

## **Effects of Integrated Multi-trophic aquaculture on Growth Rates in sugar kelp, *Laminaria saccharina*.**

The use of macroalgae as so called “scrubbers” in integrated multi-trophic aquaculture systems (IMTA) removes high, sometimes harmful concentration levels of nitrate, nitrite, ammonium, phosphorus, and carbon dioxide from the environment that may cause higher eutrophication, increased sediment bacterial metabolism, anoxic conditions, high nitrogen and phosphorus flux, and acidification. From an economic standpoint the production volumes of the algae have also been shown to increase by 46 to 50% when being grown in an IMTA system verses in isolated systems. The laboratory research conducted looked at the growth rates of the extractive algae *Laminaria saccharina* or sugar kelp in an integrated multi-trophic aquaculture system with the finfish *Fundulus heteroclitus* or mummichog. This study was conducted for four weeks in a closed aquaria system, with treatment tanks of fish and kelp and control tanks with just fish. Changes in length and weight of kelp were recorded each week and compared with statistical tests to see if there was a significant difference in growth rates between the treatment and control tanks. It was hypothesized that the kelp that is grown in the IMTA system with the mummichogs will have higher total growth rates than that of the kelp grown in the control tanks without fish effluent. The results did show that there were significant changes in growth rate from week to week but comparing treatment to control tanks there was no significant difference.

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