Production of Red Tilapia in LVHD Cages With Soy-Based Feed

Results of ASA/China 2002 Feeding Trial 35-02-114

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ABSTRACT

Growth performance of red tilapia was demonstrated from fingerling to market stages using the ASA LVHD cage technology and an all-plant protein, soy-based feed. Red tilapia in three replicate cages of size 1.0-m^3 were fed to satiation twice daily with the ASA 32/6 soybean meal-based feed in extruded, floating pellet form. Tilapia grew from 52 g to 577 in 150 days, with an average FCR of 1.34:1. Fish survival averaged 98.3%. Fish production averaged 225.8 kg/m^3. Net economic return averaged RMB 712 per m^3, at an average market price of RMB 10/kg for red tilapia. Return to investment averaged 46% for the three trial cages.

Production of 225 kg/m^3 demonstrated the effectiveness of the ASA LVHD technology and soy-based feed. Compared to traditional cages, the LVHD cages yielded higher production, were easier to manage, and had lower labor costs. The ASA soy-based feed yielded lower FCR, better fish health, higher economic return and less environmental contamination than was previously obtained by the cooperator with traditional sinking feeds. In addition, no drugs or chemicals were required in the trial, which yielded high quality "green" fish without contamination.

INTRODUCTION

The American Soybean Association (ASA), in cooperation with the Nanning Xihuide Company Fish Farm in Nanning and the Guangxi Aquaculture Technology Extension Center, conducted a feeding trial in 2002 to demonstrate the growth performance of red tilapia from fingerling to market size in freshwater LVHD cages.

MATERIALS AND METHODS

Three cages of size 1.0-m^3 each at the Nanning Xihuide Company Fish Farm in Nanning, Guangxi Province, were used for the trial. Cages were constructed according to ASA guidelines, and included opaque covers and feed enclosures. Cages were arranged with a minimum of one cage width of open space on all sides of each cage for adequate water exchange.

Fish were 52-g red tilapia produced by the Nanning Xihuide Company Fish Farm in Nanning. Red tilapia were stocked in the three trial cages at 400 fish per m^3. Target market size for the red tilapia was 500 g per fish.

Red tilapia were fed the ASA 32/6 growout feed in extruded, floating pellet form (Table 1). Fish were fed to satiation twice daily, with fish in all cages fed the same amount at each feeding.

Tilapia in all cages were sampled once per month on approximately the same date each month to monitor growth performance. At the conclusion of the trial, the three trial cages were emptied and the red tilapia in each cage counted and weighed to determine average fish weight, gross and net production, feed conversion ratio (FCR) and survival. Production input costs were recorded throughout the trial and net income and ROI calculated at the end of the trial.

RESULTS

Red tilapia were fed a total of 150 days between 25 May and 21 October 2002. Tilapia grew from 52 g to 577 g with an average FCR of 1.34:1 (Figure 1; Table 2). Average survival for red tilapia was 98.25%. Gross production averaged 225.8 kg/m^3 in the 1.0-m^3 cages (Table 2).

Net economic return averaged RMB 712 per m^3 for the three trial cages. Return on investment (ROI) was 46% at a market price of RMB 10/kg for red tilapia (Table 2). Feed cost per kilogram of fish growth was RMB 4.02 at a FOB feed cost of RMB 3.00/kg.

SUMMARY AND CONCLUSIONS

Red tilapia yielded 225 kg/m^3 with the ASA LVHD cage technology and soy-based, all-plant protein feed. Compared to traditional cages used at the Nanning Xihuide Company Fish Farm, the LVHD cages yielded higher production, were easier to manage, and had lower cage construction and labor costs. The ASA soy-based feed yielded lower FCR, better fish health, higher economic return and less environmental contamination than was previously obtained by the cooperator with traditional sinking feeds. In addition, no drugs or chemicals were required in the trial, which yielded higher quality, "green" fish without contamination.

ACKNOWLEGEMENTS

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Chinese Currency and Production Unit Conversions:

RMB 8.26 = US$1.00
1.0 kg = 2.2 lb

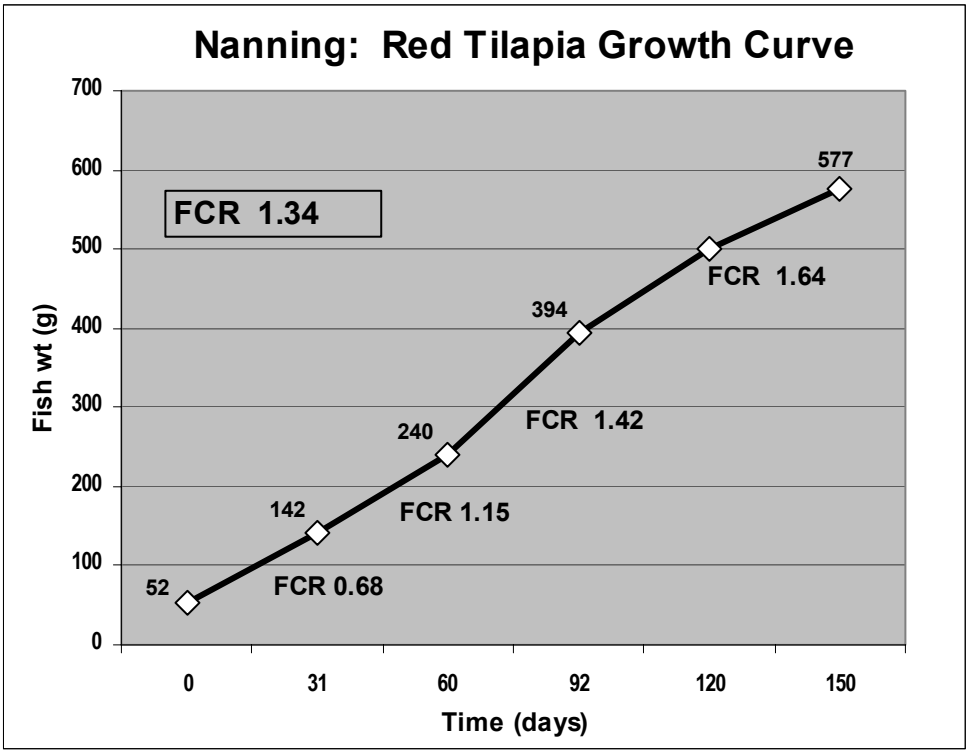

Figure 1. Growth curve for red tilapia cultured in 1.0-m^3 LVHD cages at the Nanning Xihuide Company Fish Farm in Nanning, Guangxi Province. Red tilapia grew from 52 g to 577 g in 150 days when fed to satiation twice daily with the ASA 32/6 soy-based feed in extruded, floating pellet form. Average FCR for the duration of the trial was 1.34:1. FCR for each sampling period is shown below the growth curve line and demonstrates variation in FCR as fish grow and age.

Table 1. Formulation for the ASA 32/6, soy-based growout feed used in the 2002 red tilapia LVHD cage feeding trial in Nanning, Guangxi Province, China. The feed was manufactured by Cargill in extruded, floating pellet form.

Ingredient	32/6 Growout Feed[1]
Soybean meal 47.5	52.8
Wheat, SWW	23.6
Wheat middlings	10.0
Corn gluten meal 60%	6.0
Fish oil	3.53
Soy lecithin	1.00
Ca phosphate mono	2.70
Vit PMX Roche 2118	0.10
Min PMX F-1	0.25
Ethoxyquin	0.02
Total	100.00

[1]The 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.

TABLE 2. Results of the 2002 ASA aquaculture trial at Nanning, Guangxi Province, that demonstrated fingerling to market growth performance of red tilapia in 1.0-m^3 cages using the ASA LVHD cage production model and soymeal-based growout aquafeed.

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/mu)	ROI (%)
1	52	400	150	585	226.6	97.0	1.33	722	46.7
2	52	400	150	575	225.0	98.3	1.34	706	45.7
3	52	400	150	570	225.9	99.5	1.34	708	45.6
Mean	52	400	150	577	225.8	98.3	1.34	712	46.0

[1]NiT = Red Tilapia

[2]P_G = Gross Production