

Experiment Station, Mississippi State University, Technical Bulletin No. 168, Dec., 1989.

Pomeroy, Robert S., James C. O. Nyankori, and Danilo C. Israel. "Aquaculture Products in the Market Place: Utilization of Fish and Seafood and Catfish Products by Full-Service Restaurants in the United States." Department of Agricultural Economics and Rural Sociology, Clemson University, June, 1990.

Journal Articles

Dellenbarger, Lynn, James Dillard, H. O. Zapata, Alvin R. Schupp, and Brian T. Young. "Socioeconomic Factors Associated with At-Home and Away-From-Home Catfish Consumption in the United States." Journal of the World Aquaculture Society. (In revision)

Kinnucan, H. "An Evaluation of U.S. Catfish Advertising: In Research on Seafood Advertising and Promotion." D.S. Laio (ed.). (Forthcoming)

Kinnucan, H., and M. Venkateswaran. "Economic Effectiveness of Advertising Aquacultural Products: The Case of Catfish." Journal of Applied Aquaculture. (In review)

Kinnucan, H., and M. Venkateswaran. "Effects of Catfish Advertising on Attitudes, Purchase Frequency and Farmers' Income." Southern Journal of Agricultural Economics. (In review)

Lambregts, J., and O. Capps, Jr. "Retail Demand for Catfish and Crawfish in a Local Market." Journal of Food Distribution Research, 21, 1 (Abstract) Feb., 1990. (In press)

Schupp, Alvin R., Robert Pomeroy, and Lynn E. Dellenbarger. "U.S. Food Store Experience in Handling Crawfish." Submitted Journal of Food Distribution Research.

Zidack, Walter and Upton Hatch. "An Econometric Estimation of Market Growth for the U.S. Processed Catfish Industry." Agricultural Economics and Rural Sociology, Alabama Agricultural Experiment Station, Auburn University, Journal of the World Aquaculture Society, Journal No. 1-902637P, June, 1990.

**B. Analysis of Regional and National Markets for Aquacultural Products Produced for Food in the Southern Region**

Termination Report  
For The Period  
April 1, 1988 to June 30, 1990

COOPERATING INSTITUTIONS:

Auburn University - Carole Engle<sup>1</sup>, Upton Hatch and Henry Kinnucan  
Clemson University - Robert Pomeroy  
Louisiana State University - Lynn Dellenbarger  
Mississippi State University - James Dillard  
Texas A&M University - Oral Capps

ADMINISTRATIVE ADVISOR:

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REASON FOR TERMINATION:

Objectives completed.

<sup>1</sup>Carole Engle moved to the University of Arkansas at Pine Bluff, but continued to participate in the project on an informal basis.

MAJOR ACCOMPLISHMENTS:

The Work Group began work in April, 1988, immediately upon receiving formal notice that the project was approved. The first task was to design and pre-test three different questionnaires for use in national surveys of households (consumers), restaurants, and retail grocery stores. The next tasks accomplished were deciding on an appropriate regional delineation of the U.S., sample size, sample quotas, and selecting a private telemarketing firm to develop random samples of telephone numbers and conduct the interviews. The surveys, representing 3600 households, 1800 grocery stores and 1800 restaurants, were completed in July, 1988. Even though the telemarketing firm provided initial editing of survey data, it became necessary that the Work Group further edit and remove illogical responses from the database. The Work Group agreed the database was "clean" and ready for analysis by November, 1988.

During the following four months, preliminary results of the surveys were presented to several aquaculture organizations in participating states, to Catfish Farmers of America and to an organized symposia, Southern Agricultural Economics Association. Survey results presented at these meetings are contained in a bulletin titled "*The U.S. Market for Farm-Raised Catfish: An Overview of Consumer, Supermarket and Restaurant Surveys*" (Arkansas Agricultural Experiment Station Bulletin No. 925, September, 1990).

A total of 8 research bulletins, 11 journal articles and 17 papers and other articles have been prepared from this research (see list of publications). Following is a summary of some highlights of this research, by objective.

Objective 1: To obtain and analyze comprehensive market information from consum-

ers, retail grocery stores and restaurants.

The survey of consumers revealed that catfish is no longer (if it ever was) a product consumed primarily by low income, poorly educated persons living primarily in the deep South. Catfish is now being consumed in significant quantities by persons of all income and education levels, nearly all race and ethnic backgrounds, and in all major regions of the U.S., although a majority of consumption is still in the traditional consuming area. Changes in attitudes and perceptions of farm-raised catfish were evident from the survey. Differences in consumer ratings of catfish across regions are present, but not as large as anticipated. Although industry advertising and promotional programs are relatively new, they obviously have had an impact and should be continued at the highest level feasible. Many consumers outside the traditional catfish consuming region perceive that catfish are not readily available. Catfish received relatively low ratings on appearance and packaging, odor, and having few bones. These misconceptions should be addressed in future advertising and educational programs. Attributes of catfish that received relatively high ratings were nutritional value, flavor, and ease of preparation. Catfish were not perceived as being over priced relative to other fish and meat. Marketers should take advantage of these favorable attributes.

Attempts to identify a profile for catfish consumers met with only limited success, mainly because catfish are being consumed in varying quantities by consumers in nearly all demographic categories studied. The majority of catfish consumers live in the four central regions of the U.S. Among occupational categories, households having a head classed as professional contained the largest number of catfish consumers. The household income category having the largest number of catfish consumers was \$20,000 to \$30,000. A majority

of catfish consumers were white Protestants living in households containing 2-3 persons. A higher percentage of catfish consumers were 20-39 year-olds than any other age group. A majority of catfish consumers had education levels of high school graduate, or above.

The national survey of grocery stores consisted of a random sample drawn from a population of 143,673 stores nationwide (did not include convenience stores). The survey revealed 45% of stores nationwide offered some form of catfish -- ranging from a low of 27% in New England to a high of 59% in the West South Central division of the U.S. Twenty-one percent of store managers interviewed who did not sell catfish stated they were likely to add it in the next year. Given the number of stores nationwide, this suggests much potential for market expansion.

Generally, store characteristics associated with an increased likelihood of selling catfish included: (1) members of a chain; (2) having a specialized fish market section; and (3) sales of more than \$100,000 per month. Eighteen percent of the store managers reported that the national advertising campaign for catfish influenced their decision to add catfish to their product line. Regional impact of the national advertising campaign on catfish product adoption was greatest in the South Atlantic and Mountain regions. Stores in the Pacific and South Atlantic regions reported the largest rate of catfish product adoption for the two year period prior to the time of the survey (a period overlapping The Catfish Institute's generic advertising campaign). Selected variables from the grocery store survey were included in a logit model that produced probabilities of stores adding catfish. Ranking of regional markets was quantified by a market potential index that incorporated the estimated logit probabilities, regional population and the percentage of stores not selling catfish. The top three prospects in terms of new

market development, in decreasing order of potential, were found to be the South Atlantic, East North Central and Pacific regions.

Data from the national restaurant survey were used to evaluate market potential for the expanded use of aquaculture products with specific emphasis on developing market information regarding the restaurant use of catfish. Nationwide, 29% of restaurants reported that catfish was included on their menu. Of restaurants not serving catfish, 39% stated that adding catfish would not be difficult, while 19% stated they would consider adding catfish to their menu within the next year (1989). Restaurant managers in the two South Central regions, the South Atlantic region and the Pacific region, expressed the greatest interest in adding catfish to their menus. Outside these regions, unfamiliarity with catfish seemed to be the most important constraint to adding the product in restaurants. The random sample of 1800 restaurants was drawn from a national population of 321,667 full-service restaurants. Assuming the random sample was representative, there were over 40,000 restaurants considering adding catfish to their menu. Regions outside the South which promise the greatest return to catfish market promotion and development expenditures include New England, Middle Atlantic, East North Central and Pacific. Restaurants which characterize their cuisine type as seafood, combination and steak hold the greatest promise for market expansion. Other restaurant characteristics such as location, seating capacity or type of ownership were not statistically significant to be used as a basis for recommendation.

Research at Texas A&M utilized scanner data made available by a retail food firm (43 supermarkets) in Houston to (1) evaluate marketable product forms of catfish and crawfish, (2) and to estimate retail demand relationships for catfish and crawfish. Data were analyzed in econometric models emphasizing

price and advertising elasticities of both fresh and convenience catfish and crawfish products. Price elasticities (percent change in purchases due to unit change in prices) for convenience catfish ranged from -5.5 to -12.8, and from -1.3 to -6.5 for fresh catfish products. The price elasticity of fresh crawfish was -3.3. Cross-price and advertising elasticities were also estimated. The authors warn against generalizing results from this one local market to regional or national levels. This study constitutes a pilot test of use of scanner data to investigate demand for catfish and crawfish products for a local market. The methodology needs to be replicated in other geographic areas.

**Objective 2:** To assess the effectiveness of advertising and promotion of farm-raised catfish.

Analysis of survey data strongly suggests that advertising and promotion have significantly contributed to the growth in sales of catfish, for both at-home (grocery store sales) and away-from-home (restaurant) consumption. Nationwide, approximately 37% of consumers who had eaten catfish had seen or heard some form of advertising of catfish. Several econometric models were designed to isolate the effect of generic (TCI) advertising. The first model, which contained three equations, showed only a weak statistical significance of advertising, probably the result of the newness of the generic advertising program. A second eight equation model was estimated in an attempt to describe a hierarchy of effects of advertising. Not surprisingly, the results show the nascent advertising program exerting its influence through heightened consumers' awareness and improved perceptions of catfish. A third model, which included generic advertising expenditures as a variable, was used to project wholesale demand for catfish to 1995. This model projected sales in 1995 would be 60 million pounds lower without the

assumed annual one million dollars of generic advertising. The demand analysis of scanner data from a local market (Houston, Texas) revealed a significant relationship between advertising and purchases of fresh catfish.

**Objective 3:** To develop an overall assessment of potential for producing and marketing catfish and crawfish in the Southern Region.

The Work Group generally agrees there is potential for steady growth in the market for both catfish and crawfish. From a purely physical standpoint, the potential for expanding production in the Southern region is great. From an economic standpoint, production will ultimately be limited by both institutional (e.g. environmental, water use regulations) and market (demand) constraints.

There were no findings from this research to suggest the market for farm-raised catfish is nearing saturation, even in traditional consuming areas. If the current trend toward more fish and seafood consumption continues, there is sufficient evidence to suggest catfish can gain a larger market share of the total food budget, provided industry continues to advertise and promote its product. More research is needed to aid catfish marketers in identifying specific market niches where advertising and promotion will be the most cost-effective.

#### APPLICATION OF RESULTS:

There is tremendous interest in the results of this research. The supply (2000 copies) of the first bulletin printed was exhausted within six months. One catfish processor alone requested 100 copies for use by salesmen and brokers. A long mailing list has been developed from requests for bulletins now in the publication process. The survey results, and other research contained in these bulletins, should

be of much interest to marketers of farm-raised catfish and crawfish, as well as to their advertising agents.

The national surveys of households, grocery stores, and restaurants provide for the first time a national database on catfish and crawfish consumption by major regions of the U.S. Summaries and analyses of the survey data should be of much interest to catfish processors, marketers, industry organizations, and public institutions that have interest in the continued growth and development of this industry. Results indicate much potential for further expansion of the market, particularly in the South Atlantic, East North Central, and Pacific regions. While the research conducted under this project identified broad areas of market potential, more detailed surveys of market segments will be needed to help identify specific catfish market niches.

The impact of industry advertising and promotion was studied and found to be significant. If the industry is to continue expanding its markets, effective advertising and promotion will be required.

A pilot study utilizing scanner data from supermarkets located in Houston, Texas, produced an own-price demand elasticity for catfish products that is highly elastic. An elastic demand suggests that lowering the retail price would result in greater total revenue for the industry. Thus, efforts to further improve efficiency, particularly in marketing, should continue so that retail prices are no higher than necessary to maintain growth of the industry. This research was limited to one market, so results may not lead to drawing broad nationwide or regional inferences. The methodology used in this research should be replicated in other geographic regions.

#### PUBLICATIONS:

##### Bulletins

Capps, Jr., Oral and J. A. Lambregts. "*Analysis of a Local Retail Market for Catfish and Crawfish.*" Texas Agricultural Experiment Station Technical Bulletin, June 1990.

Engle, C., O. Capps, L. Dellenbarger, J. Dillard, U. Hatch, H. Kinnucan, and R. Pomeroy. "*The U.S. Market for Farm-Raised Catfish: An Overview of Consumer, Supermarket and Restaurant Surveys.*" Arkansas Agricultural Experiment Station Bulletin No. 925, September, 1990.

Hatch, L. U., et al. "*Survey Analysis of Existing and Potential Retail Grocery Markets for Farm-Raised Catfish in the United States.*" Proposed Research Bulletin. (In review)

Hatch, Upton, Carole Engle, Walter Zidack and Surajudeen Olowolayemo. "*Retail Grocery Markets for Catfish.*" (In review)

Kinnucan, H., M. Venkateswaran, and U. Hatch. "*Effects of Catfish Advertising on Consumers' Attitude, Purchase Frequency, and Farmers' Income.*" Bulletin No. 607, Alabama Agricultural Experiment Station, Auburn University. (Forthcoming)

McGee, William M., Lynn E. Dellenbarger and James G. Dillard. "*Demographic and Attitudinal Characteristics of Catfish Consumers.*" Mississippi Agricultural and Forestry Experiment Station, Mississippi State University, Technical Bulletin No. 168, December 1989.

Pomeroy, Robert S., James C.O. Nyankori and Danilo C. Israel. "*Aquaculture Products in the Market Place: Utilization of Fish and*

*Seafood and Catfish Products by Full-Service Restaurants in the United States.*" Department of Agricultural Economics and Rural Sociology, Clemson University, June 1990.

Schupp, A., R. Pomeroy and L. Dellenbarger. "U.S. Food Store Experience in Handling Crawfish." Approved for publication as Louisiana Agricultural Experiment Station Bulletin.

#### Journal Articles

Dellenbarger, Lynn E., James Dillard, Hector O. Zapata, Alvin R. Schupp and Brian T. Young. "Socioeconomic Factors Associated With At-Home and Away-From-Home Catfish Consumption in the United States." Journal of the World Aquaculture Society. (In revision)

Kinnucan, H. "An Evaluation of U.S. Catfish Advertising: In Research on Seafood Advertising and Promotion." D.S. Laio (ed.). (Forthcoming)

Kinnucan, H., and M. Venkateswaran. "Economic Effectiveness of Advertising Aquacultural Products: The Case of Catfish." Journal of Applied Aquaculture. (In review)

Kinnucan, H., and M. Venkateswaran. "Effects of Catfish Advertising on Attitudes, Purchase Frequency and Farmers' Income." Southern Journal of Agricultural Economics. (In review)

Kinnucan, H., and R. Nelson. "Market Segmentation Research for Food Products: The Case of Catfish." Southern Journal of Agricultural Economics. (Will submit December 1, 1990)

Kinnucan, H., and M. Venkateswaran. "Effects of Generic Advertising on Percep-

tions and Behavior: The Case of Catfish." Southern Journal of Agricultural Economics, December 1990. (Forthcoming)

Kinnucan, H., and M. Venkateswaran. "Cross Sectional Evaluation of Generic Advertising: The Case of Catfish." American Journal of Agricultural Economics. December 1990. (Forthcoming)

Lambregts, J., and O. Capps, Jr. "Retail Demand for Catfish and Crawfish in a Local Market." Abstract. Journal of Food Distribution Research, 21, 1 February 1990. In press.

Schupp, Alvin R., Robert Pomeroy, and Lynn E. Dellenbarger. "U.S. Food Store Experience in Handling Crawfish." Submitted to Journal of Food Distribution Research.

Zidack, Walter and Upton Hatch. "An Econometric Estimation of Market Growth for the U.S. Processed Catfish Industry." Agricultural Economics and Rural Sociology, Alabama Agricultural Experiment Station, Auburn University, Journal of the World Aquaculture Society, Journal No. 1-902637P, June 1990.

Zidack, Walter, H. Kinnucan, and U. Hatch. "Wholesale and Farm-Level Impacts of Generic Advertising: The Case of Catfish." Western Journal of Agricultural Economics. (Submitted October 1, 1990)

#### Papers

Dellenbarger, Lynn E., James Dillard, and Alvin R. Schupp. "Socioeconomic Factors Associated with Catfish Consumption in the United States." Annual Meeting of the Southern Agricultural Economics Association, Nashville, Tennessee, February 5-8, 1989.

Hatch, L. U. "National Survey of U.S.

*Fish Consumption.*" Proceedings, Aquaculture International Congress and Exposition, Vancouver, Canada, September 1988. (Published in Proceedings)

Hatch, L. U., W. E. Zidack, T. A. Barnes, and T. K. Thorpe. "Catfish Acceptance Varies Across U.S." Alabama Agricultural Experiment Station, Auburn University, Highlights of Agricultural Research, Vol. 36, No. 3, Fall 1989.

Hatch, Upton, et al. "Market Dynamics of the U.S. Catfish Industry." Presented paper to Western Economics Association, Lake Tahoe, California, June 1989.

Hatch, Upton, et al. "Potential New Retail Grocery Markets for Farm-Raised Catfish." Presented paper to the American Fisheries Society Annual Meeting, Anchorage, Alaska, September 1989.

Kinnucan, H. and M. Venkateswaran. "Cross-Sectional Evaluation of Generic Advertising: The Case of Catfish." Presented paper to the American Agricultural Economics Association, Vancouver, B.C., August 1990.

Kinnucan, Henry and Walter Zidack. "Effects of Industry Structure on the Stability of Aquaculture Markets." Presented paper to the American Fisheries Society Annual Meeting, Anchorage, Alaska, September 1989.

Kinnucan, H. "Evaluating U.S. Catfish Advertising." Symposium on Seafood Advertising and Promotion, D. Liao (ed.) 1990. (Forthcoming)

Zidack, Walter, et al. "A Dynamic Monthly Econometric Model of the U.S. Catfish Industry." Working Paper 89-2, Department of Agricultural Economics and Rural Sociology, Auburn University, Auburn, Alabama, March 1989.

Zidack, Walter, et al. "A Dynamic Monthly Econometric Model of the U.S. Processed Catfish Industry." Presented paper to the American Agricultural Economics Association Annual Meeting, Baton Rouge, Louisiana, July 1989.

#### Other Papers and Publications

Dellenbarger, Lynn E., et al. "Socioeconomic Factors Associated with Catfish Consumption in the U.S." Presented paper to the Southern Agricultural Economics Association Annual Meeting, Nashville, Tennessee, February 1989. (Abstract accepted for Journal)

Dellenbarger, Lynn E., James Dillard, and Alvin R. Schupp. "Socioeconomic Factors Associated with Catfish Consumption in the United States." Southern Journal of Agricultural Economics, July 1989. (Abstract)

Dellenbarger, Lynn E., et al. "Socioeconomic Factors Associated with At-Home and Away-From-Home Catfish Consumption in the U.S." Article submitted to Journal of World Aquaculture Society. (In review)

Dellenbarger, Lynn E., et al. "Nationwide Grocery Store Market for Crawfish." Article accepted for publication in Louisiana Rural Economist. Published by Department of Agricultural Economics and Agribusiness, Louisiana State University. (No date provided)

Pearse, Shaun R., Farhad Niami and Lynn E. Dellenbarger. "Nationwide Grocery Store Markets for Crawfish." Louisiana Rural Economist, Vol. 51, No. 3, August 1989.

Pereira, Carmen and Lynn E. Dellenbarger. "Household Consumption Patterns for Crawfish the United States." Published in Crawfish Tales, La. Crawfish Farmers Association, July 1989.

Pereira, Carmen. *"Nationwide Markets for Crawfish, Shrimp and Lobster in the United States."* Department of Agricultural Economics and Agribusiness, Louisiana State University, Baton Rouge, Louisiana. (In review)

Unpublished Theses

Caplen, Russell T. *"Product Development in the Restaurant Industry: The Case Study of Catfish."* Clemson University, December 1990. (Thesis)

Israel, Danilo Cano. *"Total At-Home, and Away-From-Home Catfish Consumption in the United States: A Dichotomous and Ordered Logit-Probit Analysis."* Clemson University, August 1990. (Dissertation)

**C. Preparation of Southern Regional Aquaculture Publications**

Annual Progress Report  
For The Period  
October 1, 1989 to June 30, 1990

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