

Red Tilapia Production in LVHD Cages with a Soy-Based Feed: Hainan, China

Results of ASA/China 2003 Feeding Trial 35-03-113

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ABSTRACT

A feeding demonstration was conducted in a reservoir near Haikou, Hainan Province, to demonstrate fingerling to market growth performance of red tilapia using the ASA LVHD cage production model and ASA soymeal-based feed. Tilapia stocked in three, 1-m³ cages at a density of 400 fish per m³ grew from 78 g to 650 g in 101 days on a 32% crude protein, soybean meal-based, all-plant protein diet. Average FCR for the 101-day feeding period was 1.33:1. Gross production of tilapia averaged 256 kg/m³ in the three trial cages, with 99% fish survival. Tilapia harvested from the three trial cages had good size uniformity and body conformation.

INTRODUCTION

The American Soybean Association (ASA), in cooperation with Beijing Municipal Fishery Extension Center and its Hainan Fish Breeding Center in Haikou, Hainan, and the China National Fisheries Extension Center (NEC) in Beijing, conducted a 4-month cage feeding demonstration with red tilapia. The objective was to demonstrate red tilapia growth and economic performance from fingerling to market size using the ASA LVHD cage technology and the ASA 32/6 soymeal-based feed.

MATERIALS AND METHODS

Three, 1-m³ cages at the Hainan Fish Breeding Center in Haikou, Hainan, were used for the feeding demonstration. The cages were stocked in a water supply reservoir near the Hainan Fish Breeding Center Farm. The cages were constructed of nylon netting over a rigid frame, with an opaque cover as described in the ASA publication *Principles and Practices of High Density Fish Culture in Low Volume Cages*. The cages were

constructed using the ASA floating feed cage model. Cage placement was in a single row with a minimum spacing of one cage width between and on all sides of each cage.

Fish were 78-g red tilapia produced at the Hainan Fish Breeding Center fish farm. Tilapia were stocked in the three trial cages at a density of 400 fish/m³. Fish in all three trial cages were of uniform size, age and genetic background at stocking. Target market size for tilapia was 500 g.

Tilapia were fed the ASA 32/6, soymeal-based growout feed in extruded, floating pellet form (Table 1). The feed was formulated by ASA and produced by Cargill at its aquafeed mill in Jiangsu Province. Fish were fed to satiation twice daily, with fish in all three cages fed identically at each feeding.

Trial management was based on the ASA LVHD cage production model. Fish in all cages were sampled once per month on approximately the same date each month. At the conclusion of the trial, all cages were emptied and the fish in each cage were counted and weighed to determine average fish weight, gross and net production, feed conversion ratio (FCR) and survival.

RESULTS

Tilapia were fed a total of 101 days between 17 June and 25 September 2003. Tilapia grew from 78 g to an average weight of 650 g during this period (Table 2). Gross production of tilapia in 1-m³ cages averaged 256 kg/m³ (Table 2). Average tilapia survival was 98.5%. Average FCR for tilapia fed the ASA 32/6 all-plant protein, soymeal-based feed was 1.33:1 (Table 2).

Average feed cost per kilogram of fish growth was RMB 4.26 (US\$0.52). Net economic return was RMB 285 per m³ (US\$34.50/m³), at a market price of RMB 12/kg for red tilapia.

SUMMARY AND CONCLUSIONS

Red tilapia were aggressive feeders and exhibited good growth and feed conversion efficiency in LVHD cages when fed an extruded soymeal-based, all-plant protein feed. Tilapia were tolerant of production in cages. Fish biomass at harvest was 256 kg/m³, with no indication of a reduction in fish performance.

Tilapia harvested from the three trial cages were uniform in size and had good body conformation. No disease problems were encountered during the trial. No drugs or chemicals were used during the trial, producing a “green” market product.

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Table 1. Formula for the ASA 32/6¹, soymeal-based growout feed used in the 2003 red tilapia LVHD cage feeding trial in Haikou, Hainan Province, China. Cargill feed mill produced the feed in extruded, floating pellet form.

Ingredient	Percent of total
Soybean meal 47.5	52.8
Wheat, SWW	23.2
Wheat middlings	10.0
Corn gluten meal 60%	6.0
Fish oil	3.5
Soy lecithin	1.00
Ca phosphate mono	2.70
Vit PMX F-2	0.50
Min PMX F-1	0.25
Stay C-35%	0.03
Ethoxyquin	0.02
Total	100.00

¹The numerical component of the feed description refers to the percentage of protein and lipid, respectively, in the ration, i.e. 32/6 indicates 32% crude protein and 6% crude lipid.

ASA FY03 Hainan Red Tilapia LVHD Feeding Demonstration

Table 2. Results of the 2003 ASA aquaculture trial in Haikou that demonstrated fingerling to market growth performance of red tilapia using the ASA LVHD cage production model and extruded, soymeal-based growout feed.

Cage No.	NiT ¹ stocking size (g)	Stocking rate (fish/m ³)	No. days fed	Harvest wt. (g)	P _G ² (kg/m ³)	Survival (%)	FCR	Net (RMB/m ³)	ROI (%)
1	78	400	101	655	259.4	99.0	1.31	325	11.6
2	78	400	101	650	254.8	98.0	1.33	270	9.7
3	78	400	101	645	254.1	98.5	1.34	261	9.3
Mean	78	400	101	650	256.1	98.5	1.33	285	10.2

¹NiT = Tilapia

²P_G = Gross Production