

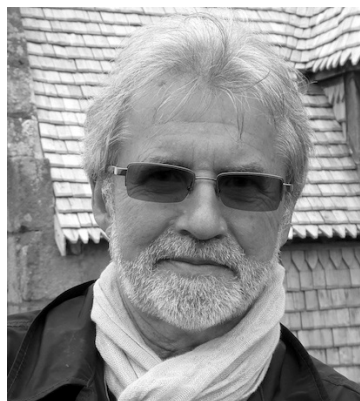
Mediterranean Aquaculture 2020

**Rhodes, Greece
October 18-21
2011**

Organised by the European
Aquaculture Society
Hosted by The Federation of Greek
Maricultures and the Hellenic
Centre for Marine Research

WELCOME

Welcome to Rhodes and to Aquaculture Europe 2011



Thank you for joining us at Aquaculture Europe 2011! It's the first time that our annual Aquaculture Europe has been held in Greece and provides a great opportunity to come to the leading Mediterranean producing country, especially as we are also so close to one of the most important production areas in Turkey.

Although Greece has a lower per capita consumption of seafood products than Portugal, Spain, France or Italy, the percentage of this consumption represented by sea bass and sea bream is the highest in the region (10.4%). The reliance on these two key species has led to market challenges in recent years and the opportunity for Mediterranean aquaculture is to expand consumption (of bass and bream) in the high fish consumption countries and to diversify the products for the 'more demanding' markets of northern Europe. With good spatial planning, increased production of other fish (marine and freshwater) and shellfish species and especially in the southern and eastern Mediterranean over the next 10 years may also be expected.

Greece is the land of the twelve Olympian Gods, the cradle of Western civilization, one of the birthplaces of sciences, philosophy, history and drama. You may know that the locations for our Aquaculture Europe events are selected by the EAS Board of Directors from proposals that we receive from EAS members in any one country. The proposal to hold this event in Greece was an excellent one and I would like to thank the Steering Committee and our hosts HCMR for the great job that they have done to make this meeting happen.

During the following days you will hear plenary presentations of some of the key issues affecting the sector as we move towards "**Mediterranean Aquaculture 2020**" – and these will be supported by a whole host of parallel sessions under the four main programme pillars of Innovation in Aquaculture; Aquaculture and Society; Aquaculture Systems and Benchmarking EU research. Our sincere thanks go to our Program co-chairs Sachi Kaushik and Constantinos Mylonas for all their hard work on this attractive program. The AE2011 trade exhibition, the Farmers' day, student sessions, the EAS General Assembly and other events will complete the AE2011 event.

Attendance this year is not only numerous, but also very diverse with representatives of the industry, research, national or European decision makers, NGO's, consumer organisations and other stakeholders. This confirms once more, the role of a bridge offered by these EAS conferences between science, the production sector as well as the final users of aquaculture products. We have no less than 8 other workshops and project consortia that are using AE2011 as a hub for their meetings.

It's also good to see many members of EATIP (European Aquaculture Technology and Innovation Platform) and the FEAP (Federation of European Aquaculture Producers), who have held their "Presidents Meeting" here in Rhodes, just prior to AE2011.

Finally, and most importantly, we want to warmly thank our numerous sponsors without whom the realisation of this event would not have been possible.

This week will be very busy, but we encourage delegates to benefit from the many opportunities offered for networking during this conference and to enjoy the historic, cultural and culinary delicacies, offered by the charming island of Rhodes.

Yves Harache
EAS President 2010-2012 and Member of the AE2011 Steering Committee

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ABSTRACTS

AQUACULTURE OF ATLANTIC BLUEFIN TUNA (*Thunnus thynnus* L. 1758): INCREASING MORPHOLOGICAL KNOWLEDGE ON LARVAE AND JUVENILES

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Introduction

In the last decade, different European research Institutes and private operators have collaborated in order to close the biological cycle of Atlantic bluefin tuna (ABFT) in captivity. Since 2002, two National projects (MIPAF 6C82 and 6C138) allowed the creation of a ABFT broodstock in cage in Italy, in order i) to improve the knowledge on anatomy (Martini *et al.*, 2007), reproductive biology (Caprioli *et al.*, 2007a; 2007b), and stress response in captivity (Ferrante *et al.*, 2003; 2007; 2008), ii) to develop a method for estimating numbers and weights of tuna in cages by means of image analysis (Costa *et al.*, 2009), and iii) to train qualified personnel for tuna farming needs. In 2007, the regional research project ALLOTUNA was carried out in the same facility and the first ABFT induced spawning in captivity was recorded in 2008 (De Metrio *et al.*, 2010) at first, and then in 2009 and 2010. The availability of ABFT viable and fertilized eggs from induced spawning in captivity moved the research efforts to the next step (larval rearing), and the enlargement of knowledge on ABFT larvae and juveniles, which represents an essential step in order to establish a reliable production of farmed BFT fingerlings.

Material and Methods

The sampled larvae and juveniles outcome from eggs obtained from hormonal induction of broodstock (De Metrio *et al.*, 2010) maintained in a floating cage at the ABFT fattening facility Mare Nostro (Lat: 38°43'36.65" N; Lon: 16° 4'39.79" E, Calabria, Italy), during the spawning seasons 2008-2010. Eggs were split and larval rearing carried out in three different private Italian hatcheries: Panittica Pugliese (Apulia), Acquacoltura Lampedusa S.r.l (Sicily) and Civita Ittica S.r.l. (Latium). Some wild ABFT juveniles were also collected at maximum 4 miles far from the fattening facility.

The following analyses were performed on 1-90 days post hatch (dph) larvae and juveniles from controlled spawning: 1) morphometric analysis, in order to describe the ontogenetic changes in shape and the pattern of morphological integration between body regions (head, trunk and tail) during growth; 2) histological observations on *in toto* 1-48 dph fish, in order to investigate on larval and juveniles ontogenesis; 3) scanning electronic microscopy (SEM) observations, in order to investigate on ontogenesis and equipment of sense organs; 4) observations on *in toto* stained individuals, in order to investigate on skeleton ontogenesis and anomalies. Each analysis was performed also on available wild samples.

Results

Some ontogenetic pattern in reared individuals vary accordingly with age (dph) (i.e., number of mucous cells in esophagus; gastric gland number in the stomach), other with size (teeth eruption; number and developmental stage of taste buds), other from individual to individual, independently from age or size (skeletogenesis). The shape trajectory evidences saturation plateau starting from 35-38 dph, where shape remains quite constant. In some lot, the 100% of reared larvae show abortive swim bladder and a very high frequency of individuals with skeletal deformities was observed.

The main ontogenetic processes seem to be similar to those reported in literature on other tuna species.

(Continued on next page)

Hatchery	Panittica	Lampedusa	Civitavecchia	Wild ABFT
Year	2008, 2010	2010	2009	2010
# samples	1296	392	321	29
Age (dph)	1-90	1-18	2-17	0 ⁺

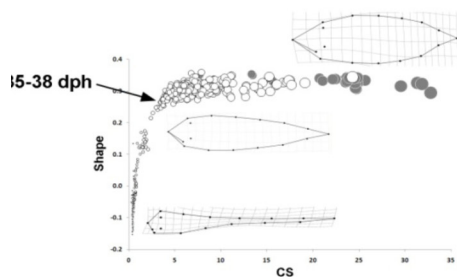


Fig. 1: Morphometric analysis - Shape trajectory of bluefin tuna. Black bubbles: Lampedusa samples; white bubbles Panittica samples; in Grey wild specimens. Bubbles size is a measure of standard length.

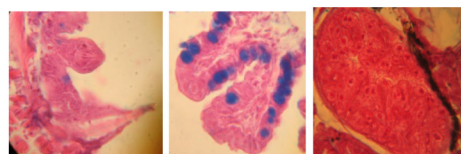


Fig. 2: Histological analysis - 40 dph reared ABFT larva. Micrograph on the left: taste bud and tooth on the buccal rim; central micrograph: mucous cell in esophagus plicae; micrograph on the right: ABFT tuna larva (15 DPH) - abortive swim bladder.

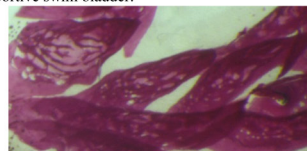


Fig. 3: Skeleton analysis - The photograph on the top show some defects in angular bone ossification in a reared juveniles (81 DPH). The two photographs below show different stage of skeleton ontogenesis in reared ABFT tuna.

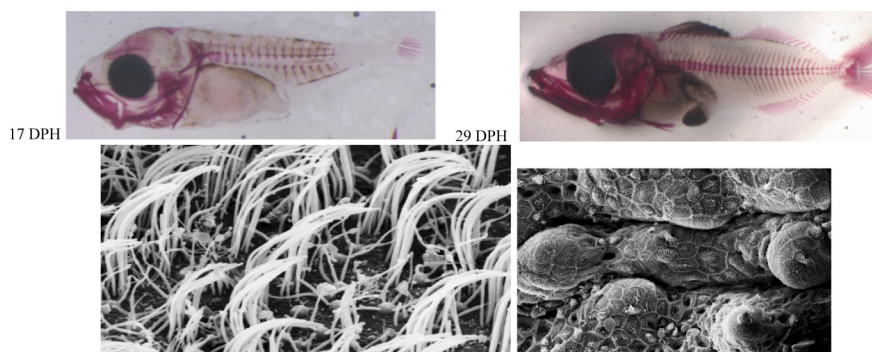


Fig. 4: SEM analysis: Micrograph on the left - differentiated olfactory epithelium in 19 DPH larva; micrograph on the right - taste buds and erupting teeth on ventral pharynx in a 22 DPH larva.

Acknowledgement: A special appreciation is given to Panittica that furnished the largest number and life span of reared samples.

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