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F. Garcia, D.M. Romera, N.S. Sousa, I. Paiva-Ramos, E.M. Onaka

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## The potential of periphyton-based cage culture of Nile tilapia in a Brazilian reservoir

**Running page head:** Periphyton-based cage of Nile tilapia

Garcia, F.\*<sup>1</sup>; Romera, D.M.<sup>2</sup>; Sousa, N.S.<sup>1</sup>; Paiva-Ramos, I.<sup>3</sup>; Onaka, E.M.<sup>1</sup>

<sup>1</sup> Instituto de Pesca, APTA/SAA, Rodovia Washington Luiz (SP 310) km 445, 15025-970, São José do Rio Preto, SP, Brazil. Postal Box 61, 15500-970 Votuporanga, SP, Brazil

<sup>2</sup> Instituto Agrônomo de Campinas, APTA/SAA, Postal Box 61, 15500-970 Votuporanga, SP, Brazil

<sup>3</sup> FEIS – Universidade Estadual Paulista “Julio de Mesquita Filho” – UNESP. Avenida Brasil, 56 – Centro - 15385-000 - Ilha Solteira, SP, Brazil

\* e-mail: fgarcia@apta.sp.gov.br

### Abstract

In land-based pond cultures, periphyton is considered to be a complementary food source for cultured fish. In cage aquaculture, studies on the use of periphyton are scarce and do not support the viability of periphyton-based cage culture. The aim of this study was to evaluate the potential of periphyton-based cage culture of Nile tilapia in a hydroelectric reservoir in Brazil at three stocking densities and two feeding regimes. Sex-reversed male Nile tilapia *Oreochromis niloticus* ( $46.56 \pm 2.53$  g) were placed in 21 cages ( $6 \text{ m}^3 - 2 \times 2 \times 1.5$  m each) with or without bamboo substrates for periphyton growth. A completely randomized design with three replicates per treatment was used to test the effect of substrate inclusion in the three stocking densities (80, 60, 40 kg of fish/ $\text{m}^3$ ) associated with two feeding regimes (100% and 50% of daily ration). Three cages without bamboo substrates were included in the experimental design as control group (CTRL) (80 kg/ $\text{m}^3$  and 100% of daily ration). The study demonstrates the efficiency of using substrates for Nile tilapia in cages in the reservoir. The presence of bamboo substrates improved the weight gain of fish but reduced the carrying capacity of the cage at the highest density. The concentration of dissolved oxygen in the cages was improved by the presence of substrate between 50 and 140 days of the trial and reduced after 155 days of culture. The inclusion of bamboo substrates inside the cages allows producing up to 52 kg/ $\text{m}^3$  of Nile tilapia using 32% less diet in a period almost 20% shorter than in the CTRL group. If farmers prefer to produce 80 kg/ $\text{m}^3$ , they can use 30% less diet but the production period would be 20% longer.

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