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# Trials find feeding frequency factor in catfish performance

Thursday, 1 June 2006

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## Feeding twice daily was not necessarily beneficial



Studies indicate that feeding channel catfish once daily to satiation from advanced fingerlings to market size provided maximum growth and production.

Unlike other farmed animals, most fish are not allowed to feed at will from a constant feed supply. Rather, how much feed is offered is generally decided by the farmer in what can be a highly subjective process.

There are no standard feeding practices across the catfish industry, mainly because many factors affect feeding and every pond of fish behaves differently. Since feed cost is the largest operating expense in catfish production, feeding the fish in a manner which results in efficient feed conversion and fast growth without negatively affecting water quality can increase production and profit.

## Feeding trials

The authors recently conducted several catfish culture studies in earthen ponds using standard industry management practices. Fish in the 0.04-ha ponds were fed by hand, and those in the 0.4-ha ponds were fed by a tractor-pulled feeder. The fish received as much as they would eat within 15 to 20 minutes. Water quality was maintained at ranges generally considered optimum for channel catfish growth.

In the first trial in 0.4-ha ponds, channel catfish of 22-gram initial weight were fed a 28 percent-protein commercial diet to apparent satiation once daily in the morning or afternoon, or twice daily in both morning and afternoon for two growing seasons. Stocking density was 24,7000 fish per hectare. Weight gain and survival were estimated based on 500 randomly sampled fish from each pond.

In a second study, 64-gram catfish stocked in 0.04-ha ponds at 14,820 fish per hectare received experimental diets containing 24-36 percent protein once daily or once every other day from May to October. Fish were considered marketable at 570 grams and above.

For trial 3, channel catfish initially weighing 44 grams were fed a 28 percent protein commercial diet at different schedules from May to October. Stocking density in the 0.4-ha earthen ponds was 24,700 fish per hectare.

In the final study, channel catfish of 39 and 249 grams initial weight were stocked at 14,820 fish per hectare in 0.04-ha ponds and fed a 28 percent protein commercial diet once, twice, or three times weekly to satiation from June to October.

## Results

### *Once vs. twice daily*

Feeding twice daily was not necessarily beneficial (Table 1). Although fish fed twice daily were offered more feed than fish fed once daily, the extra feed was not completely converted into weight gain. It is likely that feeding twice daily increases feed conversion because, if the feeder is not careful, feed can be easily wasted by overfeeding.

### Li, Mean production characteristics of channel catfish, Table 1

Feeding	Diet Fed (kg/ha)	Net Production (kg/ha)	Weight Gain (kg/fish)	Feed Conversion (feed/gain)	Estimated Survival (%)
Morning	32,003	14,125	1.117	2.19 <sup>b</sup>	69.4
Afternoon	32,185	13,328	1.096	2.40 <sup>a</sup>	66.4
Morning and afternoon	34,128	13,492	1.030	2.31 <sup>a</sup>	72.3

Table 1. Mean production characteristics of channel catfish fed once or twice daily for two growing seasons. Values within a column followed by different letters significantly different (P = 0.05).

### Li, Mean production characteristics of channel catfish, Table 2

Feeding	Diet Fed (kg/ha)	Net Production (kg/ha)	Weight Gain (kg/fish)	Feed Conversion (feed/gain)	Survival (%)	Aeration Time (hours)	Market-Size Fish (%)
Daily	13,211 <sup>a</sup>	7,665 <sup>a</sup>	0.525	1.72 <sup>a</sup>	98.1	731 <sup>a</sup>	56.0 <sup>a</sup>
Every other day	8,960 <sup>b</sup>	6,157 <sup>b</sup>	0.418	1.46 <sup>b</sup>	99.2	634 <sup>b</sup>	39.4 <sup>b</sup>

Table 2. Mean production characteristics of channel catfish fed once daily or once every other day for five months. Values within a column followed by different letters significantly different (P = 0.05).

### *Once daily vs. once every other day*

Although the authors recommend that catfish be fed once daily, feeding less frequently can be appropriate under certain circumstances. The authors' data showed that fish fed every other day consumed more feed on those days compared with fish fed once daily to apparent satiation (Table 2). The increased consumption in fish fed less

frequently than daily is primarily the result of compensatory growth, or at least a partial compensatory growth.

Fish are capable of compensating for all or part of the weight loss during a short period of feed deprivation when full feeding is resumed. Although there are some advantages to feeding every other day (reduced feed conversion, labor cost, and aeration), this is not recommended for routine feeding since fish fed every other day cannot consume enough on feeding days to compensate for the missed feed. Also, feeding every other day appears to reduce fish processing yield and extend the production cycle.



Trucks with blowers effectively distribute feed throughout large production ponds.

### ***Seven days vs. five to six days per week***

During the growing season, most catfish producers feed their fish seven days a week, but some feed six days a week. In the authors' research over a growing season, the latter reduced net production by 3.3 percent, and feeding five days a week (not Saturday and Sunday) reduced production by 6.9 percent when compared with fish fed daily (Table 3).

### **Li, Mean production characteristics of channel catfish, Table 3**

Feeding	Days Fed	Diet Fed (kg/ha)	Net Production (kg/ha)	Feed Conversion (feed/gain)	Mortality (%)
Daily	159	16,976 <sup>a</sup>	8,995	1.89	3.2
Six days weekly	138	15,635 <sup>ab</sup>	8,696	1.80	3.5
Five days weekly	117	14,570 <sup>b</sup>	8,370	1.74	3.7

Table 3. Mean production characteristics of channel catfish fed at different schedules for five months. Values within a column followed by different letters significantly different (P = 0.05).

Feed conversion was reduced by 4.8 percent and 7.9 percent, respectively, for fish fed six days and five days a week compared with fish fed every day. Considering the slight decrease in net production, slight improvement in feed conversion, and possible reduction in other feeding costs, feeding six days per week may reduce costs for food-size catfish.

However, it should be noted that the authors' studies used a single-batch cropping system and the fish were fed to satiation on days fed. If feed is restricted, one would expect a further reduction in net production. Also, if this strategy is used in a multiple-batch cropping system, skipping feed days can have more negative impacts than in single-batch systems because the smaller fish can lose more weight than was demonstrated in the studies.

## Maintenance feeding

Maintenance feeding means that all feed eaten by the fish is used to maintain the animals with no gain or loss of weight. This feeding regimen can be achieved by either supplying a maintenance ration daily or feeding to apparent satiation once or twice a week.

Since fish of various sizes are typically present in a given pond, it is better to provide all they will eat on days fed than feed a little every day. Feeding to satiation allows the smaller, less aggressive fish to feed. Maintenance feeding can also be used to feed food-size fish that cannot be harvested because of off-flavor or other issues.

Based on research results (Table 4), it appeared that feeding once a week to satiation could maintain the body weight of food-size catfish under a single-batch cropping system. However, the condition factor, a nutritional status indicator that measures the relationship between fish body weight and length, was lower for fish fed once a week than fish fed more frequently.

## Li, Mean production characteristics of two sizes of channel catfish, Table 4

Initial size	Feeding Frequency	Diet Fed (g/fish)	Weight Gain (g)	Feed Conversion (feed/gain)	Survival (%)	Condition Factor
39 g		225.0 <sup>b</sup>	85.9 <sup>v</sup>	2.62	71.5 <sup>b</sup>	0.93
249 g		396.9 <sup>a</sup>	166.3 <sup>u</sup>	2.43	81.0 <sup>a</sup>	0.92
	1 time/week	153.3 <sub>y</sub>	66.1 <sub>y</sub>	2.46	78.5	0.87 <sub>y</sub>
	2 times/week	247.2 <sub>y</sub>	105.5 <sub>y</sub>	2.38	77.7	0.91 <sub>xy</sub>
	3 times/ week	532.4 <sub>x</sub>	206.9 <sub>x</sub>	2.74	72.5	0.99 <sub>x</sub>

Table 4. Mean production characteristics of two sizes of channel catfish fed once, twice, or three times weekly for four months. Values within a column followed by different letters significantly different (P = 0.05).

(Editor's Note: This article was originally published in the June 2006 print edition of the Global Aquaculture Advocate.)

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