EGG PRODUCTION IN RELATION

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Egg production can be affected both by the conditions under which the broodstocks are maintained, and by their management.

Previous analyses of turbot broodstock management (Omnes, 1991), has given potential egg and larva production from natural or shifted stocks during the spawning season, by strict management of the spawners.

Data are summarised in this table :

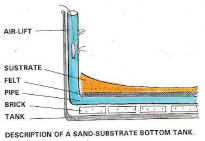
NUMBER OF SPAWNS	SPAWNING FEMALES	EGG PRODUCTION	EGG VIABILITY	LARVA PRODUCTION
44	60 %	8 000 000	77 %	2 000 000
NUMBER OF SPAWNS PER FEMALE		VIABLE EGG PRODUCTION PER KG FEM		VIABLE LARVA PRODUCTION PER KG FEM
7		280 000		66 000

Summary of mean values of egg and larva production from natural or shifted broodstock during a single spawning season (1989-1990).

Several aspects of broodstock management which are of importance in determining the number of eggs produced were examinated. Fecundity was analysed for individual females during 2, 3 or 4 consecutive breeding seasons.

RESULTS

SUBSTRATE



DESCRIPTION OF A SAND-SUBSTRATE BOTTOM TANK.

Quality and number of eggs released per female were compared in broodstocks kept on sand-substrate bottom or without substrate.
No significant difference was obtained . Nevertheless, spawns were delaid for a month, and increasing injuries were observed for fishes hold without substrate. So, spawners should be maintained in substrate tanks.

FOOD

Food consumption (% weight food /biomasse) decreased significantly ($P<0.025$), during spawning season, from 3.8% to 0.8% . Through this period female broodstock decreased in weight with high variability (mean value 0.700 kg +/- 0.4 per female).

THE TURBOT (*Scophtha*lmus maximus) IN RELATION TO BROODSTOCK MANAGEMENT

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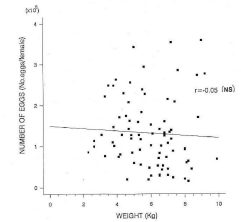
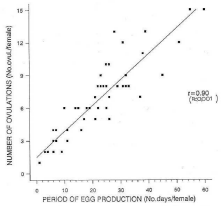
WEIGHT OF FEMALES



REGRESSION OF NUMBER OF EGGS PER FEMALE ON WEIGHT OF FEMALE

DURATION OF SPAWNING



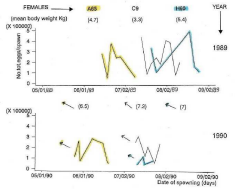
REGRESSION OF NUMBER OF EGGS PER FEMALES ON DURATION OF OVULATION.

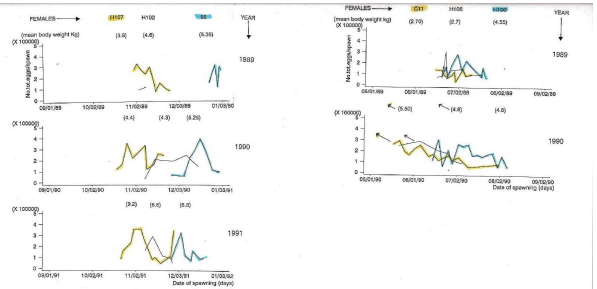
No correlation was found:
-between weight of spawners and fecundity. Fecundity per unit of body weight seems not be an appropriate index to compare productivity of the females.
-between size of the female and the occurence of spawns in the season, compared to the seabass (Devauchelle, 1980), where the biggest one are the earliest spawners in the season.

High correlation existed between duration of the spawning period and the number of spawns. These results were consistent with those found by Howell, 1989.

TIMING OF OVULATION

IN NATURAL OR SHIFTED CONDITIONS





Through consecutive seasons, spawning were spread over a three-month period. Individual periods of release for most of the females occured at the same time. For the other females, the earliness of spawning season seemed depended on the growth rate of the female between two years (arrows).

EGG PRODUCTION

YEARS / FEMALES	1988	1989	1990	1991
66 Total No. eggs	5930009	15000	1588400	1262200
viability (%)	94	81	84	88
No. spawns	2	5	8	9
665 Total No eggs	841100	1186100	1270000	913600
viab. (%)	66	75	85	63
No. sp.	4	8	5	6
H102 Total No. eggs		196300	1275600	1011280
viab. (%)		87	83	89
No. sp.		2	7	6
H107 Total No. eggs		2478300	2296400	2153690
viab. (%)		62	85	09
No. sp.		10	10	11
A4 Total No. eggs		1828840	3535800	1142900
viab. (%)		81	88	45
No. sp.		15	13	4
H2 Total No. eggs		1621900	799200	1021960
viab. (%)		77	76	83
No. sp.		7	6	9
H108 Total No. egg		1277500	1328500	
viab. (%)		89	82	
No. sp.		9	6	

As females were stripped fivefold a week (Fauvel, 1992), mean value of viability ratesof the spawns were high.
Females monitoring during several years showed:
- constant high value of viability rate , which decreased with the ageing of the female, if viability rate was high for the first breeding season,
- variable viability rate, if it was a lower one.

CONCLUSION

Egg production of the oldest females turbot was uncertain and these females were the most vulnerable (10% mortality). So, classes in the broodstocks were increased with younger fishes or "middle-weight" fishes (from 2 to 4 females per 1 kg classes from 2 Kg to 5 Kg.
More attention :
- to the growth rate - prior the spawning season,
- between two consecutive years
- to the egg viability rate of the first spawning season (by limiting overippening),
should allow to predict the time and the potential of egg production in next breeding seasons, and should help to monitor groups of similar females.

REFERENCES

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