

## **Influence of Greenhouse on Pond Water Quality and Growth Performance of Nile Tilapia in Cold Areas**

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### **Abstract**

In aquaculture, temperature is a critical environmental factor influencing the fish growth. Behavioral and metabolic activities such as feeding and digestion of fish are directly influenced by temperature. Different fish species grow optimally at different temperature ranges and significant deviations will negatively affect the growth rate. Cold regions of Kenya, stunted growth of fish as a result of lower temperatures beyond recommended range hinders aquaculture. Current research aimed to evaluate the influence of greenhouse on pond water quality and growth rate of Nile tilapia to promote aquaculture in cold areas. Total of 240 monosex Nile tilapias were cultured in two ponds (120 in greenhouse pond and 120 in open pond). Initial length and weight were recorded and fish were sampled every fortnight for a period of six month. Indicators of growth performance (Specific growth rate and Absolute growth) were calculated at the end of the experiment. In the two ponds, physico-chemical parameters which include temperature, conductivity, dissolved oxygen and pH were recorded daily. There was a significant difference in specific growth and absolute growth rates observed in fish grown in greenhouse and open pond (T-test,  $p < 0.05$ ). The calculated SGR was  $1.38 \pm 0.05$  and  $1.06 \pm 0.08$  while AG values were  $2.35 \pm 0.06$  and  $0.60 \pm 0.09$  for the greenhouse pond and open pond respectively. Results for dissolved oxygen and temperature from the two ponds revealed a significant difference (T-test,  $p < 0.05$ ) however, conductivity and pH had no significant difference. In conclusion, greenhouses for aquaculture in cold regions as a remedy for low temperature to culture Nile tilapia. Greenhouse environment maintains temperature cautioning pond from drastic temperature drop. In this experiment, greenhouse maintained water temperature in the range of 20.90 to 27.13°C which is within the recommended range of 20.00 to 30.00°C. As a result this technology promoted fish growth when compared to the open pond.