BLUE FOOD

GREEN SOLUTIONS

AQUA 2024

August 26-30, 2024

Bella Centre, Copenhagen, Denmark

CO-ORGANIZED BY

european aquaculture society

WORLD AQUACULTURE Society

gold sponsor

BioMar

silver sponsors

Biorigin

University of Stavanger

stiim

Blue Planet Academy

US SOY

was premier sponsors

ZEIGLER nutrition through innovation

SyAqua

BLUE AQUA

BLUE GENETICS Caring for life

session sponsor

AQUASOJA

Organizing partners

UNIVERSITY OF COPENHAGEN

DANISH EXPORT ASSOCIATION FISH TECH

ICES CIEM International Council for the Exploration of the Sea / Conseil International pour l'Exploration de la Mer

DTU

EUROFISH INTERNATIONAL ORGANISATION

copenhagen convention bureau

NILE TILAPIA FARMING INTEGRATED WITH BOTTOM-FEEDER SPECIES

Ana Luíza L. Rocha; Michelle R. Santos; Laurindo A. Rodrigues; Helenice P. Barros; Marcello V. Boock; Eduardo M. Onaka; Michelle P. Vetorelli; Fernanda F. Borges; Andre Z. Boaratti; Wagner C. Valenti; Patricia Moraes-Valenti*

*UNESP – Aquaculture Center (CAUNESP)
Access Road Prof. Paulo Donato Castellane
Jaboticabal/SP/Brazil - Postcode 14884-900
moraes.valenti@unesp.br

Integrated aquaculture systems can boost the final biomass and align with sustainability principles and the circular economy concepts. Thus, we investigated the integrated culture of Nile tilapia (*Oreochromis niloticus*) with curimbatá (*Prochilodus lineatus*), an iliophagus bottom-feeder, and giant river prawn (*Macrobrachium rosenbergii*), an omnivorous bottom-feeder. An experiment that lasted 176 days was developed at UNESP - Aquaculture Center, in Jaboticabal - SP, Brazil (21º15'22"S; 48º18'48"O). Twelve earthen ponds with an area of ~0.015 ha and a depth of 1 m were used. The experimental design was completely randomized, consisting of four treatments and three replications (ponds): MT - monoculture of tilapia (3 ind.m^{-2}); ITC - integrated culture of tilapia (3 ind.m^{-2}) and curimbatá (5 ind.m^{-2}); ITP - integrated culture of tilapia (3 ind.m^{-2}) and prawn (5 ind.m^{-2}); ITCP - integrated culture of tilapia (3 ind.m^{-2}), curimbatá (5 ind.m^{-2}) and prawn (5 ind.m^{-2}). Only tilapia was fed twice a day with an extruded commercial diet. At harvest, all animals were counted and weighed. Final mean mass, survival, productivity, and feed conversion ratio (FCR) were calculated for all treatments (Table 1). The co-culture of Nile tilapia, curimbatá and giant river prawn did not lead to the expected increase in productivity and reduction in FCR compared to tilapia monoculture. Curimbatá, stocked at a density of 5 ind.m^{-2}, negatively affected the development of Nile tilapia and giant river prawn. The integrated culture of Nile tilapia at a density of 3 ind.m^{-2} with giant river prawn at 5 ind.m^{-2} increased productivity and reduced FCR. Further research should be performed to define the best stocking density of each species to optimize their integrated culture.

Table 1. Production performance parameters for each treatment. Initial size: *O. niloticus* = 2.80 ± 1.19 g; *P. lineatus* = 15.54 ± 7.79 g; *M. rosembergii* = 0.03 ± 0.01 g.

	MT	ITC	ITP	ITCP
Total Yield (t.ha^{-1})	11.0 ± 0.4	10.2 ± 1.5	12.9 ± 1.5	11.4 ± 0.9
Feed Conversion Ratio (FCR)	2.1 ± 0.4	2.0 ± 0.2	1.8 ± 0.1	2.0 ± 0.05
Oreochromis niloticus				
Final mean mass (g)	475 ± 144^{a}	380 ± 96^{c}	471 ± 83^{a}	434 ± 87^{b}
Survival (%)	78.9 ± 15.1	76.9 ± 3.8	86.7 ± 8.3	72.0 ± 0.9
Yield (t.ha^{-1})	11.0 ± 0.3^{ab}	8.8 ± 1.3^{b}	12.3 ± 0.9^{a}	9.4 ± 0.4^{b}
Feed Conversion Ratio (FCR)	2.1 ± 0.3	2.0 ± 0.2	1.9 ± 0.1	2.2 ± 0.02
Prochilodus lineatus				
Final mean mass (g)	-	31.0 ± 15.4^{b}		39.2 ± 14.4^{a}
Survival (%)	-	88.5 ± 7.4		74.2 ± 7.9
Yield (t.ha^{-1})	-	1.4 ± 0.2		1.5 ± 0.2
Macrobrachium rosenbergii				
Final mean mass (g)	-		22.0 ± 8.9^{a}	16.6 ± 7.2^{b}
Survival (%)	-		51.6 ± 25.8	65.1 ± 19.9
Yield (t.ha^{-1})	-		0.6 ± 0.3	0.6 ± 0.3

Means followed by different letters in the same line indicate significant differences between treatments by ANOVA followed by the Tukey-Kramer test or *t-test* (P <0.05).