

# **Pangasius Catfish Production in LVHD Cages with a Soy-Based Feed**

## **Results of ASA/China 2003 Feeding Trial 35-03-114**

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### **ABSTRACT**

A feeding trial was conducted in a reservoir near Haikou, Hainan Province, to evaluate fingerling to market growth performance of pangasius catfish using the ASA LVHD cage production model and ASA soymeal-based feed. Pangasius catfish stocked in three, 1-m<sup>3</sup> cages at a density of 400 fish per m<sup>3</sup> grew from 190 g to 702 g in 78 days on a 32% crude protein, soybean meal-based, all-plant protein diet. Average FCR for the 78-day feeding period was 1.31:1. Gross production of pangasius catfish averaged 280 kg/m<sup>3</sup> in the three trial cages. Pangasius catfish growth in LVHD cages exceeded the target market size of 600-g by 17% in 78 days, but fish growth in cages was slower than in ponds in a comparison pond trial conducted adjacent to the reservoir. Pangasius catfish in ponds grew to 880-g in the same 78-day period, with an average FCR of 1.17:1. Pangasius catfish harvested from the three trial cages were uniform in size and had 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 3-month cage feeding demonstration trial with pangasius catfish. The objectives of the trial were to evaluate pangasius growth and economic performance from fingerling to market size in 1-m<sup>3</sup> cages using the ASA LVHD cage technology and the ASA 32/6 soymeal-based feed, and to compare pangasius catfish performance in cages against pangasius performance in ponds. A comparison pond trial was conducted at the same time as the cage trial with advanced fingerling fish from the same population.

### **MATERIALS AND METHODS**

Three, 1-m<sup>3</sup> cages at the Hainan Fish Breeding Center in Haikou, Hainan, were used for the feeding trial. The cages were stocked in a water supply reservoir near the Hainan Fish Breeding

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Center Farm. The cages were constructed of nylon netting over a rigid frame, with an opaque cover as described in the ASA publication *Principles and Practices of High Density Fish Culture in Low Volume Cages*. The cages were constructed using the ASA floating feed cage model. Cage placement was in a single row with a minimum spacing of one cage width between and on all sides of each cage.

Fish were 190-g pangasius catfish *Pangasius sutchi* produced in the ASA fry-fingerling pond feeding trial conducted immediately prior to the cage trial. Catfish were stocked in the three trial cages at a density of 400 fish/m<sup>3</sup>. Fish in all three trial cages were of uniform size, age and genetic background at stocking. Target market size for pangasius catfish was 600 g.

Pangasius catfish were fed the ASA 32/6, soymeal-based growout feed in extruded, floating pellet form (Table 1). The feed was formulated by ASA and produced by Cargill at its aquafeed mill in Jiangsu Province. Fish were fed to satiation twice daily, with fish in all three cages fed identically at each feeding.

Trial management was based on the ASA LVHD cage production model. Fish in all cages were sampled once per month on approximately the same date each month. At the conclusion of the trial, all cages were emptied and the pangasius catfish in each cage 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 78 days between 11 July and 28 September 2003. Pangasius grew from 190 g to an average weight of 702 g in 78 days of feeding (Table 2). Gross production in 1-m<sup>3</sup> cages averaged 280 kg/m<sup>3</sup> (Table 2). Average pangasius catfish survival rate was 99.7%. Average FCR for pangasius catfish fed the ASA 32/6 all-plant protein, soymeal-based feed was 1.31:1 (Table 2). Average feed cost per kilogram of fish growth was RMB 4.19 (US\$0.51). Net economic return was RMB 1,102.10 per m<sup>3</sup> (US\$133.43/m<sup>3</sup>), at a 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 in LVHD cages with the extruded soymeal-based, all-plant protein growout feed. Pangasius growth was rapid, with fish growing from 190 g to 702 g in 78 days, with an average FCR of 1.31:1. Gross production of pangasius catfish averaged 280 kg/m<sup>3</sup> in the three trial cages. Pangasius catfish growth in LVHD cages exceeded the target market size of 600-g by 17% in just 78 days, but growth was slower in cages than in a comparison pond trial conducted at the same time in ponds near the reservoir. Pangasius catfish from the same fingerling stock grew to 880-g in ponds during the same 78-day period, with an average FCR of 1.17:1.

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Pangasius in cages were aggressive feeders with the soy-based feeds. Pangasius catfish harvested from the three trial cages were uniform in size and had good body color and conformation. No disease problems were encountered during the trial. No drugs or chemicals were used in the trial, providing a healthy “green” market product.

### **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

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Table 1. Formula for the ASA 32/6<sup>1</sup>, soymeal-based growout feed used in the 2003 pangasius catfish LVHD cage 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

<sup>1</sup>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.

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Table 2. Results of the 2003 ASA aquaculture trial in Haikou that demonstrated fingerling to market growth performance of pangasius catfish using the ASA LVHD cage production model and extruded, soymeal-based growout feed.

Cage No.	PnG <sup>1</sup> stocking size (g)	Stocking rate (fish/m <sup>3</sup> )	No. days fed	Harvest wt. (g)	P <sub>G</sub> <sup>2</sup> (kg/m <sup>3</sup> )	Survival (%)	FCR	Net (RMB/m <sup>3</sup> )	ROI (%)
1	190	400	78	710	282	99	1.04	1,140	25.3
2	190	400	78	690	276	100	1.15	1,022	22.7
3	190	400	78	705	282	100	1.12	1,142	25.4
Mean	190	400	78	702	280	99.7	1.10	1,102	24.5

<sup>1</sup>PnG = Pangasius Catfish

<sup>2</sup>P<sub>G</sub> = Gross Production