

Production of Channel Catfish in Anhui Using the ASA 80:20 Pond Model and an All-Plant Protein, Soymeal-Based Aquafeed

Results of ASA/China 2001 Feeding Trial 35-01-115

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ABSTRACT

A feeding demonstration trial was conducted at the Jianguanghu Fish Farm in Huainan City, Anhui Province, to demonstrate fingerling to market growth performance of channel catfish using the ASA 80:20 pond production model and soy-based feed. This was the second year of a two-year trial at the Jianguanghu farm that began in 2000 with a catfish fry to fingerling pond trial. In the 2001 trial, catfish fingerlings were stocked in three ponds of size 3.0-mu each at a density of 600 channel catfish and 100 silver carp fingerlings per mu. Catfish were fed a 32/6 extruded, floating pellet feed formulated as an all-plant protein ration, with soybean meal as the primary protein source. Channel catfish grew from 59 g to an average weight of 672 g per fish in 156 days of feeding. Gross production of channel catfish and silver carp averaged 402 kg/mu and 77 kg/mu, respectively. Average survival rates for channel catfish and silver carp were 99.7% and 98.5%. Channel catfish FCR with the soymeal-based feeds averaged 1.44:1. Average net economic return was RMB 1,633/mu. Return on investment (ROI) averaged 35.5%. The ASA 80:20 technology and extruded, soy-based feeds simplified production management and yielded better fish performance and improved water quality, and required less labor, than the farm's traditional practices. Harvested catfish were of uniform size, and had good body shape and minimal fat deposition. No off-flavor was experienced in fish from the three trial ponds. Local farmers visited throughout the trial to monitor progress and expressed interest in adopting the technology and feed based on their observations of catfish performance.

INTRODUCTION

The American Soybean Association (ASA), in cooperation with the Jianguanghu Fish Farm, the Anhui Provincial Fisheries Extension Center and the China National Fisheries Extension Center (NEC), conducted a five-month feeding trial with channel catfish. The objective of the trial was to demonstrate channel catfish growth and economic performance from fingerling to market stages with a soymeal-based growout feed and the ASA 80:20 pond production model.

MATERIALS AND METHODS

Three ponds of size 3.0-mu each at the Jiaguanghu Fish Farm in Huainan City, Anhui Province, were used for the feeding trial. Water was supplied to the ponds from an adjacent reservoir. Water depth in the ponds averaged approximately 1.5 m. All ponds were equipped with water exchange and stand-by aeration.

Fish were 59-g channel catfish produced by at the Jiaguanghu Fish Farm in a 2000 ASA fry to fingerling demonstration trial. Catfish were stocked in the three trial ponds in early May 2001 at a density of 600 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.

Channel catfish were fed a 32% crude protein, 6% crude fat (32/6) aquafeed in extruded, floating pellet form (Table 1). The feed was formulated by ASA and produced by Fwusow Group at their aquafeed mill in Xiamen, Fujian Province. Catfish were fed using the satiation feeding methodology, in which the 100% satiation rate was determined every 10 days and the feeding rate maintained at that rate for the following 10 days. Fish were fed twice daily, with the catfish in the three trial ponds being 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 the same date each month. At the conclusion of the trial, all ponds were drained and the catfish 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

Channel catfish were fed a total of 156 days between 8 May and 11 October 2001. Catfish grew from an average weight of 59 g to an average weight of 672 g during this feeding period (Figure 1; Table 2). Gross production averaged 402 kg/mu (6,030 kg/ha) for channel catfish and 77 kg/mu (1,149 kg/ha) for silver carp (Table 2). The ratio of fed channel catfish to filtering silver carp at harvest was 84:16. Average channel catfish and silver carp survival rates were 99.7% and 98.5%, respectively. Average FCR for channel catfish was 1.44:1.

Average net economic return for the three trial ponds was RMB 1,633 per mu. ROI averaged 35.5% for the three trial ponds (Table 2).

SUMMARY AND CONCLUSIONS

The ASA 80:20 pond production model and soy-based growout feed yielded excellent catfish growth, survival, FCR and economic return in this two-year trial at the Jiaguanghu Fish Farm. The application of the 80:20 technology and high quality, extruded soy feed significantly improved pond water quality and eliminated fish disease problems that were prevalent in the farm's conventionally managed ponds. Fish fed with the extruded, soy-based feed were uniform in size and had good body shape, with low fat deposition and no off-flavor. Despite a prolonged drought, fish in the ASA trial ponds performed well, while ponds managed with traditional protocols experienced fish disease, dissolved oxygen depletion and related water quality

difficulties. Farmers from throughout the area visited the farm during the course of the trial to observe and learn the 80:20 technology, and many were reported to have adopted the technology and feed as a result of the ASA demonstration trial.

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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

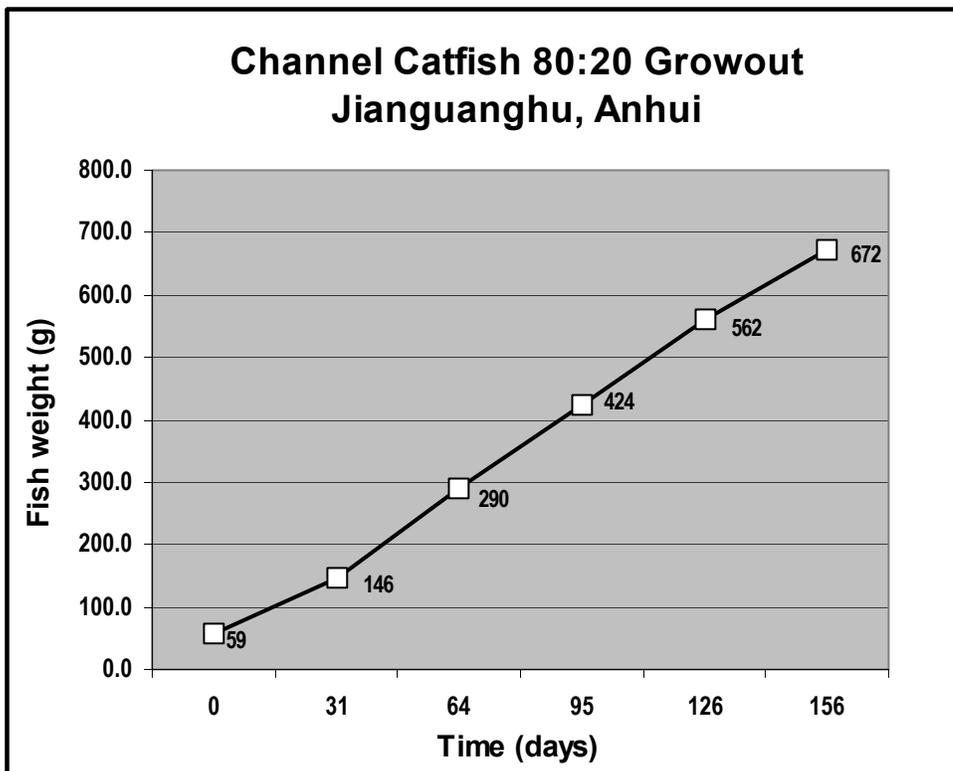


FIGURE 1. Growth curve for channel catfish produced in Anhui in a 2001 fingerling to market demonstration trial. Channel catfish grew from 59 g to 672 g in 156 days using the ASA 80:20 pond production model and extruded, soy-based growout feed. The production curve indicates that fish growth continued at a near-constant upward slope from the beginning to the end of the trial.

Table 1. Formula for the ASA 32/6, soymeal-based growout feed used in the 2001 channel catfish demonstration feeding trial at the Jianguanghu Fish Farm in Huainan City, Anhui Province, China. The feed was fed in extruded, floating pellet form to catfish from fingerling to market size.

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

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

ASA FY01 Anhui 80:20 Channel Catfish Trial

TABLE 2. Results of the 2001 ASA aquaculture trial at the Jianguanghu Fish Farm in Huainan City, Anhui Province, that demonstrated fingerling to market growth performance of channel catfish using the ASA 80:20 pond production model and soymeal-based growout aquafeed.

Pond No.	ChC 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 (%)
				ChC	SiC ²	ChC	SiC	ChC	SiC			
1	58.6	600	156	680	582	406.7	76.8	97.4	99.0	1.42	1706	37.1
2	58.5	600	156	661	605	395.6	78.2	87.5	97.0	1.46	1543	33.6
3	59.2	600	156	674	565	403.4	74.9	97.7	99.5	1.43	1651	35.9
Mean	58.8	600	156	672	584	401.9	76.6	94.1	98.5	1.44	1633	35.5

¹ChC = Channel Catfish

²SiC = Silver Carp

³P_G = Gross Production