

Thank you for inviting me here today to comment on biosecurity preparedness and efforts to address agroterrorism threats posed by plant diseases that impact the food, feed and fiber of our nation. My name is John L. Sherwood and I am a Professor and Head of the Department of Plant Pathology at the University of Georgia. I am also representing the American Phytopathological Society ([www.apsnet.org](http://www.apsnet.org)), a scientific organization of 5000 members that includes national and international scientific leaders and houses the collective expertise to mitigate the impact of introduced plant disease agents. Our member scientists are employed by universities, private industry, and agencies within the State and Federal governments.

The U.S. has been blessed with vast tracks of land that have provided an abundance of food, feed and fiber. At times plant diseases have had significant economic and social impact on our society: these have included wheat rust early in the last century, the chestnut blight of the 1930s, corn leaf blight in the 1970s, and Fusarium head blight of small grains in the 1990s. Today, the community of scientists in research, education, extension and regulatory policy are facing soybean rust and sudden oak death, among other diseases that affect the vitality of our fields and forests. As with diseases affecting animals and humans, new diseases of plants are encountered regularly here and abroad and require detection, diagnosis, investigation and control. Positive steps to protect U.S. crops have been taken. Examples are the nascent National Plant Diagnostic Network, the regulatory activities toward mitigating exotic pathogens by APHIS and State Departments of Agriculture, the EPA approval of Section 18 requests to provide expanded management tools to minimize the potential economic damage caused by soybean rust, and the establishment or revitalization of crop biosecurity panels or centers within various governmental agencies.

Securing our nation's crop production systems requires a multi-faceted, multi-agency, and highly-coordinated effort. The four key components of an effective approach to mitigate acts of crop terrorism and maintain safe and productive crop systems are strategic anticipation of potential threats, prevention of a bioterrorist attack, preparedness to respond to an attack, and coordination of these strategies.

### Strategic Anticipation

The foundation of security is identifying potential threats. Because our cropping system is so diverse and complex, predicting which exotic pathogens pose the greatest risk and preparing for their arrival are not trivial tasks, especially as new pathogens are encountered frequently. However, these activities are the role of the science of plant pathology. Each year scientists in the public and private sector prepare to thwart diseases that may affect our nation's plant production systems. Fundamental to any aspect of plant biosecurity is understanding the biology of how plants get sick. This is why support of basic and applied research through the competitive grants process is essential for the security of our nation's feed, food and fiber production systems.

Sustained funding in support of strategic anticipation will result in:

? Greater awareness of the existence, location, spread, biology and management of exotic, offshore pathogens that pose significant threats to U.S. crops, thus providing opportunities to preemptively prepare for their arrival.

- ? Understanding and incorporation of broad-spectrum disease resistance in crop species to protect against exotic pathogen introduction.
- ? A comprehensive view of how microorganisms interact in natural habitats to determine the natural processes of plant disease suppression through a combination of genomic, molecular, and ecological approaches.
- ? New chemicals to combat disease that will be used at low application rates, pose minimal environmental risk, and have a low potential for the development of pathogen resistance.
- ? Preservation of talented and trained human resources to effectively respond to pathogen outbreaks whether of natural or deliberate origin.

## Prevention

Prevention efforts must be directed towards securing the nation's 127 designated points of entry, as well as the length of our country's natural borders, against the passage of pathogens not yet in the U.S., whether such passage is natural or intentional. Currently, much effort is spent regulating pathogens that are widespread and endemic in the U.S. These pathogens pose no more threat in regard to biosecurity than they annually cause in naturally occurring epidemics. Such natural epidemics may be devastating in a given locale during any growing season, but extensive regulation of such endemic pathogens limits the ability of the scientific community to investigate and develop appropriate management strategies, and results in squandered resources.

Prevention can become a meaningful strategy with resources and support to:

- ? Fully consider the implications of placing a pathogen on a priority list, since such a listing introduces significant constraints on handling, research, and scientific communications, all of which are activities needed for optimizing prevention and preparedness. Determining the risk/benefit of listing pathogens is now under consideration by the recently established National Scientific Advisory Board for Biosecurity, and should be determined after consideration of input from both Federal agencies and the larger scientific community.
- ? Develop a process for regular and timely review of pathogen priority lists based on scientific knowledge of pathogen virulence and fitness, disease epidemiology and impact, and plant host value and susceptibility. Such review is necessary to determine the feasibility of initiating research programs and conducting management trials to mitigate ingress of an exotic pathogen into the U.S.
- ? Prevent either an unintentional escape or unauthorized access to those select agents that pose significant risk to U.S. agriculture and that are stored or handled in U.S. research laboratories.

However, research must be continued on such pathogens to assure preparedness. Thus, current and planned expensive BSL-3 facilities should be reserved for pathogens of highest risk. Other workplaces, where an inadvertent release of a lesser-risk pathogen would not affect any cropping system due to spatial and temporal parameters should be established. Such places would include climates in which the pathogen cannot survive outside the research facility or in which no plant host is grown.

It is critical to focus limited financial and research resources on the plant pathogens of greatest concern, and to determine the most effective detection and identification tools for these

pathogens. Effective communication between Federal agencies and scientific societies, such as the APS, will provide a solid foundation to prioritize these needs.

### Preparedness

Although a strong program to prevent introductions of exotic or modified pathogens is fundamental to the security of our crop production systems and will reduce the likelihood of such an event, the sheer numbers of crops and their associated or potential pathogens make 100% prevention impossible. Thus, we must be prepared for the introduction of pathogens that elude such efforts.

An effective preparedness program is dependent upon:

- 1) scientific openness,
- 2) teamwork and networking,
- 3) communication at all levels (first line responders, scientists, law enforcement, and the public),
- (4) anticipatory research programs, and
- (5) investments in infrastructure.

The recent establishment by USDA-CSREES of the National Plant Diagnostic Network (NPDN), a network of five regional plant diagnostic laboratories, dispersed among the land grant universities, that is working to establish coordinated efforts with APHIS, State Departments of Agriculture, and private seed companies, is an important step in building a preparedness infrastructure. For the NPDN to be optimally effective many critical issues must be addressed:

? Research support for detection techniques with greater speed, sensitivity and discriminatory capacity to facilitate determining whether an event is accidental or deliberate, and whether the causal agent is a high-risk, non-indigenous pathogen, a more virulent strain of an extant pathogen or an unknown pathogen. The lag time from the introduction to the discovery of a bioterrorist introduction must be minimized, and we must be able to monitor pest occurrence and spread in real-time.

? Enhanced attention to, and investment in, strategies for effective forensic analysis and criminal attribution to bring perpetrators to justice and to serve as a deterrent.

? Continued implementation of training programs and reporting incentives for first responders.

? Enhanced research capacity and support to develop a greater understanding of disease epidemiology and the genetic structure and phylogeny of pathogens around the world.

? Communication and response plans for handling intense interest from the public and the media if an outbreak should occur.

### Coordination

Many elements necessary for an effective national readiness and response plan in crop biosecurity are coming into place. The National Biodefense Analysis and Countermeasures Center (NBACC), recently established by the Department of Homeland Security and housed at Fort Detrick, MD, is charged to integrate national resources for homeland biosecurity, drawing on resources from public health, law enforcement, and national security. It will provide an interdisciplinary capability to better defend against the full range of human, animal, and plant BSL-3 and BSL-4 biothreat agents. While the greatest consideration must be given to threats

that directly impact human and animal health, we emphasize that long-term human and animal health is dependent on a sustainable agriculture production system in the U.S. In addition to endangering the production of food and fiber, the arrival of exotic plant pathogens could negatively impact world trade, and cause financial losses to our fragile rural economies. To ensure sustainable production systems into the future, long term investments by agencies in support of research on plant pathogens are critical and should not be limited to those being on a particular "list." While those may be of most concern, an understanding of similar diseases can give insight on how to manage those of greatest concern.

However, still lacking today are effective communication, coordination and strategic planning among the many entities that are charged with protecting plant health. In the fall of 2004, following two years of planning and solicitation of stakeholder input, the APS released its proposal for the establishment of a national center to coordinate efforts in crop biosecurity. APS has proposed that this National Center for Plant Biosecurity (NCPB) be established within the USDA as a Federal coordinating office staffed by Federal employees and administered at the level of the Office of the Secretary of Agriculture. This proposal has received wide support and endorsed by the Entomological Society of America, the American Society of Agronomy, the Crop Science Society of America, the Soil Science Society of America, the Society of Nematologists, and the Council for Agricultural Science and Technology. The NCPB will provide a single point of contact for the enhancement, and coordination of current and future efforts relating to defense against bioterrorist attacks, major disasters, and other emergencies, such as the recent introduction of soybean rust into the U.S. The NCPB also will provide a strong framework and leadership for anticipating, detecting, responding to, managing, and recovering from such events, as mandated in presidential directive HSPD-9, which calls for a National Plant Disease Recovery System.

Many of the critical functions of a plant biodefense system are currently the responsibility of various Federal, State and non-governmental agencies, centers, and programs. The Federal NCPB will not duplicate those efforts, but rather it will build on and coordinate these existing resources and capabilities to provide a state-of-the-art national infrastructure for documenting, monitoring, and protecting U.S. agriculture against the threat of new or emerging plant diseases and pests. This is why the APS has recommended that the NCPB report directly to the Office of the Secretary of Agriculture rather than be embedded within an existing agency. The NCPB will function as a visionary, strategic planning and coordinating entity and will be linked directly to USDA agencies and staff responsible for plant biosecurity, and closely to DHS offices responsible for biosecurity. The roles of the NCPB will be equally applicable to naturally-occurring plant-related events, such as the recent introduction into the southern United States of soybean rust, an agent then listed on the USDA-APHIS threat list.

The establishment of the NCPB will:

- ? Provide overarching coordination of all plant biosecurity activities by all Federal agencies.
- ? Provide a single point of contact with the Federal government on matters affecting plant biosecurity.
- ? Provide leadership during specific breaches of biosecurity or major disasters related to plants and help clarify which Federal agency has jurisdiction over different aspects of such events.
- ? Foster communication and synergies among government, private, and professional entities.

- ? Identify resource needs for surge capacity in reacting to suspected or actual events.
- ? Ensure that the goals and objectives of the various plant biosecurity programs are implemented by the agency charged with programmatic responsibility.
- ? Build on, support, and enhance existing and newly developed facilities and capabilities for detection, diagnosis, and communication with respect to incidents or threats to plant security.
- ? Collaborate with other agencies and organizations to conduct frequent vulnerability assessments.
- ? Develop strategic plans for addressing vulnerabilities identified in such assessments and long-term strategic plans for enhancing and expanding activities for effective mitigation of threats from biological agents.
- ? Act in concert with existing agencies charged with the protection of critical nodes of agricultural commodity production and processing and other entities to develop and regularly review response and recovery plans.
- ? Ensure the development of educational and training programs and materials for potential "first detectors" and "first responders."
- ? Identify and support targeted research initiatives that enhance the country's ability to prevent, detect, respond to, and recover from the introduction of a threat agent, including the identification and prioritization of needed research on threatening plant diseases and pests.

#### Conclusion:

The geographical expanse and economic importance of the U.S. agriculture enterprise creates a vulnerability to the intentional or unintentional introduction of plant pathogens that could directly affect crop yields and the viability of our crop production systems. While the nation will respond to and recover from such an event, there is likely to be an erosion of citizen confidence in a safe and secure supply of food, feed and fiber. New investments in the infrastructure and resources necessary to protect and maintain plant health will have significant social and economic benefit, both in the immediate future and for the generations to come.