

## ***The Fourth International Symposium on Cage Aquaculture in Asia***

The Fourth International Symposium on Cage Aquaculture in Asia (CAA4) was held as a Special Session of the triennial 10<sup>th</sup> Asian Fisheries and Aquaculture Forum (10AFAF) in the resort city of Yeosu, South Korea from the 30<sup>th</sup> April to 4<sup>th</sup> May 2013.



The combined 10AFAF and CAA4 attendance was some 680 participants - 230 overseas participants, with the rest from the host country. A total of 169 oral presentations and 155 poster presentations from 27 countries were presented during the conference.

The CAA4 session received some 23 presentations including 5 special lectures by invited speakers organized by FAO, UN. The symposium was arranged into two sub-sessions:

1. Marine and freshwater cage culture, seed production; and
2. Disease prevention and health management, pollution, ecotoxicology.

The highlight of CAA4 was the five special lectures by specialist speakers organized by Dr Matthias Halwart, FAO, UN. Details of the speakers and their topics are given below:

1. Dr Matthias Halwart, FAO, UN: ***Sustainable cage culture development - technical, environmental and policy considerations;***
2. Dr Jon Arne Grottum (Norwegian Seafood Federation): ***North Atlantic cage aquaculture;***
3. Dr Alessandro Ciattaglia (Bandinotti Group S.p.A.): ***Cage aquaculture in the Mediterranean;***
4. Dr Erick Hempel (The Nor-Fishing Foundation): ***Modern trends in offshore cage culture and its potential for Asia;*** and
5. Dr Lee Jung-Uie (NFRDI, Korea): ***Offshore aquaculture in Korea.***

Abstracts for three of the above papers are given in the Abstracts section.

Despite the political uncertainty in South Korea at the time, the CAA4 was successfully completed and continued the proud tradition of the CAA Symposium series by bringing together fisheries and aquaculture scientists from all over AP to review the current status of cage aquaculture in the AP region and other parts of the world, and to share their latest research results.

In conjunction with the Forum, a trade exhibition was held by the 10AFAF with 24 booths from 19 companies.

## ***Special Session Abstracts:***

### ***Paper 1:***

#### ***Sustainable cage culture development – technical, environmental and policy considerations.***

Matthias Halwart, Alessandro Lovatelli, Xiaowei Zhou, Weimin Miao and Jiansan Jia - FAO Rome.

The production of farmed aquatic organisms in cages is a relatively recent aquaculture innovation. This presentation examines various parameters for sustainable cage aquaculture development based on the understanding that there will be an increased global demand for fish supplies and that there are significant opportunities to increase the aquatic world food production in coastal and marine environments. The main challenges of cage aquaculture focusing on water issues, efficiencies of production, advanced technologies and required skills and knowledge, resource use for feeds and seeds including feed quality and good feeding practices as well as the choice of farmed species, ecosystem impacts, biosecurity and health considerations, financing and investment are explored. Concerted efforts in line with the ecosystem approach to aquaculture and conducive policy frameworks will be increasingly needed for achieving more enhanced and sustainable development of the cage culture sector.

### **Paper 2:**

#### **NORTH-ATLANTIC CAGE AQUACULTURE: Marine aquaculture of salmonids – an efficient and sustainable production of healthy food.**

Dr. Jon Arne Grøttum, Norway Seafood Federation.

At present about 50 % of the global aquaculture production is fish, of which only 10 % is produced in the marine environment. The main marine species is Atlantic salmon, which has increased its volume from zero to 2 000 million tons during the past 40 years out of which 1 500 million tons is produced in the North-Atlantic. The paper explores some of the knowledge and technology that has been developed to raise salmonids which is also a potential resource to boost the production of other marine fish species.

There is a growing demand from the public and the market for food that has been produced in an economic, social and environmental sustainable way. The production of salmon in the North - Atlantic is carried out in scarcely populated areas, and it is a challenge to ensure sufficient human resources with the right skills. Because of shortage of people and high labour cost it is necessary to develop efficient production methods and technologies. It is also crucial to optimize the production environment and the fish health to minimize the production loss. It is expected that an increased competition for resources used for feed production will result in higher feed costs which in turn will urge the need for alternative oil and protein sources in aquafeeds.

The paper discusses environmental impacts related to genetic effects on the wild salmon from escapees, and to transmission of parasites and viruses from bred to wild salmon. These impacts have been significantly reduced recently, even with an increased production, as a result of technological improvements and improved production methods. Because of the huge exchange of water, nutrient load is not considered as an issue today. However, in the future it may be relevant to exploit the possibilities that are offered by integrated multi-trophic aquaculture (IMTA) to reduce the impact and exploit the resources the nutrients represent.

To be able to provide for future development and sustainable growth for cage aquaculture in the North-Atlantic there must be a focus on technological development and on improved production

methods. With limited access to resources such as production areas, qualified personnel and feed raw materials it is necessary to make use of more exposed sites, efficient production using less labour and alternative nutrients. Aquaculture has become a knowledge-driven industry. Research and competence are among the most crucial driving criteria for success in order to meet the expectation for increased aquaculture food production.

Paper 3.

**CAGE AQUACULTURE IN THE MEDITERRANEAN: LATEST DEVELOPMENTS AND SELECTED TECHNICAL CONSIDERATIONS IN SEABASS AND SEABREAM FARMING.**

Alessandro Ciattaglia, Badinotti Group S.p.A. – Italy. Email -alessandro.ciattaglia@badinotti.com

The presentation explores cage culture farming practices with the most commonly farmed finfish species in the Mediterranean, i.e. the European seabass and the gilthead seabream. These have improved significantly over the past 15 years moving from predominantly land-based to off-the-coast operations. Several cage models have been used and tested over this period, but only a few have been successful and taken up in commercial operations.

At present, over 90 percent of the Mediterranean cage farms use high-density polyethylene (HDPE) cages. In 2008 the overall production output achieved maximum levels for both species, however in 2011, due to the economic crisis in some important farming areas in the Mediterranean, the production dropped by 23 and 7 percent for sea-bream and sea-bass, respectively. The decline in production was also due to other issues including conflicts among the marine resource users, lack of suitable farming sites, long and complicated administrative procedures for obtaining new farming licenses, pollution and fouling. Farmers have been forced to move further offshore where increased wave, current and wind action further compromised fish production. These constraints have certainly stimulated the development of improved technologies and farming equipment. For example, floating cages have doubled the volume in the past 10 years increasing their diameter from 16–20 m to 28–35 m to better withstand rougher weather conditions. Furthermore, the use of submersible cages increased by the mid-2000s as these structures are relatively easily maintained and are only 10–15 percent more expensive than the surface structure. These cages are mainly used offshore where the sea bottom exceeds 40 m in depth. Another important development has been the use of new plastic fibers in the productions of the nets. Larger cages have, in fact, made it necessary for the nets to be considerably lighter in order to allow handling.

The offshore environment and the larger cages certainly challenge the daily operations, however high-performance polyethylene (HPPE) fibers with their lighter weight and capacity to better resist fish biting have helped farmers to move further offshore. These nets are a third lighter than comparable nets manufactured in nylon. Furthermore, the twine has a reduced thickness that effectively helps the nets keep their shape/volume particularly when exposed to strong current forces. Furthermore, fouling is also improved due to the low surface area available for growth. These and other developments are highlighted in the presentation using Tunisia as a case study which currently operates 552 cages for a production capacity of over 18 000 tonnes.

**Below are snapshots of pictures taken during CAA4.**

**Dr Matthias Halwart, FAO, UN opening presentation**



**Some session participants**

**Registration desk**



**Symposium dinner**





Trade exhibition



