

Pond Production of Grass Carp in Anhui, China with a 66% Soy Product Feed

Results of ASA/China 2002 Feeding Trial 35-02-111

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ABSTRACT

A feeding trial was conducted in Hefei, Anhui Province, to demonstrate fingerling to market growth performance of grass carp using the ASA 80:20 pond production model and the ASA all-plant protein, 66% soy-product grass carp feed. Fish were stocked in three, 5-mu ponds at a density of 760 grass carp and 100 silver carp per mu. Grass carp grew from 49 g to an average weight of 751 g per fish in 190 days of feeding. Gross production averaged 544 kg/mu for grass carp and 115 kg/mu for silver carp. Average survival rates for grass carp and silver carp were 95.4% and 99%, respectively. Grass carp FCR with the 66% soy product feed averaged 1.36:1. Average net economic return was RMB 720 per mu, for an average return on investment (ROI) of 27%. Production and economic averages are for two ponds only, as fish were poached from one pond just before harvest. Results of the feeding demonstration showed that grass carp exhibited excellent feeding behavior, growth performance and FCR with the ASA 66% soy-product feed and 80:20 production technology. Grass carp reached the target market size and had good body shape and conformation, with little size variation. Grass carp were reported to have better taste than fish cultured on the farm using traditional techniques. Water quality was also reported to be much better than normal, and no disease problems occurred. The use of extruded, floating feed significantly reduced labor costs, lowered fish FCR and improved water quality, and allowed production of healthy fish without the use of drugs or chemicals.

INTRODUCTION

The American Soybean Association (ASA), in cooperation with the Anhui Provincial Fisheries Extension Center, the Feidong Fish Farm, and the China National Fisheries Extension Center (NEC), conducted a six-month pond feeding trial with grass carp. The objective of the trial was to demonstrate grass carp growth and economic performance from fingerling to market stages with the ASA 32/3 feed formulated with 66% soy products and the ASA 80:20 pond production model.

MATERIALS AND METHODS

Three earthen ponds of average size 5.0-mu at the Feidong Fish Farm on the outskirts of Hefei, Anhui Province, were used for the feeding trial. Pond water depth averaged approximately 1.5 m. All ponds were equipped with water exchange and stand-by aeration.

Fish were 48.7-g grass carp fingerlings produced at the Feidong Fish Farm in 2001. Grass carp were stocked in the three trial ponds in mid-April at a density of 760 fish per mu, together with 100 silver carp fingerlings per mu. Fish in all three trial ponds were of uniform size and age at stocking. Target market size for the grass carp was 650 g per fish.

Grass carp were fed the ASA 32/3 all-plant protein grass carp feed in extruded, floating pellet form. The feed is a low energy, high fiber feed formulated specifically for grass carp. Dominant ingredients in the feed are soybean meal and soy hulls (Table 1). The feed was formulated by ASA and produced by Cargill in Jiangsu Province. Grass carp were fed to satiation twice daily, with fish in all three ponds fed identically at each feeding.

Trial management was based on the ASA 80:20 pond production model. Fish in all ponds were sampled once per month on approximately the same date each month. At the conclusion of the trial, all ponds were drained and the common and silver carp in each pond 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 were calculated at the end of the trial.

RESULTS

Grass carp were fed a total of 190 days between 28 April and 4 November 2002. A significant number of fish were poached from one pond prior to harvest, and the following mean production and economic figures do not include data from this pond. Grass carp grew from 48.7 g to an average weight of 751 g during the 190-day feeding period (Figure 1; Table 2). Gross production averaged 544 kg/mu (8,160 kg/ha) for grass carp and 115 kg/mu (1,725 kg/ha) for silver carp (Table 2). Average grass and silver carp survival rates were 95.4% and 98.8%, respectively. Average FCR for grass carp with the 32/3 soy-based feed was 1.36:1.

Net economic return averaged RMB 720 per mu at a market price of RMB 5.6/kg for grass carp and RMB 3.0/kg for silver carp (Table 2). ROI averaged 27% for the two trial ponds (Table 2).

SUMMARY AND CONCLUSIONS

Grass carp exhibited excellent feeding behavior and good growth performance using the ASA 80:20 pond production model and the soy-based 32/3 specialty grass carp feed. The extruded, soy-based feed yielded good feed conversion efficiency (FCR = 1.36:1) and resulted in lower feed cost per kilogram of fish produced than with traditional culture techniques. Grass carp exceeded the target production size and had good body shape and conformation, with little size variation. Grass carp were reported to have better taste than fish cultured on the farm using traditional techniques. Water quality was also reported to be much better than normal, and no disease problems occurred. The use of extruded, floating feed significantly reduced labor costs, lowered fish FCR and improved water quality, and allowed production of healthy fish without the use of drugs or chemicals. Despite the low market price of RMB 5.6/kg for grass carp in 2002, the ASA feed and 80:20 technology netted the cooperator a 27% profit on investment.

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Chinese Currency and Production Unit Conversions:

RMB 8.26 = US\$1.00
15 mu = 1.0 hectare (ha)
kg/mu x 15 = kg/ha
1.0 kg = 2.2 lb
6 mu = 1.0 acre (ac)
kg/mu x 13.2 = lb/ac

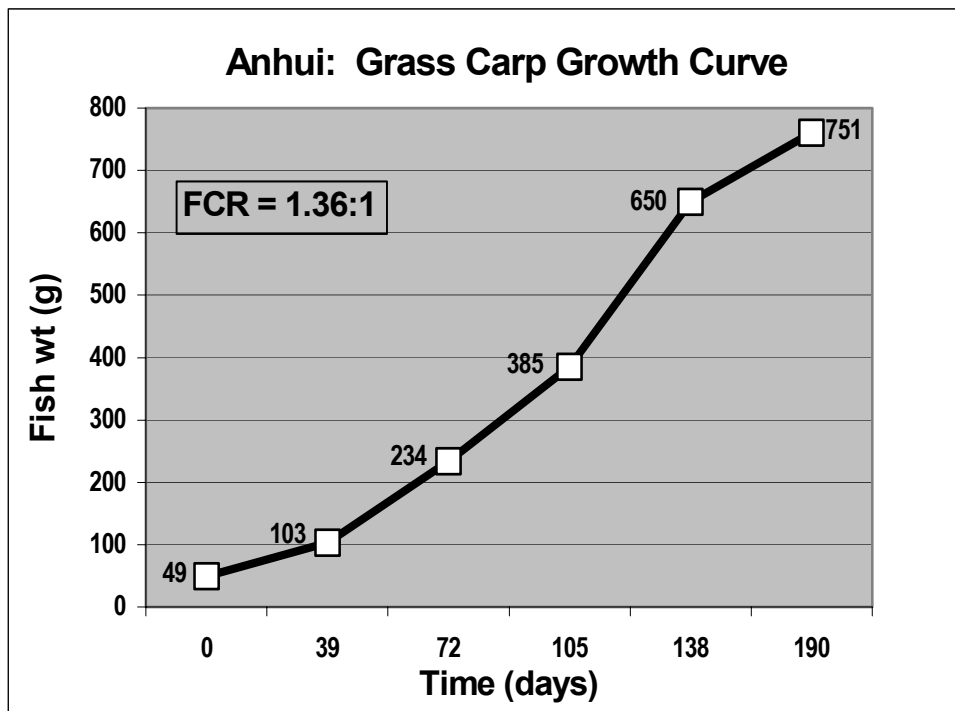


FIGURE 1. Growth curve for grass carp produced in Hefei, Anhui Province, using the ASA 66% soy product grass carp feed. Grass carp grew from 49 g to 751 g in 190 days with an average feed conversion ratio of 1.36:1.

Table 1. Formula for the ASA 32/3¹, soy-based specialty grass carp feed used in the 2002 grass carp demonstration feeding trial in Hefei, Anhui Province, China. Cargill feed mill produced the feed in extruded, floating pellet form.

Ingredient	Percent of Feed
Soybean Meal 44	50.0
Wheat, SWW	21.0
Soy Hulls	16.0
Corn Gluten Meal 60%	8.9
Ca Phosphate Mono	2.43
Fish Oil, Unspec.	1.3
Vit PMX Roche 2118	0.1
Min PMX F-1	0.25
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. 32/3 indicates 32% crude protein and 3% crude lipid.

Table 2. Results of the 2002 ASA aquaculture trial in Anhui that demonstrated fingerling to market pond growth performance of grass carp using the ASA 80:20 production model and 66% soy-based grass carp feed.

Pond No.	GrC ¹ stocking size (g)	Stocking rate (fish/mu)	No. days fed	Harvest wt. (g)		P _G ³ (kg/mu)		Survival (%)		FCR	Net (RMB/mu)	ROI (%)
				GrC	SiC ²	GrC	SiC	GrC	SiC			
1	48.7	760	190	720	1155	526.5	119.7	96.2	99.6	1.41	635	23.7
2	48.7	760	190	(779) ⁴	1165 ⁴	----	---	-----	----	----	----	-----
3	48.7	760	190	782	1087	561.6	110.9	94.5	98.0	1.31	805	30.1
Mean	48.7	760	190	751	1121	544.0	115.3	95.4	98.8	1.36	720	26.9

¹GrC = Grass carp

²SiC = Silver carp

³P_G = Gross Production

⁴Data for this pond is not contained in mean figures in last row because a significant number of fish were poached from the pond before harvest