Growth Performance of Normally Pigmented and Albino Channel Catfish in LVHD Cages in Min Qing Reservoir, Fujian Province

Results of ASA/China 2000 Feeding Trial 35-00-104

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ABSTRACT

Growth performance of normally pigmented and albino channel catfish was compared in cages at Min Qing Reservoir in Fujian Province. Catfish were cultured in floating cages using the ASA LVHD cage technology model and a soymeal-based, 32% protein floating feed. Normally pigmented and albino channel catfish were stocked in six, 1-m^3 cages at a density of 400 fish/m^3. Each treatment was replicated in three cages. Normally pigmented channel catfish grew from 83 g to 494 g in 142 days of feeding. Albino catfish grew from 83 g to 392 g in the same period. FCR was 1.56:1 for the normal catfish and 1.67:1 for the albino catfish. Gross production and survival averaged 193.8 kg/m^3 and 90.4% for the normal catfish, and 148.8 kg/ m^3 and 91.5% for the albino catfish. Fish growth, survival and production per m^3 were significantly higher ($P<0.05$) for the normally pigmented catfish group, but there was no significant difference in FCR ($P>0.05$) for the two groups. Average net economic return and ROI for the normal catfish were RMB 1,384/m^3 and 72.4%, respectively. Average net economic return and ROI for the albino catfish were RMB 1,309/m^3 and 70.8%. Net return and ROI were significantly different ($P<0.05$). Normally pigmented catfish yielded a higher net return and ROI than albino catfish, despite albino catfish having a 29% higher market value. Results of this trial were opposite of U.S. studies that found no production differences between normally pigmented and albino channel catfish, and indicate there is probably significant inbreeding in the albino catfish stock tested in this trial.

INTRODUCTION

The American Soybean Association (ASA), in cooperation with the China National Fisheries Extension Center (NEC), the Fujian Provincial Fisheries Extension Center, and the Wang Jin Cheng cage fish farm at Min Qing Reservoir, conducted a 5-month feeding trial with channel catfish. The objective of the trial was to compare the growth and economic performance of normally pigmented and albino channel catfish from fingerling to market stages with a soymeal-based, extruded aquafeed and the ASA LVHD cage production model.

MATERIALS AND METHODS

Six, 1-m^3 floating cages at the Wang Jin Cheng cage fish farm at Min Qing Reservoir, Fujian Province, were used for the feeding trial. Cages were constructed of mesh netting with a solid rim frame and suspended feeding ring. Three cages were stocked with 83-g, normally pigmented channel catfish fingerlings and three cages were stocked with 83-g, albino channel catfish fingerlings. Catfish of each pigment treatment were randomly assigned to the six cages. Catfish in all cages were stocked at 400 fish per m^3. Catfish were of uniform size and age at stocking.

Catfish in all cages were fed a 32% crude protein, 6% crude fat aquafeed formulated by ASA and produced by the Shanghai Fwusow aquafeed mill. 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 were fed to satiation to permit expression of maximum genetic growth performance. Fish in replicate cages of each treatment were fed identically.

Trial management was based on the ASA LVHD cage production model. Fish in all cages were sampled once per month on the same date each month. At the conclusion of the trial, all cages were harvested and the catfish in each cage separately counted and weighed to determine average fish weight, gross and net production, feed conversion ratio (FCR) and survival.

RESULTS

Catfish in all six cages were fed a total of 142 days between May and October 2000. Normally pigmented channel catfish grew from 83 g to an average weight of 494 g during this feeding period (Figure 1; Table 2). Albino catfish grew from 83 g to an average weight of 392 g during the feeding period (Figure 1; Table 2). Average FCR was 1.56:1 for the normal catfish and 1.67:1 for the albino catfish. Gross production and survival averaged 193.8 kg/m^3 and 90.4% for the normal catfish, respectively, and 148.8 kg/ m^3 and 91.5% for the albino catfish. Net production averaged 160.5 kg/m^3 for normal catfish and 110.3 kg/m^3 for albino catfish. Fish growth, survival and production per m^3 were significantly different ($P<0.05$), with the normally pigmented catfish outperforming the albino catfish. There was no significant difference in FCR ($P>0.05$) for the two groups.

Average net economic return and ROI for the normal catfish were RMB 1,384.20/m^3 and 72.4%, respectively, at a fish market price of RMB 17/kg. Average net economic return and ROI for the albino catfish were RMB 1,309.00/m^3 and 70.8%, at a fish market price of RMB 22/kg. Net return and ROI were significantly different ($P<0.05$), with the normally pigmented catfish yielding a higher income and ROI, despite the albino catfish having a 29.4% higher market value.

SUMMARY AND CONCLUSIONS

Normally pigmented channel catfish exhibited good growth and FCR with the soymeal-based feed and ASA LVHD cage technology. Growth performance of the normally pigmented catfish was substantially better than that of the albino catfish. The results of this trial are opposite of studies conducted in the United States that demonstrated no difference in growth performance between normally pigmented and albino channel catfish. Results of the trial at Min Qing Reservoir indicate that there is probably significant inbreeding depression in the albino catfish stock tested in this cage trial.

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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

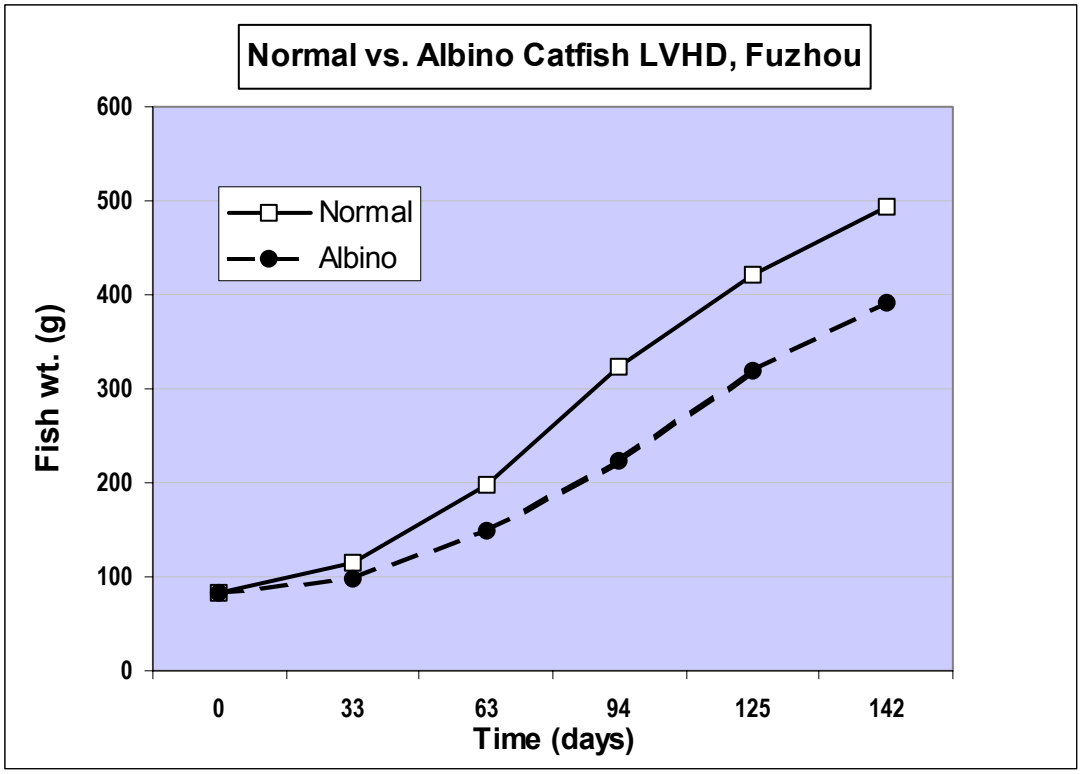

FIGURE 1. Growth curves for normally pigmented and albino channel catfish produced in 1-m^3 cages at a density of 400 fish/m^3 in Min Qing Reservoir, Fujian Province. Catfish were fed for 142 days with a soymeal-based aquafeed formulated to contain 32% crude protein and 6% fat and fed in extruded, floating pellet form. Normally pigmented catfish significantly outperformed the albino catfish, indicating significant inbreeding depression in the albino catfish strain.

Table 1. Formula for the ASA 32/6, soymeal-based growout feed used in the 2000 channel catfish feeding trial that compared growth performance of normally pigmented and albino channel catfish in 1-m^3 cages at the Min Qing Reservoir in Fujian Province, China.

Ingredient	32/6 Growout Feed[1]
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

[1]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 Min Qing Reservoir, Fujian Province, that compared fingerling to market growth performance of normally pigmented and albino catfish in 1-m^3 cages using the ASA LVHD production model and an extruded, soymeal-based aquafeed.

ChC[1] type	Stocking size (g)	Stocking rate (fish/m^3)	No. days fed	Harvest wt. (g)	P_G[2] (kg/m^3)	P_N[3] (kg/m^3)	Survival (%)	FCR	Fish price (RMB/kg)	Net income (RMB/m^3)	ROI (%)
Normal	83	400	142	493.6[a]	193.8[c]	160.5[e]	90.4[g]	1.56[i]	17.00[j]	1,384.20[l]	72.4[n]
Albino	83	400	142	392.3[b]	148.8[d]	110.3[f]	91.5[h]	1.67[i]	22.00[k]	1309.00[m]	70.8[p]

[1]ChC = Channel catfish

[2]P_G = Gross Production

[3]P_N = Net Production

Numbers in the same column followed by the same superscripted letter are not significantly different ($P>0.05$); numbers in the same column followed by different superscripted letters are significantly different ($P<0.05$).