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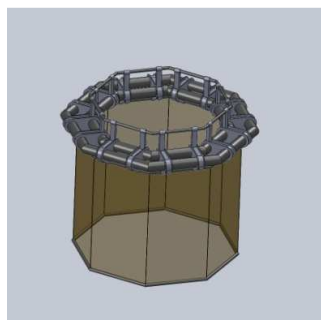
## **New Aquaculture Technology Deployed in Turkey to Combat Difficult Weather Conditions and Biofouling Issues**

This summer, the Dardanelles Strait became the first European site to install innovative copper alloy aquaculture cages. Designed to eliminate common fish farming problems, such as biofouling, damage from storms and strong undercurrents, the cages selected by the scientists at Canakkale Onsekiz Mart University and University of New Hampshire have been deployed in 50 metres of water, and are stocking 15,000 European sea bass (4.5 tonnes).

The project's designers have chosen to use copper alloy meshes for several reasons: they naturally inhibit biofouling and the growth of parasites and pathogens, improve water flow and circulation, and help maintain higher oxygen levels for healthier fish. In addition, copper alloy mesh cages maintain their shape against strong waves and currents.

This project studied the results of previous cases, such as the trial carried out at Van Diemen Aquaculture in Tasmania, Australia, where 30 newly-installed cages proved that copper alloy meshes improved the sanitary conditions, productivity and sustainability of operations for fish farmers. As a result, a new trial site to stock sea bass has been deployed in 50 metres of water in a two-by-two grid system in Turkey. This project will investigate the growth performance of the fish and the feed ratio. Besides, durability tests and monitoring of biofouling of the copper net will be performed.

### **The installation: two cages of 150 m<sup>3</sup> placed in a two-by-two grid system in 50 m depth water**



Copper cage model

- 1 cage made of silicon bronze alloy
- 1 cage made of copper zinc alloy
- Populated with 15.000 European Sea bass (*Dicentrarchus labrax*) obtained from a Turkish hatchery

Specifications

Approximately 12 storms occur in the strait each year, resulting in three to five metre-high waves. In addition, water flows in both directions along the strait, from the Sea of Marmara to the Aegean, forcing a surface current in one direction and an undercurrent in the other. The Dardanelles also suffer predator attacks from sharks and seals. A recent installation in Chile, where 60 copper alloy cages were installed for the salmon industry, demonstrated the copper alloy mesh can resist predators and prevent the escape of fish.

The Strait's tough weather conditions required a durable material. Copper alloy meshes resist corrosion and last for five years or more, compared to traditional solutions that only last a few months before cleaning is required. In addition, the copper mesh is 100% recyclable. Recycled material is used in the initial production of copper products, further reducing CO2 emissions compared with the construction of traditional polymer nets.

### **The three challenges of aquaculture in the 21st Century: quality, health, environment**

The world's annual consumption of fish and seafood has increased by 65% since the 1960s to reach 17 kg per person in 2010\*. In particular, salmon is about to replace chicken on our plates. Today, almost half of all seafood is issue of aquaculture. China is the world's largest producer (at 33 million tonnes/year), while Europe produces 2.3 million tonnes year\*.

To meet the demand whilst maintaining high quality, the aquaculture sector has to face three challenges: increased volume (production has increased by 71% in the last 10 years and the trend continues), improving the sanitary conditions at the production site, and lessening the environmental impact (preserving the marine environment, reducing waste and respecting biodiversity).

#### **Comparison of biofouling accumulated during a four-month period in an aquaculture site close to Puerto Montt, Chile.**



Polymer mesh with anti-fouling coating



Copper mesh\*\*

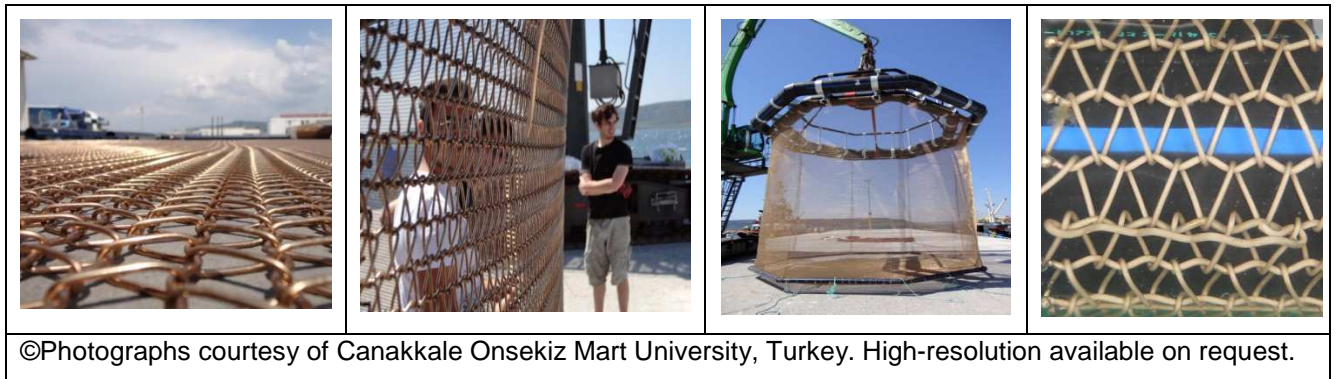
## A solution for the future of aquaculture

Unlike other net materials such as nylon or coated nets, copper and its alloys are 100% recyclable without any loss of performance. Copper alloy nets perform well in difficult conditions and their lifespan is longer than other net materials.

In future, copper cages could allow the industry to exploit new areas of production in Europe, far from the coasts, since their resistance to sea currents and waves would enable off-shore breeding. In Europe, the countries with significant aquaculture activities are Norway, Denmark, Faroe Island, Spain, UK, Portugal, Ireland, Greece, Italy and Turkey, according to UN FAO Fishery Statistics 2009.

\* FAO figures: UN Food and Agriculture Organisation

\*\*Copper mesh, UR30



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