

AQUACULTURE

EVALUATION OF COST-EFFECTIVE FEEDS FOR HYBRID CATFISH FINGERLINGS

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"RESEARCH HAS SHOWN PROTEIN LEVELS CAN BE REDUCED TO 32% AND FISH MEAL CAN BE REPLACED WITH PORK MEAT, BONE, AND BLOOD MEAL IN DIETS FOR HYBRID CATFISH FINGERLING PRODUCTION WITHOUT AFFECTING FISH GROWTH."

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Catfish fingerling feeds are more expensive than food fish feeds because of higher protein levels and more expensive ingredients, such as fish meal and other animal protein sources. Prices of commercial 35% protein fingerling feeds have been in the range of \$600–700 per ton in the past few years. Reducing feed cost without negatively affecting fish growth would increase economic returns for fingerling producers.

In 2015, the Mississippi Agricultural and Forestry Experiment Station conducted a feeding trial to evaluate diets containing 35% or 32% protein with 7.5% fish meal or pork meat, bone, and blood meal (PMBB) for pond-raised hybrid catfish fingerlings. In the past few years, fish meal typically cost \$1,300–1,400 per ton, while PMBB cost about \$700–

800 per ton. Using PMBB to replace fish meal would have considerable savings on feed cost. Results from the trial show the 32% protein diet with PMBB can provide the same fish growth and yield as the 35% protein diet with fish meal.

As a continuation of this work, we looked at additional diets in 2016. The control diet (35% protein with fish meal) was the same as in the 2015 study. Other diets included 32% all-plant protein diet, 28%

all-plant protein diet, and 28% protein diet with PMBB.

Three weeks before stocking, ponds were fertilized with urea according to recommended dose and schedule to ensure there were enough natural foods. Small hybrid catfish fingerlings (6.3 pounds per 1,000

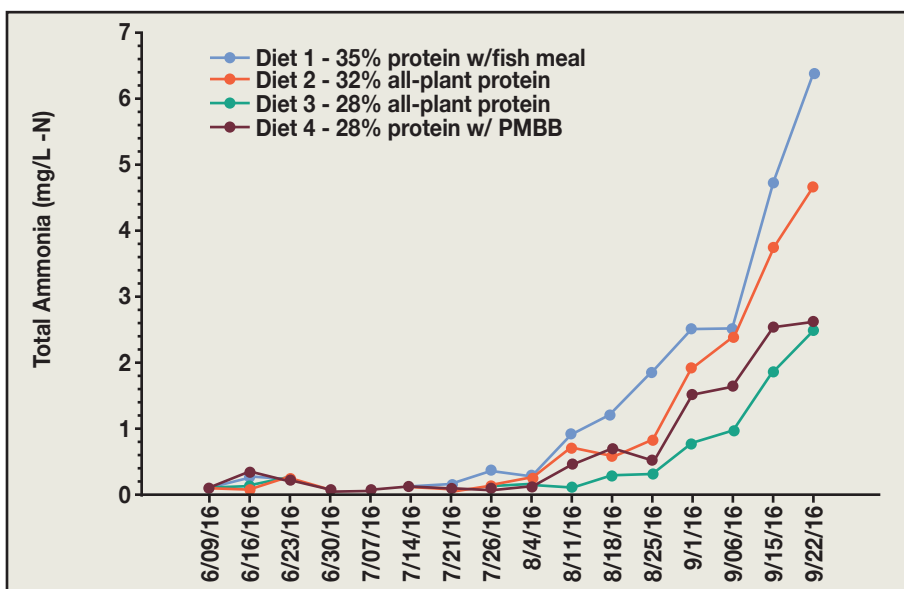


Figure 1. Total ammonia concentrations in pond water.

Dietary protein (%)	Animal protein (%)	Total feed fed (pounds/acre)	Gross yield (pounds/acre)	Final weight ¹ (pounds/1,000)	Feed conversion ratio	Survival ¹ (%)
35	Fish meal	16,933	13,743	240	1.27 c	82.1
32	None	17,681	13,464	234	1.36 a	82.3
28	None	17,071	13,328	221	1.32 ab	86.4
28	PMBB ²	17,338	13,701	231	1.31 bc	85.0

¹Estimated based on sample weight of 1,000 fish per pond
²Pork meat, bone, and blood meal

Table 1. Production data of hybrid catfish fingerlings fed experimental diets.

or 2.9 inches) were stocked in twenty 0.1-acre ponds at approximately 70,000 fish per acre. Fish were fed once a day to about satiation from late June to early October.

At the end of study, there were no statistical differences in total amount of feed fed, gross yield, final weight per fish, or survival in fish fed various diets. However, fish fed all-plant diets had significantly higher feed conversion than fish fed the control diet. This may be in part because all-plant protein diets have lower fat. Fish meal has about 9-10% fat, which is higher than all other ingredients used. Fat has more than double the energy than protein and carbohydrates and is more digestible which may lead to better feed conversion. In addition, fish meal has better protein quality.

As fish grew larger and more feed was fed, am-

monia levels in the pond water increased (Figure 1). Ponds receiving the 35% protein diet had significantly higher ammonia than fish fed 28% protein diets. This is mainly because of higher protein/nitrogen load in ponds receiving the higher protein diet.

At the time of feed purchase (June 2016), the control diet (35% protein with fish meal) cost \$613 per ton, while the 32% and 28% all-plant protein and the 28% protein pork meal diet cost \$87, \$112, and \$102 per ton less than the control, respectively. Assuming hybrid catfish producers feed about seven tons of feed per acre in a growing season, there would be \$346, \$644, and \$602 per acre annual savings using these low protein diets, respectively, after taking account for increased feed conversion. Actual cost savings of using low protein and all-plant protein diets will depend on feed prices and feeding rate.