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Influence of water quality on the growth rate for *Sparus aurata* in finfish farming in Chlef coast, Algeria

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1. Introduction

Gilthead seabream *Sparus aurata* is an economically significant species with a high market value, which has increased production. It is one of the most widely farmed fish in the Mediterranean Sea, particularly in floating cages. In finfish farming, variation of water temperature affects the vital functions of fish.

The aim of this study was to evaluate the growth rate of *S.aurata* at different variations of water temperature measured, using R for Aqua Culture (RAC) package in the farm El Mokretar Aqua, Chlef coast (Algeria).

2. Material and methods

2.1. Area study

El Mokretar Aqua is located 15 km west of the Beni Haoua fishing shelter in the Bay of Souahlia, Chlef coast, western Algerian coast (Fig.1). Its total production capacity for *S. aurata* and *Dicentrachus labrax* has increased from 700 tons in 2017 with an area of 8 hectares to around 1300 tons in 180 hectares in 2023. It has 40 floating cages distributed across fives grid cages (A, B, C, D and E) .

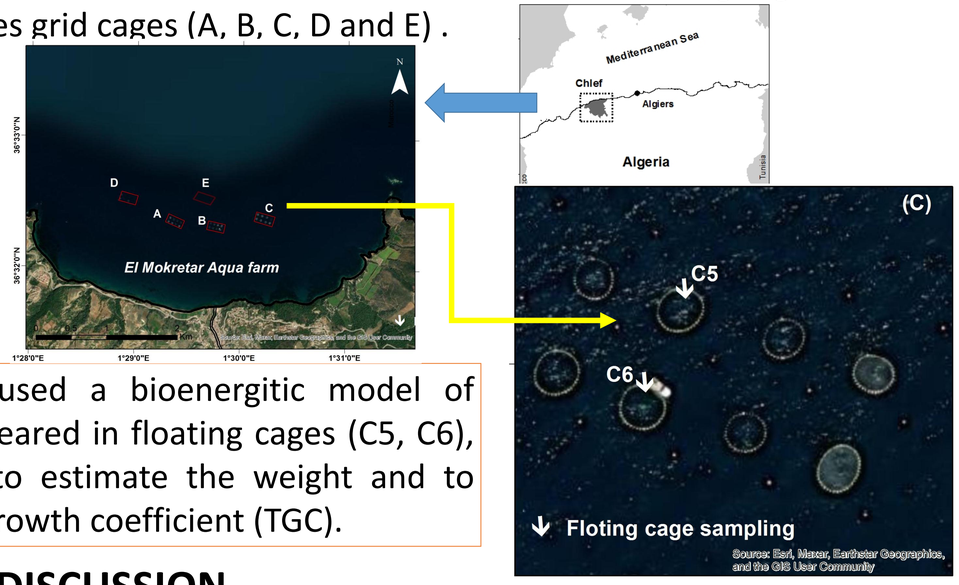

Fig.1: Map location of El Mokretar Aqua fish farm

2.2. Sampling

In this study, we used a bioenergitic model of gilthead Seabream reared in floating cages (C5, C6), with RAC package to estimate the weight and to increasing thermal growth coefficient (TGC).

3. RESULTS AND DISCUSSION

At El Mokretar Aqua fish farm, the water temperature ranges from a high of 27°C in July and August to a low of 15°C in January.

The bioenergetic model predicts a significant increase in *S. aurata* weight from May 2021 to March 2022. Weight increased from 6 g to approximately 400 g in C5 versus 300 g in C6 (Fig.2).

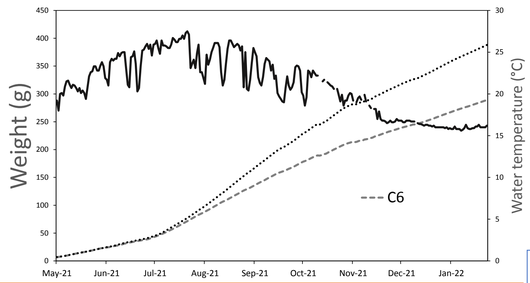

Fig.2: weight variation of *Sparus aurata* reared depending on the water temperature in the floating cages (C5, C6)

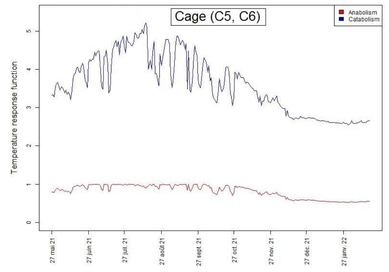

Fig. 3: Temperature response function for metabolism in both C5 and C6 using the individual model for *S.aurata*

The water temperature has the same effect on the metabolic process in C5 and C6 (Fig.3), and it is much more pronounced in anabolism compared to catabolism Because of increased food consumption and oxygen demand.

Table 1 describes the growth performance indicators of *S. aurata*. The final average weight of *S. aurata* at the end of the rearing cycle is 233.95 ±55.53 g for C5 and 221.07 ±54.43 g for C6. C5 has a significantly higher final average weight than C6 (Student's test, p-value<0.001, 95% confidence interval). The difference in TGC between C5 and C6 is not important; C5 has a value of 2.01%. The high value of the thermal unit growth coefficient (TGC) in El Mokretar Aqua fish farm is due to the high temperatures recorded in the Bay of Souahlia, with the highest being around 26 °C in August [1].

Table 1. Growth performance of S. aurata in floating cages at El Mokretar Aqua fish farm

	Cage (C5)	Cage (C6)
Mean initial weight (Wi) (g)	6.86	6.56
Mean final weight (Wf) (g)	234.2*	234.2*
Weight gain (g)	227.08	214.51
TGC (%)	**2.01**	**1.97**

* Indicates the significant difference in the final average weight for C5 and C6; these averages are significantly different according to the student test (p-value<0.05)

4.CONCLUSION

The RAC package's bioenergetic model is applied to gilthead Seabream for growth characterization and quantification of several metabolic processes to water temperature.

5. REFERENCES

Laama, C., Hassani A., Bachari NEI. 2010, Site selection for finfish cage farming using spatial multi-criteria evaluation and their validation at field in the Bay of Souahlia (Algeria). *Aquaculture international, 28*, 2419–2436. https://doi.org/10.1007/S10499-020-00598-X.