Meagre (*Argyrosomus regius*) as a potential new species for the Mediterranean aquaculture

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Workshop on meagre (*Argyrosomus regius*) aquaculture:
Results from the DIVERSIFY project.
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DIVERSIFICATION

- European aquaculture production scheme (seabream - sea bass)
  - 12-18 months to reach 350-600 g

- Sector's demand: open new markets
  introduce new species/products

- A profitable activity is targeting products (whole fish or processed) with high added value and high export potential
- Species satisfying these criteria should have
  - fast growth
  - wide distribution and
  - solved basic biological problems

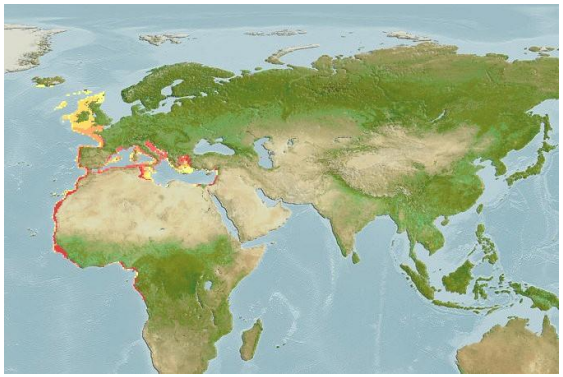
A good candidate !

- widespread all over the Mediterranean Sea. Senegal, bay of Dakar, seems to be the southern limit of the species.

- 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). 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, meagre return to deeper water.

- Reaches up to 2 m in length and 50 kg in weight

Main production countries www.fao.org



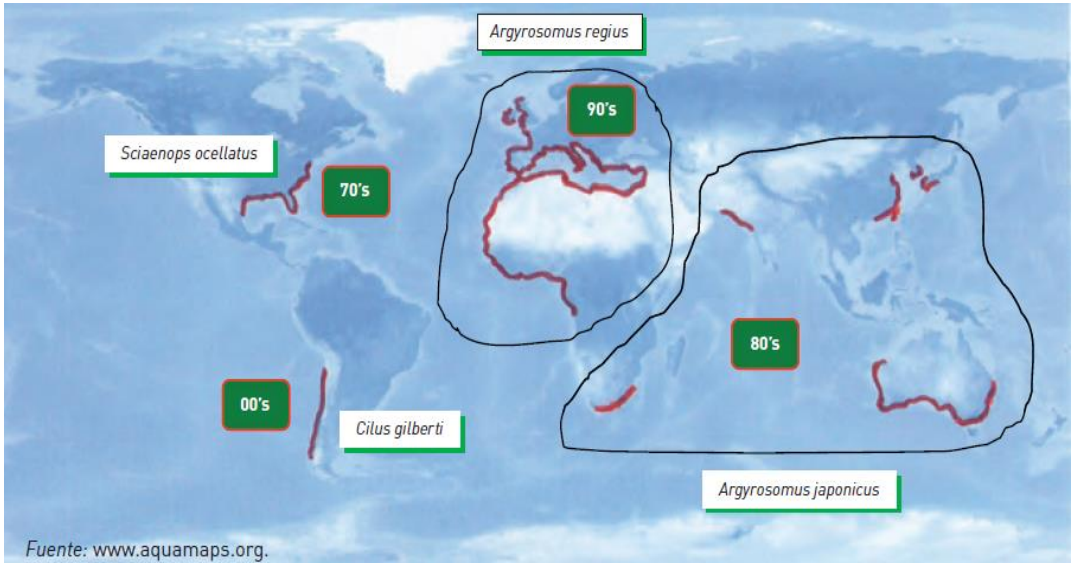
- Important commercially
  - Global distribution
  - Fast growth
    - Growth rates **10x** higher than the European seabass
  - Excellent flesh quality and global market

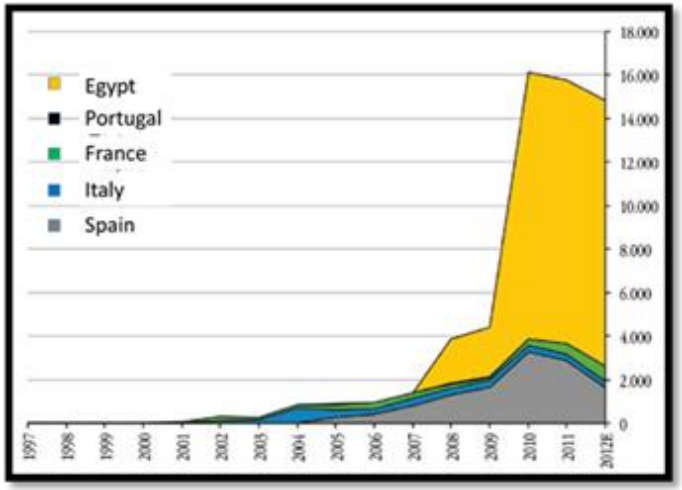
- An innovative products with added value
  - Large size attained
    - marketed as whole or as processed food
    - **suitable for development of value added products**

- Efforts to develop/improve aquaculture methods
  - Economic potential in the EU market
  - Significant potential for exports
    - **proven potential in** other markets
    - congener species are produced commercially elsewhere

Other species are produced in other countries

Especie	Nombre en Español	Nombre en Inglés	Otros nombres
Argyrosomus japonicus	Verrugato del sur	Japanese meagre	Dusky kob (Sudáfrica) Mulloway (Australia)
Argyrosomus japonicus	Corvina	Whitemouth Croacker	
Argyrosomus regius	Corvina	Meagre	Maigre (Francia)
Cilus gilberti	Corvina	Corvina drum	
Sciaena umbra	Corvallo	Brown meagre	Corvina negra
Sciaenops ocellatus	Corvinón ocelado	Red drum	Corvina roja (México) Loup des carïbes
Umbrina cirrosa	Verrugato	Shi drum	





Evolution of meagre aquaculture production in Europe and Egypt from 1997 to 2012

The product Argyrosomus regius

Meagre has a number of attractive features:

- It is a particularly lean fish 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 (1 Kg/year) with a low FCR 0.9-1.2,

Argyrosomus regius rearing in the Mediterranean región

- Started in 1997 when it was reproduced for the first time in captivity in France
  - fish of ~25 g reached ~1 kg in a year
  - standard culture conditions in cages
  - feeding on fresh fish passing quickly to artificial feeds

- The Mediterranean production in 2017 was 7934 tons (Apromar, 2018). Egypt has 16000 tons production although it is not clear that it is the same species
  - Hatcheries exits in Greece, Spain and France
  - efforts have been made by various aquaculture companies in Spain, France, Greece, Italy, Croatia

- The market price value in Spain 13-14 € kg^{-1}
  - Since 2002, producers 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.

Major bottlenecks for the EU aquaculture industry

- **Reliable reproduction**
  - In captivity reproduction is not considered a bottleneck, although there is an unknown genetic variability of captive broodstocks
    - **Wild and captive-reared breeders reproduced after hormonal treatments**, and in some cases also spontaneously.
    - There is a need to characterize genetically available cultured broodstock

- **Production of adequate numbers of juveniles**.
  - Larval rearing is not considered a bottleneck for the expansion of meagre culture.
  - Cannibalism and variable size distribution in larvae and juveniles is an increasing concern
  - Feeds must be improved to consistently obtain high growth rates

- **Fish health:** an area of concern for commercial production
  - Several diseases and pathogens as potential threats
    - Systemic Granulomatosis
    - Chronic Ulcerative Dermatopathy
    - monogenean *Sciaenocotyle panceri*
  - Study meagre immune system and responses for the development of future vaccines

What DIVERSIFY promised at the beginning (1)

- **Reproduction**
  - develop spawning induction methods (GnRHa-based spawning protocols) for masal and paired crossings
  - Characterise genetically available broodstock and fast/slow growers
  - Improve and develop new genetic tools

- **Larval husbandry**
  - develop appropriate weaning protocols adapted to the development of the digestive system of the larvae

What DIVERSIFY promised at the beginning (2)

- **Nutrition**
  - Study the most relevant nutritional aspects (Digestible protein and Energy, Essential fatty acids and aminoacids)
  - Study the requirements of antioxidants (vitamin E and C) that affect fish welfare

- **Health**
  - gene markers for immunity
  - Systemic granulomatosis and nutritional imbalance (P, vitamin C, etc)
  - Chronic ulcerative dermatopathy affecting lateral line organ and development of the disease using different water sources
  - Parasite infections by Sciaenocotyle panceri, chemical treatments

What DIVERSIFY promised at the beginning (3)

- **Growout husbandry**
  - define an appropriate feeding method that respects the behaviour of meagre in the cages
  - Modify existing methods for cage culture related to volume and ligh conditions to maximize performance
  - Study the behavior of fish in sea cages

- **Consumer market analysis**
  - Develop new products with physical prototypes
    - incorporating consumer, market and buying criteria
    - monitoring the quality for organoleptic characteristics
    - marketing and communication strategies, and market and business models development

A technical manual for meagre

DIVERSIFY

New species for EU aquaculture

Technical Manual – Meagre (*Argyrosomus regius*)

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DIVERSIFY 2018

Thank you for your participation!!