

Pangasius Catfish Production in Ponds from Fry to Market Size with Soy-Based Feeds

Results of ASA/China 2003 Feeding Trials 35-03-111 and 35-03-112

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ABSTRACT

A two-stage feeding trial was conducted near Haikou, Hainan Province, to evaluate fry to market growth performance of pangasius catfish using the ASA 80:20 pond production model and ASA soymeal-based feeds. In the first stage, juvenile fish were stocked in three, 2.5-mu (0.17-ha) ponds at a density of 3,000 pangasius catfish and 1,000 silver carp per mu (45,000 catfish and 15,000 silver carp per hectare). Pangasius catfish grew from 0.1 g to an average weight of 190 g per fish in 103 days of feeding, with an average FCR of 1.10:1. At fish size 190 g, the fish were restocked at 700 pangasius catfish and 100 silver carp fingerlings per mu (10,500 catfish and 1,500 silver carp per hectare). Pangasius catfish grew from 190 g to an average weight of 880 g in 78 days, with an average FCR of 1.17:1. Total production time from fry (0.1-g) to market size (880 g) was 181 days. Pangasius catfish demonstrated excellent growth performance and feed conversion efficiency with the ASA soymeal-based feeds and 80:20 production technology throughout the production cycle. Harvested pangasius catfish were uniform in size with good body color and 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 6-month pond feeding demonstration trial with pangasius catfish. The objective of the trial was to demonstrate pangasius growth and economic performance from fry to market size in a two-stage production system with ASA soymeal-based feeds and the ASA 80:20 pond production model.

MATERIALS AND METHODS

Three ponds of average size 2.5-mu at the Hainan Fish Breeding Center in Haikou, Hainan, 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 0.1-g pangasius catfish *Pangasius sutchi* purchased by Hainan Fish Breeding Center from a breeding farm in Malaysia. A two-stage production system was used, in which pangasius were cultured from fry to advanced fingerling size in stage one, and then restocked at a lower density for culture to market size. In stage one, pangasius were stocked in the three trial ponds in March 2003 at a density of 3,000 fish per mu (45,000 fish per hectare), together with 1,000 silver carp fry per mu (15,000 fish per hectare).¹ Fish in all three trial ponds were of uniform size and age at stocking. Stage one target size for pangasius catfish was 150 g per fish, to coincide with size of fingerlings used in a growout study conducted by ASA at the Hainan fish Breeding Center in 2002. In stage two, pangasius were stocked in the three trial ponds at a density of 700 fish per mu (10,500 fish per hectare), together with 100 silver carp per mu (1,500 fish per hectare). Stage two target market size for pangasius catfish was ≥ 600 g.

Pangasius catfish were fed the ASA 41/11 fry feed in crumble form from fish size 0.1-g to fish size 2-g (Table 1). At size 2-g, the catfish were weaned to the ASA 36/7, soymeal-based fingerling feed in extruded, floating pellet form (Table 2). At fish size 190-g, the catfish were weaned to the ASA 32/6, soymeal-based growout feed in extruded, floating pellet form (Table 3). All feeds were formulated by ASA and produced by Cargill in Jiangsu Province. Fish 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 each stage of the trial, all ponds were drained and the pangasius and silver carp in each pond were counted and weighed to determine average fish weight, gross and net production, feed conversion ratio (FCR) and survival.

RESULTS

Pangasius were fed a total of 181 days between 14 March and 28 September 2003. In stage one, pangasius grew from 0.1 g to an average weight of 190 g in 103 days (Table 4). Gross production averaged 233.5 kg/mu (3,502.5 kg/ha) for pangasius and 13.9 kg/mu (208.8 kg/ha) for silver carp (Table 4).² Average pangasius catfish and silver carp survival rates were 41% and 96%, respectively. Average FCR for pangasius catfish with the ASA soymeal-based feeds in stage one was 1.10:1. Feed cost per kilogram of fish growth was RMB 3.98 (US\$0.48).³

In stage two, pangasius grew from 190 g to an average weight of 880 g in 78 days of feeding (Table 4). Gross production averaged 610 kg/mu (9,150 kg/ha) for pangasius and 34 kg/mu (510 kg/ha) for silver carp (Table 4). Average pangasius catfish and silver carp survival rates were 99% and 96.7%, respectively. Average FCR for pangasius catfish fed the ASA 32/6 all-plant protein, soymeal-based feed was 1.17:1 (Table 4). Feed cost per kilogram of fish growth was RMB 3.74 (US\$0.45). Net economic return was RMB 6,388.60 per mu (US\$773/mu), at a

¹ 15 mu = 1 hectare

² kg/mu x 15 = kg/ha

³ RMB 8.26 = US\$1.00

market price of RMB 20/kg for pangasius catfish. Pangasius were uniform in size and had good body coloration and conformation at harvest.

SUMMARY AND CONCLUSIONS

Pangasius catfish exhibited excellent growth and feed conversion efficiency with the soymeal-based fry, fingerling and growout feeds. Pangasius growth was rapid, with fish growing from 0.1 g to 880 g in 181 days, confirming the ability to produce market size fish from imported fry within a single growing season. Pangasius growth during stage two exceeded the target production size of 600 g by 47% in 78 days. Pangasius were aggressive feeders with the soy-based feeds. The catfish grew uniformly in size and had good body color and conformation at harvest. No disease problems were encountered during the trial. No drugs or chemicals were used, providing a healthy “green” market product.

Poor survival of pangasius catfish fry in stage one was the result of significant fish mortality that occurred on the second day after stocking fry in the three trial ponds. The high initial mortality rate was attributed to poor fish condition following air shipment from Malaysia.

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Chinese Currency and Production Unit Conversions:

RMB8.26 = 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

Table 1. Formula for the ASA 41/11¹, soymeal-based fry feed used in the 2003 pangasius catfish demonstration feeding trial in Haikou, Hainan Province, China. Cargill feed mill produced the feed in extruded, floating pellet form.

Ingredient	% of total
Soybean Meal 47.5	46.3
Wheat, SWW	13.0
Corn Gluten Meal 60%	15.0
Fishmeal, Anchovy 65/10	13.5
Fish Oil, Unspec.	3.93
Soy Oil	4.0
Soy lecithin	1.5
Ca Phosphate Mono	1.7
Vit PMX F-2	0.75
Min PMX F-1	0.25
Stay C-35%	0.05
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. 41/11 indicates 41% crude protein and 11% crude lipid.

Table 2. Formula for the ASA 36/7¹, soymeal-based fingerling feed used in the 2003 pangasius catfish demonstration 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	46.0
Wheat, SWW	19.0
Corn Gluten Meal 60%	10.0
Wheat middlings	8.0
Fishmeal, Anchovy 65/10	8.0
Fish Oil, Unspec.	4.0
Ca Phosphate Mono	2.2
Soy lecithin	1.75
Vit PMX-F2	0.75
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. 36/7 indicates 36% crude protein and 7% crude lipid.

Table 3. Formula for the ASA 32/6¹, soymeal-based growout feed used in the 2003 pangasius catfish demonstration 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 Pangasius Pond Feeding Trial

Table 4. Results of the two-stage, 2003 ASA aquaculture trial in Haikou that demonstrated fry to market pond growth performance of pangasius catfish using the ASA 80:20 production model and soymeal-based fry, fingerling and growout feeds.

Stage One												
Pond No.	PnG 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 (%)
				PnG	SiC ²	PnG	SiC	PnG	SiC			
1	0.1	3,000	103	205	150	250.1	14.4	40.7	96	1.04	-----	-----
2	0.1	3,000	103	180	148	222.5	14.4	41.2	97	1.15	-----	-----
3	0.1	3,000	103	185	136	227.9	12.9	41.0	95	1.12	-----	-----
Mean	0.1	3,000	103	190	145	233.5	9.5	41.0	96	1.10	-----	-----
Stage Two												
Pond No.	PnG 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 (%)
				PnG	SiC ²	PnG	SiC	PnG	SiC			
1	190	700	78	892	332	618.0	32.2	99.0	97	1.13	6,529	112
2	190	700	78	932	350	648.8	34.3	99.4	98	1.08	7,186	124
3	190	700	78	815	376	562.4	35.7	98.6	95	1.29	5,450	94
Mean	190	700	78	880	353	609.7	34.1	99.0	97	1.17	6,388	110

¹PnG = Pangasius Catfish

²SiC = Silver Carp

³P_G = Gross Production