

## INTEGRATED CAGE-CUM-POND CULTURE: STOCKING DENSITIES OF CAGED CLIMBING PERCH IN NILE TILAPIA PONDS

Nguyen Thanh Phuong<sup>1</sup>, Yang Yi<sup>2</sup>, James S. Diana<sup>3</sup>, C. Kwei Lin<sup>2</sup> and Tran Van Bui<sup>1</sup>

<sup>1</sup>College of Aquaculture and Fisheries  
Cantho University, Cantho, Vietnam

<sup>2</sup>Aquaculture and Aquatic Resources Management  
School of Environment, Resources and Development  
Asian Institute of Technology  
Pathum Thani, Thailand

<sup>3</sup>School of Natural Resources and Environment  
University of Michigan  
Ann Arbor, USA

### Abstract

An experiment was conducted for 150 days at Cantho of Vietnam to determine the appropriate stocking density of caged climbing perch (*Anabas testudineus*) in Nile tilapia (*Oreochromis niloticus*) ponds, to assess growth and production of fishes in both cages and open ponds, and to assess the economic and environmental benefits of this integrated cage-cum-pond culture system. One 4 m<sup>3</sup> cage was suspended in each of twelve 100-m<sup>2</sup> earthen ponds, and three ponds of same size served as control without cages. Climbing perch fingerlings of 9 g in size were stocked at 50, 100, 150, and 200 fish/m<sup>3</sup> in cages, while Nile tilapia fingerlings of 10 g size were stocked at 2 fish/m<sup>2</sup> in all fifteen ponds, giving caged climbing perch to open-pond Nile tilapia ratios of 1:1, 2:1, 3:1 and 4:1, respectively. Caged climbing perch were fed commercial pelleted feed (26-28% crude protein) at rates of 5%, 3% and 2% body weight per day during the first, second and the remaining months, respectively. The control ponds were fertilized weekly with urea and TSP at 28 kg N and 7 kg P/ha/week, while no fertilizers were applied in the treatment ponds.

Survival of climbing perch in the highest density treatment (97.1%) was significantly lower than that in other treatments (99.3-99.6%;  $P < 0.05$ ), while there was no significant difference in survival of Nile tilapia, ranging from 72.5% to 87.2% ( $P > 0.05$ ). Final mean weights of both climbing perch and Nile tilapia were not significantly different among all treatments, ranging from 19.5 to 20.5 g and from 111.5 to 133.9 g, respectively ( $P > 0.05$ ). Total harvest weight of climbing perch, ranging from 4.00 to 15.2 kg/cage, increased significantly with increasing stocking density ( $P < 0.05$ ), while total harvest weight of Nile tilapia was highest in the 150 fish/m<sup>3</sup> treatment (22.7 kg/pond), intermediate in other cage treatments (19.0-20.7 kg/pond), and lowest in the control (15.8 kg/pond;  $P < 0.05$ ). The combined total weights of both climbing perch and Nile tilapia in the high density treatments

(35.0 kg/pond in 150 fish/m<sup>3</sup> treatment and 35.8 kg/pond in 200 fish/m<sup>3</sup> treatments) were significantly greater than those in the low density treatments (23.0 kg/pond in 50 fish/m<sup>3</sup> treatment and 28.2 kg/pond in 100 fish/m<sup>3</sup> treatments;  $P < 0.05$ ). FCR of climbing perch in all treatments was very high, ranging from 5.05 to 6.60. FCR was lowest in the 150 fish/m<sup>3</sup> treatment, intermediate in the 100 and 200 fish/m<sup>3</sup> treatment, and highest in the 50 fish/m<sup>3</sup> treatment ( $P < 0.05$ ). The results indicate that caged climbing perch to open-pond Nile tilapia ratio of 3:1 was the best. Further research in feed protein level and feeding strategy should be conducted.