

POLLACK (*Pollachius Pollachius*) : ACQUISITION OF BIOLOGIC DATA



IN A BREEDING PURPOSE

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The fishing of pollack in Europe is situated between 10 and 15 000 tons a year.

Since 1980, a decrease of landings has been observed. In 1996 France was the first producer and landing still reaching 3350 tons in 1998.

However, the demand remaining strong, aquaculture could be a solution to satisfy the deficit between the production and the domestic demand.

Because of the presence of pollack from the North of Norway to the North of Portugal, but also of its good flesh quality, pollack could be a good candidate for the fish farming on the French Atlantic coast. Research have been initiated in this species in the middle of the 90's.

Reproduction

Spawning was obtained from wild breeders acclimatised to inland facilities.

First maturation was obtained in 2 year old males (0.7 kg).

Maintained in 15 m³ tank, breeders spawn spontaneously.

Spawn occurs from the end of January to the end of April. The fertility is high (600 000 ova.kg⁻¹).

Pollack is a batch spawner (mean of 5 spawns.female⁻¹).



Factor	Control	LHRH	Implant	Proba
Number of females	3	2	2	
Oocytes diameter (µm)*	726±30	700±37	685±37	0.68
Nber of spawn	22.3±3.1	18.0±3.8	19.0±3.8	0.66
Nber of egg.kg ⁻¹	407000±59000	426000±71000	442000±71000	0.93
Fertilization rate (%)	27.1±0.0 ^b	44.1±0.0 ^b	47.3±0.0 ^c	0.000 Imp>LHRH>Cont
Viable egg.kg ⁻¹	115000±24000	184000±29000	210000±29000	0.13
Inter spawn period (day)	2.2±0.4	2.4±0.5	2.4±0.5	0.93
Egg diameter (µm)	1199±6	1209±13	1198±8	0.73
Hatching rate (%)	28.5±3.3	46.5±5.5	41.6±3.8	0.006 Cont<Impl=LHRH
Malformation rate (%)	17.7±1.4	20.2±2.3	17.3±1.6	0.53

*: at the start of trial, at the treatment

Egg production of pollack injected or implanted with GnRHs are not significantly different. However, hatching rate recorded in injected (46.5%± 5.5) or implanted (41.6% ± 3.8) breeders are significantly higher than those observed in control animals (28.5% ± 3.3).

Throughout the spawning period there is a decrease of the egg diameter of fishes implanted (p<0.02, r2=0.27).

Larval rearing

An upward flow in the tank allows to obtain survival rate significantly superior than that obtained with a downward flow of the water (Fig.1).

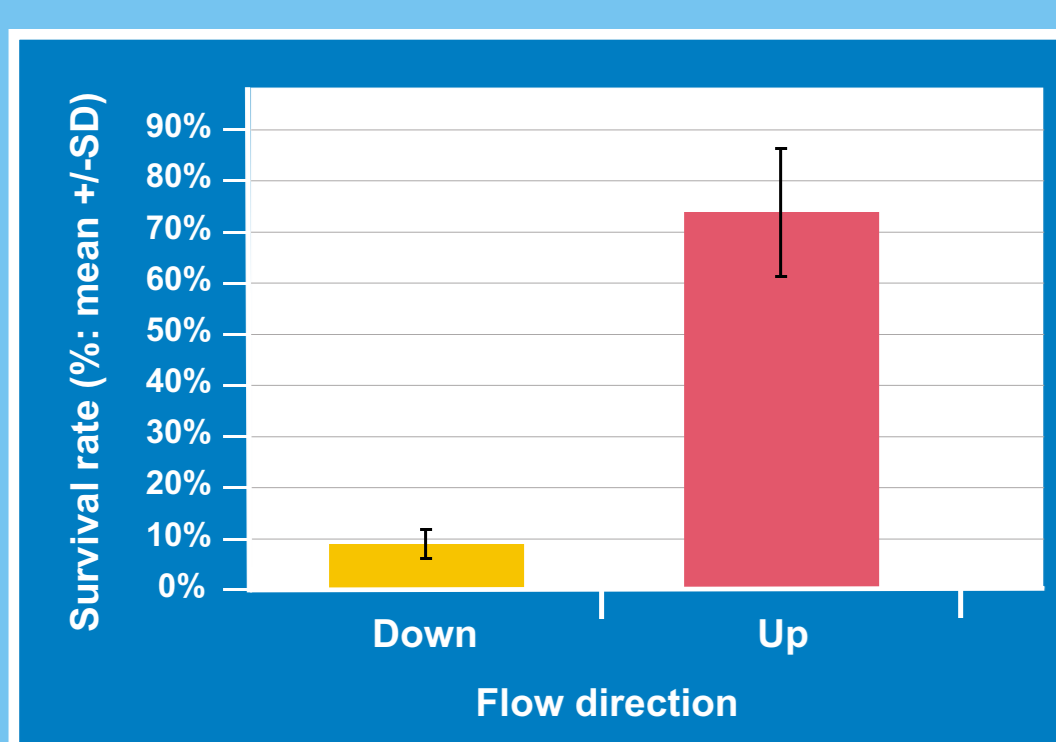


figure 1 : Performance of larval rearing at day 7 post hatching according to the direction of current (light intensity : 350 - 450 lux ; tank capacity : 150 liter; feeding with *B. Plicatilis*).

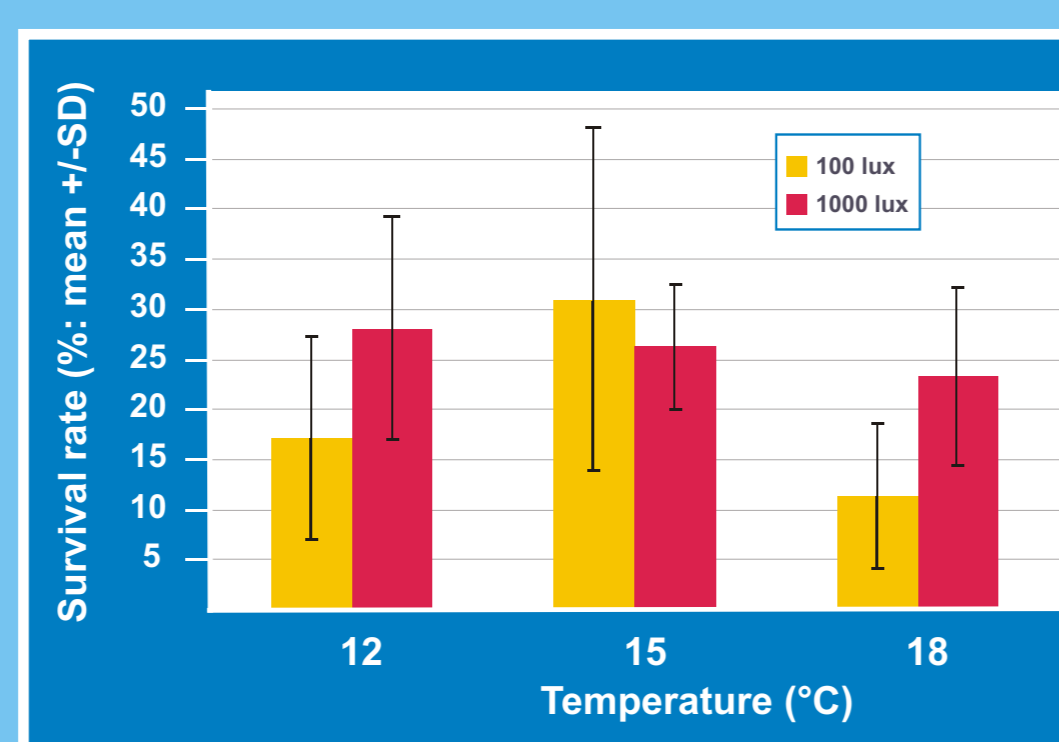


figure 2 : Performance of larval rearing at day 9 post hatching according to light intensity and temperature (tank capacity : 150 liter; water flow : 1liter.mn-1; feeding with *B. Plicatilis*).

Between 100 and 1000 lux, there is no significant influences of the light intensity on survival. In the same way there is no significant difference of survival at 12°C, 15°C or 18°C ; respectively 28% ± 0.11, 26.3% ± 0.06 and 23.3% ± 0.9 for a light intensity of 1000 lux (Fig.2).

Growing

A growth model was established till puberty : $W_f = [(W_i + 0.33) \cdot (e^{0.1606(tm-22)} - e^{-0.1823(tm-22)}) \cdot d]^{1/0.33}$

W_f = final weight, W_i = initial weight, tm = mean temperature for the period and d = duration of the period.

The highest specific growth rate are obtained for temperatures close to 16°C. 90% of maximal growth are obtained between 12 and 18°C (Fig3). Fishes were fed with dry food containing 50 % of proteins and 12 % of lipids. The conversion rate was comprised between 1 and 1.2.

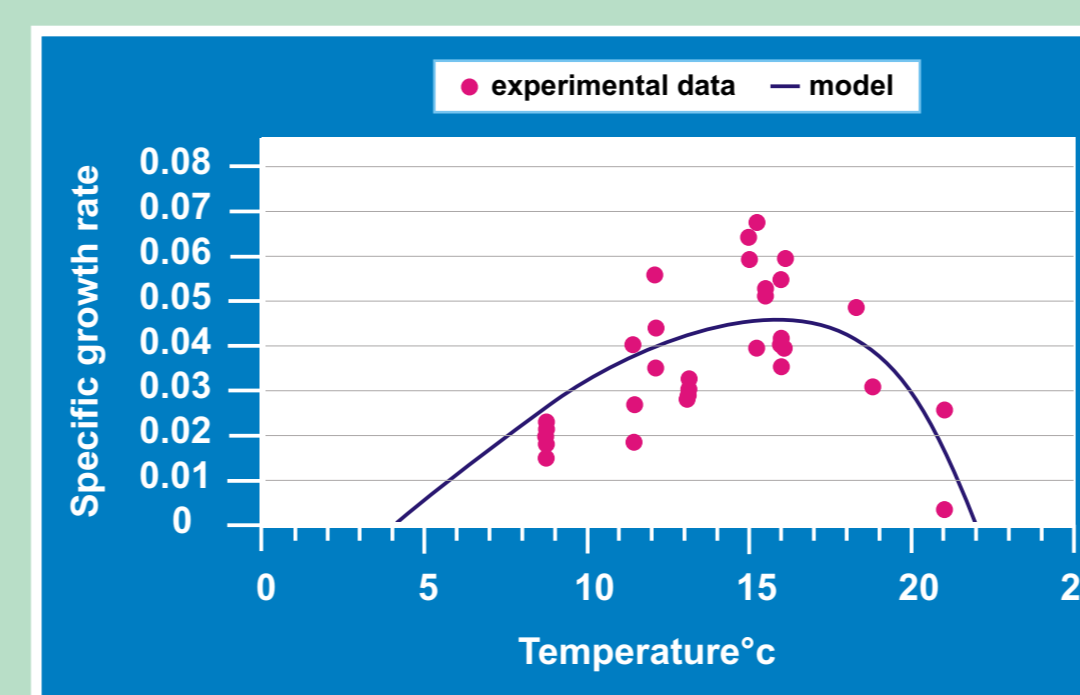


figure 3 : Adjustment of Muller-Feuga growth model to the breeding data of Pollack.

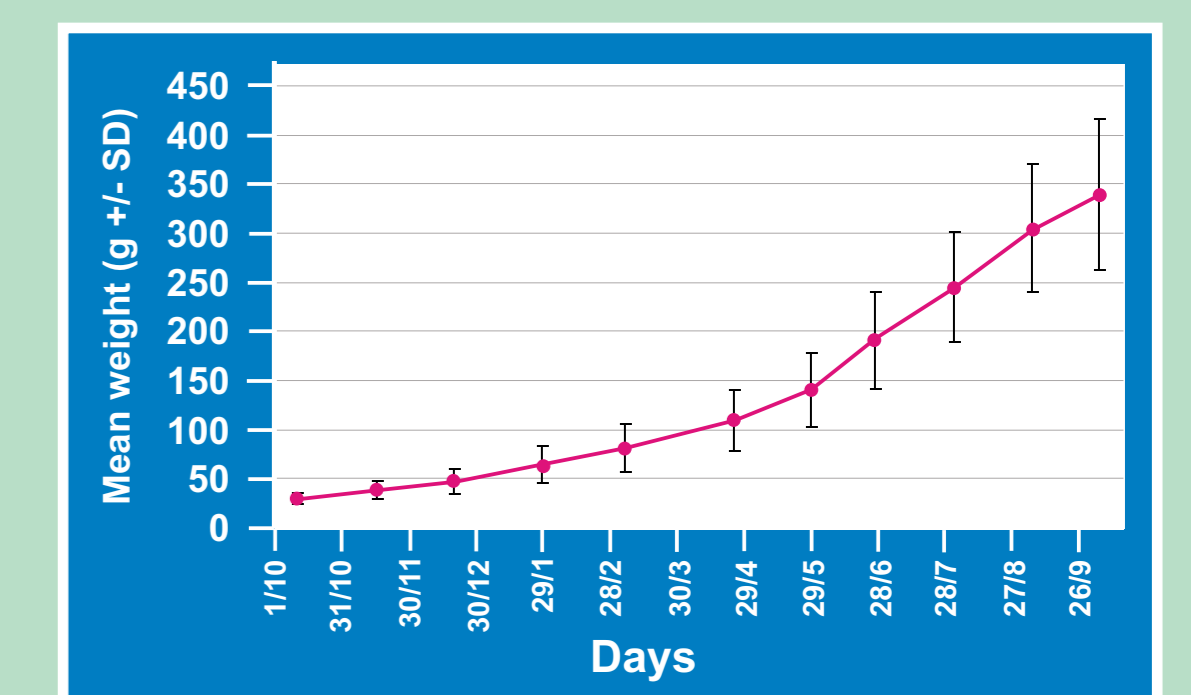


figure 4 : Growth performance obtained in Brittany thermal conditions in 2001 - 2002 (Initial number of fish : 95 ; tank volume : 4 m³ ; feeding : dry pellets).

A high survival (95%) has been recorded in juveniles during the ongrowing phase. Animals produced in our hatchery facilities and maintained in tank at water temperature varying between 8.5 and 18.5 °C, weighted 340g in 18 months (Fig4).

These biological results can sustain pollack aquaculture in France. The intermediate market price requires reduced production costs, which can be obtain by an improvement of survival rates during incubation and larval rearing phases and by a better knowledge of the nutritional requirements of the breeders and juveniles.

