Pompano (*Trachinotus ovatus*) Growth Performance in 1.5-m^3 Cages with Soybean Meal and Fishmeal Based Feed Rations

Results of ASA/China 1999 Feeding Trial 35-99-73

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ABSTRACT

Pompano (*Trachinotus ovatus*) growth in cages was evaluated with fishmeal and soybean meal based feed rations. Two ioscaloric and isonitrogenous feed rations were 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 1.5-m^3 cages at 400 fish per m^3 and fed for 150 days. Pompano grew from 2.7 g to 222 g with the soy-based ration, and from 2.7 g to 218 g with the fishmeal-based ration. There was no significant difference in fish growth ($P>0.05$) with the two feeds. FCR averaged 2.13:1 and 2.23:1 for the soy-based and fishmeal-based rations, respectively. Survival averaged 72% for all cages and treatments. Net economic return was 12% higher and return to investment was 10% greater with the soy-based ration. Production of pompano in cages with manufactured feeds was demonstrated to be both technically and economically feasible. Replacement of fishmeal with dehulled, high protein soybean meal resulted in no reduction in fish growth and a significant cost savings for feed.

INTRODUCTION

The American Soybean Association (ASA), in cooperation with the Long Gang Fisheries Research Institute and the Guangdong Provincial Fisheries Extension Center, conducted a feeding trial in 1999 to evaluate pompano (*Trachinotus ovatus*) growth in cages using ASA LVHD technology and manufactured feeds. Prior to this, pompano production along the coast of China depended on fresh fish for feeding pompano in cages. The objectives of the trial were to demonstrate the feasibility of producing pompano 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 pompano.

MATERIALS AND METHODS

Fish for the trial were 2.7-g pompano (*Trachinotus ovatus*) fingerlings. The fingerlings had been fed from the advanced fry stage to 2.7 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, 1.5-m^3 cages with rigid frames and replaceable cage netting 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 in Dong Shan Bay, Shenzhen, Guangdong Province, on 11 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 150 days between 11 June and 11 November 1999. Pompano receiving the soy-based ration grew from 2.7 g to 222 g during the 150-day feeding period (Table 2). Pompano receiving the fishmeal-based ration grew from 2.7 g to 218 g. Fish growth was not significantly different ($P>0.05$) with the two feed rations.

Net production averaged 63.9 kg/m^3 and 60.5 kg/m^3 for fish fed the soy-based and fishmeal-based rations, respectively (Table 2). FCR was 2.13:1 with the soy-based ration and 2.23:1 with the fishmeal-based ration. Survival was 73% and 71%, respectively, with the soy-based and fishmeal-based rations.

Net economic return was RMB1558/m^3 for fish fed the soy-based ration, and RMB 1391/m^3 for fish fed the fishmeal-based ration (Table 2). Net economic return was 12% greater for fish fed the soy-based ration as a result of feed cost savings obtained by replacing a portion of the fishmeal with dehulled soybean meal.

SUMMARY AND CONCLUSIONS

Feed-based production of pompano in cages using the ASA LVHD production model and manufactured feed rations was demonstrated to be feasible. The use of high protein, dehulled soybean meal at an inclusion rate of 40% resulted in substantially higher profit without any reduction in fish growth, in comparison to a ration formulated with predominantly fishmeal. Pompano grew from 2.7 g to 222 g in 150 days of feeding with the soy-based ration.

Feed conversion ratios with both test rations were erratic throughout the 150-day feeding period. Monthly FCR ranged from a low of 1.18:1 to a high of 2.70:1 for the soy-based ration, and a low of 1.12:1 to a high of 2.90:1 for the fishmeal-based ration. Some of the variation was caused by feed loss that occurred when pellets did not float. Poor feed floatation resulted from improper extrusion at the feed mill. Periodic water quality and fish health problems may have also

contributed to erratic feed conversion efficiency. Water quality was not monitored at the research site, so it is difficult to determine what factors contributed to the wide variation in feed conversion efficiency. When the feed floated properly, the pompano were aggressive in their feeding behavior and readily consumed all of the floating feed.

ACKNOWLEGEMENTS

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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 pompano (*Trachinotus ovatus*) cage trial at Dong Shan Bay, Shenzhen, 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 pompano (*Trachinotus ovatus*) growth performance in 1.5-m^3 cages with soybean meal and fishmeal based aquafeed rations.

Diet regime	Stocking rate (fish/m^3)	No. days fed	Fish harvest weight (g)	Survival (%)	FCR	Net economic return (RMB)	ROI (%)
Soy-based	400	150	222^a	73	2.13	1558/m^3	92.2
Fishmeal based	400	150	218^a	71	2.23	1391/m^3	82.4

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

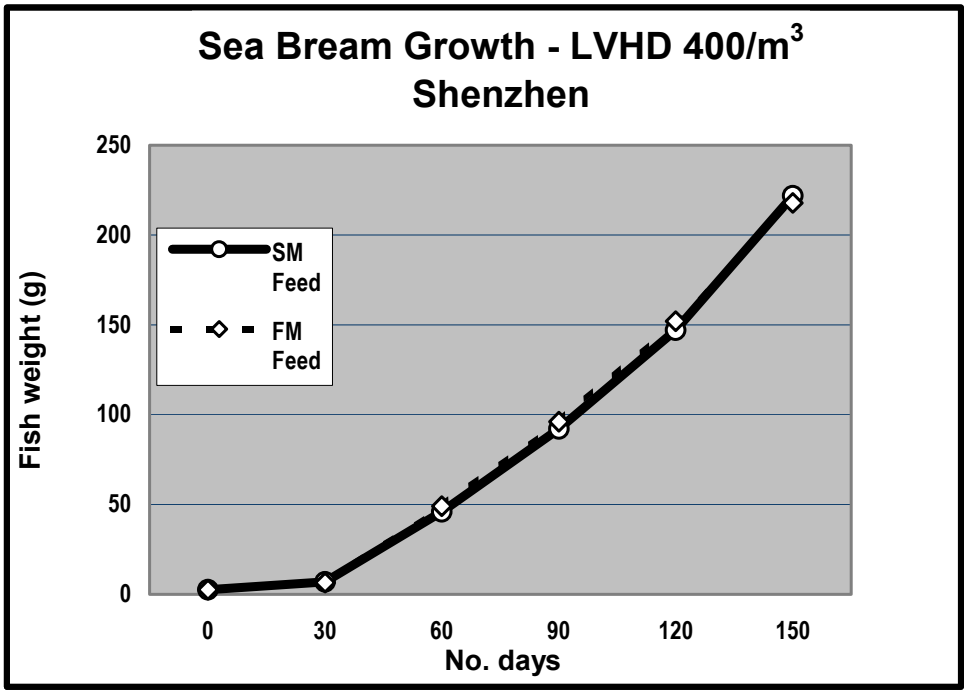

Figure 1. Growth curves for pompano (*Trachinotus ovatus*) fed isocaloric and isonitrogenous aquafeeds with dehulled soybean meal (SM) and fishmeal (FM) as the respective base ingredients. Growth performance of pompano fed the two feeds for 150 days was not significantly different ($P>0.05$).