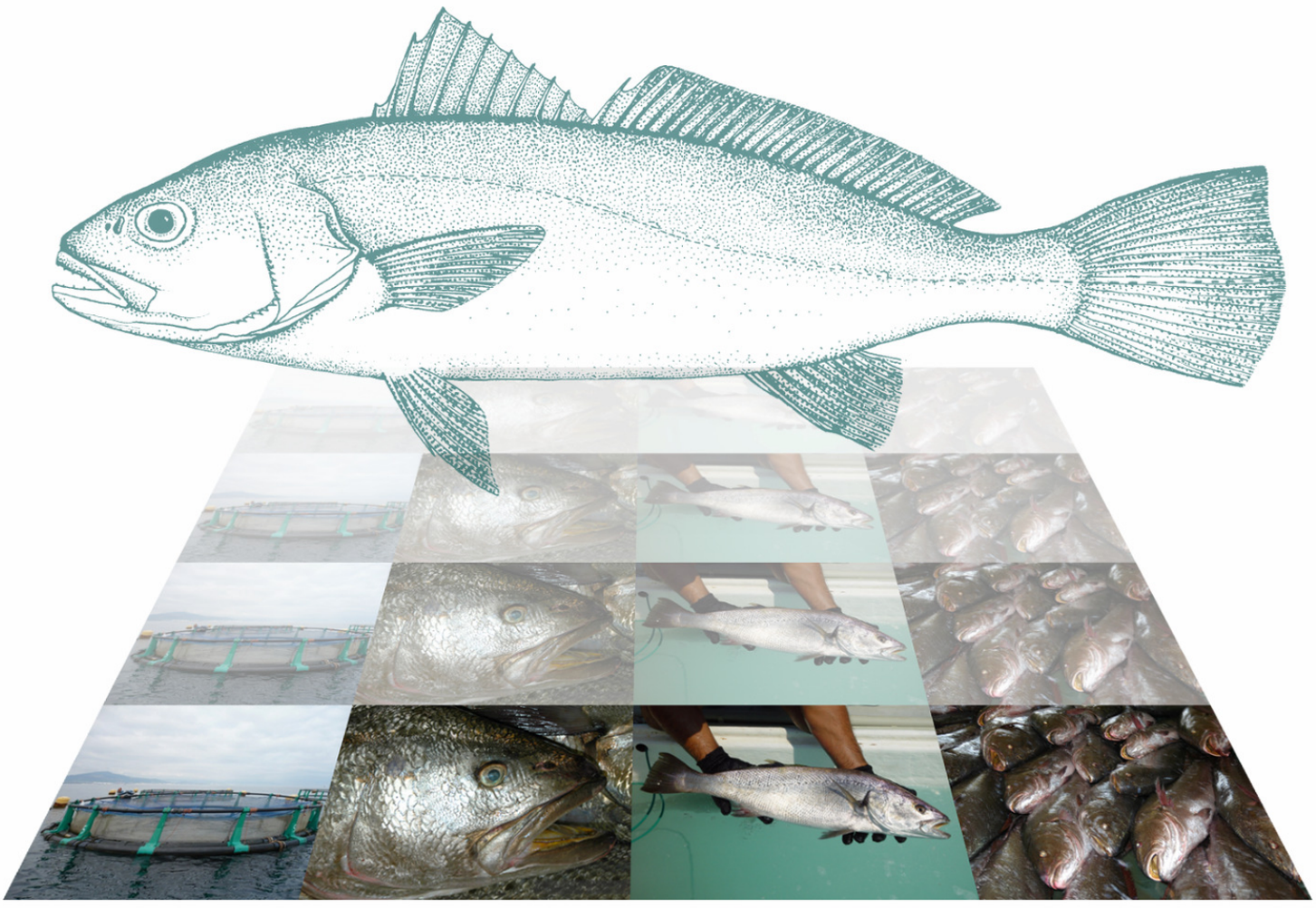
No. 89 2010

PRESENT MARKET SITUATION AND PROSPECTS OF MEAGRE (*ARGYROSOMUS REGIUS*), AS AN EMERGING SPECIES IN MEDITERRANEAN AQUACULTURE



Cover photos and design:

Front picture: *Argyrosomus regius* (courtesy of FAO)

Background left to right: floating culture cages (courtesy of F. De Rossi); meagre head (courtesy of J.M. Caraballo); market size meagre cultured in Turkey (from Deniz, 2009); cultured meagre from Spain (courtesy of J.M. Caraballo).

Cover design by F. De Rossi

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PRESENT MARKET SITUATION AND PROSPECTS OF MEAGRE (*ARGYROSOMUS REGIUS*), AS AN EMERGING SPECIES IN MEDITERRANEAN AQUACULTURE

by

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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PREPARATION OF THIS DOCUMENT

This document is an output of the MedAquaMarket project [1], "Support to the GFCM Working Group on Marketing of Aquaculture Products: Development of a strategy for marketing and promotion of Mediterranean aquaculture", funded by the Government of Spain, Secretaría General de Pesca, Ministerio de Agricultura, Pesca y Alimentación.

This study "Present market situation and prospects of meagre (*Argyrosomus regius*), as an emerging species in Mediterranean aquaculture" was commissioned by GFCM to Marie Christine Monfort, seafood marketing consultant. The main outcomes of this report were presented and discussed during the GFCM-CAQ Workshop "Development of a strategy for marketing and promotion of Mediterranean aquaculture (MedAquaMarket)" held in Tangier, Morocco, 27-28 October 2009.

The research was based on direct interviews run with meagre fish producers and traders (see Appendix 2), consolidated by existing production data statistics.

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[1] The MedAquaMarket Project, MTF/INT/943/MUL, is operative since April 2008.

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ABSTRACT

The present document review the aquaculture activities and the market situation and prospect of the meagre (*Argyrosomus regius*) in the Mediterranean countries. Meagre culture started in France and in Italy in the late '90s and is developing in the Mediterranean Region, jumping from a few tonnes in 2 000 to over 10 000 tonnes expected in 2010, highlighting the appearance of a new aquaculture species on the market. Meagre is currently sold by a limited number of players on niche segments (small volumes at relatively high prices to selected market segments). From a market viewpoint, meagre is endowed with intrinsic values such as attractive fish shape, good processing yield, good nutritional values, low fat content, excellent taste, firm texture suitable for a large variety of recipes. Yet it is very little known to end consumers. Meagre production is expected to grow fast in the medium term and ex-farm prices will probably drop under the pressure of increasing supply. This is what will most likely happen if the coming increased production converges towards favourable markets like Spain, Italy and Portugal. This report draws the picture of the existing market of meagre and describes the possible routes for development. Indeed, based on its aquaculture characteristics, meagre has the potential to become a mass market species, moving from the present position of a niche species with a limited production directed to selected market segments. The paper recommends some actions to be undertaken to consolidate good conditions for future growth and to reduce commercial risks. Most of the information used originates from national data and from the author's personal estimates.

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ABBREVIATIONS AND ACRONYMS

APROMAR	Asociación Empresarial de Productores de Cultivos Marinos de España
CooPAM	Cooperativa Produttori Acquacoltoltori Maremmani
DPMA	Deutsches Patent und Markenamt
EU	European Union
FAO	Food and Agriculture Organization
FEAP	Federation of European Aquaculture Produceres
ISMEA	Istituto di Servizi per il Mercato Agricolo Alimentare
MARA	Turkish Ministry of Agriculture and Rural Affairs
OFIMER	Office National Interprofessionnel des produits de la mer et de l'aquaculture (France)
PUFA	polyunsaturated fatty acids

EXECUTIVE SUMMARY

Meagre, *Argyrosomus regius,* is farmed in Europe since the late nineties. The activity started rather simultaneously in France and in Italy with the first commercial sized fish being traded in the late '90s. The total aquaculture production has jumped from a few tonnes in 2 000 to around 4 000 tonnes in 2008, and is expected to be over 10 000 tonnes in 2010, highlighting the appearance of a new cultured species on the market.

This report draws the picture of the existing market and describes the possible routes for development. It recommends some actions to be undertaken to consolidate good conditions for future growth and to reduce commercial risks. Most of the information used originates from national data and from the author's personal estimates.

Based on its aquaculture characteristics meagre has the potential to become a mass market species, moving from the present position of a niche species with a limited production directed to selected market segments.

Niche versus mass market

Meagre is currently sold by a limited number of players on niche segments (small volumes at relatively high prices to selected market segments). The main traditional markets for farmed meagre include Italy and Spain, and new markets are being available day after day. A certain category of commercial catering, namely medium class restaurants and ethnic restaurants including sushi eating places, is looking with increasing interest to this new fish, and there are potentialities for further sales on this segment in most European countries.

Meagre is one of the best potential candidates for large scale farming in Europe due to its favourable farming conditions. Demand for juveniles is strong and the production of commercial size fish is expected to grow fast in the short term. Some 8 to 10 million juveniles were sold to European farms in 2008. Taking an average weight in-take of circa 2 kg within two years and a 10 percent loss, an expected of up to 14 000–18 000 tonnes could be placed on the market in 2010. The industry show signs to enter into mass production.

Meagre farming will be profitable in the medium term provided that the fish produced will be price competitive to substitute wild fish. Where will the fish be positioned is one of the key remaining issues. Will it compete with intermediate range price such as marine white fish species (cod, haddock, etc.) or with low priced fish such as Nile perch or pangasius. The answer lies partly into producers' future strategies and tactics.

Market potential

From a market viewpoint, the fish is endowed with intrinsic values: attractive fish shape, good processing yield, good nutritional values, low fat content, excellent taste, firm texture suitable for a large variety of recipes. Yet it is very little known to end consumers. On a global market with dramatic seafood shortage, there is room for locally supplied meagre fish, provided that it is price competitive and gains some reputation. Moreover, this species can be processed into portions (fillets, loins) and supply the growing segment for portion sized product. At the processing stage, there is large room for productivity improvement and cost reduction in the medium term.

Market coordination and communication to consumers

Meagre production is expected to grow fast in the medium term and ex-farm prices will probably drop under the pressure of increasing supply. This is what will most likely happen if the coming increased production converges towards favourable markets like Spain, Italy and Portugal.

The fish is not known, and even less known are its organoleptic and nutritional qualities. Therefore it is highly recommended to inform buyers. A well structured communication campaign, with the relevant choice of messages, channels, targets and partners would contribute to prepare the markets for the arrival of this new aquaculture species and at best create some demand for it.

1. INTRODUCTION

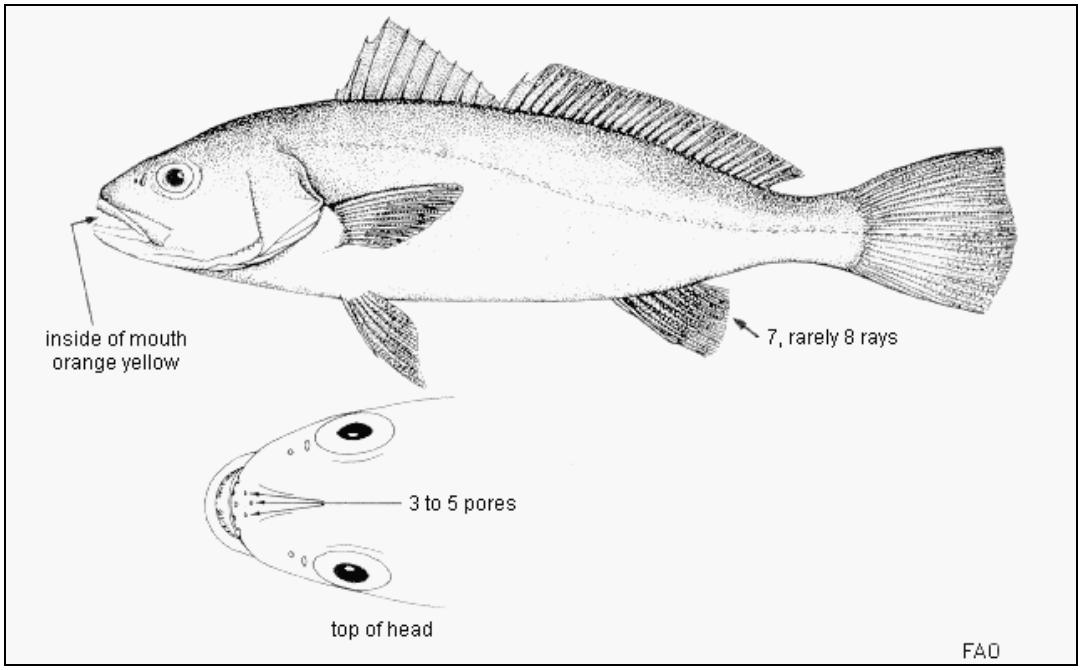
Meagre, *Argyrosomus regius,* (Figure1) is farmed in Europe since the late nineties. The activity started in Europe rather simultaneously in France and in Italy with the first commercial sized fish being traded in the late '90s. Spain entered into the business in 2004, followed in 2007 by Greece and Turkey. Egyptian production started later on. The total aquaculture production has jumped from a few tonnes in 2000 to around 4 000 tonnes in 2008 (FAO, 2010), and over 10 000 tonnes in 2010, highlighting the appearance of a new cultured species on the market.

This report draws the picture of the existing market and describes the possible routes for development. It recommends some actions to be undertaken to consolidate good conditions for future growth and to reduce commercial risks. Most of the information used originates from national data and from the author's personal estimates.

Meagre has the potential to become a mass market species, moving from the present position of a niche species with a limited production directed to selected market segments.

More information on the biology and the culture of this species can be found in the FAO Cultured Aquatic Species Information Programme: *Argyrosomus regius*, reported as Appendix 3.

Figure 1 – Morphological characteristics of meagre (from Schneider, 1990)



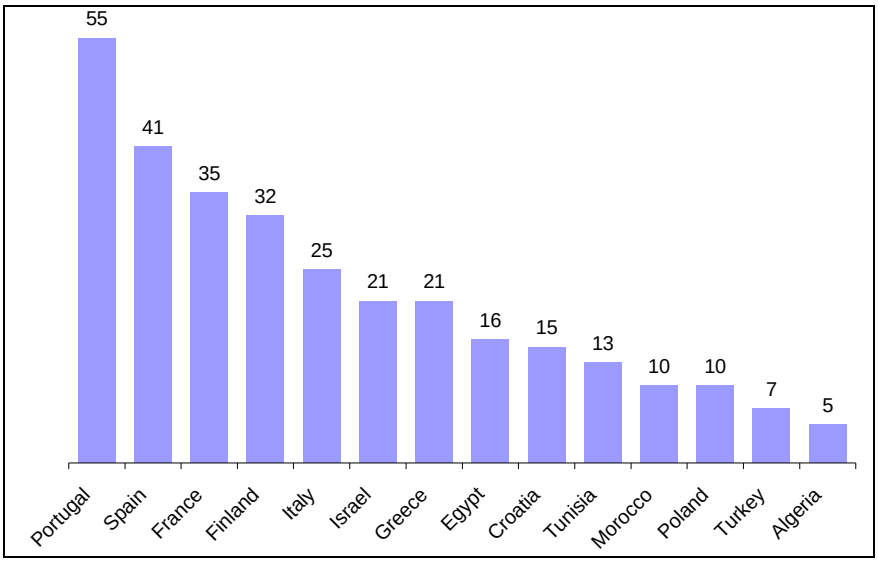
2. THE EUROPEAN MARKET FOR SEAFOOD: CONTEXT

2.1 Overall situation

The European market for seafood is characterised by a dramatic deficit. The continent is extremely dependant upon external supplies. In 2008, the EU imports of fresh, frozen and canned seafood totalled €30 billion (Eurostat Statistical Books, 2009 edition), of which €16 billion originating from non EU countries. The largest importing countries are Spain with imports from non EU countries worth €4.7 billion, France with €3.9 billion and Italy with €3.7 billion. In 2008, Europe exported seafood worth €2.7 billion. Total imports from both within the EU and from non EU countries equalled 15 million tonnes in live weight, or 9 million tonnes in output weight.

Seafood supply varies greatly by country and within some large countries by region (Figure2). Apparent consumption in Poland and Hungary hardly reaches 10 kg per capita per annum, whereas in Spain it is well above 40 kg. Annual per capita seafood consumption in Portugal meets a record with over 55 kg.

Figure 2 – Seafood supply, in kg per capita in 2005



Source: FAO (2007)

Not only does the volume, but the type of product purchased greatly vary by country as well. In southern European countries, the assortment for sale offers a wide range of species whereas in northern countries it is limited. In Germany, for example, four species (Alaska pollock, herring, salmon, tuna) total over 60 percent of the overall consumption, whereas in Spain and in France the four most consumed species hardly total a third of all sales.

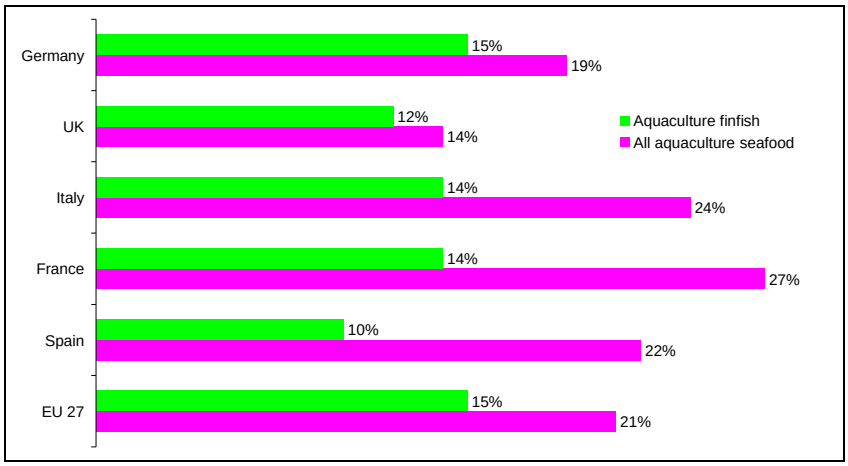
In Mediterranean countries, purchase of whole fish sold in bulk is still common, whereas on north European markets, prior to be sold to end buyers, usually fishes have been processed. In most cases, it has been processed into a portion-sized packaged item. In the United Kingdom of Great Britain and Northen Ireland (UK), 90 percent of all fish is packaged and branded, whereas in Spain this proportion drops down to 35 percent (Monfort, 2008). In this latter country seafood is still dominantly sold in bulk, though this share is declining.

2.2 The market for farmed seafood

Seafood consumption in the European Union (EU 25) reached 13.3 millions tonnes in 2007, in equivalent live weight (Paquotte, 2010, pers. comm.): 10.5 million tonnes from capture fisheries, 2.8 million tonnes from aquaculture (Figures 3–5). This consumption concerned 1.5 million tonnes of farmed finfish and 1.3 million tonnes of farmed shellfish.

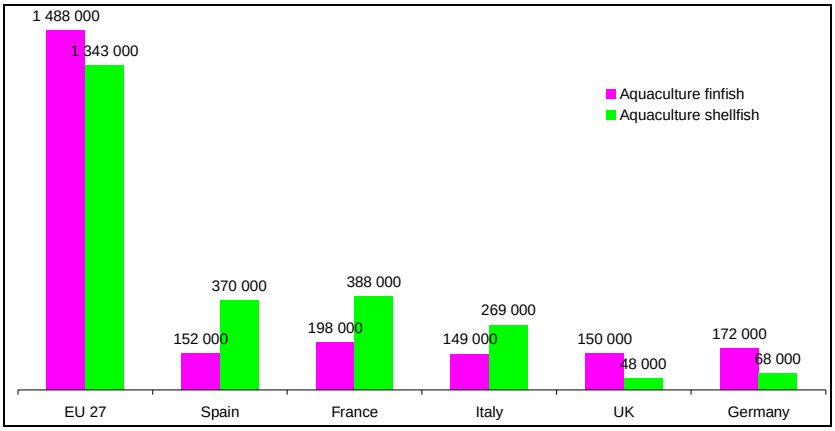
The importance of farmed finfish in total EU imports has grown twofold, from a 7 percent market share of all seafood in the early ‘90s to 15 percent in 2007. Atlantic salmon is highly responsible for this movement observed in the ‘90s. More recently, the massive influx of low priced farmed freshwater fish, such as pangasius and tilapias, has been visible on several major markets. Only five years after its introduction on the French market, pangasius occupies now a significant 5 percent of the market for fresh fillets sold in supermarkets.

Figure 3 – Europe 27 seafood supply balance in 2007: market share of aquaculture products



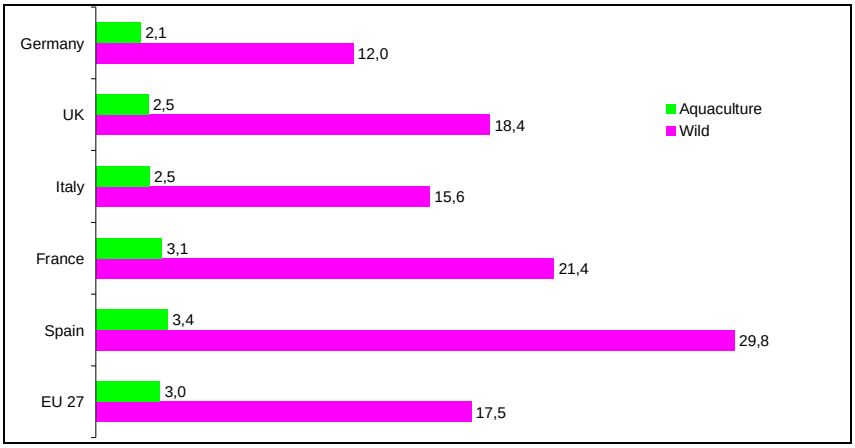
Source: Paquotte, (2010, pers.comm)

Figure 4 – Aquaculture seafood supply in 2007 (tonnes)



Source: Paquotte, (2010, pers.comm)

Figure 5 – Finfish seafood supply in kg per capita, by production mode in 2007



Source: Paquotte, (2010, pers.comm)

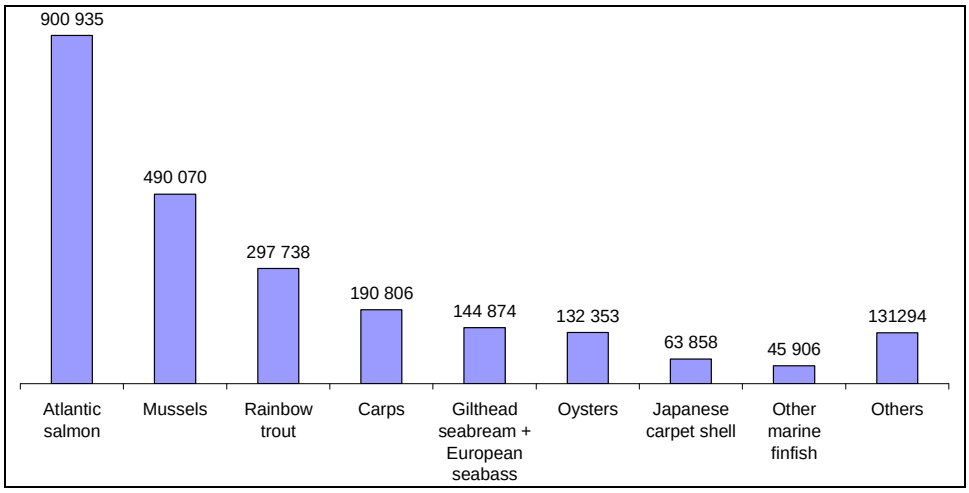
The consumption of aquaculture finfish is quite homogeneous across countries, with per capita consumption ranging from 2 to 3 kg, whereas shellfish consumption reports high variation by countries. In many regions fish from capture fisheries is still preferred against the cultured one (Paquotte, 2007). In the UK and Germany, consumers are quite confident in aquaculture techniques, whereas in France, Italy and Spain, they do not fully trust the farming process. .

The market share of aquaculture *vs* wild products is still low, but it is growing. In 2007, for Europe 27, farmed seafood accounted for a fifth of total seafood supply (Figure 6). By country, it varies from a few percent (Netherlands, Ireland) to values above the average (France: 27 percent, Germany: 19 percent, Italy: 24 percent, Spain: 22 percent).

According to some opinion leaders and some consumers, farmed fish carries the positive image of a product which contributes to release the pressure on wild stocks. This feature may have an impact on its consumption.

When it comes to products, origin and distribution patterns, the European market is characterised by great variations by countries. Each national market has its own characteristics, though common traits may be found in neighbouring countries. Unfortunately to date there is no observatory or common data base which provides comparative information.

Figure 6 – Aquaculture seafood production in 2007 in Europe (tonnes)



Source: FAO (2009)

Consumption of aquaculture seafood has dramatically increased in recent years with salmon and shrimp being the two winners of this trend. European sea bass and gilthead sea bream are two other species which have gained market shares.

Farmed seafood has also become an excellent raw material for the seafood processing industry thanks to its year round availability, stable and relatively low price. This is especially true for salmon, shrimp and more recently for pangasius, which are all actually transformed into a large variety of end-products.

2.3 Consumption and distribution trends

The demand for seafood, as for food in general, has experienced changes in the past decades and will continue to evolve under the influence of social and economic factors. The major changes observed in recent time and the visible impact on farmed fish demand are hereby summarized.

Changing eating habits

Eating habits have changed in the past decades. What goes into shopping trolleys and what the catering industry buys is different compared to a couple of decades ago. This is due to important social

and economic changes. The most drastic ones, which have a clear impact on food consumption, are the following:

- Family structures have changed with an increasing number of singles. This stimulates the demand for portion-sized products (whole fish, portioned fillets, slices).
- The gloomy economic situation that Europe is facing, with enlarged low-income population, has favoured low price sub-segments. When it comes to distribution, development of low price retailers (hard discount) and caterers (fast food, low budget restaurants, sandwiches) are the most visible effects. In the catering industry, the need to control cost in order to maintain competitiveness has induced some changes in purchasing attitudes. For example caterers give their preferences to products with a known yield or with no waste, such as pre-packed fixed weight portions.
- Women are the ones who predominantly choose food products for domestic consumption. Hence, they still perform the gatekeeper function, operating as filters for the whole family. Compared to one or two generations ago, women today have a higher education level and enjoy a higher employment rate. The former gives them easier access and a better understanding of a wide spectrum of information (daily newspapers, women's magazines, doctors' prescriptions, etc.), whereas the latter stimulates their demand for time-saving products. These higher educated consumers are also more health-oriented.
- The development of new eating habits (snacks, fast food, etc.) versus the traditional meal model has been thoroughly investigated by sociologists. The typical south European pattern of three structured and regular daily meals is weakening. Though "fast food" still meets some resistance in Mediterranean countries, due to the important social role of meals, snack food and sandwiches consumption is increasing.
- The loss of culinary expertise that traditionally passed from generation to generation is mainly due to the reduced time spent in the kitchen by both those who cook and who know the recipes (generally the mother/grandmother) and those who should learn from them (children/young adults). This phenomenon has stimulated the demand for ready-to-eat food, including all dishes (starters, main dishes, desserts). Pre-prepared items such as fish portions with some culinary content (sauce, bread-crumb, pre-cooked) are increasingly appreciated.

Market competition and promotional campaigns

The market's moderate increase exacerbates competition between operators involved in the food chain. Major protein producers compete to gain access to the limited space on supermarket shelves and to make their products become in demand by end users. In this context, food manufacturers develop aggressive marketing and commercial policies to attract buyers and encourage their loyalty. All food producers, through individual or collective initiatives, spend a lot of money in trying to understand consumers' motivation, through advertising, promoting and ultimately publicly arguing about the benefits of their products.

In February 2009, the Norwegian industry decided a NOK20 million (€2.3 million) marketing campaign for cod. The budget was to be channelled through the Norwegian Seafood Export Board, and the Norwegian government was contributing to NOK11.5 million. The marketing actions attempted to boost the demand of *klippfish* (dried and salted cod) in Portugal and fresh and frozen cod in Sweden, France, Spain and elsewhere.

As far as products with private labels are concerned, price is the primary factor for buying these products. When it comes from fresh produce, most retailers and large-scale wholesalers have recently created their own brands attached to "own supply chains" which they control.

Large-scale wholesalers selling at national scale to the food service industry have also developed their own labels which ensure safety and quality to the consumers. In France, Metro, the largest cash and carry chain, sells 30 percent of its fresh seafood under its own brand "Filière metro", created in 2000.

Low price hard discount retailers are developing fast in terms of turnover and number of outlets. The most important buyers in these new types of retailers are of low-income, young adults and large families (households > 5 people).

Price promotions make consumers change their purchasing decisions. When clearly advertised, also in free catalogues distributed to thousands of families by retail chains, price discounts boost sales by as much as two to three times compared to normal. In supermarkets, 15 percent to over 30 percent of all seafood is sold during promotional campaigns.

3. THE PRODUCT AND PRODUCT FORMS

3.1 Natural distribution and capture fisheries

Meagre is distributed in the East Atlantic Ocean, from Mauritania in the south to Norway in the north and in the Mediterranean Sea. Global fisheries production ranges from 5 000 to 10 000 tonnes per annum. The production of meagre from capture fisheries in Europe (geographical perimeter) is low, ranging from a few hundreds tonnes to 1 500 tonnes in the different countries (Table 1). It is supplemented by imports from Morocco. No figures could be provided (this fish is not identified by the international trade statistics); thus, several traders mentioned purchase of considerable volumes in Spain and Portugal.

Wild meagre is common in two regions in western Europe: south Spain and Portugal and west France. In both areas landed fish may have a large size (commonly above 5 kg) and the fish is very appreciated by local buyers.

Table 1 – Production of meagre from capture fisheries (tonnes)

	1980	1990	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total world[a]	3 207	5 261	4 108	4 046	5 926	6 340	8 941	9 337	8 250	4 840	5 724
Egypt	269	113	776	1 038	1 372	1 414	2 411	1 232	2 107	1 602	1 202
France		179	189	162	156	101	525	1 263	1 356	1 204	13
Ghana										233	2 042
Guinea–Bissau			394	372	730	337	310	277	260	240	240
Israel	10	67	288	223	273	249	144	6	2	22	22
Mauritania		2 000	600	600	600	950	1 200	1 500	900	1 320	1 230
Morocco*	1 160	2 544	1 755	1 534	2 047	3 102	4 160	4 722	3 387	**	**
Portugal	937		4	6	36	40	46	172	154	143	159
Spain	816	94									
Turkey	15	193	70	50	63	75	62	96		60	56

Source: FAO (2010a)
** data from FAO (2008). ** In FAO (2010a), 2007 and 2008 meagre were grouped with all Sciaenidae.*
[a] *total world production reflects the fact that in some years and countries meagre was grouped with all Sciaenidae.*

In France meagre capture fisheries is highly concentrated in the west regions, near the Gironde mouth. After first sale in local fish auctions (where the fish fetches €2–7/kg, depending on the size and on the fishing gear), meagre is mainly sold either to restaurants or to independent fishmongers in the region. Note that part of the French production which is caught by line is marketed with a label fixed on the gills, which guaranties quality, freshness and traceability.

In Portugal the fish is well known and highly appreciated in the south of the country (Algarve). Landed wild fish may be of large size (over 5 kg).

3.2 Production from aquaculture

Meagre culture started in the late '90s following an agreement between Italian and French producers, with the first commercial production in 1997 in France. Fingerlings produced in Sète were grown in farms near the Orbetello lagoon, in Tuscany, on the west coast of Italy. Its culture then spread to other Mediterranean countries, and productions are rapidly increasing (Table 2). Global production (slaughtered volumes in 2008) on the northern bank of the Mediterranean Sea is estimated at 2 500 to 3 000 tonnes. Based on the fact that some 8 to 10 million juveniles have been sold in 2008 to European farmers, 2010 production may be well above 10 000 tonnes. More than half of this will be produced in Spain.

Table 2 – Production of meagre from aquaculture 1997–2008 (tonnes)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
France	30	30	30	33	35	165	100	147	267	282	282	300
Italy						131		696	186	172	192	300
Spain							3	16	347	489	251	1 374
Portugal									47	47	25	15
Greece												*240
Turkey												**512
Malta										#28	#12	#12
Egypt												2 031

*Source: FAO (2010b), * Barazi (2010, pers. comm), ** Deniz (2009), # Vassallo Agius (2010, pers. comm.)*

In France, according to official data from the Ministry of Agriculture, production reached 282 tonnes in 2006, 380 tonnes in 2008. Currently three farms (in Sète, Cannes and Marseilles) are producing meagre.

In Italy, according to CooPAM, the Italian largest producer, production was expected to reach 350 tonnes in 2009, with an estimated ex farm price of €6.50/kg.

In Spain the 2007 production reached 800 tonnes and the 2008 forecast production was over 1 500 tonnes (Apromar - Spanish producers association- pers. comm.).

In Greece, 2008 production reached 240 tonnes and should be around 500 tonnes in 2009 (Barazi, 2010, pers. comm.). The 600 000 fry stocked in farms in 2008 are expected to result in an estimated production of 1 200 – 1 600 tonnes in 2010.

In Turkey, three companies lead meagre culture: Ugurlu Fish Products Inc., Kılıç Sea Products Inc (respectively with a production capacity of 200 and 80 tonnes per year), and Ege-Mar Sea Products Inc., which has been producing commercial size meagre since 2005, with a production of 512 tonnes in 2008 (Table 3) (Deniz, 2009).

Table 3 – Turkey: EgeMar Company meagre production in 2005–2008

Year	Production (t)	Year	Production (t)
2005	836	2007	1 500
2006	-	2008	512

Source: EgeMar Sea Products Inc., in Deniz (2009)

Four hatcheries started juveniles' production in 2008, with a total annual production capacity of 5 600 000 meagre fingerlings (Table 4).

Table 4 – Turkey: hatcheries and their production capacities for meagre juveniles

City	Company	Capacity (fingerlings/year)
Aydın	Ege-Mar Inc.	2 500 000
Izmir	Akuvatur Inc.	2 000 000
Izmir	Turkuaz-Marin Inc.	600 000
Mugla	Kılıç Holding Inc.	500 000
TOTAL		5 600 000

Source: MARA Data base (in Deniz, 2009)

Meagre fish is today sold by a limited number of companies on niche markets. Price was €9/kg for export in 2008 (Deniz, 2009). There is one processing company: Ugurlu Balık, which deals with seabass, seabream and meagre.

In Egypt, Sadek *et al.* (2009) estimated that around 420 hectares of earthen ponds in the Dibah Triangle Zone (Damietta and Port Said Governorates) are cultured with meagre each year, as capture based aquaculture, with a potential production of around 3 000 tonnes/year, and an average production of 5–7 tonnes/ha/year. The culture is based on the collection of wild finfish fry and juveniles along the Nile delta, which represents the reproduction and nursery area in the eastern Mediterranean (El-Hehyawi, 1974). Between 2 to 5 million fry and fingerlings catch per year were estimated by Sadek *et al.* (2009).

Meagre is cultivated on small scale also in Malta (12 tonnes in 2008, R.Vassallo Agius, 2010, pers. comm.) and in Croatia, where culture started in 2009, with the stocking of about 100 000 fry in cages (V. Franičević, 2010, pers. comm.).

Fry production started in France, but has recently spread to Turkey, Italy, Morocco hatcheries.

3.3 Commercial names

Meagre is a species only known by consumers in some limited areas. In most countries it has several local names:

in France: ***maigre*** (most common name), *courbine, aigle* or *grogneur*.

in Spain*:* ***corvina***; yet *corvina* also refers to other species of the Sciaenidae family.

in Portugal: ***corvina***.

in Great Britain: **meagre**, craoker and drum.

in Italy: ***ombrina bocca d'oro***; *figao, figou, figaro*, in Liguria; *ombra, ombreta, ombria* in Veneto and in Friuli-Venezia Giulia; *bocca gialla* in Toscana; *ombrina* in Marche, Abruzzo, Lazio, Sicilia; *vocca d'oro* in Campania and Puglia; *umbrina di canale* in Sardegna. *Ombrina* also refers to the shi drum, *Umbrina cirrosa* (Tortonese, 1975).

3.4 Product forms

Farmed meagre is mainly sold fresh. The bulk is traded whole head on, ungutted or gutted depending on the end market. Few fish are sold at size below 1 kg; over 50 percent is sold at size from 1 kg to 2 kg; a third at size above 2 kg. Indeed, portion-sized fish (400–700 g) are not considered suited for marketing as this size fish have a large head, large bones, little flesh, and are not very tasty. In Spain, small sized fish (less than 1 kg) are considered too dark (*negra*), and consequently not very attractive.

Only small volumes are processed to be frozen. Smoked fillets were mentioned by farmers as a possible output, yet no commercial producers were spotted. Attempts to sell farmed meagre to

Japanese sushi restaurants received good responses, as this lean fish seems to have the quality to be eaten raw.

Considering that small size fish are not suited for sales, that meagre grows quickly to size suitable for being processed into fillets, that the market for whole fish is shrinking whereas demand for portion sized product is growing, the future for meagre fish is seen into the production of ready-to-cook portions.

Photo 1 – Meagre in a fish-market on the Bay of Cádiz (southwestern coast of Spain).

The four fish weighed about 20 kg or so each (courtesy of T. Billany, 2007)

4. DISTRIBUTION CHANNELS

4.1 Present situation

Up to 2008, farmed meagre was mainly sold in Italy, Spain and Portugal. Recently, Egyptian production is sold even in Israel.

The majority of today production is sold to commercial catering through wholesalers. Restaurants constitute the number one outlet in Italy, Spain, and France. Restaurants buy it whole and cut the fish on site, or pre-cut portions processed in the farming unit.

Meagre is normally sold at a size of around 2.5 kg to restaurants or processing plants producing fillets. It is not yet convenient neither economical to sell the fish at around 300–400 grams as portion size fish, as in the case of seabream and seabass, for the points discussed above but also because of the high price, largely made by expensive fingerlings.

Whole fish are sold to independent fishmongers as well, who cut the fish into slices or fillets. Limited volumes have reached the end consumers through supermarkets; some have been identified in Italy and Spain.

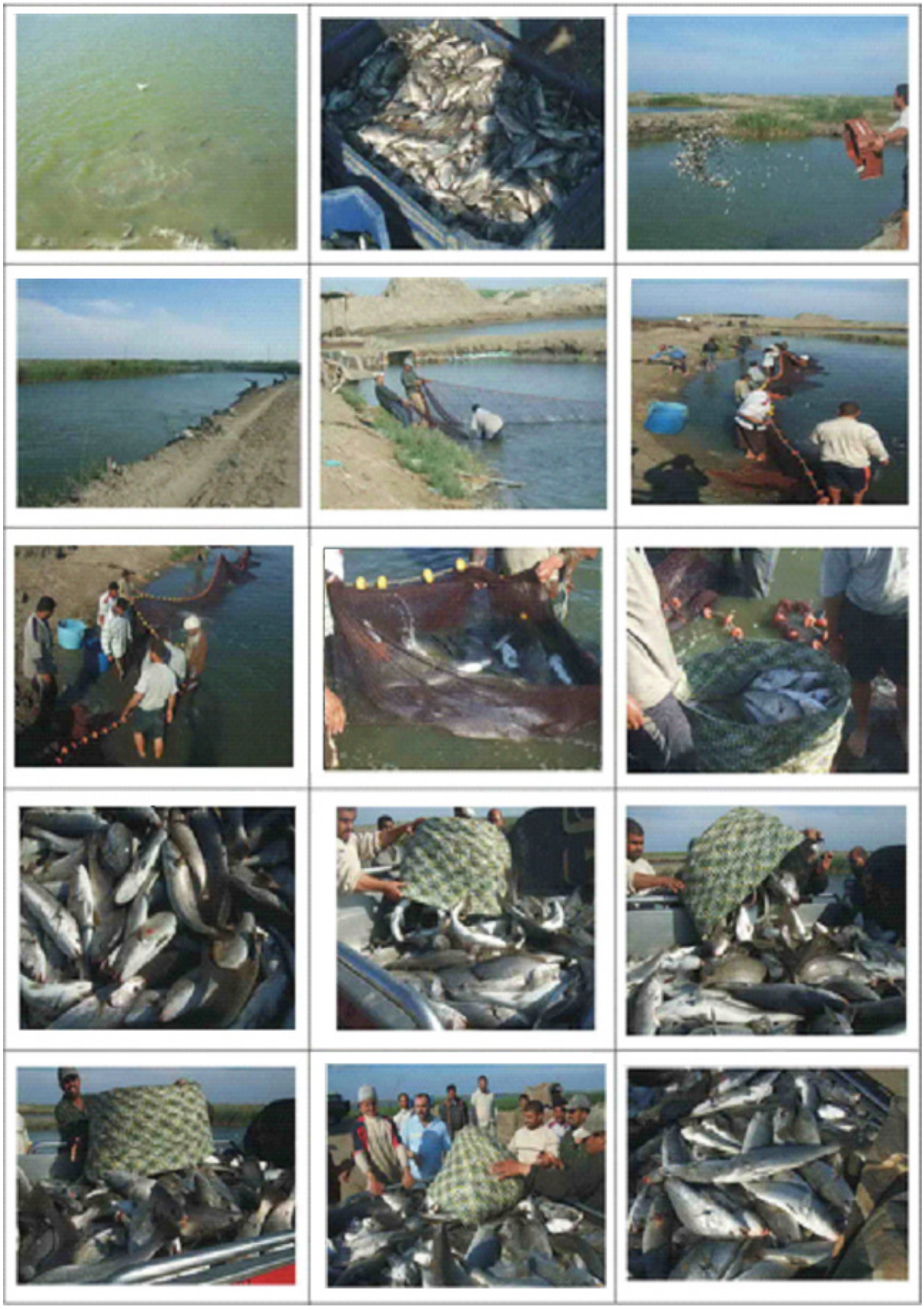
4.2 Prospects

Meagre is a promising aquaculture species for its high grow rate (it can reach 2.5 kg in 24 months; around 1 kg per year, depending on culture conditions) and excellent conversion rate (0.9–1.2 depending on the feed) (Poissons du soleil, pers.comm).

A size of 2.5–3 kg is suitable for the production of fillets.

Considering the large quantities of juveniles produced and sold to farmers in 2008, a large quantity of market size fishes should be on sale in the near future (2010). The probable consequent drop down of prices will offer easier access to consumers and restaurants.

Photo 2 – Pond culture of meagre in Egypt



(courtesy of S. Sadek, 2009)

The **catering industry** is the most open segment to new species and offers good prospects, not only in southern countries but all over Europe. Based on 2008 selling price (> €6/kg), only white tablecloth outlets have shown an interest in the fish.

Sushi outlets represent a potential market. In France, the 500 sushi restaurants bought an estimated 700–1 000 tonnes of finfish in 2007, of which some 150–200 tonnes of white flesh fish (Paquotte, pers. comm.). Meagre could enter their assortment as one of the two or three whitefish on sale.

Independent fishmongers are efficient prescribers for seafood, whose advices are much appreciated by their clientele. They will actively participate to the selling of meagre, provided that they get the right information and incentives for promoting this "new" cultured fish. The success on this segment will directly depend on the marketing effort deployed by producers.

Supermarkets represent the dominant outlet for seafood in most European countries and their share will grow, especially in southern countries (Spain, Portugal, and Italy) where meagre offers the best short term prospects. This category of buyers requires a large and increasing amount of portion sized products, in bulk and in pre-packed formats.

5. PRICE AND COMPETITIVE POSITION

5.1 Production and selling cost

Ex-farm selling prices are rather high, being around and sometimes above €6/kg for 2–3 kg whole fish (2008). At this price, meagre finds its way to the narrow market for medium/upper class restaurants. Such high ex-farm price for whole fish makes the price for fillets at €15–17/kg and the retail price well above €20/kg. At this level, meagre has little chance of success: consumers will better go for more known species, unless great marketing efforts are deployed.

Production costs are much lower (€3/kg), and tomorrow conditions should enable European farmers to produce meagre at even lower prices (€2.5/kg). Juveniles price, which is up to €1 per piece (2009), may drop down to around 30 cents under the combined effect of increased competition on fry supply (in 2008, one supplier was responsible for over 90 percent of total meagre fry production) and improved technology. Feed conversion ratio (flesh weight on feed weight) has dropped from 2.5 down to 0.9 to 1.2 in some farms (Poissons du Soleil, pers.comm.). If this scenario proves to be true, meagre may become a good offer on the wide market for medium priced fillets (sold at retail price of €10 to 15/kg).

The price also depends on the whole market of cultured fish, and is even under the influence of the sea bass and sea bream productions. Large productions of meagre could determinate a decrease in prices even for this species.

5.2 The market for whole fish

Due to the low value of small size, this fish could only be sold whole at size above 800 g. It could find its route through the catering industry; less through the retail segment, where whole fish are preferred to one portion sizes (300–500 g).

The mean market price of meagre coming from the capture fisheries varied little between 1985 and 1991 (€2–4/kg) but it increased from 1992 (€4.5–6/kg). In 1996 prices dropped to €4–5/kg, due to the increased availability from large Mediterranean catches, and remained relatively stable until 1998. Following low catches in 1999, prices suddenly increased to €6/kg. Since then, there has been an increase in demand for fish weighing more than 2 kg, which is sold at €7–12/kg. Southern France and Italy are the most important markets for this species (at 1–3 kg); nowadays the supply comes from both capture fisheries and aquaculture. In Egypt ex-farm price was around US$4.5/kg in 2009 for meagre larger than 1.25 kg (Sadek *et al.,* 2009).

Since 2002, producers are trying to differentiate between meagre products: smaller fish (600 g to 1 kg) are sold whole or filleted, whereas larger fish (1 kg to 3–5 kg) are sliced or filleted and smoked. The smoking procedure is very recent and is giving good results.

Meagre flesh quality is considered very good, characterised by high protein levels and low lipid content (Table 5). Total lipids are characterised by high percentages of polyunsaturated fatty acids which are mainly represented by a high proportion of n_3 PUFA and by low n_3/n_6 ratio values.

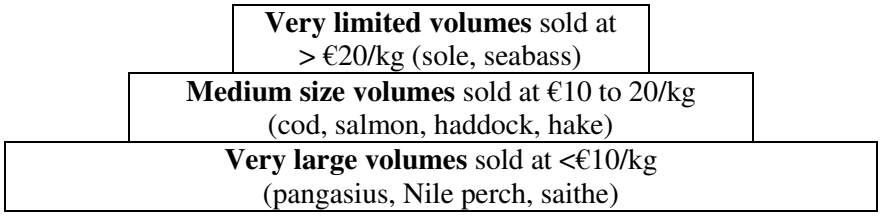
Table 5 – Chemical-nutritional composition of cultured meagre (*Argyrosomus regius*) of different size collected from Italian farms (from Orban *et al*., 2008).

	min	max
weight (kg)	0.65	4.83
length (cm)	43	84
values referred to 100g edible tissue		
pH	6.37	6.67
moisture (g)	72.69	76.1
protein (g)	19.14	21.71
total lipid (g)	1.68	4.18
ash (g)	1.12	0.35
nonprotein nitrogen (g)	0.31	1.36
energy value (kcal)	97	124
cholesterol (mg)	54.46	68.68
α-tocoferol (mg)	1.17	2
γ-tocopherol (mg)	0.02	0.12
squalene (mg)	0.83	2.31
fatty acids (% of total)		
saturated	29.29	30.41
monosaturated	26.28	30.82
polysaturated	34.48	39.16
n-3	20.7	26.72
n-6	11.71	13.79
n-3/n-6	1.5	2.15

5.3 The market for fillets

Three market segments could be potentially occupied by meagre fillets: the large volume low price segment, the medium volume medium price and the exclusive segment of high profile species (Figure 7). The two main forces that will decide the future position of the fish on the European market include the natural economic development of the industry and possibly the strength of the marketing efforts deployed.

Figure 7 – Schematic description of the European retail market for fresh fish portions by consumers' prices categories



The development of the meagre farming industry will depend on its ability to reduce production and processing costs. In the case of a well structured industry with industrialized tools, ex-processing plant

price for fillets reaches will stabilize at circa €6–8/kg. The product would then enter the medium size market for white fish fillet, where cod, whiting, haddock, hake are positioned. Would ex-processing price for meagre fillets drop down to <€5/kg, it would be able to enter the very large size market for low price white fish, where pangasius and Nile perch can be found.

The level of industrialization (farming and processing) will be a key factor for the competitiveness, hence the future development of this industry. Note that the future market for fresh fillets will include an increasing share for pre-packed products. This type of presentation, already developed in northern countries, will expand in southern countries. Signs are already visible in Spanish and Portuguese supermarkets.

Well managed and efficiently designed communication and marketing policies may modify the demand. In the case of meagre, which has virtually no image (beside narrow geographical areas), all may be considered, at collective as well as private levels. Considering that production will grow rapidly, the collective effort will have to be run quickly before the products gets naturally a "non mastered" image from its increased visibility.

6. SWOT ANALYSIS

6.1 Weaknesses

- The species is generally unknown to fish consumers, apart from some local areas, where it is landed from capture fisheries, i.e. western France (Gironde area), southern Portugal (Algarve), southern Spain and Egypt.
- In some countries, the commercial name may carry a not-so-positive image. This is the case in France, where it is called "*maigre*" (slim). In others, the name may be confusing and refer to other Scianidae species, placing the fish in competition with related species (shi drum for instance).
- At present the small quantity of farmed fish available on the market induces a limited visibility and reduced knowledge among all buyers, including professional ones (fishmongers, restaurant's chefs, supermarkets managers). This increases the difficulties for independent fishmongers and supermarkets sellers to promote it.
- Over 10 000 tonnes are expected to be slaughtered in 2010. The industry has not yet agreed upon a common communication programme and plan of marketing actions.

6.2 Threats

- In the short term, due to the economic difficulties that European consumers are facing, the market for seafood, especially the market for medium and high profile species, is atone and prospects for the short term unwelcoming.
- One of the major risks that this nascent industry may face is the rapid drop in ex-farm prices under the pressure of over-production, i.e. production level well above the market absorption capacity. The decline of the ex-farm price as the supply grows has been experienced in all farmed seafood businesses (i.e.: farmed Atlantic salmon and Atlantic cod - Appendix 1).
- For all the reasons detailed below, the market offers good potential in the medium term. Yet, it is not ready to absorb large volumes. Producers have to work out the marketing phase: information, communication, differentiation were mentioned several times as the keys to the successful introduction of this species on the market.

Photo 3 – Market size meagre cultured in Turkey

(Source: EgeMar Sea Products Inc. in: Deniz , 2009)

Photo 4 – Medium size meagre cultured in Turkey

(Source: EgeMar Sea Products Inc. in: Deniz, 2009)

Photo 5 – Capture of meagre in Orbetello (Italy)

(courtesy of A. Barbaro, 2005)

Photo 6 – Meagre broodstock from a culture pond in Orbetello (Italy)

(courtesy of A. Barbaro, 2005)

6.3 Strengths

- Meagre is a fast growing species, where a few grams fry becomes an over 700 g fish after 12 months and a 2–2.5 kg after 24 months. Growth can even be faster in high temperature zones (southern Spain, Canary Islands, South Mediterranean).
- Meagre is characterized by a high feed conversion rate (0.9-1.2 depending on the feed).
- Meagre is even characterized by high adaptation capacities to environmental conditions and by high resilience against stress factors (El Ahdal, 2009).
- Meagre is only known to a small part of European consumers, yet, for all of these connoisseurs, the fish enjoys a very positive image. According to French, Spanish and Italian farmers, tests on markets (with chefs or householders, most of which did not know the product) have given very positive results. The fish is endowed with a good taste flesh, which remains firm and tight after cooking, and it can be prepared in many different ways. Meagre also has a nice shape, close to the one of sea bass. Moreover meagre is a lean fish with a high polyunsaturated fat content.
- Up to now, the limited production was sold on niche markets, where the fish fetched high prices. Examples of ex-farm prices given by producers ranged from €6 to 10/kg (whole fresh fish).

- This large size fish offer excellent opportunities for processing, with an output yield ranging from 42 to 45 percent (according to the size of the fish and the final product). Meagre offers good prospects as smoked fish and for sushi.

6.4 Opportunities

- Seafood enjoys a positive image; most national health institutes recommend to eat fish several times a week.
- Europe demand for seafood is rising and EU production is far from covering the needs. Seafood imports reached 15 million tonnes in 2008.
- In a context of growing demand and declining wild fish landings, the appetite for aquaculture fish is good.
- Meagre fish is mainly sold in Italy, Spain and Portugal. In addition, it has received positive feed back from markets where it is not known at all, i.e. the UK, Switzerland and Germany. Both the commercial catering segments and the upper range supermarkets have given encouraging responses.
- The demand for fish fillets is high on north European markets (UK, Germany, France) and fast growing in southern markets (Spain, Portugal) where traditionally whole fish was favoured. At European scale, the demand for fresh cuts is growing. This constitutes an advantage to meagre which is a good candidate for being sold in portions.
- Thanks to its size (1.5 kg and above) and its morphology, it is possible to process meagre into a large variety of portioned products such as fillets, with or without skin, loins, with or without skin, slices, etc. all items increasingly demanded by the European market.
- The production of organic fish offers good opportunities on markets sensitive to this marketing argument (UK, Germany, Switzerland).
- The fish has no image, but positive intrinsic values. From a marketing view point everything will have to be created.
- Depending on which market segment the fish will be positioned, specific tools may be utilized to escape from direct competition with existing products: brands, quality certification, certification of origin, specific communication emphasising the local origin (limited transport cost, low carbon foot print on transport), etc.

7. PROSPECTS AND RECOMMENDED MARKETING STRATEGIES

7.1 Present situation and strategies for the medium term

Meagre fish is endowed with positive attributes (shape, colour, taste, texture), being often compared to European sea bass. Farmed meagre is today sold overall in whole forms on niche segments which are quite receptive to this species. This includes commercial restaurants in Italy where the fish enjoys a positive appreciation. In other markets, thanks to persuasive and efficient commercial efforts run by individual producers, and to meagre intrinsic qualities some upper range buyers (medium, upper class restaurants) have been convinced to adopt it, as a new species. Farmers have no difficulties to sell meagre, at a good price; yet they feel that this niche market is too small.

The production of large size animals for making fillets appears a good strategy for a medium term best performances of the meagre on the market. If this scenario proves to become true, the industry needs to consider if they can be competitive, in terms of services and prices on the market segment for white fish they will target.

Adding material values: processing

Large in northern countries, smaller in the south, the demand for portion-sized products is yet increasing all over Europe. Not only does it include fillets, but all sorts of portion-sized products: skin-on, skin-less, loins, pieces, cubes, breaded or battered portions, etc. Moreover demand goes for pre-packed products. The industrial units planning to process meagre in the future ought to consider packaging as a non optional decision. The challenging question remains the identity of the processors and the nature of the link with farmers.

Adding immaterial values: labelling

Whether meagre shall be positioned on the lower white fish fillets segment or on the intermediate one, it will be in competition with species occupying the segment. Producers will have to consider creating a specific desire (comparative attraction) for this fish considering that at present it is generally little known by consumers. Tools and messages will differ according to the targeted segment. From a marketing view point, all is to be considered: quality label, organic schemes, private branding, etc. In the hyper competitive fish business, adding value is necessary for all stakeholders to create their share in the market.

As demand shifts, opportunities are numerous. Creating new products and inserting non-material values should be considered as part of the strategy. Efficiency and chances of success in adding value with profit lie in the efficiency of the vertical chain constructed for that purpose. Adding value requires the development of a supply chain approach to business. The more value is added, the more complex is the value chain, requiring diverse and complementary expertise. A sustainable and profitable added value experience for farmers should include cooperation/alliance with distributors, the dominant players of today's food business system, and with processors.

Communication

As production grows, the need for information will develop. For the time being, it is difficult to get access to comprehensive information regarding this species. Besides the usual communication channels on the mass-media it would be very important to create a website dedicated to meagre, accessible in the national language of most potential markets all over the world. This could be the faster and efficient way to communicate with professional buyers and end consumers.

7.2 Recommended strategies: how to amplify the potential market base

Common/mutual effort

The industry needs to gather and communicate on all positive attributes of meagre, i.e:

- the nutritional values;
- the characteristics of the taste and flesh texture;
- the possible usage of the fish, the different ways of cooking.

The industry should work at building a well designed communication strategy based on the right target, the right message and the right period. It is difficult to draw the main lines of such communication programme from the existing available information. Yet considering the low level of knowledge regarding the fish in most European national markets, focused programmes will be more cost effective compared to a pan European generic campaign. Professional chefs may be involved at detecting and presenting all positive elements that characterize meagre.

Several difficulties may prevent opportunities to run a generic campaign and may alter its results:

- the industry is not well organised and producers are scattered in several countries; it is not endowed with a common marketing organization,
- the number of producers is limited whilst the cost of a generic campaign would be high,

- the industry is made of sea bass and sea bream producers which are facing severe difficulties and at present have little cash.

These forecast difficulties do not mean that nothing should be done. On the contrary, communication efforts should be directed with no delays (2010) to market business players. Though all commercial efforts will be run individually by producers, they should gather to create a common base of information on meagre.

Considering the production and market context, it would be useful to run a round table meeting with the entire industry including all/most meagre producers for discussing where to join efforts and what to avoid when it comes to communication.

As far as marketing the fish is concerned, the creation of a horizontal alliance, such as a European type producers' organization, may be considered.

Individual corporate efforts

Sales performances for any product rely on the capacity of individual companies to promote and encourage the purchase of the fish. Producers who consider a differentiation strategy may adopt a national or an European food quality scheme. Adopting a European business to business (B2B) or business to consumers' (B2C) scheme may be considered. The decision should be based on a cost and benefit analysis.

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https://www.was.org/main/Default.asp

Appendix 1
Statistics

Table A1.1 – Seafood imports, in 2007 (€ million)

	from world	from intra EU	from extra EU
EU (27)	29 065	13 059	16 006
Spain	4 704	1 636	3 068
France	3 881	2 355	1 525
Italy	3 605	2 019	1 586
Germany	2 886	1 381	1 505
UK	2 722	824	1 898
Denmark	1 884	366	1 518
Netherlands	1 881	595	1 287
Sweden	1 844	289	1 555
Belgium	1 503	817	686
Portugal	1 267	862	405
Poland	823	487	336
Greece	417	212	205
Austria	293	263	30
Finland	212	109	103
Lithuania	188	98	89
Ireland	154	150	4
Czech Republic	148	111	37
Romania	128	91	37
Latvia	94	72	22
Estonia	89	67	22
Luxembourg	68	67	1
Slovenia	58	47	11
Cyprus	53	23	31
Hungary	48	40	8
Slovakia	46	39	7
Bulgaria	41	20	20
Malta	30	19	11

Source: Eurostat

Table A1.2 – Wild meagre in France: sales in auctions (tonnes)

	2006	2007	2008	2009
Total	1 080	986	1002	771
Oléron	474	402	178	295
Royan	150	165	46	170
La Rochelle	148	129	83	64
St Jean de Luz	39	92	147	109
Arcachon	137	105	77	57
Les Sables d'Olonne	83	57	12	36
Noirmoutier	9	13	8	6
St Gilles Croix de Vie	29	13	23	12

Source: Ofimer/ DPMA

Table A1.3 – Wild meagre in France: auction prices (€/kg)

	2006	2007	2008	2009
Average	3.79	4.17	4.92	5.44
Oléron	3.64	3.37	4.26	4.93
Royan	4.61	4.63	5.31	6.21
La Rochelle	4.02	4.72	5.32	5.16
St Jean de Luz	4.81	5.20	6.46	5.83
Arcachon	2.86	3.66	4.76	5.10
Les Sables d'Olonne	3.33	5.20	6.18	5.72
Noirmoutier	4.40	6.87	7.39	6.16
St Gilles Croix de Vie	4.11	5.64	4.87	4.88

Source: Ofimer/DPMA

Table A1.4 – France: La Cotinière (Oléron) landings of meagre (in tonnes by size)

	2006	in %	2007	in %	2008	in %
>2kg	18	4	35	9	33	9
1 to 2 kg	78	18	38	10	53	14
0.5–1kg	149	35	142	35	144	37
<500g	181	42	187	47	159	41
Total	427		402		389	

Source: Nicolas Dubois, port de la Cotinière (pers. comm.)

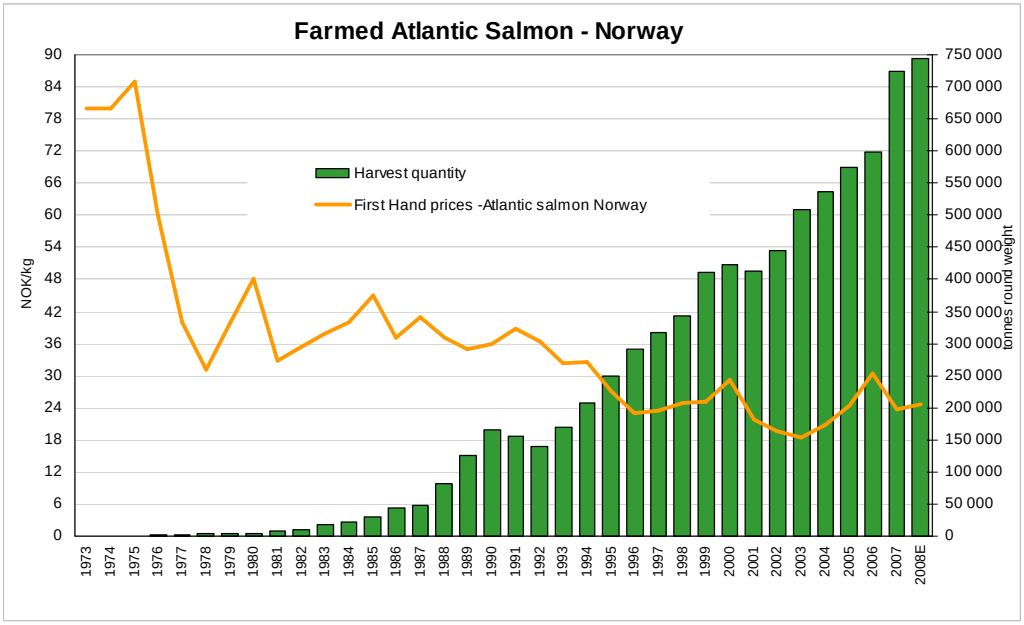
Table A1.5 – Barcelona wholesale market Mercabarna: sales of fresh farmed meagre (tonnes)

	2005	2006	2007	2008	2009
Total	0	55	78	63	97
Alicante		30	19	4	4
Cadiz			11	1	13
Murcia			5	11	14
Valencia		8	11	55	35
France		3	7	10	5
Greece		2	13	24	18

Source: Mercabarna[2]:

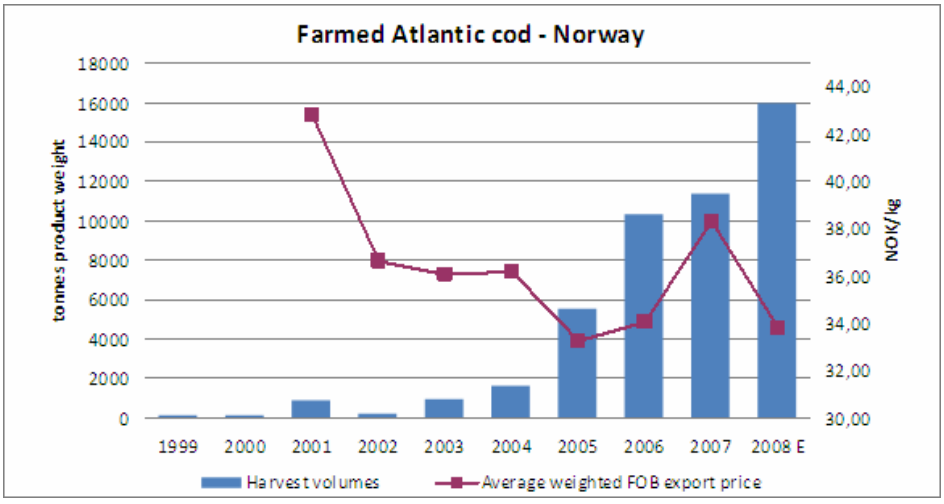
[2] *Note by the author: These data should be read as an indication. For instance, in 2007, one French fish farmer alone sold over 15 tonnes to Mercabarna wholesalers*

Figure A1.1 – Production and ex-farm price for farmed Atlantic salmon in Norway



Source: Kontali AS

Figure A1.2 – Production and ex-farm price for farmed Atlantic cod in Norway



Source: Kontali AS

Appendix 2
Persons contacted

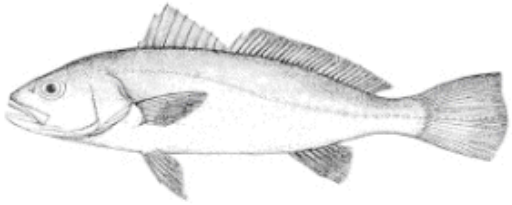
Name	*Affiliation*
Balma Philippe	Poissons du soleil hatchery, managing director, France
Barazi-Yeroulanos Lara	Kefalonia Fisheries S.A., chief executive officer, Greece
Begtashhi Ideal	Acuigroup Mare-Mar, sales manager, Spain
Caraballo Jose Manuel	Puntatlantis, environment NGO, Spain
Charvoz Rémi	Cannes Aquaculture, general manager, France
Dubois Nicolas	Development Agency, Oleron island, France
Gilmozzi Marco	Coo.P.A.M. (Cooperativa Produttori Acquacoltori Maremmani), general manager, Orbetello, Italy
Gonzalez Rafaël	Gloriamaris farm, commercial manager, France
Gonzalez Jaime	Casa Botas, managing director, Spain
Hellin Henry	Viviers Marins. Boulogne sur mer, France
Hough Courtney	FEAP
Jacquet Frédéric	Demarnes wholesaler, Rungis, France
Lacomba Sobrino Tahiche	Acuicola Marina, fish farm, Spain
Myrseth Bjørn	Marine farms, general manager, Norway
Ojeda Javier	Apromar, director, Spain
Paquotte Philippe	In charge of the economic division. Ofimer, France
Parga Lopez Xian	Frigorificos de Vigo SA. Sales manager, Spain
Piozzi Patrizio	Ismea, Italy
Salgado Mely	Vieirasa processing plant, sales manager, Spain
White Yvette	SFAM. French marine fish farmers' association, France
Fishmongers	Three fish mongers in Paris, France

Appendix 3
Cultured Aquatic Species Information Programme[3]: *Argyrosomus regius* (Asso, 1801)

IDENTITY

Argyrosomus regius Asso, 1801 [Sciaenidae]

FAO Names: En - Meagre, Fr - Maigre commun, Es - Corvina



Biological features

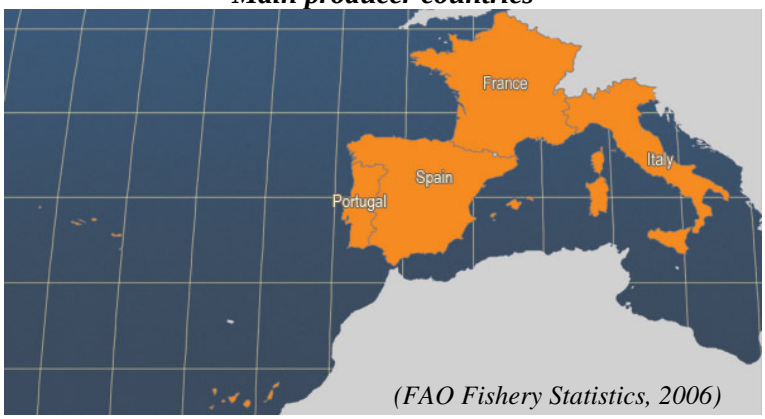
Relatively big head with elongated body. Mouth in terminal position without barbils. Eyes quite small. Lateral line evident, extending onto caudal fin. Second dorsal fin much longer than first. Anal fin has a first short spiny ray and a second very thin one. Several branched appendices are present in the gas bladder, which can vibrate producing a typical 'grunt'. Very large otoliths. Body colour silver-grey, with bronze traits dorsally. Fin base reddish brown and mouth cavity yellow-gold. Post-mortem colour brown. Reaches up to 2 m in length and 50 kg in weight.

PROFILE

Historical background

The history of meagre in aquaculture is quite recent. First trials with wild broodstock were conducted in the south of France, where some of the Sciaenidae family were thought to have good aquaculture potential. Starting from 1996, fry production has been very limited, with a single hatchery operating in France. In fact the rearing protocol of this species is still relatively unknown, and has not yet been made public. The first commercial production (in France) was recorded in 1997. Since then production has expanded slowly in nearby regions, especially on the Tyrrhenian side of the Italian coast, and in Corsica. The adult meagre market is now slowly expanding, especially in Italy; this could promote fry production in the future, as well as research on fry and juvenile production. Commercial production in Italy was first reported to FAO only in 2002.

Main producer countries



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Habitat and biology

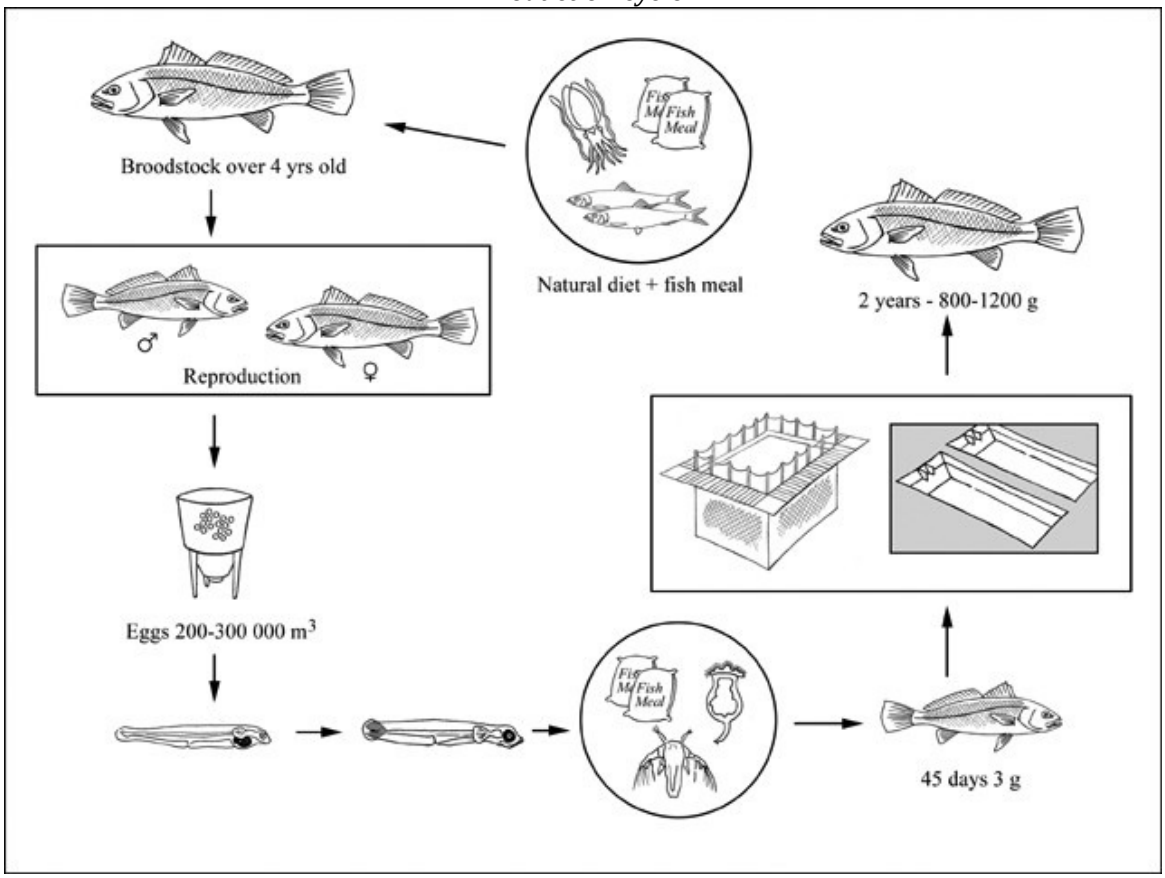
Meagre are widespread all over the Mediterranean Sea, although not very common around Italy and Greece; the biggest fish are found along the coast of West Africa. In Senegal, in the bay of Dakar seems to be the southern limit of the species; big schools of meagre are found around wrecked ships that were sunk to create habitats for several commercial species. They can grow up to 2 m and reach >50 kg. Growth is mainly achieved during summer; feeding activity is substantially reduced when sea temperatures drop below 13–15 ºC.

During reproduction migration, adult meagre approach the coast line in mid-April. They penetrate estuaries at the end of May in order to spawn (anadromous migration). During the spawning season, males produce a typical deep sound, by pushing their abdominal muscles against the gas bladder. From mid-June until the end of July they leave estuaries to feed along the coast. They remain in shallow water until the beginning of autumn. During winter, meagres return to deeper water.

Juveniles (age 0) leave the nursing areas (estuaries) at the end of summer and migrate to coastal waters (from 20-40 m) to spend the winter. Starting from mid-May they return to their estuarine feeding areas. Water temperature is the most important factor that determines the trophic migration and reproduction of meagre. The arrival of adults and the departure of juveniles from estuaries (age classes 0, 1 and 2) occur in May and October when water temperature is close to 13–14 ºC. The best temperature for the growth of meagre is between 17–21 ºC, with an acceptable range of 14–23 ºC. A 1.2 m female produces about 800 000 eggs, spawning occurs at 17–22 ºC. Fertilized eggs measure 990 µm in diameter. After 30 hours the lipid droplet is totally absorbed. At 96 hours the vitellin sac is almost consumed and the mouth is open. Benthic juveniles of 3.7 cm have been captured, indicating that pelagic life is quite short. Larvae need temperatures above 20–21 ºC in order to feed. Juveniles (age 1) eat small demersal fish and crustaceans (mysids and shrimp). When they reach 30–40 cm, they feed on pelagic fish and cephalopods.

PRODUCTION

Production cycle



Production systems

Farmed meagre come from intensive production, conducted both in land-based tanks and cages. Production facilities are few and mainly distributed in southern France (Camargue, Cannes, and Corsica) and Italy (La Spezia and Orbetello).

Seed supply

At present (2004), the supply of seed still comes from a single hatchery in the south of France. There are probably two main reasons. Firstly, market demand is not great enough to justify greater fingerling production; secondly market demand is insufficient to persuade other hatcheries to develop their own production protocol for this species.

Nursery

A specific nursery phase is not compulsory for meagre. However, fingerlings are normally delivered between 3 g and 20 g and are stocked into small ponds or cages (about 80–100 m³) at 300–350 fish/m³. Usually they are kept for 3 months until they reach 100 g. During this phase survival rate is around 80 percent.

Ongrowing techniques

Ongrowing techniques are similar to those used for European seabass and gilthead seabream.

In land-based farms production is mainly achieved in circular or rectangular tanks with a water depth of 1 m and a volume of 500 m³; the tanks are usually covered with PVC cloth to avoid skin abrasions, especially where they are concrete. The tanks may be circular or rectangular and are stocked with 100 g fish at about 50/m³.

At normal stocking density (50/m³) meagre reach 800–1 200 g in less than 24 months. Very often they are fed until they reach 2 000–3 000 g, a size that is more suitable for fillets or slices.
Nowadays meagre is mainly farmed in the sea, using circular or square surface cages of 500–1 000 m³. More recently, submerged cages have also successfully been used; these 2 000 m³ cages are submerged at 10–20 m, and a low stocking density (10–15/m³) is used. Good results have been obtained in terms of growth rate and FCR.

Feed supply

Feed is supplied by all the major aquafeed producers. Meagre feed is similar to that used for other Mediterranean marine species. An extruded feed with 45–48 percent protein and up to 20–24 percent lipid is used. In land-based farms 2 to 3 meals per day are presented; in sea cages a single daily meal is often normal. In sea cages, where oxygen levels are not normally problematic, meagre can be fed with 1–2 percent bw/day, especially during the first year, when water temperatures are above 18 ºC. An FCR of about 1.7:1 has been achieved; in some cases (in large sea cages with a stocking density below 50 m³), trails are showing even better FCRs.

Harvesting techniques

Harvesting occurs throughout the entire year. During winter, large size fish tend to accumulate perivisceral fat, and so it is usually better to harvest smaller sizes during the cold season, especially those in sea cages. Seines are normally used for harvesting but sometimes special fish pumps are employed. Harvested fish are immersed in an ice-water solution, as rapidly as possible.

Handling and processing

Even though meagre are quite resistant to handling, care is still needed. Scales can easily be lost and tails damaged. Their eyes are also quite delicate and being hit may cause blindness.

Sometimes meagre are gutted and/or filleted soon after harvesting. Studies are being conducted on the best harvesting protocols to optimize the shelf life of the final product.

Production costs

Since the number of production units is low, cost comparisons are difficult to make. In land-based systems costs depend mainly upon the size of the farm. However, in cage culture the major expense is the cost of juveniles; currently these must be bought in the South of France. Generally, feed represents the other major cost during grow-out but it is lower than other marine fish species, since the FCR for meagre is generally better.

Diseases and control measures

There are still few data regarding diseases of this species. It seems that they are quite resistant to the bacterial diseases experienced by other marine species. There have been cases of parasitism (such as *Amylodinium* sp.). Prevention is mainly achieved by controlling density and water quality.

In some cases antibiotics and other pharmaceuticals have been used in treatment but their inclusion in this table does not imply an FAO recommendation.

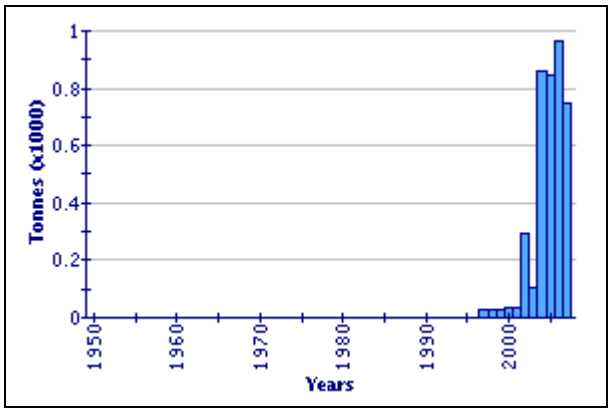
DISEASE	AGENT	TYPE	SYNDROME	MEASURES
Vibriosis	*Vibrio anguillarum*	Bacterium	Fins and areas around vent and mouth become reddened; loss of appetite	Antibiotic in feed
Oodiniasis	*Amyloodinium ocellatum*	Protozoan parasite	Protozoan attach to gills, producing irritation, asphyxia and hypermucosis	Formalin; copper sulphate
Fluke	*Gyrodactylus* sp.	Trematodal parasite	Parasites attached to fins and gills	Formalin

Suppliers of pathology expertise: each producing country has a government authority responsible for upholding statutory requirements, such as licensing, discharge control, notifiable disease control, etc. Contact the relevant government aquaculture/fisheries/animal health departments. The supply of diagnostic services may be carried out by government departments or private organizations or individuals.

STATISTICS

Production statistics

Global aquaculture production of *Argyrosomus regius* (FAO Fishery Statistic)



Production of farmed meagre is very limited so far and is confined to the Mediterranean Basin (southern France, Corsica and Italy). Reported production in 2002 was 231 tonnes (50 percent from Italian cages; 7 percent from Italian tanks; 40 percent from French cages; 3 percent from French tanks) with a value of USD 1.55 million.

Market and trade

The mean market price of meagre coming from the capture fisheries varied little between 1985 and 1991 (€2–4/kg) but it increased from 1992 (€4.5–6/kg). In 1996 prices dropped to €4–5/kg, due to the increased availability from large Mediterranean catches, and remained relatively stable until 1998. Following low production in 1999, prices suddenly increased to €6/kg. Since then, there has been an increase in demand for fish weighing more than 2 kg, which is sold between €7–12/kg. Southern France and Italy are the most important markets for this species (at 1–3 kg); nowadays the supply comes from both capture fisheries and aquaculture. Since 2002, producers are trying to differentiate between meagre products: smaller fish (600 g to 1 kg) are sold whole or filleted, while bigger fish (1 kg to 3–5 kg) are sliced or filleted and smoked. The smoking procedure is very recent and is giving good results. Meagre meat quality is considered very good, due to its very high content of polyunsaturated fatty acids.

STATUS AND TRENDS

Recently a research project on meagre funded by the Italian Regional Agency for the Development and Innovation of Agriculture (ARSIA) has investigated several aspects, such as reproduction, grow-out and quality issues. Other projects are forecast, focussing on reproduction and juvenile production protocols. Economic and technical comparisons of land-based versus cage culture for meagre production are underway. Meagre are included in shelf-life studies.

Meagre has a number of attractive features:

- It is a particularly lean fish, even when grown intensively and receiving the high fat diets that produce high quality marketable products.
- It has a high dressing percentage, low adiposity, healthy muscular lipid content, and long shelf life.
- It reaches relatively large commercial sizes quite rapidly, showing promise for the processing industry; this could create a different market niche for meagre, compared to seabass and seabream.

A small but steady increase in the production of farmed meagre is expected in the next few years, especially in central Italy (southern Tuscany area).

MAIN ISSUES

Two major factors need to be addressed if meagre farming is to expand significantly:

- Juvenile quality cannot yet be controlled, since there is currently only one source.
- Demand is low, because meagre products are not yet sufficiently well-known to the public. Meagre is generally sold by farms that also produce seabass and seabream, which (so far) are generally more appreciated.

Responsible aquaculture practices

Like the farming of other marine species, meagre culture has some negative impacts on the environment (such as potential pollution and disease transfer), due to the intensity of its production. However, fish escapes from cages are not considered a major problem because meagre is endemic in the Mediterranean basin (recently a few hundred meagre escaped from a cage in Tuscany but all were collected nearby within a few days by the local trawling fleet, indicating that this species does not move very fast and is easily recaptured; this reduces the risk of altering the existing fish community structure).

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This document "Present market situation and prospects of meagre (*Argyrosomus regius*), as an emerging species in Mediterranean aquaculture" draws the picture of the existing market of meagre and describes the possible routes for development. Meagre culture started in France and in Italy in the late '90s and is developing in the Mediterranean Region, jumping from a few tonnes in 2 000 to above 10 000 tonnes in 2010, highlighting the appearance of a new aquaculture species on the market. Indeed, based on its aquaculture characteristics, meagre has the potential to become a mass market species, moving from the present position of a niche species with a limited production directed to selected market segments. The paper recommends some actions to be undertaken to consolidate good conditions for future growth and to reduce commercial risks. Most of the information used originates from national data and from the author's personal estimates.

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