

A Comparative Study on Primary Productivity in Fish Cage Culture Unit and Fish Pond in Relation to Different Level of Water Depth

Authors : Pawan Kumar Sharma, J. Stephan Sampath Kumar, D. Manikandavelu, V. Senthil Kumar

Abstract : The total amount of productivity in the system is the gross primary productivity. The present study was carried out to understand the relationship between productivity in the cages and water depth. The experiment was conducted in the fish cages installed in the pond at the Directorate of Sustainable Aquaculture, Thanjavur, Tamil Nadu Dr. J. Jayalalithaa Fisheries University, Tamil Nadu (10° 47' 13.1964" N; 79° 8' 16.1700"E). Primary productivity was estimated by light and dark bottle method. The measurement of primary productivity was done at different depths viz., 20 cm, 40 cm, and 60 cm. Six Biological Oxygen Demand bottles of 300 ml capacity were collected and tagged. The productivity was obtained in mg O₂/l/hr. The maximum dissolved oxygen level at 20 cm depth was observed 5.62 ± 0.22 mg/l/hr in the light bottle in pond water while the minimum dissolved oxygen level at 20 cm depth in a cage was observed 3.62 ± 0.18 mg/l/hr in dark bottle. In the same way, the maximum and minimum value of dissolved oxygen was observed at 40, and 60 cm depth and results were compared. A slight change in pH was observed in the cage and pond. The maximum gross primary productivity observed was 1.97 mg/l/hr in pond at 20 cm depth while minimum gross primary productivity observed was 0.82 ± 0.16 mg/l/hr in a cage at 60 cm depth. The community respiration was also variable with the depth in both cage and pond. Maximum community respiration was found 1.50 ± 0.19 mg/l/hr in pond at 20 cm depth. A strong positive linear relationship was observed between primary productivity and fish yields in ponds. The pond primary productivity can contribute substantially to the nutrition of farm-raised aquaculture species, including shrimp. The growth of phytoplankton's is dependent on the sun light, availability of primary nutrients (N, P, and K) in the water body and transparency, so to increase the primary productivity fertilization through organic manure may be done that will clean to the pond environment also.

Keywords : cage aquaculture, water depth, net primary productivity, gross primary productivity, community respiration

Conference Title : ICSAF 2020 : International Conference on Sustainable Aquaculture and Fisheries

Conference Location : Tokyo, Japan

Conference Dates : March 23-24, 2020