ANALYSIS OF TURBOT (*Scophthalmus maximus R.*) BROODSTOCK PILOT SCALE PRODUCTION

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INTRODUCTION

Turbot rearing reaches the commercial scale. The techniques of shifting the environmental conditions allow a production of eggs all the year round (Devauchelle *et al.*, 1988). However, egg quality tends to be highly variable (Jones *et al.*, 1981; Mc Evoy, 1984; Devauchelle *et al.*, 1988). The improvement in egg quality and its consequences on the production of larvae by a strict management of spawners are examined, over two consecutive years (1989, 1990).

MATERIALS AND METHODS

Three broodstocks were held under natural or shifted maturation conditions ; spawning periods occured respectively in winter, summer and autumn.

Freeze branding with liquid nitrogen (23")

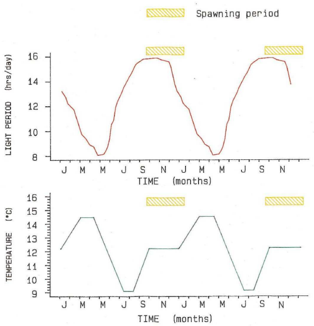
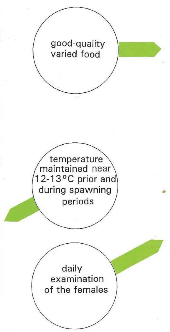


Fig. 1 - Light (a) and temperature (b) cycles applied during a shifted period: autumn spawning season.

management :



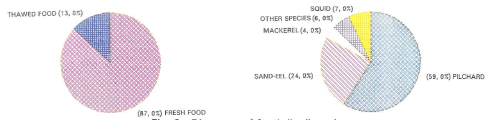
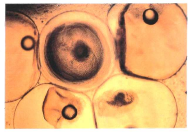


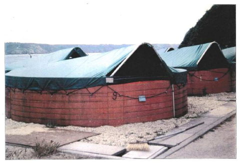
Fig. 3 - Diagrams of food distributed.

Ova collection

- quality and quantity assessement of eggs before fertilization



Poor quality eggs



Broodstock tanks (16 m³)

- mean stocking density 5-6 kg/m²
- 1/3 wild, 2/3 hatchery reared turbot
- female/male ratio: 0.80

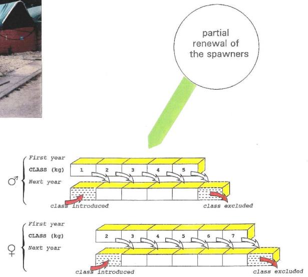


Fig. 2 - Diagram of partial renewal of spawners, males or females (two fishes per class).

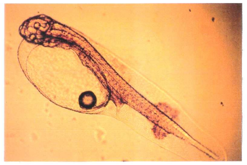
artificial fertilization

ratio 100 : 0.5 : 50 (ova, sperm, seawater)

4 cell-stage (4 h after fertilization)

Sperm collection (in 1 ml syringue)

Incubation system (Devauchelle *et al*, 1986)



Newly hatched turbot larva (lenght 2-3 mm)

RESULTS

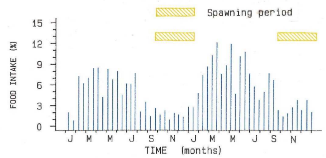


Fig. 4 - Fortnightly food consumption over one year (weight food/biomass)

- annual fortnighly food intake: 6 % (weight food/biomass)
- mortality due to hand-stripping: 10 %
- spawns were obtained from 60 % of the females (mean value 7 spawns per female per season)
- highest egg production in weight classes from 3 to 5 kg
- mean value of viability rate: 77 %
- fertilization rate: 75 %

- average production of good quality fertilized eggs: 180.000 eggs per kg per female
- hatching percentages between 33 % and 43 %
- larval malformation rate between 5 and 15 %
- viable larva production: 66.000 per kg of female

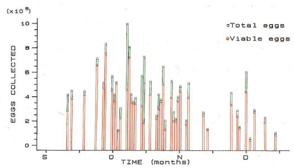


Fig. 5 - Occurence of spawns during autumn spawning season (1990).

TANKS	NUMBER OF SPAWNS	SPAWNING FEMALES	EGG PRODUCTION	MEAN EGG PRODUCTION PER KG FEM	EGG VIABILITY (%)	LARVA PRODUCTION	MEAN LARVA PRODUCTION PER KG FEM
1989							
A	42	9/12	7 031 500	270 293	79	1 915 920	46 063
B	44	5/10	6 154 580	317 841	75	1 687 840	81 690
C	49	6/12	7 388 845	305 273	68	1 715 033	70 697
ANNUAL PRODUCTION			20 574 925			5 318 793	
1990							
A	32	4/12	6 061 502	286 728	87	1 444 961	72 440
B	26	7/10	4 368 822	102 415	69	1 165 538	31 210
C	71	8/11	17 394 210	367 311	80	4 124 293	94 037
ANNUAL PRODUCTION			27 824 534			6 734 792	
MEAN VALUES	**44**	**60 %**	**8 000 000**	**280 000**	**77**	**2 000 000**	**66 000**

Table 1 : Summary of egg and larva production data for the broodstocks studied in 1989 and 1990 (A, C shifted broodstocks, B natural broodstock).

DISCUSSION - CONCLUSION

A large larva production per year was obtained from the three broodstocks. This significant progress was mainly due to the increase of the **viability rate of the eggs** (77 %).

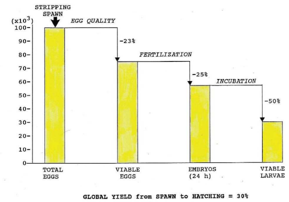


Fig. 6 - Diagram of distribution of losses on a spawn of 100.000 eggs (autumn spawning period).

Our pilot scale conditions yielded 6 millions larvae over almost ten months of the year. However, only 1/3 collected eggs developed up to larvae. Losses were mainly attributed to incubation and fertilization conditions which must be improved in further studies.

High egg quality is obtained by strict application of the method described above. But occurence of ovulation is not controlled in this process. Further progress in hatchery management should be expected from development of hormonal stimulation techniques.

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