Plum Island Animal Disease Center

Science and Technology

PROTECTING THE NATION'S AGRICULTURE

The Plum Island Animal Disease Center (PIADC) has been protecting the nation's agriculture against the accidental, natural, or intentional introduction of transboundary animal diseases (TADs)—including foot-and-mouth disease (FMD) and African swine fever (ASF)—for nearly 70 years.

To execute its agricultural defense mission, PIADC operates as a partnership between the U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T), the U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS), and the USDA Animal and Plant Health Inspection Service (APHIS).

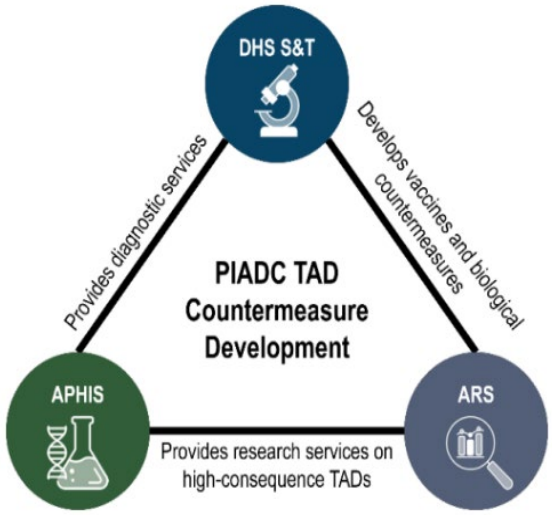
PIADC's mission is to protect U.S. agriculture by conducting research on high-consequence livestock pathogens and to provide essential diagnostic services for the veterinary community, state and federal partners, and domestic and international agricultural industry stakeholders.

PIADC is currently the only federal laboratory in the nation that can conduct diagnostics and research using live FMD virus and live ASF virus (ASFV).

EXPERTISE IN AGRICULTURE DEFENSE

PIADC maintains modern capabilities for countermeasure development that require dedicated expertise and lab infrastructure to support the DHS agriculture defense mission. PIADC's scientific subject matter experts (SMEs) serve the broader homeland security enterprise by:

- Performing advanced development of vaccines and other biological countermeasures for TADs



DHS S&T, ARS, and APHIS contributions to TAD countermeasure development

- Establishing cooperative research and development agreements (CRADAs) with global animal health biopharmaceutical companies, veterinary biotech, and animal agriculture industry stakeholders
- Filing and receiving patents through the U.S. Patent and Trademark Office (USPTO) related to novel recombinant vaccine platforms and improved methods of vaccine production for TADs

IMPACT—DEFENDING AGAINST TADS

Since 1956, PIADC has defended the nation against the introduction of TADs—such as FMD and ASF—that would significantly impact international export markets and our ability to trade animal products. While the U.S. has been FMD-free for almost 100 years, the cost of an outbreak could cost $2 billion to $200 billion.[1]

ASF is a highly transmissible disease with a mortality rate that can reach 100% in swine, and there are no available licensed vaccines or effective disease treatments. Following a 2018 outbreak, China—a global leader in pork production—lost approximately 225 million pigs to the disease or to culling as a means to control the outbreak.[2] ASF outbreaks have now been reported in over 50 countries, including most of Asia and, most recently, Haiti and the Dominican Republic. The U.S. pork industry is one of the largest global pork exporters, exporting around one quarter of its pork products annually.[3] While the

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U.S. has never had a case of ASF, a domestic outbreak would significantly impact its ability to export pork, and efforts to control a disease outbreak could cost billions.

PATENTS RELATED TO FMD VACCINES

PIADC research and development (USDA and DHS) has resulted in numerous patents granted by the USPTO.

PIADC scientists conduct research to protect the nation's agriculture against the threat of TADs

Recent PIADC inventions have supported more efficient production of next generation, molecular-based FMD vaccines, including more rapid manufacturing for novel, emerging FMD strains, and created a blueprint that other scientists may be able to use to create animal or human vaccines against diseases caused by picornaviruses in a fraction of the time it takes now.

INDUSTRY PARTNERSHIPS AND CRADAS

PIADC has established agreements with industry partners for ASF vaccine development. In 2019, PIADC partnered with the National Pork Board to evaluate the efficacy of commercial disinfectants for decontamination of surfaces contaminated with ASFV.

In 2020, PIADC entered into an agreement with MatMaCorp and successfully conducted a laboratory evaluation of a field-deployable diagnostic test capable of detecting ASFV DNA in clinical samples from infected pigs and contaminated pork products.

As ASF continues to rapidly spread in many parts of the world, this field-deployable technology can help respond to the threat posed by ASF in the U.S.

ESTABLISHED ASF TASK FORCE

In response to ASF's increasing global threat, PIADC established an interagency ASF Task Force. To date, it has met its primary objectives, including:

- Developing advanced vaccines and biological countermeasures for ASFV
- Improving diagnostic test surge capacity to support national surveillance and outbreak response
- Increasing national preparedness and response
- Evaluating commercially available disinfectants to determine their efficacy to decontaminate ASFV-contaminated surfaces
- Fast-tracking development and scale-up production of an emergency-use ASF vaccine

ASF MASTER QUESTIONS LIST

In 2021, as a result of significant contributions from PIADC SMEs, the S&T Probabilistic Analysis for National Threats Hazards and Risks Program, and the S&T Hazard Awareness & Characterization Technology Center, an ASF Master Questions List (MQL) was published, which is intended to:

- Quickly present the current state of available information to government and industry stakeholders to facilitate optimal decision-making during the operational response to an ASF outbreak
- Allow structured and scientifically guided discussions across both federal and state government and industry stakeholders without burdening them with the need to review scientific reports
- Prevent duplication of efforts by highlighting and coordinating ASF research

The MQL will undergo periodic updates to ensure it remains current.