Carrying capacity model for bivalve mariculture and explanation of Parameters

Fang Jianguang

Yellow Sea Fisheries Research Institute, CAFS, Qingdao, 266071

Mariculture has become one of the most important industries in China since 1990's. In 2005，the total annual mariculture production reached to 13.848 million MT, among them the annual production of bivalves and seaweed was 10.675 and 1.511 million MT respectively, accounting for 88% of total mariculture production of China in 2005. As we know, the growth of seaweed relies on the supply of nutrient, while bivalves mainly rely on the supply of phytoplankton in the sea. Therefore, the marine ecosystem in the coastal waters will be certainly affected by the large scale of mariculture. The results show that about 10—15kg nitrogen will be removed from sea water when one MT in dry weight of kelp is harvested. Meanwhile, one scallop *Chlamys farreri* with shell height of 5cm can filter about 100 litres seawater during the period of 24 hr in September. Oyster and mussel also have high clearance rate for removing particulate organic matter (POM) from the cultured sea site. Besides that, the fouling organisms growing on the surface of mariculture facilities will absorb some nutrients and feed some food competing with cultivated organisms. It formed a complex food web in the mariculture ecosystem. If the supply of nutrients or food is sufficient for the demand of cultivated organisms, there will be no obvious change in the mariculture system. If the supply of nutrients or food is fall short of the demand of cultivated organisms, the growth rate of cultivated organisms will be decrease and the mortality will increase. Therefore, it is very important to pay great attention to study the inter-reaction mechanism of large scale mariculture of seaweed and bivalves on ecosystem in coastal zone for ensuring the development of mariculture in sustainable way. One of the best ways to solve the problems such as slower growth rate, higher mortality and pollution caused by intensive mariculture is to regulate the mariculture activities based on the carrying capacity of mariculture sites. How to establish the carrying capacity models, how to determine the key parameters for assessing the carrying capacity for bivalves, and how to develop the mariculture technologies based on the carrying capacity of culture sites are discussed here with the case study in Sungo Bay.

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