Pacu *Piractus branchypomum* Production in Ponds with Soy-Based Feeds

Results of ASA/China 2002 Feeding Trial 35-02-109

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ABSTRACT

A feeding trial was conducted in Nanjing, Jiangsu Province, to demonstrate fingerling to market growth performance of pacu *Piractus branchypomum* using the ASA 80:20 pond production model and the ASA all-plant protein, soymeal-based growout feed. Fish were stocked in three, 4-mu ponds at a density of 900 pacu and 100 silver carp per mu. Pacu grew from 40 g to an average weight of 497 g per fish in 80 days of feeding. Gross production averaged 443 kg/mu for pacu and 102 kg/mu for silver carp. Average survival rates for pacu and silver carp were 99% and 98%, respectively. The soy-based feed yielded a FCR with pacu of 1.24:1. Average net economic return was RMB 715 per mu. Average return on investment (ROI) was 31.2%. This compared to an FCR of 2.84:1 with the farm's traditional feed, which yielded an ROI of –8.6%. Pacu demonstrated excellent growth performance and feed conversion efficiency with the ASA soymeal-based feed and 80:20 production technology in this trial. Pacu produced in the trial were uniform in size with good body color and conformation.

INTRODUCTION

The American Soybean Association (ASA), in cooperation with Jiangpu County Fishery Extension Station, the Jiangpu County Fish Stock and Breeding Farm in Nanjing, the Jiangsu Provincial Fisheries Extension Center, and the China National Fisheries Extension Center (NEC), conducted a three-month pond feeding trial with pacu. The objective of the trial was to demonstrate pacu growth and economic performance from fingerling to market stages with the ASA 32/6 soymeal-based growout feed and the ASA 80:20 pond production model.

MATERIALS AND METHODS

Three ponds of average size 4.0-mu at the Jiangpu County Fish Stock and Breeding Farm in Nanjing, Jiangsu 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. All ponds were cleaned of organic bottom mud and the ponds dikes rebuilt prior to commencement of the trial.

Fish were 40.5-g pacu *Piractus branchypomum* fingerlings produced at the Jiangpu County Fish Stock and Breeding Farm in Nanjing. Pacu were stocked in the three trial ponds in late May at a density of 900 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 pacu was 500 g per fish.

Pacu were fed the ASA 32/6 all-plant protein growout feed in extruded, floating pellet form (Table 1). The feed was 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 the trial, all ponds were drained and the pacu 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

Pacu were fed an average of 80 days between 23 May and 9 August 2002. Pacu grew from 40.5 g to an average weight of 496.6 g during this feeding period (Figure 1; Table 2). Gross production averaged 443.6 kg/mu (6,654 kg/ha) for pacu and 102 kg/mu (1,530 kg/ha) for silver carp (Table 2). Average pacu and silver carp survival rates were 99.2% and 98.3%, respectively. Average FCR for pacu with the 32/6 soymeal-based feed was 1.24:1. Harvested pacu were very uniform in size and had good body coloration and conformation.

Net economic return averaged RMB 714.7 per mu at a market price of RMB 6.0/kg for pacu and RMB 3.4/kg for silver carp (Table 2). ROI averaged 31.2% for the three trial ponds (Table 2).

SUMMARY AND CONCLUSIONS

Pacu exhibited excellent growth and feed conversion efficiency using the ASA 80:20 pond production model and the soy-based 32/6 growout feed. Pacu exhibited rapid growth on the soy-based feed, growing from 40 g to 497 g in just 80 days. This was 40% faster than the allotted 135 days for the fish to attain a target market size of 500 g, and demonstrated the excellent production potential of this species with soy feed.

Pacu were aggressive feeders with extruded, soy-based feed. The pacu grew rapidly and had uniform size and good body color and conformation at harvest. The ASA soy-based feed was more efficient than the local sinking feed used by the farm. More than twice as much local sinking feed was required to produce 550-g pacu in a separate pond. An average of 2,028 kg of feed per pond was used in ASA ponds, in comparison to 5,178 kg of sinking feed in the local feed pond used for comparison. FCR of 1.24:1 with the ASA soy-based feed was also less than half that of the 2.84:1 obtained with the local feed. Feed cost per kilogram of fish growth was 43% higher with the local sinking feed than with the ASA extruded feed. Feed cost per kilogram of fish growth was RMB 3.66 with the ASA extruded feed, in comparison to RMB 5.25 with the local sinking feed.

The extruded, soy-based feed also demonstrated other advantages. These included:

- Easier observation of fish feeding performance and fish health
- Better fish health, with no disease

- Reduced labor costs and increased farm efficiency
- Improved water quality, which reduced energy use
- Better profit

ACKNOWLEGEMENTS

ASA gratefully acknowledges the Jiangpu County Fishery Extension Station, the Jiangpu County Fish Stock and Breeding Farm, the Jiangsu Provincial Fisheries Extension Center, and the China National Fisheries Technology Extension Center for their assistance and support for this aquaculture trial.

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

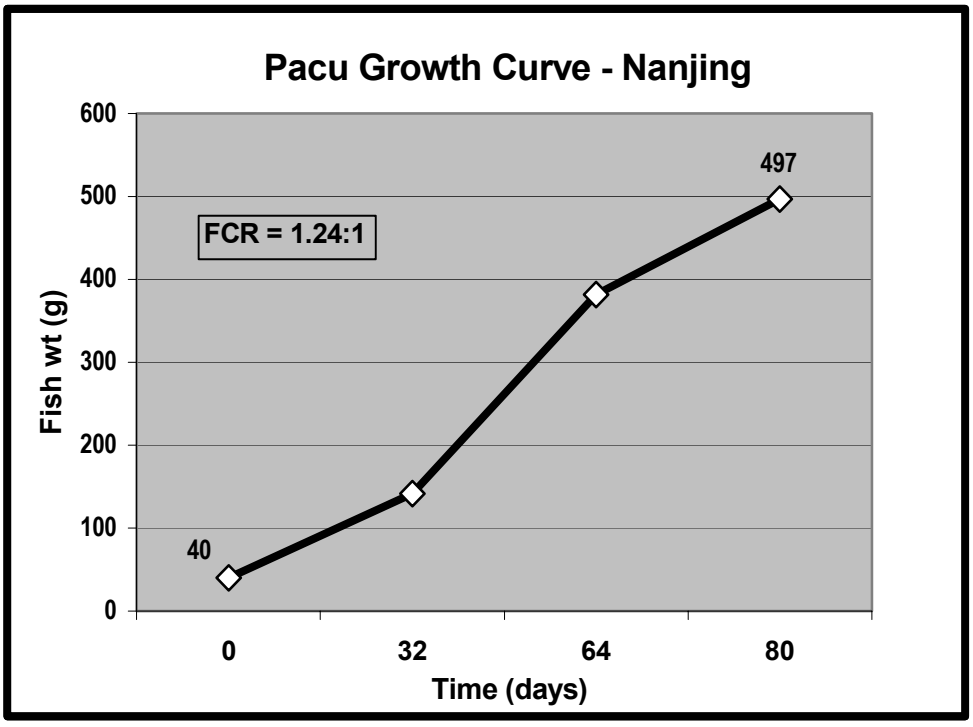

FIGURE 1. Growth curve for pacu produced in ponds with an extruded, soymeal-based aquafeed. Pacu grew from 40 g to 497 g in 80 days with an average feed conversion ratio of 1.24:1. Feed cost per kilogram of fish growth with the extruded feed was RMB 3.66.

Table 1. Formula for the ASA 32/6, soymeal-based growout feed used in the 2002 pacu demonstration feeding trial in Nanjing, Jiangsu Province, China. Cargill feed mill produced the feed 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 in Nanjing that demonstrated fingerling to market pond growth performance of pacu using the ASA 80:20 production model and soymeal-based growout feed.

Pond No.	Pacu stocking size (g)	Stocking rate (fish/mu)	No. days fed	Harvest wt. (g)		P_G[2] (kg/mu)		Survival (%)		FCR	Net (RMB/mu)	ROI (%)
				Pacu	SiC[1]	Pacu	SiC	Pacu	SiC			
1	40.5	900	79	505	1,187	357.0	119	99.5	100	1.18	868.4	38.6
2	40.5	900	81	503	1,013	372.7	100	99.8	99	1.23	742.0	32.1
3	40.5	900	82	482	902	366.5	87	98.4	96	1.32	533.8	23.0
Mean	40.5	900	80	497	1,034	365.4	102	99.2	98.3	1.24	714.7	31.2

[1]SiC = Silver carp

[2]P_G = Gross Production