

impact

of the College of Agriculture and Life Sciences



Competitive Agricultural Systems in Global Economy Aquaculture Pathology Program for Shrimp

Issue

Large scale commercial farming of shrimp is a young and rapidly growing industry that began only 30 years ago, and now nearly half of the world supply comes from farms. Most of the product is imported by the U.S., Japan and Western Europe. As the industry has grown, some very significant shrimp diseases have emerged and have also become more widespread in the industry, resulting in some severe epizootics in some shrimp growing countries, and in global crop losses since 1992 averaging nearly one billion dollars annually.

What has been done?

The Aquaculture Pathology Program in the University of Arizona College of Agriculture and Life Sciences focuses on diagnosing and researching shrimp diseases. The main goal is to describe and study the biology of diseases of farm raised shrimp and to develop diagnostic methods and control or prevention strategies for these diseases using traditional and modern molecular techniques.

Once an accurate diagnostic method is developed, prevention and control methods are researched as well. These

include methods for developing specific pathogen free or specific pathogen resistant shrimp stocks.

The program includes a laboratory and a primary quarantine facility which acquires wild or farmed shrimp and assesses the disease status of these stocks. The laboratory has been designated by the Office of International Epizootics as one of only two reference laboratories in the world for crustacean pathogens, and it was recently received USDA APHIS certification for shrimp disease diagnostic services. The ideal geographic location of the UA, isolated from coastal waters, reduces to near zero the risk of accidental introduction of shrimp pathogens into the aquatic environment.

The UA provides expert assistance to governments and to the shrimp farming industry with a variety of diagnostic techniques, including microbiological and histological identification of the disease process, electron microscopic examination of newly recognized shrimp pathogens, as well as other standard diagnostic methods. The UA has also pioneered the use of molecular and monoclonal antibody technologies

for application in the study and diagnosis of shrimp diseases and it has received USDA APHIS certification for shrimp disease diagnostic services.

Impact

Diagnostic kits based on gene probes and monoclonal antibodies have been developed by the Aquaculture Pathology Program and transferred to the private sector for commercial development and marketing. These kits can be used in diagnostic laboratories and in the field at shrimp farms and hatcheries. The kits provide the shrimp farming industry much more rapid and sensitive tools for detecting pathogens than were available with traditional methods like histology and live animal bioassays. Currently, 75 percent of the approximately 40 shrimp disease diagnostic laboratories present in the Western Hemisphere use kits that were initially developed at the University of Arizona. While the financial impact of these advanced diagnostic technologies to the shrimp farming industry of the Americas cannot be readily measured, their widespread use by the industry highlights their importance in disease management.

Funding

Special Research Grants

Other CSREES: USDA Marine Shrimp Culture Consortium

Other: Environmental Protection Agency; U.S. Department of Commerce (grants and contracts); NSF; Food and Agriculture Organization of the U.N.

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