

PRODUCTIVE PERFORMANCE OF TAMBAQUI *Colossoma macropomum* IN CAGES IN NORTHEAST OF BRAZIL

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Introduction

The Brazilian native, tropical fish tambaqui *Colossoma macropomum* (Cuvier) is the second largest scaled fish in the Amazon River basin. In Brazil, the tambaqui is rearing on different systems and environments and some of them have shown substantial growth performance. Pond production has a higher technological level, while production in cages is promising, it lacks more studies testing stocking densities. The aim of this study was to evaluate the growth of tambaqui in cages at different stocking densities in a lake supplied by with rainwater.

Material and methods

The experiment was conducted at Embrapa Coastal Tablelands, Aracaju, Sergipe State, NE, Brazil in consecutive phases: nursery at densities of 50, 100, 200 and 300 fingerlings.m⁻³ for 98 days (mean weight of 0.35 ± 0.02 g) and growth at densities of 20, 40 and 60 fish.m⁻³ for 270 days. The experiment was carried out using twelve 1m³ cages with a 20 mm metallic mesh placed in a lake 0.5 ha with water depth ranged from 1.4 to 2.5m according season. During the nursery phase, a nylon 4 mm mesh was placed into cage to prevent escape of fingerlings. Commercial extruded feed was offered four times a day in the nursery phase and twice a day in the growth phase. The nursery feeds contained 40% and 36% of crude protein and 32% in growth feed. Sampling was done every 30 days to evaluate growth in weight and adjust the feeding rate. Water temperature, dissolved oxygen, pH and conductivity were monitored daily. The performance parameters evaluated were: final weight, weight gain, feed conversion rate, condition factor, survival rate and final biomass. The data were processed with SPSS 15.0 software.

Results

Water temperature was 29.1 ± 1.4°C, dissolved oxygen 8.3 ± 0.8mg.L⁻¹, pH 6.5 ± 1.1 and conductivity 606.2 ± 69.9µS.cm⁻¹. Environmental parameters of the water fluctuated within the recommended range for the rearing of tambaqui, according to Aride et al. (2007). In the nursery, the highest final weight was obtained at 50 fingerlings.m⁻³, (table I). Survival over 97% was observed in the nursery. Final biomass of 14.0kg.m⁻³ was significantly higher for fish at 300 fingerlings.m⁻³.

In the growth phase, the highest weight gain 955.0 g was obtained at 20 fish.m⁻³,(table II). Final biomass was significantly affected by stocking density, reaching 48.7 kg m⁻³ at the highest density.

Discussion and Conclusion

Survival rate in the nursery was similar to that obtained by Silva et al.(2007). The total survival rate (100%) at growth phase confirms that tambaqui clearly adapts to cage culture. The recommended density in nurseries for producing juveniles tambaquis reared in cages of small volume is 300 fish.m⁻³. In the nursery and growth phase, the stocking density had a significant effect on production, with the highest final biomass in cages stocked at the highest density. Weight gain and specific growth were inversely proportional to densities. Feed conversion and condition factor were not influenced by the evaluated densities. Mean weight gain at densities of 20 and 40 fish.m⁻³ in this study were similar to that reported by Gomes et al.(2006). The density of 20 fish m⁻³ is more adequate to grow tambaqui in cages. The results show that the tambaqui cage culture is viable in lakes provided with rainwater and can be integrated with multiple-use water services. Further research is needed to improve growth to market-size and decrease feed conversion rate lowering production costs.

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Table I: Final weight, feed conversion rate (FCR), survival rate and final biomass of tambaqui in the nursery phase.

Parameter	Fingerling.m ⁻³			
	50	100	200	300
Final weight (g)	¹ 83.5 ± 18.0 ^a	70.8 ± 19.1 ^a	44.0 ± 4.7 ^b	46.8 ± 9.2 ^b
FCR	1.1 ± 0.1 ^b	0.9 ± 0.1 ^a	1.0 ± 0.1 ^b	0.8 ± 0.1 ^a
Survival rate (%)	88.2 ± 13.5 ^b	97.4 ± 2.2 ^a	99.5 ± 0.6 ^a	99.7 ± 0.4 ^a
Final biomass (kg.m ⁻³)	3.6 ± 1.9 ^c	6.9 ± 1.6 ^b	8.8 ± 0.9 ^b	14.0 ± 2.7 ^a

¹Means (± SD). Means followed by different letters are significantly different at P<0.05 by Tukey's test.

Table II: Initial and final weight, weight gain, final biomass, feed conversion rate (FCR), condition factor, specific growth and survival rate of tambaqui in the growth phase.

Parameter	Fish.m ⁻³		
	20	40	60
Initial weight (g)	¹ 73.5 ± 3.3	73.2 ± 3.4	74,8 ± 1.0
Final weight (g)	1028.5 ± 84.9 ^a	901.8 ± 94.9 ^{ab}	812.0 ± 39.8 ^b
Weight gain (g)	955.0 ± 84.9 ^a	828.6 ± 109.5 ^{ab}	737.2 ± 46.0 ^b
FCR	2.1 ± 0.2	2.3 ± 0.3	2.4 ± 0.1
Condition factor	3.8 ± 0.2	3.6 ± 0.2	3.7 ± 0.1
Specific growth (%weight.day ⁻¹)	0.98 ± 0.1 ^a	0.93 ± 0.1 ^{ab}	0.89±0.1 ^b
Survival rate (%)	100	100	100
Final biomass (kg.m ⁻³)	20.6 ± 1.9 ^a	36.0 ± 4.4 ^b	48.7 ± 2.8 ^c

¹Means (± SD). Means followed by different letters are significantly different at P<0.05 by Tukey's test.

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