

# COD (*Gadus morhua*) REARING ATTEMPTS IN FRANCE

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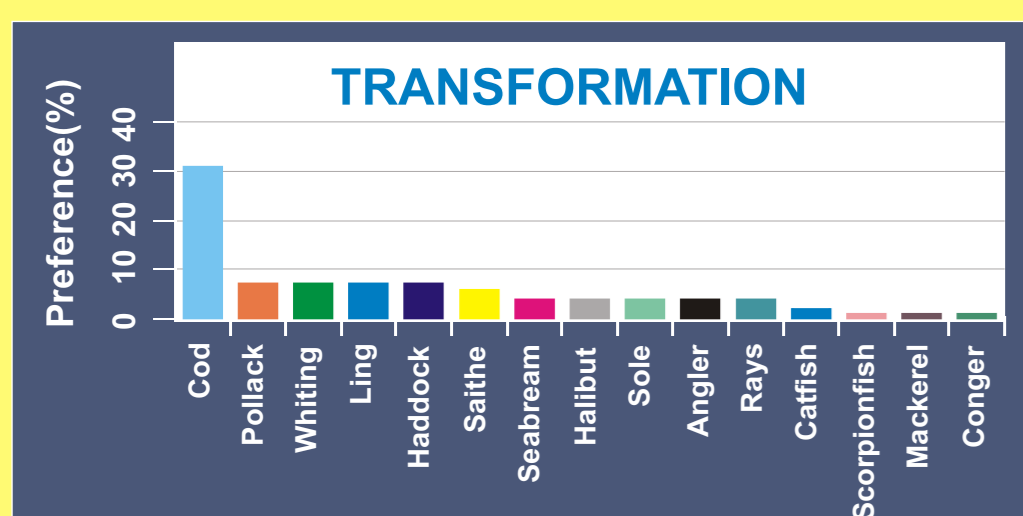
Because of its rapid growth, its good reputation and the promising aquaculture experiments conducted in Norway and Scotland, cod is considered as a good candidate for cold water aquaculture.

The aim of this paper is to present the work carried out in France since 1999:

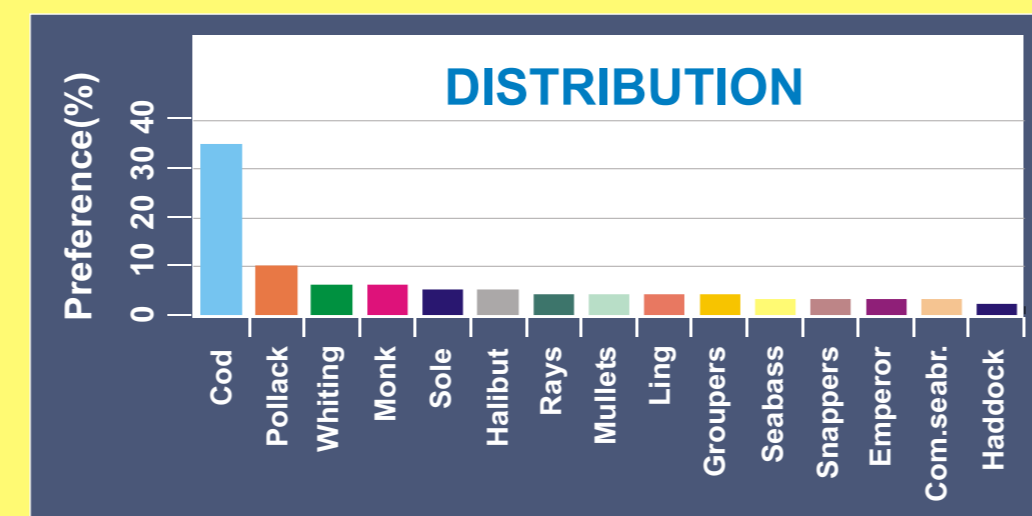
the selection of cod as a promising candidate for aquaculture and the assessment of its rearing performances on the Northern coasts of France.

## Selection of new candidates for aquaculture

From inquiries conducted by Ifremer in 1996 and 1997, cod was selected by the main actors of the French transformation and distribution channels as the most promising species for both activities.



Inquiry conducted with 13 companies among the most important in France.



Inquiry conducted with 11 companies representing 80% of the national turnover.

Using a sustainable selection of “new fish species” (3 step procedure, 32 criteria considering biological, fisheries and economic aspects) cod was elected as the top candidate among 20 000 fish species, for aquaculture in the Atlantic, Channel and North Sea coastal areas of France (Quéméner *et al.*, 2002).

## Catching breeders

### Channel Ground Fish Survey



### International Bottom Trawl Survey



More than 350 wild breeders were caught during fishing campaigns.

Fish caught at depths from 20 to 50 m: air overpressure was depressed by pricking the swimbladder.

Cods were maintained in quarantine before being admitted to broodstocks.

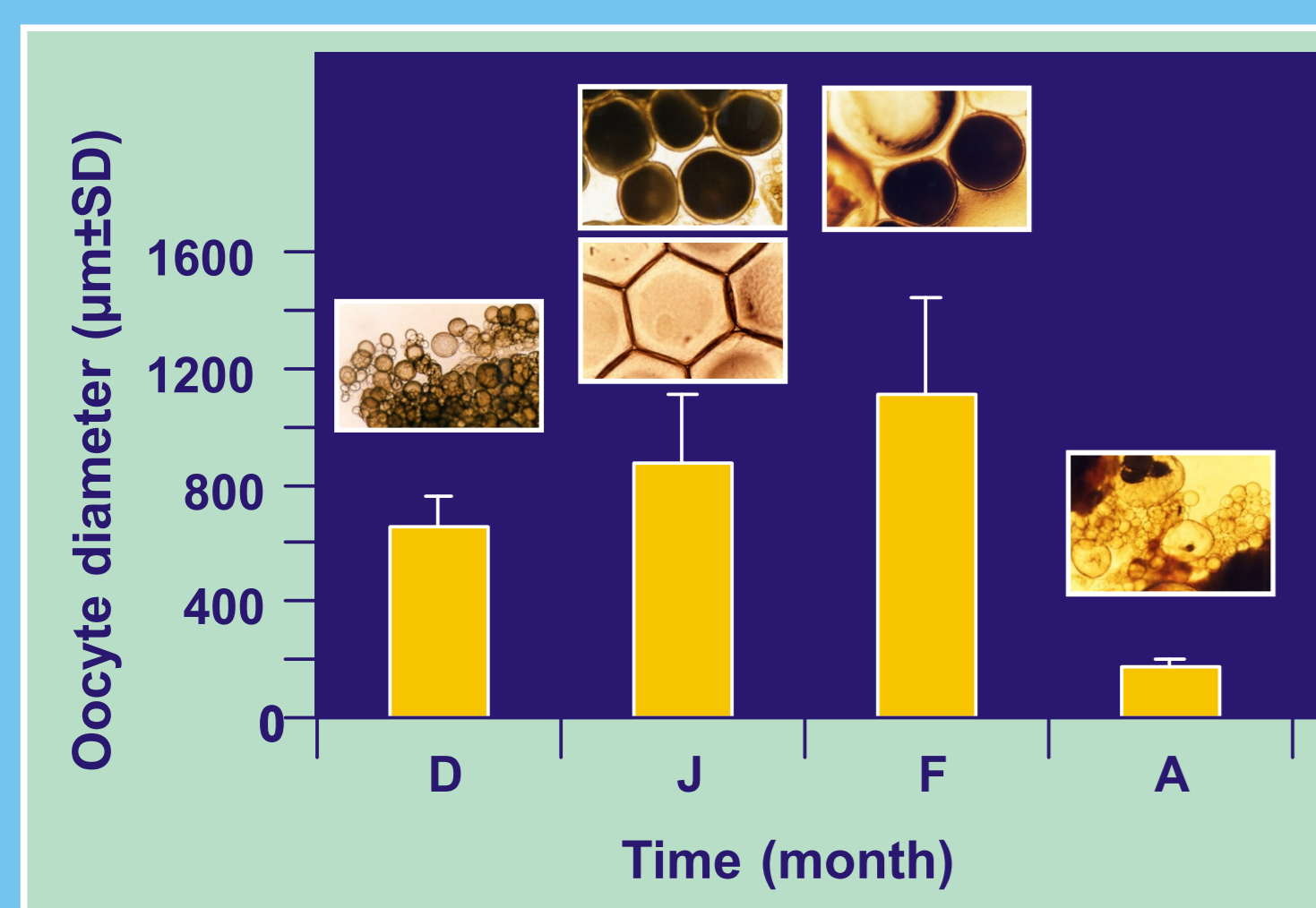
Survival ranged from 10 to 50%.

## Reproduction



Tank: outdoor 15 m<sup>3</sup>  
Food: sardines, shrimps, squids  
Water temperature :

- Annual: 8-14°C
- Spawning period: 7-9°C



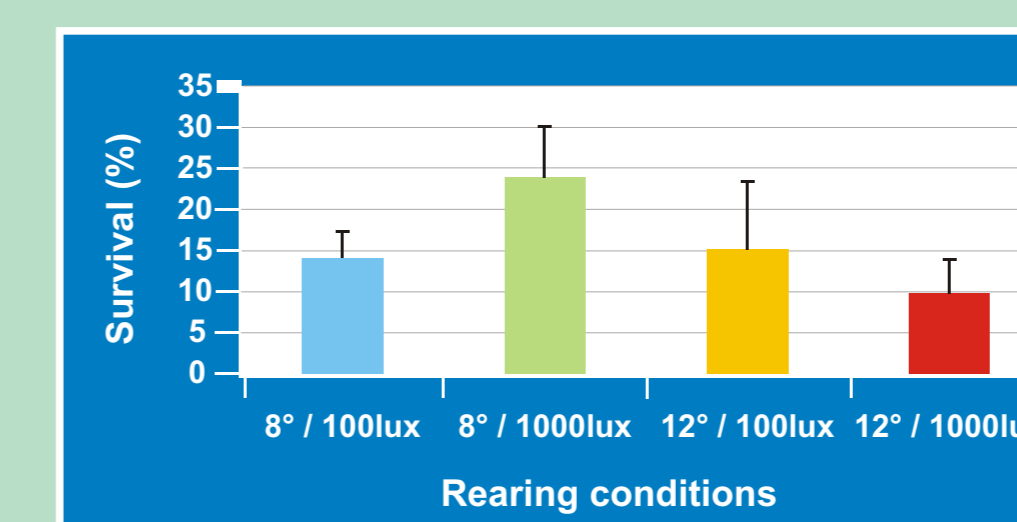
Changes with time of oocyte diameter

Year	Spawning period	Total eggs/kg of female	Fertilization rate (% ± SD)
2001	Natural	187 000	51.8 ± 35.8
2001	Natural	413 000	44.1 ± 29.5
2001	Advanced	-	72.9 ± 32.7
2002	Natural	766 000	75.5 ± 27.9

Eggs production features of cod broodstocks

## Larval rearing

In **IFREMER**:  
no significant effect of temperature and light conditions.



Effect of water temperature and light intensity on larval survival at day 40.



In **AQUASTREAM** (private hatchery, Lorient, France):  
8 batches of eggs collected in Ifremer facilities were reared:

- eggs:

after 11 days at 8°C, high hatching rate: 67.8 ± 25.2%.

- larvae :

4m<sup>3</sup> tanks, temperature: 8-13°C, rotifers, enriched artemia and micropellets: from day 40, high mortalities were observed daily resulting in a low survival rate.



Quéméner L. *et al.*, 2002. *Aquat. Living Resour.*, 15(5), in press.

Photos: Lesbats S., Dugorney O., Barbaroux O. and Omnes M.H.

- These preliminary biological results could support the candidature of cod for aquaculture development on the Northern coasts of France.

- Rearing conditions must be improved and especially during the larval phase.

- This area is south of the cod's breeding ground, suggesting a high growth rate of juveniles in captivity (local temperature of water : 8-18°C).



