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Periphyton-Based Jaraqui (*Semaprochilodus insignis*) Culture with Two Types of Substrates at Different Densities

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Abstract

Influences of two types of substrates, natural (macrophyte, *Pistia stratiotes*) and artificial (plastic screen) were evaluated at 3 differrent densities (10, 20, 30%) on periphyton development, water quality and growth performance of jaraqui (*Semaprochilodus insignis*). Fish of average initial weight 1.46-1.69 g and length 4.15-4.26 cm stocked at 1/m^2 in 46 m^2 masonry tanks were grown for 120 days. The tanks were fertilized with urea, triple superphosphate and wheat bran. The types and densities of substrates tested did not drastically influence water quality. Natural substrate harboured higher periphyton biomass (1.48±0.09 mg/cm^2) as well as species diversity (28 genera) than the artificial substrate (0.84±0.12 mg/cm^2, 20 genera,). Fish in 10% and 20% artificial substrate and 20% natural substrate treatments showed better mean values of body weight (24.64, 23.86, 29.26 g respectively) on termination of the experiment. Fish survival was the lowest in 30% natural substrate (84.1%) and highest in 10% artificial substrate (94.2%). Higher fish biomass was recorded in 20% natural and 10% artificial substrate treatments (25.05 and 21.71 g/m^2), which amounts to a four-month yield of 250 and 217 kg/ha in the two treatments.

Keywords: Aquaculture, jaraqui, substrates, growth, water quality.

Introduction

Aquaculture is increasingly being considered as the answer of food security issues the world over, in the face of declining marine capture fisheries. At the same time, there is a great concern on the possible environmental impacts of aquaculture. Among the various strategies adopted to increase fish production from inland waters, periphyton-based fish culture is a viable option, since it also addresses environmental concerns. Periphyton-based specific systems with no additional feeding have long been practiced in the Africa (Hem and Avit, 1994) and Asia (Wahab and Kibria, 1994), mainly using bamboo and other locally available natural substrates. Most truly herbivorous fish species feed on larger, benthic, epilithic or periphytic algae, rather than phytoplankton (Horn, 1989). A positive effect of substrate introduction and consequent periphyton development on the production of the target species and on water quality has been observed (van Dam *et al*., 2002). Much of the periphyton-based fish culture research has been carried out comparing the growth of the target organism with