Tools to Fund Agricultural Research
The Citrus Industry Model

Farm Foundation Forum
January 28, 2015

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Topics

• Perspective: The Florida Citrus Industry and Huanglongbing Disease
• Emergence of the Citrus Research and Development Foundation, Inc.
  • Structure and Purpose
  • Processes
  • Funding and Funds Management
• Is this model working?
• Interface of CRDF with other Ag Research Funding Organizations
• Benefits of Industry-Organized and Managed Research
• Challenges in the Private Industry Model
Profile: Florida Citrus Industry at Risk

- Nearly 550,000 acres
- Juice and Fresh Marketing
- 34 producing counties
- 6,000 small and large growers
- 76,000 employees
- 160-180 million boxes of fruit
- $1.2 billion farm gate value
- $8.9 billion economic impact
- Supplies 90% of U.S. OJ
- National Industry – CA, TX, AZ
The Huanglongbing (HLB) Disease Triangle

Asian citrus psyllid Vector (1998)

CLas Bacteria Pathogen (2005)

DPI Photo

Citrus Tree Host (>200 years)
Progressive Biological Impacts of HLB: 2005-2014

- Inoculation into Leaves by Psyllid
- Systemic Movement in Vascular Tissue
- Mottling of Leaves (starch)
- Debilitation of Root Systems
- Decline of Limbs, Thinning of Canopies
- Small, Off-flavored Fruit
- Pre-harvest Fruit Drop Increase
- Overall Tree Decline
- Increasingly Compounded by Other Stresses
- Individual Grove Failure
How to Mobilize a Response Within a Segmented Industry and System

New Product Discovery and Development Roles

Direct

- USDA
- Universities
- FFSP
- CRDF
- USDA-SBIR

Indirect

- NSF
- NRC

Time to Market

Never

Now
Assistance in Developing a Response to HLB

- Planning: A Critical Element
- 2008 NAS-NRC Planning
- 2010 NRC Study Published [http://www.nap.edu/catalog/12880/](http://www.nap.edu/catalog/12880/) (328 pages)
- CRDF Formed as Non-Profit Research Sponsor
Structure of CRDF

• “Identify one organization and empower it to have oversight responsibility over HLB research and Development Efforts” NRC 2010
• Organized as a 501(c)(3) NFP under University of Florida (DSO)
• Governed by State Statutes for Non-profits
• 13-member Board Primarily Composed of Citrus Industry Members
• 6 Committees Provide Oversight and Recommendations to Board
• Meetings Publically Noticed and Open to Public
• Monthly Board Meetings Since 2009
• Management Staff of 4: Contractors Conduct Research, Delivery and Other Support
Purpose of CRDF

“Advance disease and production research and product development activities to ensure the survival and competitiveness of Florida citrus”

Seek solutions to HLB via

• Industry Research Coordination Committee - priorities
• Research Management Committee: Open call competitive grant program –
  • 2 levels peer review with board final decisions
• Commercial Product Delivery Facilitation – invited proposals, advisors review, board final decision
• Successful proposals are contracted for 1-3 years
• Scientists and solvers in 27 states, 5 countries have been supported
• Typical portfolio is 125-150 active projects
Funding the CRDF Mission
Sources of Funding to Drive Solutions to HLB

• State Marketing Order – Mandatory tax on harvested boxes of fruit
  • Florida Citrus Production Research Box Tax ( $.03/box)
  • Florida Department of Citrus Marketing and Promotion Box Tax ($.05-.30/box)

• Donor Contributions
  • $0.5 to $1.5 million per year

• Government Funding
  • State Legislature – Appropriations through Florida Dept. Agriculture
  • Federal Funding
    • USDA, ARS Specific Cooperative Agreement (SCA)
    • USDA, NIFA, SCRI Competitive Grant: CRDF Project Management – Grant Agreement
    • USDA, APHIS, MAC Group: Funds to support “shovel-ready projects” – SCA

• One-Year Sponsor Contracts are Standard
Citrus Industry Research Investments (CRDF)

Research & Delivery Expense Summary

Pre-HLB Era

HLB Era

CRDF and Federal Funding Programs – HLB

CRDF Program Goals

- Understanding HLB
- Long-Term Development
- Medium-Term Development
- Short-Term Solutions
- Delivery of Solutions to the grove

Federal Funding Programs

- **Farm Bill - USDA, NIFA**
  - Specialty Crop Research Initiative (SCRI) CDRE Program
  - $25 million per year over 5 years

- **Congressional Appropriation**
  - Multi-Agency Coordination Group (MAC); USDA, APHIS
  - $21 million over 2 years

- **Citrus Health Response Program (CHRP)**
  - USDA, APHIS and State Dept. Ag.
Benefits of Industry- Organized and Managed Research

- True private/public partnership “from bottom up”
- Needs-driven focus on solutions to the HLB crisis
- Shared governance
- Flexible funding: direct to specific needs
- Engage public/private entities in discovery > problem solving > delivery
- Real-time reporting and feedback
- Flexibility to alter directions
- Facilitation of hand-off steps
- Open process allows all partners to be aware
Contributions to Basic Science

- Genomes of citrus, psyllid, bacterial
- Gene Expression Studies
- Culturing recalcitrant bacteria
- Epidemiology of exotic disease
- Host plant/pathogen/vector relationships
- Vector transmission and endosymbionts
- Targets for bacterial intervention
Evaluation of Near-Commercial Tools

- Commercial Tools to Reduce Vector Insect Populations
- Chemical and Thermal Therapy to Reduce Bacteria in Trees
- Naturally Occurring Microbial Products
- Plant Growth Regulators - Fruit Drop due to HLB
- Field Trials of Integrated Practices - Root Health
  - Organic Compost
  - Organic Acids
  - Acidification of Irrigation Water and Soil
- Field Delivery of Tolerant or Resistant Citrus Germplasm
- Evaluation of Advanced Citrus Production Systems
- Inoculum Removal
  - Demonstration of Benefit of Removal
  - Motivate Larger Scale Inoculum Removal
Challenges in the Private/Public Model

• Stability of private/public funds – e.g., declining production
• Tendency to focus on near-term: Long-term goals needed
• Focus is not on fundamental science
• Regional differences in need/timelines cause disconnects, even within one commodity
• Perceived lack of timely progress jeopardizes long-term sustainability
• Limited scope of funding compared to large government funding programs
• What happens when the current crisis is averted?
Thank you!

CRDF is proud to provide support to the Florida citrus industry