FIRST RESULTS ON ONGROWING OF HATCHERY REARED ATLANTIC BLUEFIN TUNA, *Thunnus thynnus,* KEPT IN SEA CAGES

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Introduction

Bluefin tuna fattening began in Spain and Europe in the nineties. But this activity depends on wild tuna capture, and in order to develop integral culture of bluefin tuna, the Ricardo Fuentes e Hijos Company and the Spanish Institute of Oceanography (IEO) started to carry out several aquaculture projects. As a result of these projects, more than 7000 bluefin tuna fingerlings born in captivity have been moved to the cages in 2012 and 2013. In this study, general cage culture methodology and growth results with a tuna batch born in 2012 June are shown. The work shows a first approach to growth of Atlantic bluefin tuna rearing in captivity in their first year of life.

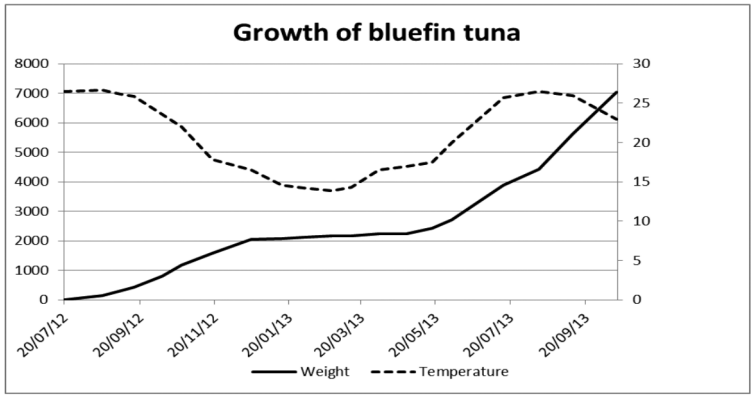
Materials and methods

Bluefin tuna used in this study, came from a broodstock kept in Caladeros del Mediterráneo facilities from 2007, fed on raw fish (sardine, mackerel and herring). During spawning season, a system of PVC curtains designed to collect eggs was placed covering the whole perimeter of the cage (Selfdott, 2012). Fertilized eggs were collected on 8th June 2012 at a water temperature of 22ºC, and the eggs were moved to the IEO facilities in Mazarrón (SE Spain). Larval rearing was performed in a 40m^3 circular tank. Feeding schedule was: enriched rotifer (*Brachionus plicatilis), Artemia* and yolk sac larvae of sea bream (*Sparus aurata*). Bluefin tuna were weaned on minced fish and when tuna fingerlings weighted between 3-4gr (38dph) and their total length was 6-8cm, they were transferred to floating cages in the sea. A total of 1400 bluefin tuna fingerlings were stocked in net cages of 25 meters diameter and 10-12 meters depth.

Initial feeding consisted on sand eel (*Gymnammodytes cicerellus*) which were later replaced by sardine (*Sardina pilchardus),* mackerel *(Scomber scombrus),* and anchovy *(Engraulis encrasicolus*). The tunas were fed to satiety several times per day: at the beginning raw fish was shared in eight times, and frequency was decreasing while they grew. During the winter months, their feed intake was quite low, so the number of feeding times was reduced to once per day. To evaluate the growth we have used data recorded of dead fish collected in the cages during all the year round.

Results

Mortality during ongrowing in the cages was high, mainly due to the damages that tunas suffered when they collided against the net. These collisions were caused by the biological characteristics of the species, which react to any stimulus with a very vigorous and fast swimming. Mortality rate during the first month was high (60%), and went out being tidy during the first three months. In this moment tunas weighted one kg and mortality was close to 75%. From this moment, and in spite a problem with the net which led to a pick of mortality one month later, survival got stable and it was about 15% after one year of ongrowing.



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Information about tuna growth coming from artificial rearing is scarce. Results obtained in these early growth experiences of Atlantic bluefin evidence that their growth speed is high and it is directly related to the water temperature, as it happens with the Pacific bluefin tuna bred in captivity (Sawada et al., 2013). The growth was very fast, mainly during the first months of their life. During this first stage in the sea net cages the tuna grew from 5 to over 500 grams in just two months, and their specific growth rate (SGR) was 8.09.

In spite of growth decreased with the size, the tuna fingerlings were showing a very fast growth during the first five months in the cages, being able to reach 2kg body weight when they were six months old. Following figure shows a graph with the growth of the tunas and the temperature during whole experimental period.

During the first five months, SGR was 3.9. From this moment the growth became practically invaluable during the winter months, and it started to be quickened again from April, when temperatures rose above 16ºC. However a temperature above 18ºC was necessary to increase SGR above 0.5

After the end of the second summer in the sea, when they were sixteen months old, they reached 7kg of average body weight.
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Discussion and conclusion

These results suggest that tuna growth is closely related to water temperature. During the summer months, the growth was quite high, but during the winter months their growth stopped as well as their feeding activity. The tunas started to increase their feed intake and to grow when temperature increased to 16ºC, but it was necessary for their good growth that temperature reached 18ºC.

During this experiment raw fish had been used to feed bluefin tuna, but it is necessary to develop artificial diets for growing them. A tasteful and balanced artificial diet could improve feed conversion rates, but more than that would reduce dependence on fisheries and save costs and could prevent diseases.

References

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