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IMTA based system in offshore environment: a Ligurian case study and hints for combining aquaculture and ecological restoration

The total world production of aquaculture products in the last years is around 170 million tons; in 2020, Italy produced 130.000 tons, representing the 11,3% of the total European production.

Aquaculture represents one of the most sustainable and efficient animal production system; it is important to keep developing sustainable aquaculture practices, environmentally and economically. Integrated multi-trophic aquaculture systems may represent an excellent solution, in order to develop sustainable aquaculture practices. Such systems, by combining the co-cultivation of fed aquaculture species (e.g., finfish), with inorganic extractive aquaculture species (e.g., seaweeds) and organic extractive species (e.g., suspension and deposit feeders), could improve economic, social and environmental benefits. IMTA systems aim to recreate a natural trophic network, for instance, by recycling waste nutrients from higher trophic level species into production of lower trophic level species, also reducing organic waste dispersal on the benthic compartment.

The University of Genoa, in collaboration with Aquadema s.r.l, in the context of the European project Novafoodies and of the National Biodiversity Future Centre, is going to set an experimental IMTA system in the Ligurian Sea (Lavagna, Genova).

The farm is already running as a monoculture farm of sea bream (*Sparus aurata*) and seabass (*Dicentrarchus labrax*). The envisaged species for the system are oysters (*Ostrea edulis*) and seaweeds (*Ericaria amentacea* and self-recruited algae).

The cultivation of the brown canopy forming seaweed *Ericaria amentacea* in the aquaculture plant could represent a valuable approach for a larger scale production of juveniles of a valuable species for restoration action implementations.