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RE: The NAREEE Board's Citrus Disease Subcommittee's (CDS) Recommendations for the Research Priorities for the FY2024 Emergency Citrus Disease Research and Extension (ECDRE) Program

Dear REE and USDA leadership,

Section 7103 of the Agricultural Act of 2014 (Farm Bill) established the Citrus Disease Subcommittee (CDS) as a permanent subcommittee of the National Agricultural Research, Extension, Education, and Economics (NAREEE) Advisory Board to provide advice and recommendations to USDA to help advance the research and extension capabilities related to citrus diseases.

This correspondence conveys the annual research priorities for NIFA's ECDRE program to enable NIFA's release of the Request for Applications (RFA) for ECDRE for FY2024. The priorities detailed on pages 2-3 are the same priorities that were determined as relevant by the subcommittee in FY2023.

The United States citrus producing regions have varying degrees of citrus greening disease/ huanglongbing (HLB) affecting the growers. California currently is the least impacted by disease severity – it requires emphasis on regional Asian Citrus Psyllid (ACP) management and HLB detection. Florida and Texas benefit from curative treatments and optimized delivery systems to target therapies to HLB-stricken trees for rehabilitation. All regions have a top priority to develop resistant citrus varieties for diverse commercial markets. By majority vote, the priorities below are listed in order of importance to target grower needs, reduce research project redundancy, and with a focus on producer implementation.

1. Progress in the development of commercial citrus varieties (rootstocks and scions) for both fresh and processed markets, with genetic tolerance and resistance to HLB using traditional breeding techniques and/or gene editing. These efforts could be focused on the identification of gene-editing targets, the use of CRISPR tools, or large-scale evaluation of resistant breeding lines for horticultural performance, consumer acceptance/marketing, and economics. Development of varieties (grapefruit, lemon, mandarin/tangerine, and orange) across a range of markets is highly recommended to address the needs of US growers.

2. Regional management or eradication of ACP on commercial citrus groves and residential plantings; management strategies should incorporate appropriate resistance management measures.

3. Optimized detection and surveillance programs for ACP and/or HLB. Detection and surveillance programs should incorporate all effective tools and tactics, including psyllid attractants, predictive models of psyllid movement and dispersal, and early detection of HLB/ CLas (based on an understanding of mechanisms).

4. A cure for HLB-infected trees and strategies for maintaining their productivity. Progress in this area can be made through the development of the nutritional materials and their delivery, antimicrobial applications and their delivery, or commercialization of molecules that improve citrus production and emphasizing large scale field trials.

5. A delivery system for therapeutics, nutrition and other HLB solutions. Most therapies available are not adequately delivered via foliar application. The citrus industry needs an engineered delivery system for phloem to access the *Candidatus Liberibacter asiaticus* (CLas) systemic infection.

6. Consolidation of screening efforts for intervention targets and reduction of candidate lists to include only those most worthy of advanced testing and commercialization. High priority screening efforts are needed to identify: 1) Host plant defense or resistance; 2) ACP suppression, reduced transmission, or behavior modification (e.g., attract and kill); or 3) Pathogen CLas titer reduction, competition, or acquisition/transmission prevention.

7. A reliable technique for culturing CLas bacteria.

8. A better understanding of the HLB/vector/citrus pathosystem, including phloem biology, the movement of CLas and therapy into and through phloem, and the interaction of host, pathogen and vector (disease triangle).

9. Greater understanding of the ecology and interactions of the citrus production system and the citrus greening disease complex (HLB and ACP). These studies are needed to answer basic questions regarding how climate and other environmental factors impact tree health and the spread of HLB and ACP. While we understand that situations contrast greatly between California and Florida, citrus production and HLB invasion, the fundamentals of how they differ may point to important differences in disease response and management. Texas will likely benefit from advances in both fronts.

We ask that these recommendations are appropriately conveyed for inclusion and consideration in the FY2024 ECDRE RFA and program. On behalf of the CDS, we look forward to our continued work and collaboration on this important issue. If you have any questions or need additional information, please contact Kate Lewis, Executive Director of the NAREEE Advisory Board at 202-631-1434 or kate.lewis@usda.gov.

Sincerely,

Kenrett Jefferson-Moore
Chair, NAREEE Advisory Board

William "Gee" Roe III
Chair, Citrus Disease Subcommittee