

Coordinated Issue Area

Seafood Safety

Whether you prefer clams, lobster, fresh tuna or flounder, smoked salmon, gefilte fish, pickled herring, or high quality sushi you can always find your favorite type of seafood in New York. Just how much money New Yorkers spend on seafood and how important the seafood industry is to the state's economy is the subject of a Sea Grant report that will be out later this spring.

Coming Soon to Computer Screens Near You

NYSG's Ken Gall is heading up a national project to convert the three-day Seafood HACCP Alliance training courses into a Web-based distance learning format for the seafood industry and food inspection agencies who, under a December 1997 U.S. Food and Drug Administration regulation, have had to develop and implement a HACCP system to control all significant food safety hazards associated with their products and operations.

In 1994, the National Seafood HACCP Alliance developed a training curriculum for these groups that was recognized by the FDA as the standardized curriculum to meet the training requirement in the agency's seafood HACCP regulation. Almost 12,000 individuals had completed this training program in the U.S. and other countries by October

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According to **Ken Gall**, NYSG's seafood specialist, New York has a diverse seafood industry. The largest industry sectors are involved in the wholesaling or distribution of seafood products, whether they are available from Long Island, Louisiana, Chile or China, to the retail and restaurant operations that serve the state's large and diverse population.

Because seafood is such a unique and diverse food, there are a wide variety of issues that can have an impact on many different New Yorkers including seafood businesses, consumers, and even anglers who catch fish or shellfish for recreation and their own personal consumption. These impacts, coupled with new advances in seafood production and technology over the last two decades, have been the focus of New York Sea Grant's seafood safety and technology program. This focus has created a true synergy between NYSG's research and outreach components.

Since the inception of Sea Grant in the 1970s and especially in the 1980s, seafood consumption rose sharply in the U.S., as new information about seafood's nutritional benefits became available. In the late 1980s and periodically since that time, public attention has been focused on a variety of food safety issues associated with seafood products that has created the impression to some that seafood products are not adequately inspected and may be unsafe. Sea Grant has played a leadership role in helping both the seafood industry and consumers understand food safety issues related to seafood and develop strategies to effectively manage potential risks.

To help improve industry performance and educate the public with science-based information, Sea Grant's Ken Gall actively works with a variety of groups including the seafood industry, regulatory agencies, researchers, consumer educators, and public programs. In the early 1990s he played a key role in helping the state's seafood

industry organize itself to form the New York Seafood Council, which provided a voice for the industry to help it address the crisis in public confidence in seafood safety that was prevalent at that time. Throughout the 1990s this and other industry organizations have been active collaborators with Sea Grant to develop and implement new initiatives to enhance seafood safety. In 1995, the U.S. Food

and Drug Administration (the federal agency charged with regulating seafood safety) published a new regulation to

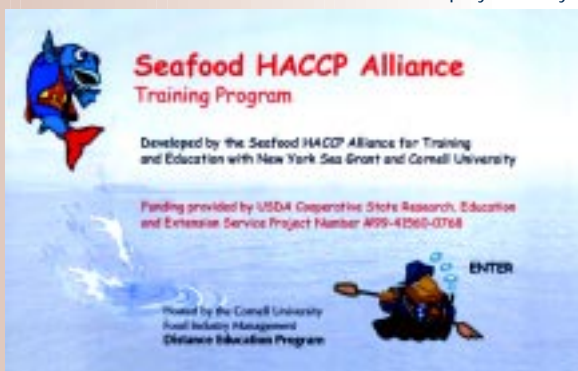


enhance seafood safety that requires seafood firms to utilize a HACCP (Hazard Analysis Critical Control Point) based system to prevent, eliminate or reduce food safety hazards to an acceptable level in products produced or imported into the U.S.," says Gall. Once a final Seafood HACCP regulation was published, seafood processors, wholesalers, docks and others in the distribution chain had two years to develop and implement a HACCP plan for their operation. Since then, NYSG has provided HACCP training in collaboration with local and regional FDA officials, NYS agencies such as the Department of Agriculture and Markets and the Department of Environmental Conservation and the New York Seafood Council to over 800 people in New York from the seafood industry and regulatory agencies (**See sidebar**).

In a 2000 national survey of seafood businesses conducted by Gall and the National Seafood HACCP Alliance, 77 percent of the 750 respondents said that they could not have been able to get a HACCP plan in place without the help of HACCP training. A report issued earlier this year by FDA in response to the General Accounting Office's (GAO) evaluation of FDA's seafood HACCP program cited the survey. "Two surveys of the seafood industry, one by the New York Sea Grant Extension Program and one by the Seafood HACCP Alliance, report that, as a result of FDA's HACCP program, the seafood industry is acquiring a better understanding of food safety hazards and how to control them."

The application of this new science-based system in the seafood industry has also pointed to a need for new research. According to Gall, "During the process of applying the HACCP concept to seafood products, it became clear that our current understanding of some hazards associated with seafood and how to effectively monitor and control them was inadequate. Additional scientific research was needed to develop or improve existing controls for some biological and chemical hazards."

One such hazard is *Listeria monocytogenes*, one of the most difficult microbial pathogens to control in foods that are not cooked before consumption. Currently there is a regulatory policy of zero tolerance for *Listeria monocytogenes* in ready-to-eat foods including seafood



products such as smoked fish. Thus, the smoked fish processing industry is subject to increased scrutiny by federal and state regulatory authorities. Since 1998, NYSG has funded research by **Martin Wiedmann** and **Kathryn Boor**, and graduate students **Dawn Norton** and **Adam Hoffman** of the Food Safety Laboratory at Cornell University. They have applied new DNA fingerprinting methods to study this pathogen, its ecology, and the effectiveness of measures to control it in seafood processing plants. Working cooperatively with NYSG's and managers of three smoked fish plants in NY, the Cornell team has taken hundreds of samples from each plant. "Results from this project provide additional strong evidence that different *L. monocytogenes* subtypes differ in their ability to cause human disease," says Weidmann. "The improved *Listeria* control strategies which have and will be implemented in smoked fish plants as a result of this project will decrease the likelihood of finished product contamination."



The results of this research have been communicated to the regulatory agencies and the seafood industry. "We conclude that application of molecular approaches can provide critical information on the ecology of different *L. monocytogenes* strains in food processing environments. This information can be used to develop practical recommendations for improved control of this important food-borne pathogen in the food industry," reported the research team in the January 2001 issue of the scientific journal, *Applied and Environmental Microbiology*. (See page 15 for journal citation.) The results of this research have also been extended to a national audience via the National Fisheries Institutes' Smoked Fish Committee.

NYSG is currently funding a second research project to examine in-plant control strategies for *Listeria*. In 2000, Wiedmann and Gall also received over \$500,000 in additional funding support from USDA's Food Safety Initiative program to expand this work to other ready-to-eat seafood products in addition to smoked fish. This 3-year project involves collaboration with a team of research and extension specialists from Virginia Tech, the Universities of Maryland and Delaware, Louisiana State University, the National Fisheries Institute, the National Food Processors Association and 10 seafood processing plants in the Northeast, Mid-Atlantic, Gulf Coast and Pacific Northwest regions of the U.S.

DNA fingerprinting methods have also been applied to another emerging pathogen, the O3:K6 strain of *Vibrio parahaemolyticus*, the organism that caused two different illness outbreaks associated with clams and oysters harvested in Texas and Oyster Bay, New York. Previous collaboration between Cornell's Food Safety Lab and NYSG enabled the Cornell team to quickly develop a project proposal to USDA, and the project was funded in 1999. NYSG's Gall will help regulatory authorities assess applications for this new analytical tool in their monitoring programs.

In a different line of research at the SUNY College of Environmental Science and Forestry in Syracuse, **Gregory Boyer** and his team are working on a toxin analyzer designed for use by the shellfish industry. Paralytic Shellfish Poisoning (PSP) is caused by several species of marine algae. Some species are toxic to fish, while others produce a series of neurotoxins that accumulate in shellfish and may cause numbing or paralysis in humans who consume them. By finding out if shellfish harvest areas have the toxin, regulatory agencies or even fishermen can use this tool to

prevent contaminated shellfish from entering the marketplace. "Our goal is to construct a simple device that can easily be used on a scallop boat to tell immediately if that day's catch is potentially contaminated. Experience gained with installing the research unit in governmental analytical labs has convinced us that our goal is possible. We remain committed to that task," says Boyer.

A series of socioeconomic research projects funded by New York Sea Grant has attempted to characterize risk perceptions and attitudes about environmental chemical contaminants and suggest various risk communication strategies to more effectively reach sport anglers and those who eat their catch. Results from these funded research projects conducted by **Barbara Knuth** of Cornell's Human Dimensions Unit, have been used primarily by public health agencies such as the NYS Department of Health, the U.S. EPA and health authorities in other Great Lakes States and Canada to refine risk communication strategies for those at greatest risk from consuming sport fish with elevated contaminant levels.

—**Barbara A. Branca and Ken Gall**

Photo page 10
Ken Gall demonstrates shrimp deveiner.

Photo page 11
Dr. Martin Wiedman and Dawn Norton collecting samples at a smoked fish plant.

2000. However, the Seafood HACCP Alliance recognized the need to continue offering this course over the long term to smaller audiences on an as needed basis. In response, the Alliance formed an Alternative Training committee in 1998 chaired by NYSG's Gall.

"We determined as a committee," says Gall, "that both trainer and student time and resources could be more effectively managed if students could receive much of the course material in some form of a self-study program delivered via the Internet." In 1999, a project proposal developed by New York Sea Grant in collaboration with Cornell's Food Industry Management Distance Education Program and the Seafood HACCP Alliance Alternative Training committee received over \$50,000 in funding support from the USDA's Cooperative State Research, Education and Extension Service for this project.

The 12 training modules included in the online training course have been completed, and this program is expected to be available to trainers and students in the late spring or early summer of 2001. These modules, as Gall explains, will cover all of the important HACCP concepts including practical examples, interactive worksheets and links to other supporting resources on the Internet. Students will have the option of either viewing each module online or downloading it to their computer. Special features that provide the text in an audio format will also be available. Students who wish to receive a certificate of course completion equivalent to the certificate for the current "live" three-day course can attend a one-day training session and complete a hands-on HACCP plan development exercise.

—Paul C. Focazio