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CALIFORNIA AGRICULTURAL RESEARCH PRIORITIES: PIERCE'S DISEASE

Pierce's disease, which impairs production of wine, table, and raisin grapes, has become a major problem for California agriculture due to the recent introduction of the glassy-winged sharpshooter, one of the most invasive pests to afflict California. This leafhopper insect aggressively transmits the bacterial pathogen (*Xylella fastidiosa*) that causes Pierce's disease. The California Department of Food and Agriculture (CDFA) and affected industries have raised funds to initiate and support a research program aimed at finding solutions to this problem.

To help evaluate and improve the current research program, CDFA requested a study by the National Academies, a private nonprofit organization that advises the nation on matters of science and technology. In response, the National Academies Board on Agriculture and Natural Resources convened an international committee of experts to review the state's priorities for short-term and long-term research and efforts to manage the disease and glassy-winged sharpshooter. The major findings of the report are listed below.

Focus on Controlling Pierce's Disease, Not Eradicating It

Because measures to keep disease at a low level are more realistic than attempts to cure or eradicate the disease, research should focus on identifying feasible options for controlling the spread of disease. Each different measure is likely to provide only an incremental benefit; the goal should be to develop a complementary suite of approaches. Control measures must be sustainable approaches that are adaptable and affordable over the long term.

Improve Selection and Prioritization of Research

Over the past 3 years, CDFA and other research sponsors have spent more than \$20 million on research efforts, and this investment is beginning to deliver results. The new report states that the scope of the research program is appropriate, but in order to accelerate progress, the selection of research projects will require more coordination and strategic decision making.

To enhance the coordination of the Pierce's Disease research program, the process for soliciting and reviewing research proposals should be consolidated. The report also recommends that funding decisions be based on the scientific merit of proposals and take better advantage of new information as it evolves. In developing research priorities, sponsors should consider whether a particular approach will realistically and sustainably contribute to disease and vector management.

Pursue Research on Both Basic Biology and Management Options of the Disease

Management efforts are still hindered by a lack of understanding of the biology of the organisms and their mechanisms of interaction, and by a lack of information on the costs and benefits of different approaches. Research should be pursued to determine:

- how to disrupt the interactions between the host (plant), pest (glassy-winged sharpshooter), and pathogen (*Xylella fastidiosa*). This research should include genetic, biochemical, or physiological approaches to:
 - identify the basis for how the pathogen triggers Pierce's disease in the plant,
 - identify the basis for the insect's use of host plants and its ability to transmit the pathogen,
 - understand how some plants resist the disease and the pest.
- the potential and the impacts of certain types of biological control of the sharpshooter, particularly in vineyards or areas where insecticide use can be eliminated or severely limited,
- when and where chemical application will effectively manage the sharpshooter,
- new ways to manage the planting of crops to help avoid spread of the disease (e.g., through vegetation management), and
- the economics of the disease and management measures (i.e., are the management strategies cost effective?).

Committee on California Agricultural Research Priorities: Pierce's Disease: Jan E. Leach, *Chair*, Kansas State University; Pedro Barbosa, University of Maryland, College Park; Michael J. Davis, University of Florida; David G. Hoel, Medical University of South Carolina; L. Joe Moffitt, University of Massachusetts, Amherst; Alison G. Power, Cornell University; Terry L. Root, Stanford University; Jack Schultz, The Pennsylvania State University; William E. Splinter, University of Nebraska, Lincoln; Brian J. Staskawicz, University of California, Berkeley; Marie-Anne Van Sluys, University of São Paulo, Brazil; T. Ulf Westblom, Central Texas Veterans Health Care System, Texas A&M University, Kim Waddell (NRC Study Director until March 2004), Robin Schoen (Program Officer). This brief was prepared by the National Research Council based on the committee's report.

For more information, contact the Board on Agriculture and Natural Resources at 202-334-3062 or visit <http://dels.nas.edu/banr>. *California Agricultural Research Priorities: Pierce's Disease* is available from the National Academies Press, 500 5th Street, Washington, DC, 20001; (800) 624-6242, www.nap.edu.



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