

# **Grass Carp Fingerling to Market Growth Performance in Ponds in Harbin on a Soymeal-Based Feed**

## **Results of ASA/China 2000 Feeding Trial 35-00-098**

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### **ABSTRACT**

A feeding trial was conducted at the Jin Shan Bao Fish Farm in Harbin, Heilongjiang Province, to demonstrate the fingerling to market growth performance of grass carp using the ASA 80:20 pond production model and a soymeal-based growout feed in northeastern China. Harbin is located at 46° north latitude. Fish were stocked in two ponds of approximately 5-mu size at densities of 600 grass carp and 100 silver carp fingerlings per mu. Grass carp grew from 60 g to an average weight of 777 g per fish in 138 days of feeding. Gross production averaged 424 kg/mu for grass carp and 87 kg/mu for silver carp. Average survival rates for grass carp and silver carp were 91% and 98%, respectively. Grass carp FCR with the all-plant protein, soymeal-based feed was 1.54:1. Average net economic return was RMB 896 per mu, for an average return on investment of 36.8%. Results of the feeding demonstration showed that grass carp fed well on the extruded, floating feed, and exhibited good growth performance, FCR, survival and economic return with the ASA soymeal-based feed and 80:20 production technology.

### **INTRODUCTION**

The American Soybean Association (ASA), in cooperation with the China National Fisheries Extension Center (NEC), the Heilongjiang Provincial Fisheries Extension Center, and the Jin Shan Bao Fish Farm in Harbin, conducted a 4.6-month 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 a soymeal-based, extruded feed and the ASA 80:20 pond production model.

### **MATERIALS AND METHODS**

Two ponds of size 5.0-mu and 4.9-mu at the Jin Shan Bao Fish Farm in Harbin, Heilongjiang Province, were used for the feeding trial. The trial farm was located at approximately 46° north latitude in northeastern China. Pond water depth averaged approximately 1.5 m. All ponds were equipped with water exchange and stand-by aeration.

Fish were 60-g grass carp fingerlings produced in an ASA fry to fingerling feeding trial in 1999 at the Jin Shan Bao Fish Farm, and over-wintered in ponds at the farm. Grass carp were stocked in the two trial ponds in May 2000 at a density of 600 fish per mu, together with 100 silver carp fingerlings per mu. Fish were of uniform size and age at stocking.

Grass carp were fed a 32% crude protein, 6% crude fat aquafeed formulated by ASA. The feed was an all-plant protein ration formulated with dehulled soybean meal as the primary protein source (Table 1). The feed was fed in extruded, floating pellet form. 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. 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 grass 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**

Grass carp were fed a total of 138 days between May and September 2000. Grass carp grew from 60 g to an average weight of 777 g during this feeding period (Figure 1; Table 2). Gross production averaged 424 kg/mu (6,360 kg/ha) for grass carp and 87 kg/mu (1,305 kg/ha) for silver carp (Table 2). Net production averaged 388 kg/mu (5,820 kg/ha) for grass carp and 50.5 kg/mu (757.5 kg/ha) for silver carp (Table 2). The ratio of fed grass carp to filtering silver carp at harvest was 83:17. Average grass and silver carp survival rates were 91.1% and 98.0%, respectively. Average FCR with the soymeal-based feed was 1.54:1.

Net economic return for the demonstration trial was RMB 896 per mu at a market price of RMB 7.50/kg for grass carp and RMB 3.40/kg for silver carp (Table 2). ROI averaged 36.8% for the two trial ponds (Table 2).

## **SUMMARY AND CONCLUSIONS**

Grass carp exhibited good growth, FCR, survival and economic return when cultured using the ASA 80:20 pond production model and a 32/6 growout feed formulated with dehulled soybean meal as the primary protein source. Average growth of 5.2 grams per day was excellent for the northeastern region of China, where average afternoon water temperatures were only 19° C in the first and last month of the grass carp culture period. Harbin is located at 46° N. latitude.

## **ACKNOWLEDGEMENTS**

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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

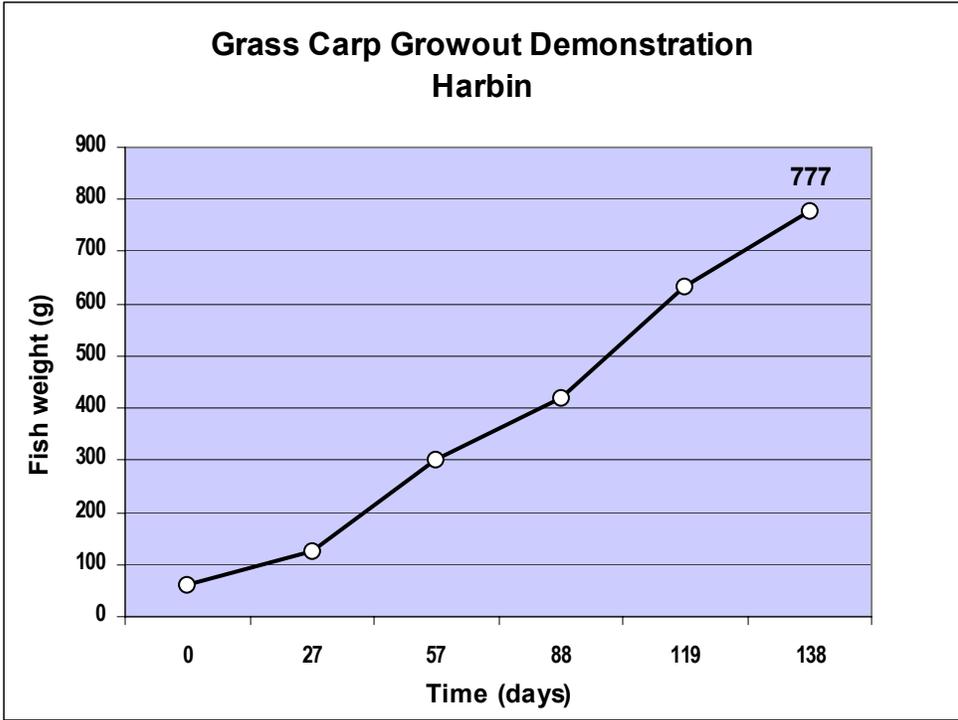


FIGURE 1. Growth curve for grass carp produced in Harbin, northeastern China, with a soymeal-based aquafeed formulated to contain 32% crude protein and 6% fat and fed in extruded, floating pellet form. Grass carp grew an average of 5.2 grams per day over the 138-day feeding period.

Table 1. Formula for the ASA 32/6, soymeal-based growout feed used in the 2000 grass carp demonstration feeding trial at the Jin Shan Bao Fish Farm in Harbin, Heilongjiang Province, China.

Ingredient	32/6 Growout Feed <sup>1</sup>
Soybean meal 47.5	52.80
Wheat, SWW	23.60
Wheat middlings	10.00
Corn gluten meal 60%	6.00
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

<sup>1</sup>The 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.

TABLE 2. Results of the 2000 ASA aquaculture trial at the Jin Shan Bao Fish Farm in Harbin that demonstrated fingerling to market pond growth performance of grass carp using the ASA 80:20 production model and an extruded, soymeal-based aquafeed.

Pond No.	GrC <sup>1</sup> stocking size (g)	Stocking rate (fish/mu)	No. days fed	Harvest wt. (g)		P <sub>G</sub> <sup>3</sup> (kg/mu)		P <sub>N</sub> <sup>4</sup> (kg/mu)		Survival (%)		FCR	Net (RMB/mu)	ROI (%)
				GrC	SiC <sup>2</sup>	GrC	SiC	GrC	SiC	GrC	SiC			
304	60	600	138	750	880	409.4	86	373.4	50	91.0	98.0	1.58	804	35.6
305	60	600	138	803	886	439.2	87	403.2	51	91.2	98.0	1.49	998	38.0
<b>Mean</b>	<b>60</b>	<b>600</b>	<b>138</b>	<b>777</b>	<b>883</b>	<b>424.3</b>	<b>86.5</b>	<b>388.3</b>	<b>50.5</b>	<b>91.1</b>	<b>98.0</b>	<b>1.54</b>	<b>896</b>	<b>36.8</b>

<sup>1</sup>GrC = Grass carp

<sup>2</sup>SiC = Silver carp

<sup>3</sup>P<sub>G</sub> = Gross Production

<sup>4</sup>P<sub>N</sub> = Net Production