

Effects of Sea Cage Farm on Wild Fish Populations: A case study of bluefin tuna (*thunnus thynnus*) fattening in Castellammare del Golfo (western sicily)

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Abstract

Aggregations of fish have been extensively recorded around natural drifting objects (such as logs, jellyfish, and drift algae) and artificial floating structures, such as rubbish, rafts, man-made fish aggregating devices (FAD), and oil platforms.

Also, floating cages for fish culture, such as as FAD, attracts both pelagic and demersal wild fish, which aggregate around sea cages, attracted by uneaten feed and profuse fouling.

Despite the fact that research on the ecological impacts of marine fish farms is well documented, there is a growing interest about the effects on wild fish population, particularly those that aggregate in the immediate vicinity of fish farms.

Mediterranean fish species that characterize the community around sea cages differ from those around artificial and natural FAD systems. Sparids as Boops boops and Oblada melanura are very abundant around the sea cages, but virtually absent around FADs, while only Trachurus sp. Aggregates around both FADs and sea cages.

Previous reports demonstrated that fish farming may affect the presence, abundance, diet, and residence times of fish in a given area, and the quality of wild fish in the vicinity of fish farms, in terms of taste and chemical composition, such as fatty acid composition.

The presence of fish around sea-cages seems to exert a positive effect on the impact derived from fish farming on the marine environment. Wild fish aggregated around the sea-cage fish farms, eating the dispersed food, helps to reduce the effects of the organic matter accumulation that reaches the bottom.

*Marine fish, especially carnivores such as tuna, have a natural diet rich in highly unsaturated ω 3 fatty acids. Caged bluefin tuna are fed on fatty fish species, such as Atlantic herring (*C. harengus*), Atlantic mackerel (*S. scomber*) and round sardinella (*S. aurita*), rich in ω 3 polyunsaturated fatty acids. At the end of the fattening period, the fatty acid profile of tuna flesh reflects that of fish fed.*

We monitored wild fish populations aggregating around the bluefin tuna cages located in the gulf of Castellammare over a three-year period (from 2004 to 2007). In consideration of the demonstrated increment of wild fish biomass during the tuna fattening activity, in this report we show the variation of biochemical composition of wild fish, aggregating around the tuna cages, with respect to control specimens collected in areas not influenced by the tuna farm.

¹ Aegusa Soc. Coop. a r.l., Trapani.

² Ibid.

³ Ibid.

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⁶ Ibid.