

Japanese Sea Bass (*Lateolabrax japonicus*) Growth in 8.0-m³ Cages with Soybean Meal and Fishmeal Based Feed Rations

Results of ASA/China 1999 Feeding Trial 35-99-74

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ABSTRACT

Japanese Sea Bass (*Lateolabrax japonicus*) growth in cages was evaluated with two isocaloric and isonitrogenous feed rations formulated to contain 43% protein and 12% fat. One ration was formulated predominantly with fishmeal, while the other ration contained 40% dehulled soybean meal. Fish were stocked in 8.0-m³ cages at 350 fish per m³ and fed for 153 days. Sea bass grew from 3 g to 297 g with the soy-based ration, and from 3 g to 289 g with the fishmeal-based ration. There was no significant difference in fish growth ($P>0.05$) with the two feeds. FCR averaged 1.53:1 and 1.55:1 for the soy-based and fishmeal-based rations, respectively. Survival averaged 50% for all cages and treatments. This was the first phase of a two-phase trial. Fish will be grown to a ≥ 500 g market size during the year 2000 phase two component of the trial.

INTRODUCTION

The American Soybean Association (ASA), in cooperation with the Ping Yang County Fisheries Bureau of Zhejiang Province, conducted a feeding trial in 1999 to evaluate Japanese sea bass (*Lateolabrax japonicus*) growth in cages using ASA LVHD technology and manufactured feeds. Prior to this, sea bass production along the coast of China depended on fresh fish for feeding fish in cages. The objectives of the trial were to demonstrate the feasibility of producing Japanese sea bass with manufactured feeds, to begin establishing feed-based parameters for this species, and to evaluate the feasibility of using high protein, dehulled soybean meal as a primary protein source in feed for sea bass.

MATERIALS AND METHODS

Fish for the trial were 3.0-g Japanese sea bass (*Lateolabrax japonicus*) fingerlings. The fingerlings had been fed from the advanced fry stage to 3 g with fresh fish ground to a paste. Prior to starting the trial, the fingerlings were weaned from the fresh fish paste to one of two manufactured feed rations. Weaning was done over a 5-day period by gradually replacing the fresh fish paste with manufactured feed pellets.

Six, 8.0-m³ cages outfitted with opaque covers and enclosures for floating feed were used for the trial. Fish in three of the cages were fed a fishmeal-based ration (Table 1). Fish in the other three cages were fed a soy-based ration formulated with 40% dehulled soybean meal (Table 1). The two manufactured rations were formulated to be isocaloric and isonitrogenous, with 43% protein and 12% fat. Both rations were fed in extruded (floating) pellet form, with an initial

pellet size of 1.5 mm. Fish were fed *ad libitum*, with fish in all cages receiving the same amount of feed. The two feed rations were randomly assigned to the six cages, with three replicates of each feed ration.

The fish were stocked in cages at Nan Ji Island, off the coast from Wenzhou, Zhejiang Province, China, on 10 June 1999. Cages were arranged according to ASA guidelines, with a minimum of one cage width of open space between cages in all directions. 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 fish in each cage counted and weighed to determine average fish weight, gross and net production, feed conversion and survival.

RESULTS

Fish were fed a total of 153 days between 10 June and 11 November 1999. Japanese sea bass receiving the soy-based ration grew from 3 g to 297 g during the 153-day feeding period (Table 2). Sea bass receiving the fishmeal-based ration grew from 3 g to 289 g. Fish growth was not significantly different ($P>0.05$) with the two feed rations.

Net production averaged 50.3 kg/m³ and 49.5 kg/m³ for fish fed the soy-based and fishmeal-based rations, respectively (Table 2). FCR was 1.53:1 with the soy-based ration and 1.55:1 with the fishmeal-based ration. Survival was 50.3% and 49.5%, respectively, with the soy-based and fishmeal-based rations.

SUMMARY AND CONCLUSIONS

Feed-based production of Japanese sea bass in cages using manufactured feed rations was demonstrated to be feasible. The use of high protein, dehulled soybean meal at an inclusion rate of 40% produced equivalent fish growth in comparison to fish growth with a ration formulated with predominantly fishmeal. Sea bass grew from 3 g to approximately 300 g in 153 days with the soy-based ration. Excellent feed conversion efficiency was obtained with both the soy and fishmeal based feed rations. However, price of the soy-based feed ration (RMB5,000/mt) was 10% less than that of the fishmeal based ration (RMB5,500/mt), which yielded significant savings in feed costs.

The 1999 trial was the first phase of a two-phase trial designed to produce market size Japanese sea bass of ≥ 500 g in weight. Phase two sea bass growout to market size will take place in a follow-on ASA feeding trial in year 2000.

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Chinese Currency and Production Unit Conversions:

RMB 8.26 = US\$1.00
1.0 kg = 2.2 lb

TABLE 1. Diet formulations for the soybean meal and fishmeal based ASA aquafeed rations tested in the 1999 Japanese sea bass (*Lateolabrax japonicus*) cage trial at Nan Ji Island, Zhejiang Province, China. The two rations were formulated to be isocaloric and isonitrogenous, with 43% protein and 12% fat.

Ingredient	Soybean Meal Based Ration	Fishmeal Based Ration
Dehulled soybean meal (47.5%)	40.0	18.5
Fishmeal, anchovy 65/10	34.0	44.0
Wheat, SWW	16.5	25.0
Fish oil	8.03	7.03
Corn gluten meal (60%)	1.00	5.00
Mineral premix	0.25	0.25
Vitamin premix Roche 2118	0.20	0.20
Ethoxyquin	0.02	0.02
TOTAL	100.00	100.00

TABLE 2. Results of the 1999 ASA aquaculture trial to evaluate Japanese sea bass (*Lateolabrax japonicus*) growth performance in 8.0-m³ cages with soybean meal and fishmeal based aquafeed rations.

Feed ration	Stocking rate (fish/m ³)	No. days fed	Fish harvest weight (g)	Net production (kg/m ³)	Survival (%)	FCR
Soy-based	350	153	297 ^a	50.3 ^b	50.3 ^c	1.53 ^d
Fishmeal based	350	153	289 ^a	49.6 ^b	49.5 ^c	1.55 ^d

Data with the same superscripted letters are not significantly different (P>0.05)

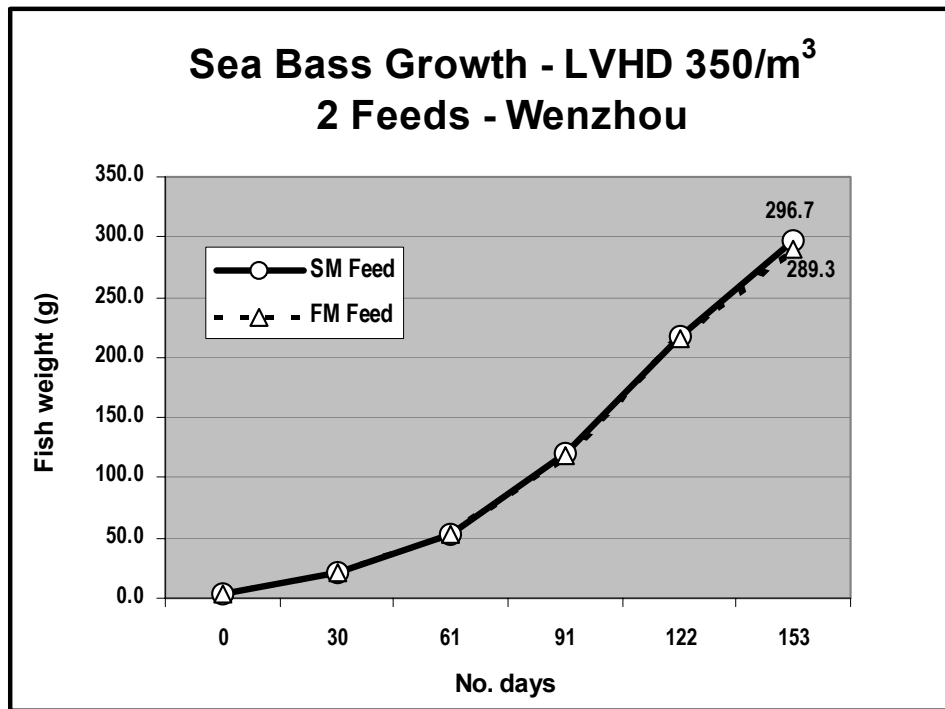


Figure 1. Growth curves for Japanese sea bass (*Lateolabrax japonicus*) fed isocaloric and isonitrogenous aquafeeds with dehulled soybean meal (SM) and fishmeal (FM) as the respective base ingredients. Growth performance of sea bass fed the two feeds for 153 days was not significantly different ($P>0.05$).