

Crucian Carp Fingerling to Market Growout in Chengdu with a Soymeal-Based Diet

Results of ASA/China 2000 Feeding Trial 35-00-100

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ABSTRACT

Crucian carp fingerlings were grown to market size in ponds in Chengdu using the ASA 80:20 production model and a combination of local and ASA soymeal-based growout feeds. Fish were stocked in three ponds of approximately 3-mu each at 2,000 crucian carp per mu together with 150 silver carp fingerlings per mu. Crucian carp were stocked at size 20 g and grew to an average weight of 214 g per fish in 164 days of feeding. Gross production averaged 406 kg/mu for crucian carp and 137 kg/mu for silver carp. Net production for crucian carp averaged 366 kg/mu for the 9.9 mu of trial ponds. Average crucian carp survival was 95%. FCR for the combination of local and ASA feeds was 1.63:1. Net economic return was RMB 645 per mu. ROI ranged from 10% to 30.4% for the three trial ponds. The average ROI for the three ponds was 21.2%. Low economic return in one of the ponds was the result of a silver carp fish kill in mid-August. Results of the feeding demonstration showed that crucian carp reached the target market size 15 days ahead of schedule using the ASA technology and feed.

INTRODUCTION

The American Soybean Association (ASA), in cooperation with the China National Fisheries Extension Center (NEC) and the Sichuan Provincial Fisheries Bureau, conducted a 5.5-month feeding trial with crucian carp at the Wen Jing Fish Farm in Xing Jing County, Chengdu, Sichuan Province. The objective of the trial was to demonstrate crucian carp growth and economic performance from fingerling to market size with ASA soymeal-based, extruded feeds and the ASA 80:20 pond production model.

MATERIALS AND METHODS

Three (3) ponds of size 3.1-mu, 3.3-mu and 3.5-mu at the Wen Jing Fish Farm in Xing Jing County, Chengdu, Sichuan Province were used for this trial. Fish were local Ma Ji strain crucian carp fingerlings that were produced by the Wen Jing Fish Farm in fed polyculture ponds in 1999.

Crucian carp fingerlings of size 20 g were stocked in the three trial ponds at a density of 2,000 crucian carp per mu together with 150 silver carp fingerlings per mu. Crucian carp were scheduled to be fed soymeal-based fingerling and growout feeds formulated by ASA (Table 1).

The ASA 36/7 fingerling feed was scheduled to be fed from fish size 20 g to 40 g, followed by the ASA 32/6 growout feed from fish size 40 g to the target market fish size of ≥ 200 g. Fish feeding rate and frequency varied with fish size and water temperature following ASA guidelines.

Trial management was based on the ASA 80:20 pond production model. Pond water depth averaged approximately 1.5 m. All ponds were equipped with water exchange and stand-by aeration.

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 crucian carp and silver carp in each pond counted and weighed to determine average fish weight, gross and net production, feed conversion ratio (FCR) and survival.

RESULTS

The Wen Jing Fish Farm was unable to obtain the ASA 36/7 fingerling feed and instead fed a locally formulated growout diet for approximately the first month. Crucian carp were switched to the ASA 32/6 growout feed when they reached approximately 50 g in weight. The Chengdu Phoenix feed mill produced both the local and ASA growout diets in extruded (floating) pellet form.

Crucian carp were fed a total of 164 days between April and September 2000. Crucian carp grew from 20 g to 214 g during this feeding period (Table 2). Gross production averaged 406 kg/mu (6,090 kg/ha) for crucian carp and 137 kg/mu (2,055 kg/ha) for silver carp (Table 2). Net production for crucian carp averaged 368 kg/mu (5,520 kg/ha) for the 9.9 mu (0.66-ha) of trial ponds. Average crucian carp survival was 95%. FCR for the combination of local and ASA feeds averaged 1.63:1.

Net economic return for the demonstration trial was RMB 645.06 per mu (Table 2). ROI ranged from 10% to 30.4% for the three trial ponds (Table 2). The average ROI for the three ponds was 21.2%. Low economic return in one of the ponds was the result of a silver carp fish kill in mid-August.

SUMMARY AND CONCLUSIONS

Crucian carp reached the target market size of ≥ 200 g approximately 15 days ahead of schedule using the ASA technology and feed. The combination of ASA's 80:20 feed-based technology and soy meal-based feed produced rapid fish growth, good feed conversion efficiency and a $>20\%$ return to investment. Harvesting was conducted when crucian carp carrying capacity reached >400 kg/mu. Restricting carrying capacity to approximately 400 kg/mu, together with the use of high quality feeds, resulted in good fish health and no fish disease problems. The use of nutritionally balanced, extruded feeds permitted close monitoring of fish feeding performance and fish health.

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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

Table 1. ASA feed formulations for the fingerling and growout rations in the 2000 crucian carp demonstration feeding trial at the Wen Jing Fish Farm in Xing Jing County, Chengdu, Sichuan Province, China.

Ingredient	Fingerling Feed	Growout Feed
Soybean meal 47.5	46.30	52.80
Wheat, SWW	19.00	23.60
Wheat midds	8.00	10.00
Corn gluten meal 60%	10.00	6.00
Fishmeal, Anchovy 65/10	8.00	-----
Fish oil	4.58	3.53
Soy lecithin	1.50	1.00
Ca phosphate mono	2.20	2.70
Vit PMX Roche 2118	0.15	0.10
Min PMX F-1	0.25	0.25
Ethoxyquin	0.02	0.02
Total	100.00	100.00

TABLE 2. Results of the 2000 ASA aquaculture trial at the Chengdu Wen Jing Fish Farm that demonstrated fingerling to market pond production performance of crucian carp using the ASA 80:20 production model and ASA soymeal-based growout feed.

Pond No.	Fish stocking size (g)	Stocking rate (fish/mu)	No. days fed	Harvest wt. (g)		P _G ³ (kg/mu)		P _N ⁴ (kg/mu)		Survival (%)	FCR	Net (RMB)	ROI (%)
				CrC ¹	SiC ²	CrC	SiC	CrC	SiC				
7	20	2000	164	229.9	714	441.5	150.9	401.5	128.4	96	1.48	938	30.4
8	20	2000	164	202.2	300 ⁵	383.9	111.3 ⁵	343.9	73.6	95	1.73	308	10.0
9	20	2000	164	208.8	610	392.6	150.0	352.6	127.5	94	1.68	689	23.2
Mean	20	2000	164	213.6	541	406.0	137.4	366.0	109.8	95	1.63	645	21.2

¹CrC = crucian carp

²SiC = Silver carp

³P_G = Gross Production

⁴P_N = Net Production

⁵Lower production of silver carp in pond 8 was the result of a silver carp fish kill in mid-August and restocking of silver carp fingerlings as replacements for fish that were killed