KENTUCKY AQUATIC FARMING

A Newsletter for Kentuckians Interested in Improving Fish and Shellfish Production, and Pond Management.

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CONTENTS

ANNOUNCEMENTS

Pesticide Applicators Workshop

FRIDAY, MARCH 11 FROM 9:30 AM

(registration until 10:00) to about 4:00 pm

Kentucky State University Aquaculture Research Center.

The workshop will focus on aquatic weed control and will include aquatic plant and algae identification, methods of control and herbicide and algaecide use. The program will emphasize proper chemical selection and application techniques, applicator safety and recordkeeping. The Kentucky Department of Agriculture has approved the program for 3 specific hours for category 5 credit and 2 general hours for categories 10 and 12. This workshop is free and open to the public.

For more information, please contact
Forrest Wynne in Mayfield at (270) 247-2334 or
Dr. Bill Wurts in Princeton at (270) 365-7541, ext. 200.

Pond Management: Home Use and Recreational Aquaculture

SATURDAY, MARCH 12 FROM 8:30 AM TO NOON

Kentucky State University Aquaculture Research Center.

Following this workshop, the Kentucky Aquaculture Association will meet for its Annual Meeting after a quick lunch. KAA plans to have workshop presentations and its annual business meeting until 4:30 pm.

See registration form at end of newsletter.

For more information, please contact
Dr. Durborow at (502) 597-6581, email: robert.durborow@kysu.edu
or Ms. Angela Caporelli at (502)564-0290, ext. 259 or angela.caporelli@ky.gov

Direct Marketing Aquaculture Products to Hispanic Consumers

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Introduction

The Hispanic population in Kentucky is substantial and growing: according to the 2000 U.S. Census, Kentucky had approximately 60,000 reported Hispanics; however, it is suspected that this number is much higher. Estimated Hispanic population by 2006 was greater than 94,000 individuals (U. S. Census Bureau, 2010). Anecdotal evidence indicates that Hispanic consumers buy fresh food products from farms, which includes live animals. If this is true, Hispanics would be an important marketing asset for small-scale farmers in Kentucky and in other states.

This paper investigates the potential of selling fresh fish and crustaceans directly to Hispanic consumers. Data for this paper were collected in Kentucky; however, the results may be applicable to other states with aquaculture production and Hispanic consumers.

Material and Methods

Data were collected from a Hispanic consumer survey conducted during 2010 in Franklin, Fayette, Shelby, and Jefferson counties of Kentucky. These counties were chosen for their significant Hispanic population. The survey was administered in Spanish, and Hispanic respondents indicated their grocery buying habits and willingness to purchase products directly from a producer. The survey questions were developed during 2009 from discussions with a focus group of Hispanic consumers, restaurateurs/ caterers, and Extension professionals at Kentucky State University specialized in serving Hispanic households. This focus group advised university researchers about products and product forms that Hispanics purchase in their home countries and in the United States. They also indicated what types of food shopping habits to expect. The completed questionnaire was later tested by this Hispanic focus group to ensure that the questions were relevant. The targeted aquaculture products were tilapia, channel catfish, largemouth bass, and freshwater prawns. A total of 144 completed survey questionnaires contained useful data.

This paper contains descriptive results that characterize the Hispanic direct-to-consumer market in Kentucky. Hispanic consumer preferences were analyzed statistically

Table 1. Distribution Of Demographic Information Expressed as a Percentage of the 144 Respondents. U. S. Hispanic Population Demographics are Provided for Comparison Purposes.

	Our data[a]	U. S. Hispanic population[b]
Gender:		
Male	45%	51%
Female	47%	49%
Age:		
30 or less	41%	57%
31-40	31%	17%
41-50	13%	13%
51-60	3%	7%
61-65	1%	2%
66 or more	0%	4%
Education:		
High school or below	67%	71%
Technical	18%	____[c]
4-year degree or more	7%	10%
Country of Origin:		
Mexico	65%	65%
Honduras	6%	1%
Guatemala	4%	2%
El Salvador	3%	3%
Nicaragua	3%	1%
Other	9%	28%
Household income:		
Less than $20K	52%	20%
≥$20K but <$30K	28%	15%
≥$30K but <$40K	10%	13%
≥$40K but <$50K	2%	11%
≥$50K	2%	40%
Occupation of breadwinner:		
Agricultural industry	26%	7%
Labor	27%	27%
Sales	3%	14%
Management	6%	11%

[a]Percentages do not always sum to 100% due to lack of responses to various questions from completed questionnaires
[b]2007 data from United States Census Bureau: http://factfinder.census.gov
[c]Data unavailable

RESULTS

Respondent Characteristics

Table 1 contains a summary of respondent demographics, juxtaposed to corresponding 2007 U. S. Hispanic population demographics. It shows that most of the respondents were young with 72% being 40-years old or younger. The majority of Hispanic consumers were not very highly educated: 67% had a high school education or less. Most respondents were from Mexico, with only 25% of respondents from other Latin American nations. More than half of the respondents received less than $20,000 as annual household income. Fifty-three percent of respondents were employed as either agricultural workers or as laborers.

Food Purchasing Behavior

Table 2 contains results pertaining to grocery shopping habits and preferences. Large chain supermarkets, such as Wal-Mart and Kroger were the main food source for 44% and 30% of respondents, respectively. This was followed by 15% of respondents using smaller chain-groceries such as Save-A-Lot as their main food source. While only 10% of respondents considered Hispanic stores to be their main grocer, 72% of respondents made at least 2 trips to Hispanic grocery stores per month. Forty-seven percent of respondents bought groceries during the week, while 39% bought groceries during weekends only. Fifty-five percent of respondents spent $300 or less per month on groceries.

Table 2. Food Purchasing Habits and Preferences of 144 Hispanic Consumers in Kentucky (those responding to our questionnaire).

Questions	Main Responses
Respondent is the principal grocery shopper	76%
Main grocery store is:	Wal-Mart (44%), Kroger (30%), smaller U.S. chain store (15%), Hispanic store (10%)
Number of grocery shopping trips per month	2-3 (38%); 4 (35%); >4 (15%)
Number of grocery shopping trips per month to Hispanic stores	0 (10%); 1 (16%); 2-3 (45%); 4 (15%)
Number of grocery shopping trips per month to farmers' markets	0 (69%); 1 (19%)
Grocery shopping times	Weekend only (39%); During week only (47%)
Grocery spending per month	$0-$199 (27%); $200-$299 (29%) $300-$399 (20)% $400-$499 (13%) $500-$599 (6%) $600 or more (4%)
Are you willing (and/or able) to travel to a farm to buy food products?	Willing (56%); Not willing (21%); Willing but no transport (16%)
How many miles will you travel to a farm from your residence?	up to 5 (24%); >= 5 - 10 (27%); >= 10 - 20 (21%)
Would you prefer vendors brought food products directly from farms to your community?	Yes (85%); No (9%)

A major impetus of this study was to investigate the willingness of Hispanic consumers to purchase food directly from farms. Seventy-two percent of respondents were willing to travel to farms to buy food products. Twenty-four percent of respondents were willing to travel to farms within a 5-mile radius of their residence, another 27% of respondents were willing to travel up to 10 miles of their residence, and an additional 21% of respondents were willing to travel up to 20 miles from their residence. Correspondingly, 85% of respondents were willing to patronize vendors bringing food products from farms to their communities.

Willingness to Buy Aquaculture Products from Farms

Respondents indicated a strong desire to purchase various fish and crustaceans from Kentucky farms. Table 3 lists various Kentucky aquaculture products in decreasing order of popularity. Eighty-four percent of respondents were willing to purchase locally-grown tilapia and 48% of respondents were willing to buy freshwater prawns. This is encouraging news because research results and field demonstrations have shown that both tilapia and freshwater prawns could be simultaneously cultured in the same pond, in a small farm/limited resource setting (Danaher, Coyle, & Tidwell, 2004; Danaher, Tidwell, Coyle, Dasgupta, & Zimba, 2007).

Table 3. Types of Seafood Products that Respondents Would Like to Buy for At-Home Consumption. Each of the 142 Respondents was Allowed to have Multiple Answers.

Seafood type	Number of respondents	Percentage
Tilapia	119	84%
Freshwater prawns	68	48%
Bass	44	31%
Catfish	35	25%

Table 4 lists preferred product forms for fish by Hispanic consumers in decreasing order of popularity. Whole fish was the most preferred form (80% popularity) followed by fresh fillets (48% popularity). Frozen fillets, at 16% popularity, were not a very sought after item.

Table 4. Preferred Fish Product Forms. Each of the 143 Respondents Was Allowed to Have Multiple Answers.

Seafood type	Number of respondents	Percentage
Whole fish (not live)	114	80%
Fresh fillet	64	45%
Live	25	18%
Frozen fillet	23	16%

Table 5 reports various preferred sources for buying aquaculture products. While supermarkets were the most popular source, it is unlikely that small-scale producers will sell to supermarkets. This is because the conflux of higher production costs in small-scale farms and price markups usually made by supermarkets make products from small-scale farms unaffordable to many supermarket shoppers. However, Table 5 shows that 35% of respondents were willing to buy local aquaculture products from a farm. Arguably, these consumers will also buy the same products if vendors transported the seafood items to their communities. This is an important result for small-scale producers seeking direct-to-consumer markets. No respondent wanted to shop at farmers' markets, usually due

Table 5. Preferred Outlets for Seafood Purchases. Each of the 143 Respondents was Allowed to Have Multiple Answers.

Seafood type	Number of respondents	Percentage
Supermarket	82	57%
Farm	51	35%
Hispanic grocery store	26	18%
Farmers' market	0	0%

Photo by Charles Weibel

to the language barrier; most farmers' market vendors did not speak Spanish.

We segmented the group of respondents who indicated preference towards tilapia. This would allow producers to better-target their promotional activities among Hispanic consumers. Chi-squared tests indicated that respondents who wanted to obtain fresh foods directly from a farm had a significantly higher inclination to buy live tilapia (P = 8.13%). Consumers who used Hispanic stores as their main grocery source also showed a significantly higher willingness to buy live tilapia (P = 0.7%).

The survey asked respondents to provide the maximum that they will pay for a 2 lb tilapia. This size of fish is a common harvest size in Kentucky (Danaher, Coyle, & Tidwell 2004). Figure 1 shows interviewees' willingness to pay (WTP) certain prices for tilapia. Clearly, $2/lb was a popular price with 28% of respondents stating this WTP, followed by 2.25/lb. The weighted mean stated WTP was $2.33/lb plus or minus $0.54/lb.

Conclusions

Gallons, Toensmeyer, Bacon, and German (1997) indicated that the typical U.S. consumer that purchased food products directly from farms was a well-educated, upper-middle class, suburban individual. This paper shows that Hispanic consumers, most of whom were less-educated and with low income, are also interested in purchasing food products directly from farms. The results show that 72% of surveyed Hispanic consumers were willing to buy food products at a farm and 85% were willing to patronize vendors selling farm products in their communities (Table 2).

A substantial proportion of Hispanic consumers (35%) preferred to buy fresh aquaculture products at a farm (Table 5). The survey respondents viewed Kentucky's aquaculture products favorably: tilapia received 84% consumer approval, followed by freshwater prawns at a 48% consumer approval (Table 3). Other results show that Hispanic consumers preferred whole fish over fillets. This is encouraging for small-scale aquaculture farmers who usually find processing fish to be prohibitively expensive.

This paper shows that sales of fish/crustaceans to Hispanic consumers would improve if such activities focus upon population segments that are willing purchase food from farms and/or buy groceries mainly from Hispanic stores. Results indicate that aquaculture products could be sold by: 1) having fish at farms near Hispanic communities and advertising products in Spanish, 2) bringing products to Hispanic communities, similar to a mobile farmers' market, and/or 3) using Hispanic grocers as "middle men". The data suggest that it is important for vendors to speak Spanish, which will likely increase sales. An important question is whether the direct-to-Hispanic consumer market is feasible, i.e., can farmers sell products profitably in this market and consumers find the prices acceptable. This paper indicates that the stated willingness-to-pay for whole/live tilapia was between $2-$3/lb, with 79% of respondents preferring the price to be in that range. Williams and Dasgupta (2007) suggested a profitable price of $2/lb for whole tilapia. This suggests that selling tilapia directly from farms to Hispanic consumers is likely to be a feasible business scenario for aquaculture farms.

Acknowledgements

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Photo by Charles Weibel

Winter Tips for Catfish Producers

George Selden, M.S., Extension Aquaculture Specialist, University of Arkansas Pine Bluff

1. Salt in ponds- Chlorides should be at least 100 ppm to help prevent Brown Blood Disease.
2. Oil in all electric aerator gear boxes should be changed. If done now, the aerator is ready to go next spring/summer. If not, moisture can accumulate and cause the bearings to rust, necessitating their replacement. This is a much more expensive task.
3. Now is also a good time to check the aerators belts and chains for wear, floats for leaks, and perform other needed maintenance.
4. Now would be a good time to check and relubricate bearings on tractors, emergency PTO aerators, and other equipment that have bearings, are exposed to water, and will sit idle all winter. If moisture has penetrated the seals, the bearings will rust, again a much more expensive and time consuming task. Equipment may also not be available when needed.
5. Book feed for the next year.
6. Clean feed bins if empty, and service the feed bin lid mechanisms.
7. Check for water in Diesel tanks.
8. Lay out, clean and repair seines.
9. Adjust water levels in preparation for winter rains. Use the "3/6" water management system. Fill ponds to 3 inches below the top of the overflow pipe. This allows for 3 inches of rainwater storage. Wait until the water level falls at least 6 inches below the overflow level before pumping the up to the 3 inch level.
10. Make sure that levees that will need to be driven on during the winter have enough gravel. Insure that ground cover is on all other levees. If it is too late for Bermuda grass to take root, winter wheat is a good option. Bare levees will erode, shortening the life of the pond.
11. Check for catfish trematodes. Snag or seine up at least 10 fish per pond to check for any trematode problem.
12. Now would be a good time to clean fire ants and debris out of breaker boxes and assess their condition.
13. Reducing pond densities so that they don't exceed 4,000-5,000 pounds per acre will reduce losses due to winter kill.
14. The fall migrations lead to increased fish predation by birds. Spend the time and effort needed to scare birds away from ponds. Stock up on bird scaring supplies. This is also a good time to make sure that depredation permits are up to date. Contact Wildlife Services for more information.
15. Time to check your DO meter. Remove the batteries to prevent corrosion. Remove the membrane and diaphragm from the probe and rinse everything thoroughly with distilled water. Allow all parts to air dry and then reassemble with a new membrane according to manufacturers' directions.
16. Formulate your stocking strategy for next year.
17. If you purchase fingerlings, make plans with your fingerling producer to ensure a supply.
18. The fall is a good time to renew association memberships and make plans to attend annual meetings.
19. Determine whether any ponds should be rebuilt next year. Now is not the time to drain them, but now is the time to prepare.

Photo by Charles Weibel

Local Farmers' Markets as Possible Direct Retail Outlets for Fresh, Whole, Freshwater Prawn

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Description of the Project

Freshwater Prawns harvested from Kentucky State University's research ponds were donated to the aquaculture graduate student club, the "Aquabreds". The Aquabreds sold the prawns fresh and whole on drained ice at three nearby farmers' markets and one seasonal festival in order to evaluate the potential for such markets as a retail outlet for local shrimp growers. The proceeds will be used for student travel to conferences to present the findings and other research outcomes. All prawns sold were properly chill-killed in ice water for 10-15 minutes before being stored on drained ice overnight for sale at the next day's market. The prawns were large due to a good, hot, growing season, and averaged about twelve per pound at time of sale. The Aquabreds sold the prawns at the Franklin County (Frankfort), farmers' market on Tuesday, Wednesday and Thursday (September 14-16). They were also sold at the Franklin County, St. Matthew's (Louisville), and the Bluegrass (Lexington) farmers' markets on Saturday, the 18th of September. Also, on the afternoon of the 18th, shrimp were taken to the Chinese Moon Festival in Lexington, an annual autumnal celebration that coincides well with the shrimp harvest season.

Advertising

In the weeks prior to the market sales, we advertised the fact that there would be freshwater shrimp at the markets by contacting local newspapers in Frankfort and Lexington, both of which ran small stories about the sale free of charge, and we also made sure that the farmers' markets mentioned the shrimp sale in their weekly e-mail/blog/newsletters. Being at KSU, we also took advantage of the school's electronic message board on Main Street to promote the sales. The prawns received an unexpected promotion at the Louisville farmer's market on the day of the sale because a local news team showed up to cover the market and talked to one of our graduate students on the air about the prawns. At the Franklin County Market, Angela Caporelli, of Kentucky Department of Agriculture held cooking demos and served up samples of the product while selling frozen freshwater shrimp tails for the Kentucky Aquaculture Association the week before, which also undoubtedly helped to build interest and acceptance of the product.

Sales

Prawns were sold for $8/lb at all farmers' markets as that was judged to be a fair price for both farmers and consumers. At the Chinese Moon Festival, the shrimp were sold at varying prices as part of a marketing study to determine what price the consumers were truly willing to pay, so the majority of the shrimp sold there were sold at around $6/lb. Initially, we were unsure of how much could be sold at the weekday farmers' markets (which have far smaller crowds than the Saturday markets) so we sold out within two and a half hours at the first market day on Tuesday. Also, on Saturday, we sold out early at several markets (see comments, table 1), and could have easily sold more shrimp (possibly 20-50 more lbs) at these markets.

As can be seen in table 1, sales were around 40-50 pounds at the weekday markets (Sept. 14 - 16) and above 100 pounds at each of the Saturday markets (Sept. 18), and could have been more at several of them. Most consumers were willing to pay the $8/lb price, and many people who were more familiar with purchasing fresh (wild-caught) shrimp said that $8/lb was comparatively cheap. The customers at these farmer's markets are willing to spend a little more on locally-produced food, and freshwater prawns give them the opportunity to enjoy gourmet "seafood" while still eating local. Many customers were unsure of how to use the whole prawn product, so hand-outs describing how to process and cook the shrimp, and especially how to use the heads (in stocks, etc.) proved to be particularly encouraging to undecided customers. Some customers said that they would only buy shrimp if they were tails-only. Many customers came to the market specifically to buy prawns after seeing the article in the newspaper. Since prawns are a unique product and draw people to the market that might otherwise not come, the market managers and other vendors seemed pleased to have someone selling prawns at their markets.

Repeat Customers

The key to any thriving business is repeat customers, and while the duration of this sale was too short to see the true extent of the repeat-customer market, results were encouraging. At the Franklin County market, we had multiple repeat customers who bought a pound the first time, and after cooking them up at home, came back on a later day to buy more. Many people at all markets also asked if we would be back next week and expressed disappointment that we would not. Also, several customers who purchased shrimp from our KSU shrimp sale last year eagerly came back and found us again this year to buy large amounts of shrimp (5-10 pounds). It would seem that once people try this fresh, local product, they are very willing to come back and buy more. Also encouraging is the fact that so many shrimp were sold at the Franklin County Market on all four days of the week that we were there, which shows that the customer base is fairly large and that the success of the sales was not entirely due to its "one-day- only" nature.

Holding Prawns on Drained Ice

The prawns sold were initially weighed live, right after harvest from the ponds, and then chill-killed and placed into coolers on drained ice. It was observed at all markets that it seemed as though the prawns lost a significant amount of weight as they sat on ice. It is probable that this is mainly due to the water loss that occurs when the prawns are killed, causing their book-lungs to empty of the water that they hold while the prawns were alive (and initially weighed). This weight loss, however, will result in a decreased profit for the farmer if break-even and sale-prices are determined based on live weight. Further studies on this matter will be looked into at KSU in the future. Also contributing to the fact that fewer pounds were sold from the coolers than were originally placed into the coolers is the fact that very small, damaged, soft, or otherwise ugly prawns were not sold, and a little extra weight was generally included with each sale, which may add up to a significant amount by the end of the day.

Table 1.

Freshwater Prawn sales at several farmers' markets from September 14-18, 2010.

Market	Date	Lbs. Sold	Revenue	Comments
Franklin Co.	9/14	40.5	$324	Sold out early- Could have sold more
Franklin Co.	9/15	38.5	$308	Sold out by end of market
Franklin Co.	9/16	47	$376	Slow, rainy day-Sold out by end of market
Franklin Co.	9/18	129	$1,032	Sold out by end of market
St. Matthew's	9/18	113.5	$908	Sold out early- Could have sold more
Bluegrass	9/18	150	$1,200	Sold out early- Could have sold more
Moon Festival	9/18	90	$592	Sold out early- Could have sold more

Conclusions

Local farmers' markets in or near larger cities in Kentucky seem to be a potentially valuable direct-retail outlet for freshwater shrimp producers in the state. Customers at these markets appreciate the unique and local attributes of the fresh product and are willing to pay $8/lb. Each market has different rules and fees for obtaining booth space, and these must be considered against potential sales when committing to such a market, but it seems that most markets are happy to have a prawn farmer in their market, as it is a unique and popular product. If a small-scale shrimp producer could extend his harvest over the course of several weeks, then membership in a single farmers' market could allow him to sell a fairly large amount of his product at retail price. Advanced advertising and cooked samples seem to be beneficial for sales. Since purchasing whole shrimp is a new experience for many people, the marketer must make sure that the customer has the best experience possible with the product. This includes handing out informational materials on how to handle, store and cook the shrimp, as well as strict attention to quality control. The shrimp must be stored in coolers such that all melt water can drain, as shrimp that are left in water will become mushy and un-sellable. Any excessively soft, damaged or otherwise unappealing shrimp should absolutely not be sold to customers, as a single negative experience can turn a customer (and everyone they talk to!) off of the product forever. Also, having cheap coolers or cooler bags available for sale, along with clean ice to pack with the shrimp would allow more customers to purchase the product and get it home safely. Many customers also asked about the availability of frozen tails or Tilapia, so a farmer with a more diverse array of aquaculture products could probably do very well at these markets. More research on weight-loss of fresh shrimp on drained ice is needed to determine whether retail price needs to be adjusted to prove profitable to the producer.

Any farmers interested in getting involved in selling their product at farmers' markets can contact KSU Aquaculture for support and help with marketing materials, proper procedures, and advice.

Willingness to Pay for Freshwater Prawn Among Asian Consumers in Kentucky

William J. Rimmele, Graduate Student and **Siddhartha Dasgupta, Ph.D.,** Associate Professor, Kentucky State University

Introduction

The freshwater prawn *(Macrobrachium rosenbergii)* industry in Kentucky is at a disadvantage due to the price competition from cheaper, more convenient substitutes such as marine shrimp. However, Kentucky prawn farmers are able to offer their customers something marine shrimp suppliers cannot compete against: a supply of freshly harvested, locally-grown product. A major hurdle for the Kentucky prawn industry is finding markets where fresh, locally grown-product commands premium price, enough for farmers to be profitable.

The purpose of this study was to determine the true willingness to pay (WTP) per pound of freshwater prawn using what economic researchers call a "Becker-deGroot-Marshak (BDM) experimental auction" using data from the Asian American community in central Kentucky. This selection was based on the hypothesis that Asian Americans in Kentucky would have a strong preference for freshwater prawn due to their larger size and freshness when compared to marine shrimp.

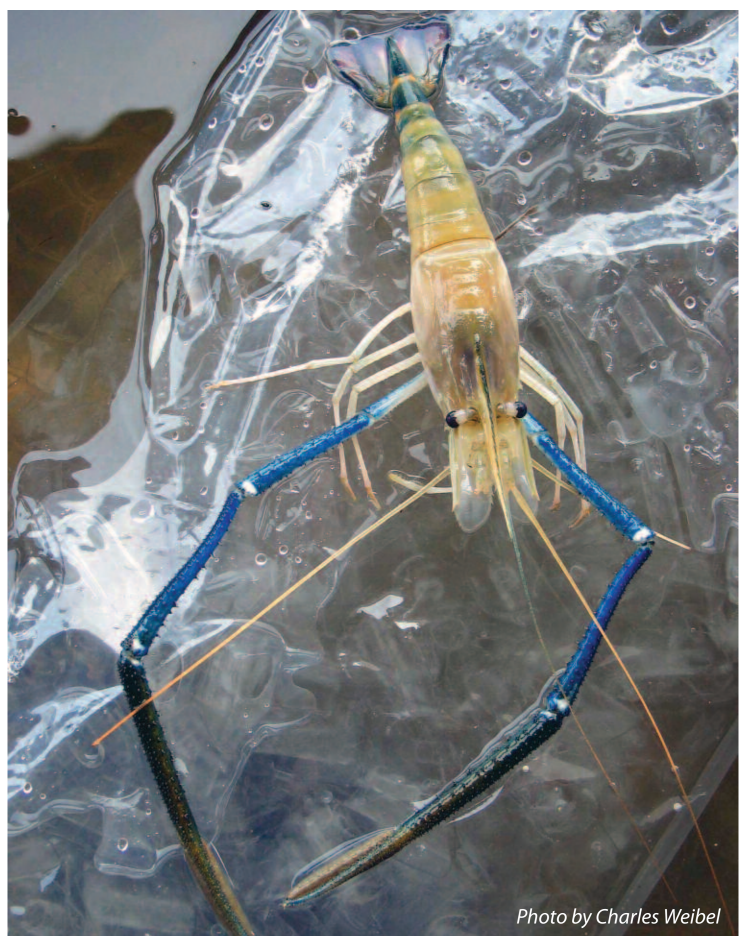


Photo by Charles Weibel

Materials and Methods

The experimental auction was performed at the annual Chinese Moon Festival, held on September 18, 2010 in Lexington, Kentucky. The Chinese Moon Festival is a popular event and was chosen because local Asian consumers were congregating there. The Moon Festival was held in a small amphitheatre in Lexington, where local vendors had set up tents to sell their wares. The BDM experimental auction was implemented by 1) allowing consumers to inspect fresh, whole prawns, 2) asking each consumer interested in purchasing prawns to select a maximum willingness to pay (WTP) price for a pound of freshwater prawn, 3) simultaneously selecting a random price for prawns using a computer random number generator. The random price was selected between $6.00/lb and $10.00/lb, representing typical pricing in prawn direct-to-consumer markets; however, this information was kept from auction participants. If a participant's WTP exceeded the computer-generated price, he/she was allowed to purchase the prawn at the lower price; otherwise, he/she was disallowed from making a purchase. Participants were given three chances to bid, and if their WTP was consistently too low in comparison to the computer-generated bids, they were not permitted to purchase prawns. This provided a real incentive for the participant to make a realistic offer; otherwise, they may not have been permitted to buy the desired product. Participants were asked questions in a survey to elicit their preferences about prawns and marine shrimp, their WTP for fresh marine shrimp, followed by various questions regarding demographics.

Results

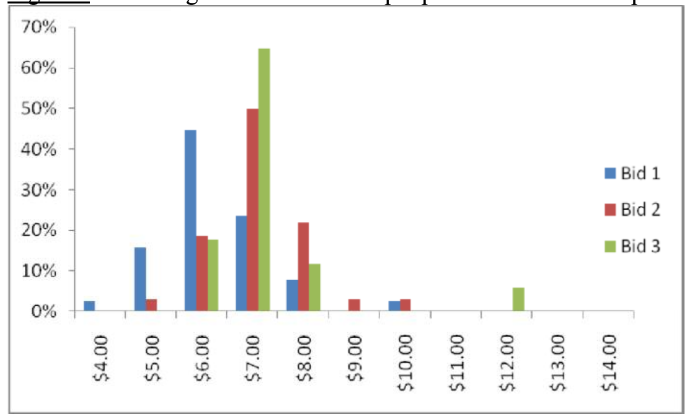
Table 1 reports a summary of demographic characteristics of the participants. A total of 35 participants took part in the experimental auction, while only 28 of those respondents took part in the survey.

Table 1. Description of Participant Demographics..

Characteristics of Study Participants	Percentage of sample
Age:	
21-30	15%
31-40	42%
41-50	31%
51-60	4%
Education:	
High school or less	7%
4-year college degree	11%
Professional degree	81%
Annual gross family income:	
Less than $30,000/year	11%
$31,000-$50,000/year	11%
$51,000-$70,000/year	16%
$71,000-$100,000	31%
$101,000-$150,000	19%
More than $150,000	11%
Gender: Males	50%
Ethnicity: Asian	100%

Figure 1 shows the percentage distribution of bids for freshwater prawn given by participants for each of the three rounds of bidding in the BDM auction. The highest proportions of bids in the first and second rounds were $6.00/lb (45%) and $7.00/lb (50%), respectively. The highest proportion of participants gave a bid of $7.00/lb (65%) during their third round of bidding. Although the majority of participants (77%) gave bids between $5.00/lb and $8.00/lb, 12% of participants were willing to pay up to $12.00/lb while one participant gave the lowest bid of $4.00/lb.

Figure 1: Percentage of bids in dollars per pound for freshwater prawn.



For sake of comparison, respondents were asked their WTP for a pound of fresh, whole marine shrimp. Figure 2 outlines the results of this question, where 88% of participants were willing to pay over $6.00/lb. The average WTP for freshwater prawn was found to be $7.90/lb while the average WTP for marine shrimp was $7.20/lb. Statistical analysis of the data showed that there was no significant difference between the two prices. More than half the respondents indicated that they would pay between $6.00/lb and $7.00/lb for fresh marine shrimp. The lowest stated WTP was $4.00/lb.

Figure 2: Percentage of willingness to pay for fresh marine shrimp in dollars per pound

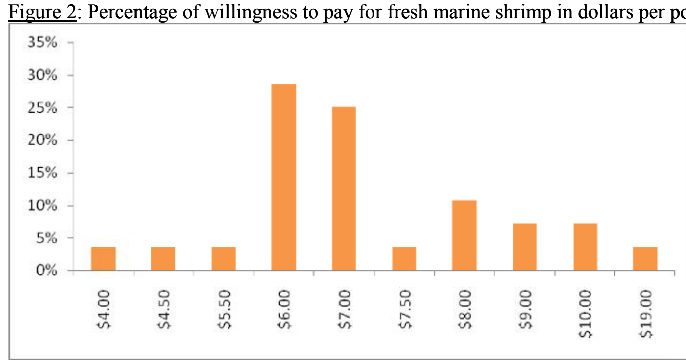
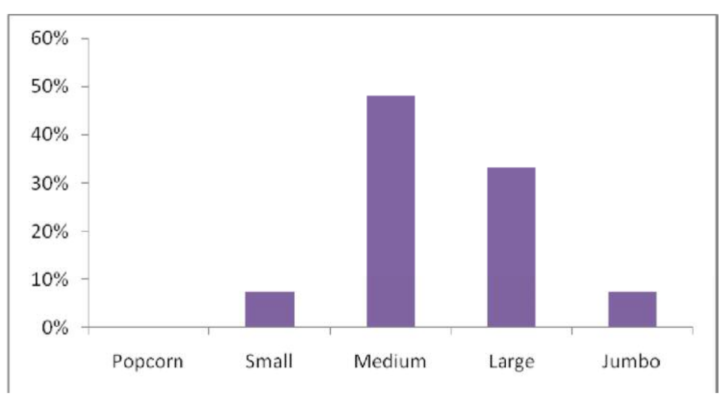


Figure 3 illustrates the distribution of the preferred size of prawns/ shrimp. Nearly 50% of participants preferred medium sized animals over other sizes, but 33% or respondents wanted large prawns. Few participants favored jumbo or small animals, and no participants preferred the " popcorn" size.

Figure 3: Percentage of size preference for freshwater prawns.



Conclusions

Data collected from this study suggested that the average WTP for freshwater prawn, when compared to typical breakeven prices for prawn producers, was sufficient for many farmers to be profitable. The survey data showed that a sales price between \$6/lb and \$8/lb for whole prawns was definitely achievable in this market. Economics research on the costs of freshwater prawn production indicated that many production scenarios should generate breakeven prices less than \$6/lb. However, this study does not address important transaction costs associated with this market such as costs of transportation and holding of fresh, whole prawns, and costs of advertisement and obtaining a marketplace targeting the Asian community, which would be important for a producer's profit margin.

Other findings of this study show that Asian consumers have a preference for freshness, which is possible to do for local prawn suppliers, but not for marine shrimp suppliers in Kentucky. A higher percentage of the Asian participants had a preference for medium sized animals, which diverged from Caucasian farmers' market consumers who had exhibited preference for large/jumbo prawns. Future studies related to the WTP for prawns among Asians should compare their bids before and after tasting prawns to evaluate the potential of repeat customers for this novel product.

Sustainable Small-Scale Catfish Farming

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http://www.ca.uky.edu/wkrec/Wurtspage.htm

Costs of energy, especially crude oil, have skyrocketed causing dramatic cost increases for intensive, commercial channel catfish farming. High energy prices have led to increased costs for distribution (processed fish and feed), electric aeration and on-farm practices relying on fossil fuels. High crude oil prices caused a shift in corn and soybean production from foodstuffs to biofuels. Channel catfish feeds are formulated with roughly 50% soybean and 30% corn. The costs of feeds and feeding for catfish farming have soared. Fuel prices have not yet matched their previous highs. But because global population growth and fossil fuel consumption have increased exponentially over the past 40 years, and continue to do so, energy costs will likely reach new highs in the near future. Grain prices, dwindling global energy supplies, and intensive production practices place the future of commercial channel catfish farming in jeopardy. Furthermore, the high feed and waste loads associated with intensive catfish farming significantly impact water quality in production ponds.

Environmental carrying capacity is determined by fish biomass and feed input. High demands are placed on environmental carrying capacity by intensive channel catfish production, creating dependence on external feed, energy and chemical inputs. Intensive farming commonly involves high stocking densities (5,000 fish/acre or greater) and high daily feed inputs (100-150 lb feed/acre). Daily aeration is needed. To maintain maximum production, small juveniles are periodically stocked with larger catfish ("under-stocking") – multiple batch production. The combined fish population is fed with floating feeds that target larger fish. Survival of under-stocked juveniles is often poor. It is likely that under-stocked juveniles do not compete effectively with larger fish for bigger, floating feed pellets.

Catfish farming is typically practiced intensively on large scales. Most people contacting Kentucky extension specialists about aquaculture want a production system that can be practiced on small acreage farms with minimal costs.

Production costs can be significantly decreased by reducing basic inputs and farming on a smaller scale. Low-input aquaculture allows producers to maintain much higher water quality relative to intensive production practices. Small-scale, low-input catfish farming practices offer an attractive opportunity for improving the sustainability of aquaculture in the United States.

In theory, yields of up to 3,000 lb of catfish/acre annually, without routine aeration, are possible with a total annual stocking of 2,500 catfish/acre and a maximum daily feeding rate of 30 lb/acre. Growth adjusted feeding for fingerlings with sinking feed for several weeks after stocking could significantly improve growth and survival of juveniles in a mixed size-class catfish population. Feeding rates, fish biomass and waste nutrient concentrations are maintained at or below pond (environmental) carrying capacity with periodic size selective harvests; preserving environmental quality. This system could be implemented by producers with small farms but is scalable and could be adapted for moderate to large acreage production. Reduced energy and waste inputs promote long-term sustainability.

Use of Soybean Meal and Distiller's Dried Grains with Solubles in Feeds for Australian Red Claw Grown in Kentucky Ponds

Kenneth R. Thompson, M.S., Alejandro Velasquez, Linda S. Metts, Laura A. Muzinic, M.S. and Carl D. Webster, Ph.D.
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Introduction

Interest in the production of Australian red claw has increased over the past few years and the species is commercially cultured in several countries including China, Mexico and Australia. Currently, there is little production of red claw in the United States. In Kentucky, red claw has attracted interest as a potential aquaculture species due to the success of growing them at Kentucky State University's (KSU) Aquaculture Research Center during the past decade. In the early 2000s, KSU researchers produced the most red claw (by weight) in North America. Research at KSU has found the following favorable culture traits: they consume a prepared diet directly after hatching; grow rapidly up to (65-90 grams or 1/7 to 1/5 of a pound) in a limited (<120 days) growing season in temperate-climate ponds; and are highly-desired by consumers because of their lobster-like appearance, large size, excellent flavor, and good storage quality (Figures 1 and 2). Notably, red claw grow larger than the most-commonly cultured crayfish in North America, the red swamp crayfish, which attains an average weight of between 20 to 35 g. Further, while the red swamp crayfish has a tail meat yield of between 15-20%, red claw tail meat yield is approximately 30%. Red claw have a straightforward production technology; tolerance of a wide range of water temperatures (15-32C) and low dissolved oxygen concentrations (as low as 1 part per million; no post-hatch larval phase, negating the need for expensive and sophisticated hatcheries; are tolerant of crowded conditions and non-burrowing behavior; and readily accept prepared diets, especially newly-released individuals which can reduce or eliminate the need to feed on live foods.

Although red claw seems to be a promising aquaculture species for U.S. farmers, there are production challenges that need to be assessed before this enterprise can grow. Since red claw are a subtropical species, culture of red claw in temperate climate ponds is constrained by a short growing season. Further, red claw juveniles are not readily-available in the U.S.; therefore, producers must purchase these individuals from hatcheries in other countries (Australia or Mexico) and costs can be higher than $1.00 (US) per juvenile (includes transport costs). There are red claw hatcheries in the U.S.; however, they tend to be dedicated to the aquarium hobbyist, and prices are very high ($1.00-3.50 per juvenile) making them too expensive for purchase by producers who need many thousands to stock in their ponds.

Figure 1: Pictures of an adult male red claw caught at harvest.

Photos by Charles Weibel

Use of an inexpensive formulated diet is essential for profitability in the U.S. Protein is generally the most expensive component in a prepared diet for fish or crustaceans. In addition, fish meal (FM) is generally the most desirable animal protein ingredient because of its high protein content and digestibility, excellent source of essential fatty acids and energy and its high palatability. Therefore, in an effort to reduce diet costs, it would be necessary to either reduce the protein level and/or replace FM with a less expensive protein source(s), such as soybean meal (SBM). The purpose of the present study was to determine growth, survival, total yield (lbs/acre) and processing characteristics of red claw fed diets with two different crude protein levels (18% and 28%), with or without FM present.

Figure 2: Holding harvest-size male red claws.

Photos by Charles Weibel

Figure 3: Photo of a manual red claw harvest.

Photos by Charles Weibel

Materials and Methods

Juvenile red claw (5.75 g) were stocked into ponds (1/10th acre) and fed one of four diets: Diet 1 contained 18% protein with FM; Diet 2 contained 18% protein without FM; Diet 3 contained 28% protein with FM; and Diet 4 contained 28% protein without FM. The even number diets (Diets 2 and 4) contained SBM and distiller's dried grain with solubles (DDGS) as replacements for FM (Table 1). Red claw were fed twice daily by distributing feed pellets over the entire surface area of each pond at 8:00 a.m. and 3:30 p.m. for 97 days. At harvest, ponds were completely drained and red claw were manually removed, hand-counted and individually weighed (Figure 3).

Results and Conclusions

After 97 days, the final mean weights of red claw fed Diet 3 (28% protein with FM) and Diet 4 (28% protein without FM) were significantly ($P < 0.05$) higher than those of red claw fed Diet 1 (18% protein with FM) and Diet 2 (18% protein without FM; Figure 4). Percent survival and total yield did not differ significantly among treatments, averaging 65.2% and 652 lbs/acre, respectively. Processing traits of red claw revealed that males and females fed Diets 3 and 4 had numerically the highest tail muscle meat (no shell) weight and claw weight for females.

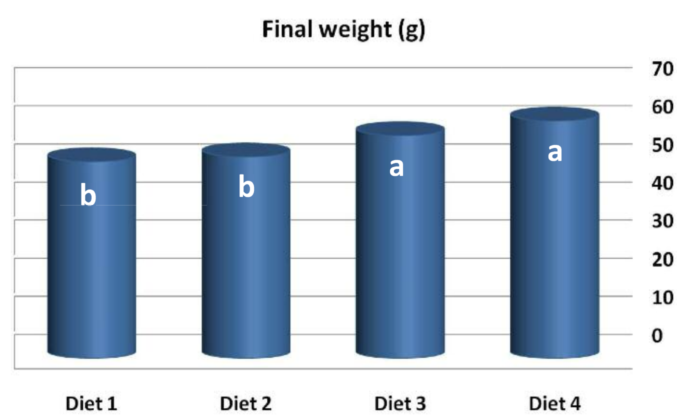

Figure 4: Final weight of pond-raised red claw fed four practical diets containing two levels of protein, with or without fish meal (FM). Diet 1 contained 18% protein with FM; Diet 2 contained 18% protein without FM; Diet 3 contained 28% protein with FM; and Diet 4 contained 28% protein without FM. The even number diets (Diets 2 and 4) contained SBM and distiller's dried grain with solubles (DDGS) as replacements for FM . Bars with the same letter were similar to each other ($P > 0.05$).

The results of the present study indicate that red claw grown in ponds can be fed a diet in which FM is completely replaced with a combination of plant-protein ingredients (SBM and DDGS) when the protein level is 28% crude protein (CP). However, when red claw were fed diets containing 18% CP, growth and processing traits are reduced.

The use of soybean meal (SBM), when combined with distiller's dried grains with solubles (DDGS), offers much promise as a replacement for FM since diet costs can be reduced. Soybean meal is the most widely-used plant protein source in aquafeeds because of its high protein content, satisfactory essential amino acid composition, reasonable price, consistent quality, and steady supply. DDGS contains moderately high protein content (28-32%) and is the by-product from distillation of ethyl alcohol from grain or grain mixtures. The use of less-expensive, but nutritious, plant-protein ingredients, such as SBM and DDGS, is critical to reducing aquaculture diet costs so that the U.S. can be competitive in the global marketplace. Further research needs to be conducted on the use of SBM and other alternative protein sources to reduce diet costs for red claw, thereby increasinge the sustainability and profitability for producers in the future.

Acknowledgments

This research was partially funded by a grant from the Kentucky Soybean Promotion Board and Kentucky Soybean Association, a USDA Capacity Building Grant, and a USDA grant under agreement KYX-80-09-18A to Kentucky State University. The authors would also like to thank Charles Weibel for graphics support.

Replacement of Fish Meal with Soybean Meal and Yeast in Organic Diets for Nile Tilapia

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Contact author: carl.webster@kysu.edu, Kentucky State University, Aquaculture Research Center, Frankfort, KY 40601

Introduction

What is Aquaculture?

Aquaculture, or fish farming, is the fastest-growing agricultural sector in the United States, with annual growth rates of more than 6% for the past two decades. Globally, fish made up 15% of the average per capita animal protein intake in 2007; aquaculture supplied close to 50% of this demand. Total value of various aquaculture products is shown in Figure 1. Future trends project aquaculture production will continue to rise largely due to the fact that the oceans are being overfished and are reaching their maximum production capacity. While numerous efforts have been done to preserve the wild fisheries in recent years, there continues to be strong pressures on a variety of wild fish stocks. As the human population continues to expand worldwide, it is essential that seafood supply comes from aquaculture. In the U.S., consumption of tilapia, catfish, salmon and shrimp has boosted the percentage of seafood being produced by aquaculture. However, it should be noted that much of the higher supply to meet this growing demand is imported. Clearly, U.S. producers face strong competition from foreign producers around the world. Therefore, it is essential that domestic producers continue to develop new products and increase production efficiencies of rising aquaculture products, such as tilapia, to compete economically with producers overseas.

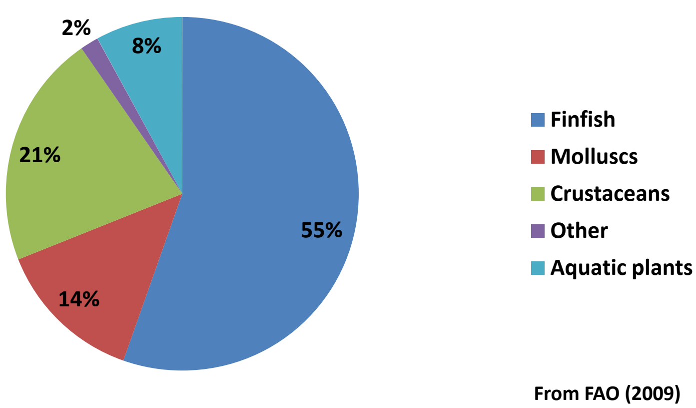

Figure 1: Total value of various U.S. aquaculture products (data adopted from FAO 2009).

Tilapia

Tilapia are tropical fish endemic to freshwater in Africa, Jordan, and Israel and are being cultured in virtually all types of production systems in both fresh and saltwater in tropical, subtropical and temperate climates. Tilapia have a long history of use as a food source; ancient Egyptians used to feed tilapia that were being held in cages waiting to be taken to market, and it has been speculated that tilapia were the fish from the biblical parable of the loaves and the fishes. Since then, tilapia have been introduced world-wide and production has grown to over 2.2 million metric tons in 2007, with an approximate production level of 3 million metric tons in 2010, making it one of the most important farm-raised finfish globally. Tilapia's acceptance by consumers worldwide is shown on Figure 2, where the annual growth rates are almost twice as big as the overall aquaculture rates. In 2007, tilapia was estimated to be the 4th most consumed finfish in the United States. This wide-spread success is due, in part, to their high level of adaptability and the ease of production.

Tilapia have sometimes been called "aquatic chicken" due to their rapid growth rates; high-quality flesh; tolerance to disease; adaptability to virtually all types of production systems in tropical to temperate climates; and ability to grow and reproduce in captivity. Currently, they are the second-most

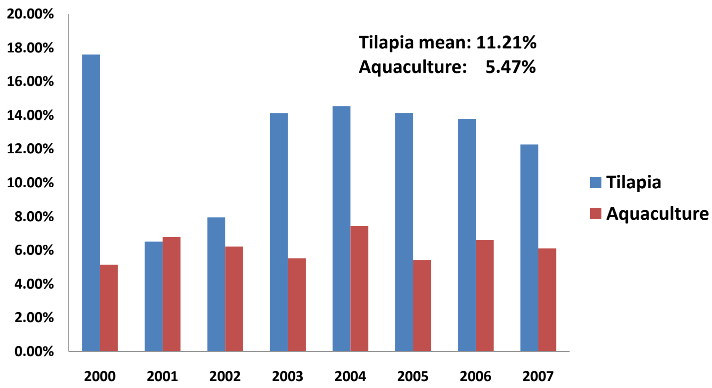

Figure 2: Overall annual growth rates of tilapia and aquaculture worldwide.

produced group of food fish globally (behind carps), and the growth trend is likely to continue. To date, the vast majority of tilapia consumed in the U.S. is produced in China, and Central and South America; however, increasing positive attitude toward local, organically-produced seafood may cause U.S. production of tilapia to rise. Tilapia are produced in intensive production systems, and as a result, it has become important to evaluate diets that are economically and environmentally-sustainable, as well as nutritionally-complete.

Traditional Aquaculture Diets - Fish Meal Dependence

Because diet costs make up the largest expense (40 to 80% of operating expenses) of an intensive aquaculture enterprise, it is essential to evaluate low-cost, nutritious diets to increase profitability for tilapia producers. This could lead to expansion of tilapia farming in the U.S. Currently, fish meal (FM) constitutes a substantial part of a commercial diet formulation of tilapia fry. FM is considered the most desirable animal protein ingredient in aquaculture diets because of its high protein content, balanced amino acid profiles, high digestibility and palatability, and as a source of essential omega-3 (n-3) polyenoic fatty acids. However, FM is one of the most expensive macro-ingredients (used in high percentages) in an aquaculture diet currently costing $900-1100 per ton. With the static or declining fish populations that are used to produce FM, any negative disturbance, supply disruption, or availability problem, can lead to dramatic increases in FM prices. The high cost of FM and concerns regarding its future availability have made it imperative for the aquaculture industry to reduce or eliminate FM from fish and crustacean diets.

One approach aquaculture nutritionists have embraced is to partially or totally substitute FM with alternative protein sources which will alleviate the dependence on marine-derived protein sources, allow for continued expansion of the global aquaculture industry by utilizing renewable ingredients, and possibly decrease diet costs, thereby potentially increasing profits for tilapia producers. It has been found that the use of two or more complimentary protein sources in addition to amino acid, vitamin and mineral supplementation may allow for growth results similar to those found when FM is the primary protein source.

Alternatives to Fish Meal

There have been many studies focused on finding protein replacements for fish meal in fish diets. Some of these fish meal replacement candidates include soybean and cottonseed meals, grains, yeast and rendered animal meals. Plant proteins have the advantage of being sustainable, highly available and lower-cost due to their worldwide production. Soybean meal (SBM) is the most widely-used plant protein source in aquafeeds and is known to be a cost-effective alternative for high-quality FM in diets for many aquaculture species because of its high protein content, well-balanced amino acid profiles, reasonable price, consistent quality, and steady supply. It has been well documented that SBM has one of the best amino acid profiles of any plant protein feedstuff. However, a diet containing SBM as the sole protein source might be nutritionally incomplete since methionine and lysine are the most limiting amino acids in high-SBM diets.

The use of sustainable, alternative protein sources, such as plant and yeast meals, provides the opportunity for the use of organic diets in aquaculture. Organic agriculture is the fastest growing food production industry in many countries and the sale of organic products increase revenue for producers up to 20% higher than non-organic counterparts. In the U.S., the value of organic agriculture is estimated to be $30 billion annually. However, in order for tilapia to be labeled as organic, they must be fed an organic diet.

In order to evaluate use of organic diets for tilapia, a study was conducted to assess organic yeast (OY) in combination with organic SBM (OSBM) as complete protein replacements for FM in diets for Nile tilapia. Fish meal is not considered an organic protein source.

Materials & Methods

One control diet was formulated similar to a commercially-available tilapia diet, while eight experimental diets were formulated to contain organic soybean meal (OSBM) and various levels of organic yeast (OY; 15, 30 and 45%), with and without amino acid (AA) supplementation of methionine and lysine, as replacements for menhaden fish meal (FM; Table 1). Diets were extruded into spaghetti-like strands using a 0.5-cm die and air-dried (Figure 3). Once all diets had dried completely, portions of each diet were stored in plastic bags and stored in a freezer until fed.

The feeding trial was conducted using a recirculating aquaculture system, comprised of aquaria that drained into a biofilter (Figure 4). Nile tilapia averaging 0.11 g were stocked into each aquarium at 20 fish per aquarium (36 aquaria total). Each aquarium was assigned one of the nine diets. Tilapia was fed three times daily (0800, 1200 and 1600 h) all the diet they could consume for thirty minutes for six weeks (Figure 5).

Results & Conclusions

After six weeks, final mean average weight of fish fed Diet 1 (20% FM and 50.3% SBM) and Diet 9 (0% FM, 33.8% organic soybean meal [OSBM], and 46.5% organic yeast [OY]+ the amino acids [AA] lysine and methionine) was significantly higher (4.98 and 4.96 g) than fish fed all other treatment (diets) (Figure 6). Final mean weight increased with increasing OY inclusion in both the non-amino acid-supplemented and the supplemented treatment groups.

These are the first data evaluating the use of organic SBM and OY as total replacement for FM in Nile tilapia fry. Results indicate that a diet containing 40% protein and formulated to contain

Table 1. Ingredient composition of the nine practical diets containing various levels of soybean meal and yeast extract fed to Nile tilapia fry. All ingredients were certified organic in Diets 2-9. Diets marked with an asterisk (*) were supplemented with methionine and lysine amino acids (A.A.).

	Diets								
Ingredient	**1**	**2**	**3***	**4**	**5**	**6**	**7***	**8***	**9***
Fish meal	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Soybean meal	50.3	84.4	83.9	67.1	51.0	35.7	68.4	51.3	33.8
Yeast extract	0.0	0.0	0.0	15.0	30.0	45.0	15.0	30.0	46.5
A. A. Suplementation									
Methionine			0.30				0.30	0.28	0.27
Lysine			0.30				0.35	0.40	0.43
Other	29.7	15.6	16.1	17.9	19.0	19.3	16.6	18.7	19.7

Figure 3: Tilapia diets being prepared for the study.
Photos by Charles Weibel

0% FM, 33.8% OSBM, and 46.5% OY, with supplemental methionine and lysine, may be sufficient for Nile tilapia fry as this diet produced as much growth as the commercial diet. While information about specific nutritional requirements and practical diet formulations for tilapia has been widely studied, there is little information on the partial or total replacement of FM with less expensive organic plant protein sources. Replacement of FM with less expensive protein sources, such as OSBM and OY, may help contribute to a reduction in diet costs and thereby increase profits for producers. In addition, organically-grown tilapia may offer a broader marketing-base for tilapia producers, while at the same time increase the value compared to traditional non-organically grown products. This study could lead to domestic production of certified organically-grown tilapia which might allow farmers to market a product that foreign competitors do not currently have, and at the same time, allow for the use of domestic SBM. Further studies need to be conducted on the use of SBM,as a FM replacement in tilapia diets.

Acknowledgments

This research was partially funded by a grant from the Kentucky Soybean Promotion Board and Kentucky Soybean Association, a USDA Capacity Building Grant, and a USDA grant under agreement KYX-80-09-18A to Kentucky State University. The authors would also like to thank Charles Weibel for graphics support.

Figure 4: The experimental aquaria system used in the study.
Photo by Charles Weibel

Figure 5: Top picture shows tilapia being fed in the aquaria while the photo at the bottom are the tilapia fry.
Photos by Charles Weibel

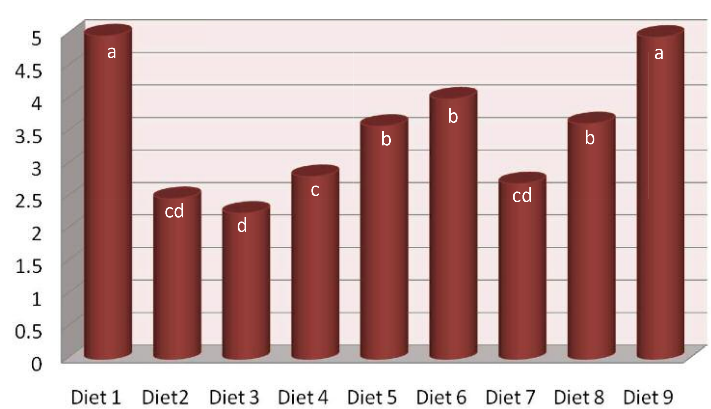

Figure 6: Tilapia diets being prepared for the study.

Koi Demonstration Project to Control Aquatic Weeds

Bob Durborow, Ph.D. and Boris Gomelsky, Ph.D., Kentucky State University Aquaculture. Phone (502) 597-8103.

Aquatic weeds diminish the usefulness of recreational ponds. They can completely "clog-up" the water column making it very difficult to fish with a hook and line, feed fish, harvest with a seine, go boating, or swim. Aquatic weed control problems comprise the most common questions from pond owners for Cooperative Extension specialists and Agents. It has been generally recognized that stocking koi *(Cyprinus carpio)* in ponds helps to prevent the establishment of aquatic weeds (Figure 1). Koi are a colorful version of common carp, and they have the common behavior of digging and foraging on the pond bottom; this behavior stirs up and suspends mud in the water and simultaneously releases nutrients from the mud that fuel the growth of phytoplankton. The turbidity from the phytoplankton and mud prevents sunlight from reaching the pond bottom; the lack of sunlight there helps to prevent the establishment of aquatic plants and algae. The following pictures show a 1-acre pond in Kenton County, Kentucky in 2007 before it was stocked with 45 11+-inch long koi (Figure 2) and the same pond in 2010 after having koi present for a few years (Figure 3). The large koi size was chosen because 15 to 18-inch long largemouth bass were present at the time of stocking.

Figure 2: In this Kenton County, Kentucky pond in 2007, submerged aquatic weeds were able to fill up a large portion of the pond's water column. They became established because the water was clear and sunlight was able to penetrate to the pond bottom where weed growth began.

Photo by Bob Durborow

Figure 3: This is the same Kenton County pond in 2010, 3 years after koi were stocked for aquatic weed control. The activity of the koi kept the pond-bottom nutrients and mud suspended in the water column; the resulting phytoplankton algae and muddiness blocked sunlight, preventing the growth of weeds.

Photo by Bob Durborow

Figure 1: Koi are stocked in a pond with weed problems.

Photo by Bob Durborow

Don’t Let Your Chemicals Be Their Next Weapon

International and domestic terrorists have released, contaminated, and ignited chemicals, causing mass destruction and loss of life. If you store or distribute chemicals you can help prevent such attacks in the future.

An online screening process quickly determines whether your facility is potentially at high risk.

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Step 1: Check if you store “chemicals of interest”

Step 2: Register your facility

Step 3: Complete a Top-Screen

Homeland Security

For More Information

Contact the CSAT help desk at CSAT@DHS.GOV or 1-866-323-2957 or visit www.dhs.gov/chemicalsecurity

Please see the next page for a list of chemicals of interest.

Do you raise fish?

Do you use formalin, hydrogen peroxide, potassium permanganate, or other chemicals?

You may be subject to Department of Homeland Security Chemical Facility Anti-Terrorism Standards

What is CFATS? Responsibility for chemical security is shared among federal, state, and local governments, as well as the private sector. Chemical Facility Anti-Terrorism Standards (CFATS) were developed by the Department of Homeland Security (DHS) to allow for cooperative monitoring and control of various chemicals that present one or more security issues if released, stolen or diverted, or could be used for purposes of sabotage or intentional contamination.

Who is subject to CFATS? The Department of Homeland Security has issued CFATS for any facility that manufactures, uses, stores, or distributes certain chemicals at or above a specified quantity. **This includes aquaculture facilities that use or store these chemicals of interest.**

What are the chemicals of interest? DHS has identified more than 200 chemicals of interest (http://www.dhs.gov/xlibrary/assets/chemsec_appendixa-chemicalofinterestlist.pdf). Chemical use patterns will vary, and each facility is responsible for evaluating their own chemical use patterns and determining which are subject to CFATS. However, the chemicals of interest most likely to be found at aquaculture facilities are:

Formalin/Formaldehyde Solution--subject to CFATS if ≥1% solution and ≥15,000 lbs. stored
Hydrogen Peroxide—subject to CFATS if ≥35% solution and ≥400 lbs. stored
Potassium Permanganate—subject to CFATS if commercial grade and ≥400 lbs. stored

What should I do if I think my facility is subject to CFATS? If you use or store any of the chemicals of interest in volumes above the CFATS thresholds, you must register to access the Chemical Security Assessment Tool (http://www.dhs.gov/files/programs/gc_1169501486197.shtm). Once you are registered, complete a Top-Screen preliminary assessment to determine risks at your facility. Depending on the level of risk associated with your facility's chemical use patterns, you may be required to complete a Security Vulnerability Assessment and you may need to develop a Site Security Plan. These added steps are only necessary for those facilities determined to be high-risk by DHS.

You may already be doing everything necessary to prevent misuse of chemicals at your facility, but it is your responsibility to be sure and report what you are doing. Don't let your chemicals be their next weapon!

For More Information:

Contact the CFATS help desk at CSAT@DHS.GOV

Call 1-866-323-2957

Visit www.dhs.gov/chemicalsecurity

AFS Fish Culture Section Working Group on Aquaculture Drugs, Chemicals and Biologics

2011 Annual Meeting (for KAA) Sign-Up Form

REGISTRATION FORM

Name: ____

Address: ____

City: ________________ County: ________________ State: ________ Zip: ________

Phone: ______________________ Cell Phone: ______________________

Fax: ______________________ Email: ______________________

Web site: ____

$25 per person *(includes meeting registration, annual KAA dues, and lunch)*

Number of persons attending ________

MAKE CHECKS PAYABLE TO KAA AND SEND TO:
Shiela McCord, KAA treasurer
4258 Lexington Rd.
Winchester, KY 40391

OBITUARY - Mr. Calvin Lewis Curry

Mr. Calvin Lewis Curry, manager of Brush Creek Trout Farm, of Summersville, Kentucky, son of Charlie Curry and Glenda Mae Curry both of Greensburg, was born on December 9, 1975 in Taylor County, Kentucky and departed this life on Saturday, January 22, 2011 in Summersville due to a farming accident. He was 35 years, one month and 13 days of age.

He had made a profession of faith in Christ and was a member of the Allendale Baptist Church. He was a farmer and a member of the Green County High School Class of 1994.

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PERMIT NO. 274

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This newsletter also available on the web at
www.aquanic.org/newsltrs/state/kentucky.htm
and at www.ksuaquaculture.org

KENTUCKY AQUACULTURE ASSOCIATION
Membership Application

Do you give permission to display the following information in an Agricultural Directory? **❑ Yes ❑ No**

AQUACULTURE BACKGROUND *(check more than one where appropriate):*
❑ Producer ❑ Live Hauler ❑ Processor ❑ Pay Lake Owner
❑ Feed Mill ❑ Extension/Research
❑ Other *(explain)* ______________________

SPECIES
❑ trout ❑ minnows ❑ largemouth bass ❑ catfish ❑ bluegill
❑ hybrid striped bass ❑ freshwater shrimp ❑ red claw crayfish
❑ paddlefish
❑ Other *(explain)* ______________________

WATER SOURCE *(if applicable):*
❑ well ❑ spring ❑ watershed pond ❑ stream or lake
❑ Other *(explain)* ______________________
Number of ponds or raceways: ____________
Total acreage (if ponds) ____________
Comments (e.g. issues you want the Association to address): ____________
____

Name: ______________________
Street Address: ______________________
City: ____________ County: ____________
State: ____________ Zip: ____________
Phone: ______________________
Cell Phone: ______________________
Fax: ______________________
Email: ______________________

MEMBERSHIP DUES
Kentucky Aquaculture Association Dues: $25.00
Student KAA Dues: $5.00 School:____________
Current Project: ______________________

Please return this application to the address listed below:
Kentucky Aquaculture Association
c/o Shiela McCord
4258 Lexington Road
Winchester, KY 40391