Agricultural Screening Tools

The U.S. agricultural economy generates $1 trillion in activity each year and employs about 13 percent of the nation's workforce.

IMPACT STATEMENT

High-consequence animal diseases pose catastrophic risks to the U.S. agricultural economy, which generates $1 trillion in activity each year and employs about 13 percent of the nation's workforce. Animal agriculture in particular is built upon a "just in time" process that carefully coordinates the production and transportation of livestock, poultry and their products. Tools that screen for high-consequence animal diseases while fitting into established business routines serve to support the business continuity of animal agriculture while also protecting the food supply, public health and the economy.

THE CHALLENGE

New tools and technologies are needed to protect the nation's agriculture and public health sectors against high-consequence foreign animal, emerging and zoonotic diseases. Systems are needed for rapid detection of, response to, and recovery from animal disease events to support business continuity and ensure livestock welfare. Identified needs include development of veterinary medical countermeasures, pen-side tests, hand held detection systems and in-process monitoring devices.

THE SOLUTION

Based on recommendations from a series of workshops to coordinate and enhance the agro-security enterprise, the National Center for Foreign Animal and Zoonotic Disease Defense (FAZD) proposed and was awarded a number of research efforts whose outcomes can be integrated with minimal disruption into daily business practices to help establish the "proof of negative" status essential to maintain business continuity. These research efforts will facilitate rapid sampling, testing and reporting of results to promote efficient and effective incident management.

The National Center for Foreign Animal and Zoonotic Disease Defense
A Department of Homeland Security Science and Technology Center of Excellence

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APPLICATIONS

Optimization and Validation of a Real-Time RT-PCR Assay for Rapid Detection of FMDV for Use in Bulk-Tank Milk Samples

The objectives of this study are to define, optimize and standardize RNA extraction and polymerase chain reaction (PCR)-mediated detection of foot-and-mouth disease virus (FMDV) from bulk-tank milk samples and obtain data suitable for development of a national surveillance plan for screening milk for FMDV. This tool will test pooled samples taken from bulk-tank milk to determine the status of herds or premises during an FMDV outbreak. Demonstration of negative status will support product movement under the Secure Milk Supply Plan for business continuity.

Partners:

Texas A&M Veterinary Medical Diagnostic Laboratory (TVMDL)

Pirbright Institute

U.S. Department of Agriculture (USDA) Foreign Animal Disease Diagnostic Laboratory (FADDL)

Wisconsin Veterinary Diagnostic Laboratory (WVDL)

California Animal Health and Food Safety Laboratory (CAHFS)

USDA National Animal Health Laboratory Network (NAHLN)

The dairy industry

Development of a Mutiplex RT-qPCR Assay for Surveillance of Foreign Animal Diseases During Routine Testing of Oral Fluid Samples

This test will support a comprehensive swine surveillance program for endemic disease testing with the multiplexed ability to test for foreign animal diseases (FAD) using the same pooled sample of oral fluids. The successful execution of this project will enable an economic and rapid method for FAD surveillance and testing, and for conserving reagents, which may be in short supply during an outbreak.

Partners:

Texas A&M Veterinary Medical Diagnostic Laboratory (TVMDL)

USDA Foreign Animal Disease Diagnostic Laboratory (FADDL)

National Pork Board

Development of a Prototype and Bench Validation of a 3BFMDV Competitive ELISA Kit

The goal of this effort is to develop a prototype of a competitive enzyme-linked immunosorbent assay (ELISA) against the foot-and-mouth disease virus (FMDV) 3B non-structural protein for use in a diagnostic kit capable of differentiating infected from vaccinated animals (DIVA) for early detection of FMDV. The ability to produce and distribute a faster and more sensitive DIVA diagnostic on the U.S. mainland will improve outbreak response time and capacity, enabling a more rapid recovery.

Partners:

Texas A&M Veterinary Medical Diagnostic Laboratory (TVMDL)

Pirbright Institute

Onderstepoorte Veterinary Institute (OVI)

USDA Foreign Animal Disease Diagnostic Laboratory (FADDL)

VMRP, Inc.

USDA Agricultural Research Service (ARS)

Department of Homeland Security (DHS) Plum Island Animal Disease Center

The Matrix-Chaperone: Ambient Temperature Biospecimen Collection, Transport, and Banking for Simplified Animal Disease Screening
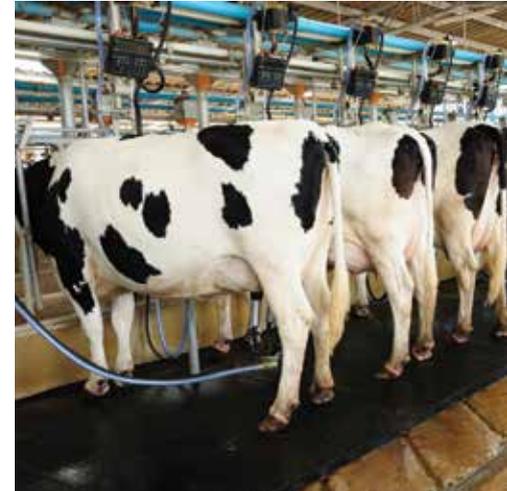
This project will develop and validate a novel field collection technology for the shipping and preservation of biological samples without the need for refrigeration or additional containment. Eliminating cold chain requirements will simplify sample shipping to diagnostic laboratories during a disease outbreak and has the potential to be especially impactful in the developing world where refrigeration is not always possible.

Partners:

Texas A&M Veterinary Medical Diagnostic Laboratory (TVMDL)

IntegenX

Texas A&M University College of Veterinary Medicine and Biomedical Sciences (CVM)

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