

CRDF Funded Projects through 01/04/2024

Project No#	Principal Investigator	Project Title	Institution
00	Stansly, Phil	Development and Delivery of Comprehensive Management Plans for Asian Citrus Psyllid Control in Florida Citrus	University of Florida
000	Muraro, Ron	An Economic Model to Evaluate Emerging Solutions to Citrus Greening	University of Florida
002	Albrigo, Gene	Characterize the roles of callose and phloem proteins in citrus Huanglongbing (HLB) symptom development	University of Florida
004	Stansly, Phil	Creation and Maintenance of an Online Citrus Greening Database	University of Florida
005	Baldwin, Elizabeth	Effects of HLB on quality of orange juice and identification of HLB-induced chemical signatures in fruit juice and leaves	USDA-ARS
007	Bassanezi, Renato	Comparative epidemiology of citrus huanglongbing (greening) caused by Candidatus Liberibacter asiaticus and Ca. Liberibacter americanus	Fundecitrus
008	Bassanezi, Renato	Reduction of bacterial inoculum and vector control as strategies to manage citrus huanglongbing (greening)	Fundecitrus
013	Powell, Chuck	Control of the Asian Citrus Psyllid, Diaphorina citri Kuwayama with protease inhibitors and RNAi	University of Florida
014	Bowman, Kimberly	Development of Promising New Rootstocks and Scions for Florida Citrus	USDA-ARS
016	Brlansky, Ron	Alternative Hosts of HLB to Assist in Disease Management	University of Florida
021	Brown, Judy	The citrus psyllid transcriptome and time course differential gene expression in Ca. Liberibacter-infected/free whole psyllids and organs	University of Arizona
025	Burns, Jackie	Combating symptom development in fruit from Huanglongbing-infected citrus trees: A transcriptomic, proteomic and metabolomic approach	University of Florida
034	Brown, Judy	Gross and fine structure localization of Liberibacter in citrus psyllid Diaphorina citri organs: elucidating the transmission pathway	University of Arizona
038	Brown, Judy	Management of Pyslla in tree fruit crops using RNA interference	University of Arizona
045	Dawson, Bill	Examine the response of different genotypes of citrus to citrus greening (Huanglongbing) under different conditions	University of Florida
046	Dawson, Bill	Identify and Deliver Antibacterial Peptides and/or Proteins for Control of Citrus Greening (Huanglongbing or HLB)	University of Florida
048	Dollet, Michel	Attempts to in vitro culture Candidatus Liberibacter asiaticus isolates in order to fulfil Koch's postulates	Cirad
057	Ehsani, Reza	Detecting Citrus greening (HLB) using multiple sensors and sensor fusion approach	University of Florida
061	Della-Colletta, Helvecio	Diagnosis of Candidatus Liberibacter asiaticus in plant and vector based on molecular and serological approaches.	Fundag, Brazil
063	Futch, Stephen	Grower educational programs to enhance adoption of psyllid and HLB control	University of Florida
065	Gabriel, Dean	Genomic sequencing to closure of a curated Florida citrus greening strain of Candidatus Liberibacter asiaticus	University of Florida
066	Gmitter, Fred	Development of transformation techniques for Murraya, to engineer a deadly trap plant	University of Florida
067	Gmitter, Fred	Surviving HLB and canker: genetic strategies for improved scion and rootstock varieties	University of Florida
068	Gmitter, Fred	Identification and Characterization of HLB Survivors	University of Florida
071	Gmitter, Fred	International citrus genome consortium (ICGC): Providing tools to address HLB and other challenges	University of Florida
072	Gmitter, Fred	Assessment of HLB Resistance and Tolerance in Citrus and Its Relatives	University of Florida
076	Gottwald, Tim	Efficacy of citrus canker control strategies, leafminer interactions, and bacterial survival.	USDA-ARS
077	Gottwald, Tim	Epidemiology and disease control of HLB	USDA-ARS
078	Gottwald, Tim	Efficacy of interplanting citrus with guava as a control strategy for Huanglongbing	USDA-ARS

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079	Gowda, Siddrame	Development of sensitive,non-radioactive and rapid tissue blot diagnostic method for large-scale detection of citrus greening pathogen	University of Florida
081	Graham, Jim	Systemic acquired resistance (SAR) for control of citrus canker on young trees	University of Florida
082	Graham, Jim	Characterization of canker resistance in citrus plants created by 'Somatic Cybridization' without citrus transformation.	University of Florida
083	Graham, Jim	Canker management in Florida citrus groves: chemical control on highly susceptible grapefruit and early orange varieties	University of Florida
084	Graham, Jim	Transmission of HLB by citrus seed	University of Florida
085	Graham, Jim	Survival of Xanthomonas citri ssp. citri (Xcc) to estimate risk of citrus canker transmission by infected fruit	University of Florida
086	Graham, Jim	Does systemic acquired resistance (SAR) control HLB disease development?	University of Florida
087	Grosser, Jude	Accelerating the Commercialization of Transformed Juvenile Citrus	University of Florida
088	Gurley, William	Engineering citrus for resistance to Liberibacter and other phloem pathogens	University of Florida
090	Mizell, Russell	An effective trap for Asian citrus psyllid that can be used to monitor groves and plants for sale	University of Florida
091	Hall, David	Efficacy of Seasonal Insecticide Programs for Suppressing HLB in New Citrus Plantings	USDA-ARS
093	Hall, David	Pathogen-Vector Relations between Asian Citrus Psyllid and Liberibacter asiaticus	USDA-ARS
095	Hartung, John	Preparation of monoclonal antibodies against Candidatus liberibacter asiaticus	USDA-ARS
102	Horvath, Diana	Genetic Resistance to Citrus Canker conferred by the Pepper Bs3 Gene	Two Blades
108	Irey, Mike	Support for the Southern Gardens Diagnostic Laboratory	Southern Gardens
119	Lee, Richard	Recovery of Citrus germplasm in Florida	USDA-ARS
122	Falk, Bryce	Controlling HLB by controlling psyllids with RNA interference	UC Davis
123	Lindeberg, Magdalen	Bioinformatic characterization and development of a central genome resources website for Ca. Liberibacter asiaticus	Cornell University
125	Lin, Hong	Development of SSR markers for detection, genotyping, phenotyping and genetic diversity assessment of Candidatus Liberibacter strains in Florida	USDA-ARS
126	Lopes, Roberto S.	Factors influencing acquisition and inoculation of Candidatus Liberibacter asiaticus by Diaphorina citri	Fundag, Brazil
129	Lu, Hua	Manipulating SA-mediated defense signaling to stimulate broad-spectrum resistance to HLB and other diseases in citrus	University of Baltimore
132	Machado, Marcos Antonio	Analysis of transcriptome of citrus infected with Ca. Liberibacter asiaticus and Ca. L. americanus.	Fundag, Brazil
144	Moore, Gloria	Agrobacterium-mediated Genetic Transformation of Mature Citrus Tissue	University of Florida
145	Moore, Gloria	Evaluate Differences in Response to HLB by Scions on Different Rootstocks	University of Florida
149	Mou, Zhonglin	Transferring Disease Resistance Technology from a Model System to Citrus	University of Florida
155	Grosser, Jude	Increasing the Capacity of the University of Florida's CREC Core Citrus Transformation Facility (CCTF)	University of Florida
158	Pena, Leandro	Development of transformation systems for mature tissue of Florida commercial varieties, and strategies to improve tree management	IVIA, Spain
158.1	Dawson, Bill	Development of transformation systems for mature tissue of Florida commercial varieties, and strategies to improve tree management	University of Florida
161	Powell, Chuck	A Rapid Screening Process for Chemical Control of Huanglongbing	University of Florida
162	Duan, Yongping	Dissecting the Disease Complex of Citrus Huanglongbing in Florida	USDA-ARS

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163	Triplett, Eric	Integrated approaches to discover pathogenesis-associated proteins from the causal agent of citrus greening disease and build new diagnostic tools	University of Florida
164	Qureshi, J.A.	Sampling Plans to Guide Decision Making for Control Asian Citrus Psyllid	University of Florida
168	Ritenour, Mark	Pre-Grading Fresh Citrus for Canker Prior to Dumping on the Main Packingline	University of Florida
170	Roberts, Pam	Diagnostic Services for growers for detection of HLB to aid in management decisions	University of Florida
172	Roberts, Pam	Spatial and Temporal Incidence of Ca. Liberibacter in Citrus and Psyllids detected Using Real-time PCR	University of Florida
174	Rogers, Michael	Huanglongbing: Understanding the vector-pathogen interaction for disease management	University of Florida
175	Rogers, Michael	Resistance and cross-resistance development potential in Asian citrus psyllid to insecticides and its impact on psyllid management	University of Florida
176	Rogers, Michael	Effects of nutrition and host plant on biology and behavior of the Asian citrus psyllid and implications for managing psyllid populations	University of Florida
179	Rouse, Bob	Cultural Practices to Prolong Productive Life of HLB Infected Trees and Evaluation of Systemic Acquired Resistance inducers combined with Psyllid Control to manage Greening	University of Florida
179-1	Rouse, Bob	Supplement to Project 179 with objectives below: Exp 1-Optimizing ground & foliar nutrients; Exp 2-Benefit of vector control and foliar nutrition	University of Florida
184	Salyani, Masoud	Evaluation and development of effective ultra low volume spray technologies for management of the Asian citrus psyllid	University of Florida
191	Schumann, Arnold	Intensively managed citrus production systems for early high yields and vegetative flush control in the presence of greening disease	University of Florida
196	Setamou, Mamoudou	Coupling citrus flush management and dormant chemical spray as a strategy to control populations of Asian citrus psyllid	Texas A&M
200	Singh, Megh	Elimination of HLB infected trees without physical removal through application of herbicides	University of Florida
202	Song, Wen-Yuan	Engineering Resistance Against Citrus Canker and Greening Using Candidate Genes	University of Florida
203	Schumann, Arnold	Using physical and chemical property changes of citrus leaves as early indicators of HLB infection and effects of added plant nutrients	University of Florida
204	Burns, Jackie	Strategies to minimize growth flushes of mature citrus trees with pruning practices and plant growth regulators to reduce psyllid feeding	University of Florida
210	Stansly, Phil	Ultralow Volume and Aerial Application of Insecticides and Horticultural Mineral Oil to Control Asian Citrus Psyllid in Commercial Orchards	University of Florida
212	Stansly, Phil	Enhanced Biological Control of Asian Citrus Psyllid in Florida through Introduction and Mass Rearing of Natural Enemies	University of Florida
213	Stelinski, Lukasz	Development and optimization of biorational tactics for Asian citrus psyllid control and decreasing huanglongbing incidence	University of Florida
214	Stelinski, Lukasz	Quantitative measurement of the movement patterns and dispersal behavior of Asian citrus psyllid in Florida for improved management.	University of Florida
215	Stelinski, Lukasz	Identification of psyllid attractants and development of highly effective trapping and attract-and-kill methods for improved psyllid control	University of Florida
217	Stelinski, Lukasz	Development of Effective Guava-based Repellent to Control Asian Citrus Psyllid and Mitigate Huanglongbing Disease Incidence	University of Florida
220	Stover, Ed	A secure site for testing transgenic and conventional citrus for HLB and psyllid resistance	USDA-ARS
221	Stover, Ed	Production of Transgenic Commercial Cultivars Resistant to HLB and Canker	USDA-ARS
232	Wang, Nian	Characterization the virulence mechanism of the citrus Huanglongbing pathogen Candidatus Liberibacter asiaticus	University of Florida
233	Wang, Nian	Identification and characterization of critical virulence and copper resistance genes of Xanthomonas axonopodis pv. citri & related species	University of Florida

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236	Yamamoto, Pedro Takao	Can insecticides and mineral oil avoid transmission of Candidatus Liberibacter asiaticus by Diaphorina citri?	Fundecitrus
238	Atwood, Ryan	Expand Research Plots and Maintain Existing Areas at Mid Florida Citrus Foundation	Mid Florida Citrus Foundation
305	Dandekar, Abhaya	Improving innate immune response of Citrus to HLB	UC Davis
306	Davis, Michael J	Culturing Liberibacter asiaticus	University of Florida
307	De La Fluente, Leonardo	Infection traits and growth of Candidatus Liberibacter asiaticus inside microfluidic chambers	Auburn University
308	Dewdney, Megan	Does huanglongbing (HLB) or associated nutrient deficiencies change asian citrus psyllid (ACP) feeding patterns?	University of Florida
309	Dewdney, Megan	How the Ca. Liberibacter asiaticus prevalence in groves can affect the acquisition and transmission by the Asian citrus psyllid	University of Florida
310	Duan, Yongping	Characterization of a putative insect-transmission determinant/virulence gene (Hyp1) of 'Candidatus Liberibacter asiaticus'	USDA-ARS
312	Gowda, Siddrame	Functional study of the putative effectors of 'Candidatus Liberibacter asiaticus' using Citrus tristeza virus vector	University of Florida
313	Graham, Jim	Evaluation of foliar Zinc and Manganese application for control of Huanglongbing or associated symptom development	University of Florida
314	Grishin, Nick	Insight into the causative agent of citrus greening disease (HLB) using computational structure/function analysis of genome encoded proteins	UT Southwestern Medical
315	Hall, David	Speedy evaluation of citrus germplasm for psyllid resistance	USDA-ARS
319	Keyhani, Nemat O.	Application of Asian citrus psyllid, Diaphorina citri, tissue culture cell lines	University of Florida
324	Qureshi, J.A.	Impact of insecticidal control of Asian citrus psyllid (ACP) on leafminers, mites, scales, thrips and their natural enemies in Florida	University of Florida
325	Rogers, Michael	Development and evaluation of psyllid management programs for protection of resets and young tree plantings from HLB	University of Florida
326	Roose, Mikeal	A Chemical Genomics Approach to Identify Targets for Control of Asian Citrus Psyllid and HLB	UC Riverside
328	Santra, Swadeshmukul	Copper loaded silica nanogel technology for long term prevention of citrus canker disease	UCF
329	Schumann, Arnold	Evaluation of the mechanism and long-term management potential of boron based suppression of HLB symptoms	University of Florida
330	Shatters, Bob	Targeting the Asian Citrus Psyllid Feeding Mechanism as a Means of Blocking Psyllid Feeding on Citrus	USDA-ARS
330-1	Shatters, Bob	Enhancement - Targeting the Asian Citrus Psyllid Feeding Mechanism as a Means of Blocking Psyllid Feeding on Citrus	USDA-ARS
331	Stansly, Phil	Thresholds for vector control in young citrus treated for symptoms of HLB with a nutrient/SAR package	University of Florida
332	Stelinski, Lukasz	Is Candidatus Liberibacter asiaticus, the pathogen responsible for Huanglongbing in Florida, sexually transmitted between adult psyllids?	University of Florida
333	Stelinski, Lukasz	Maintaining the effectiveness of our current and most important psyllid management tools (insecticides) by preventing insecticide resistance	University of Florida
334	Stelinski, Lukasz	How does Liberibacter infection of psyllids affect the behavioral response of this vector to healthy versus HLB-infected citrus trees?	University of Florida
335	Stelinski, Lukasz	Evaluation of Methyl Salicylate as a simultaneous repellent of Asian citrus psyllid and attractant for psyllid natural enemies	University of Florida
336	Triplett, Eric	Genome-enabled metabolic reconstruction of Ca. Liberibacter asiaticus and its use in culturing and controlling the pathogen	University of Florida
337	Wang, Nian	Control of Citrus Huanglongbing by disruption of the transmission of citrus greening pathogen by psyllids	University of Florida
338	Yamamoto, Pedro Takao	Improvement and development of new method to control Asian Citrus Psylla, Diaphorina citri	Fundecitrus
400	Powell, Chuck	Top 100 Antibiotics: Screening Effective Chemical Compounds Against Citrus HLB Bacterium, Candidatus Liberibacter asiaticus	University of Florida

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401	Powell, Chuck	Top 100 RNAi: Cloning, Expressing and Testing Key RNAi Molecules Against Asian Citrus Psyllid, <i>Diaphorinia citri</i>	University of Florida
402	Belknap, William	Acquisition and Assembly of the Genomic Sequence of the Citrus Rootstock Variety Carrizo	USDA-ARS
405	Brlansky, Ron	Transmission of the Emerging Citrus Pathogen Cytoplasmic Citrus Leprosis Virus by Endemic <i>Brevipalpus</i> mites	University of Florida
407	Davis, Michael J	Culturing <i>Liberibacter asiaticus</i>	University of Florida
411	Dewdney, Megan	Understanding potential inoculum sources of <i>Guignardia citricarpa</i> , the causal agent of citrus black spot	University of Florida
413	Folimonova, Svetlana	How the efficiency of HLB transmission by psyllids varies depending on the stage of infection and plant development	University of Florida
414	Gonzalez, Claudio	Identification of small molecules that disrupt pathogenicity determinants of <i>Liberibacter asiaticus</i>	University of Florida
416	Graham, Jim	Evaluation of foliar Zinc and Manganese application for control of Huanglongbing or associated symptom development	University of Florida
417	Graham, Jim	Novel formulations and application methods for bactericides to control systemic HLB infection	University of Florida
417-1	Graham, Jim	Enhancement - Novel formulations and application methods for bactericides to control systemic HLB infection	University of Florida
418	Hilf, Mark	Analysis of the colonization of citrus seed coats by 'Candidatus <i>Liberibacter asiaticus</i> ' the causal agent of citrus huanglongbing and their use as a concentrated, pure source of bacteria for research.	USDA-ARS
422	LaPointe, Stephen	Automated application of semiochemicals for control of citrus leafminer and citrus canker disease with application for control of Asian citrus psyllid and HLB.	USDA-ARS
423	Lee, Won Suk	Sensing system for symptomatic citrus greening infected leaves using polarized light	University of Florida
424	McNellis, Timothy	Functional disruption of the NodT outer membrane protein of <i>Candidatus Liberibacter asiaticus</i> for rootstock-mediated resistance to citrus greening using a phloem-directed, single-chain antibody	Penn State University
425	Morgan, Kelly	Effect of application rate, tree size and irrigation scheduling on leaf Imidacloprid concentration, psyllid populations and soil leaching.	University of Florida
427	Pelz-Stelinski, Kirsten	Insecticidal and antimicrobial peptides for management of Asian citrus psyllid	University of Florida
434	Stansly, Phil	Mass rearing and release of parasitic wasps to augment biological control of the Asian citrus psyllid (ACP)	University of Florida
439	Stelinski, Lukasz	How does infection of Asian citrus psyllid (ACP) with <i>Candidatus Liberibacter asiaticus</i> (Ca Las) affect the behavioral response of the vector to healthy versus diseased citrus trees?	University of Florida
440	Stelinski, Lukasz	Testing of existing botanical insecticides for activity against Asian citrus psyllid to identify potential new tools for psyllid management.	University of Florida
440-1	Stelinski, Lukasz	Enhancement - Testing of existing botanical insecticides for activity against Asian citrus psyllid to identify potential new tools for psyllid management	University of Florida
441	Stelinski, Lukasz	Improving psyllid management by optimizing 1) adjuvants for low volume sprays, 2) targeted border-row treatments, and 3) location of spray applications	University of Florida
445	Wang, Nian	Characterization of critical genes involved in spread of citrus canker pathogen <i>Xanthomonas axonopodis</i> pv. <i>citri</i>	University of Florida
446	Rogers, Michael	Establishment of Citrus Health Management Areas (CHMAs)	University of Florida
447	Stansly, Phil	Role of Nutritional and Insecticidal Treatments in Mitigation of HLB in New Citrus Plantings	University of Florida
447-1	Stansly, Phil	Enhancement - Role of Nutritional and Insecticidal Treatments in Mitigation of HLB in New Citrus Plantings	University of Florida
502	Hall, David	High-Throughput Screening of Transgenic Citrus for HLB Resistance.	USDA-ARS

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503	England, Gary	The support of Citrus Research and Extension efforts by maintaining and improving the Mid Florida Citrus Foundation grove	Mid-Florida Citrus FOundation
508	Bowman, Kimberly	Development of Promising Supersour and Other Rootstocks Resistant to HLB	USDA-ARS
510	Brown, Judy	Molecular and cellular mechanisms that drive psyllid vector-Liberibacter interactions in the transmission pathway	University of Arizona
516	Dawson, Bill	Develop citrus resistant or tolerant to HLB using the CTV vector and transgenic approaches	University of Florida
517	Dawson, Bill	Determine the time and location of sources of HLB inoculum of trees after visit of infected psyllids	University of Florida
518	Dawson, Bill	Examination of poncirus genes fo4r toleranccec of sweet orange to HLB	University of Florida
519	Dewdney, Megan	Strobilurin (QoI) resistance and the potential for resistance development to the newly introduced SDHI and DMI fungicides in tangerine-infecting <i>Alternaria alternata</i> populations of Florida	University of Florida
523	Duan, Yongping	Screening and Cloning of Resistance Related Genes by RNA-Seq in Huanglongbing (HLB) Resistant and Susceptible Citrus Breeding Lines	USDA-ARS
525	Duncan, Larry	Managing root health by exploiting the benefits and mitigating the challenges afforded by nematodes	University of Florida
526	Ehsani, Reza	Precision foliar nutrient management using real time leaf analysis and a variable rate application technique	University of Florida
530	Falk, Bryce	Targetting <i>Diaphorina citri</i> using insect virus-induced systemic RNA interference	UC Davis
531	Falk, Bryce	Transgenic RNAi-based psyllid control	UC Davis
532	Foliomonova, Svetlana	A novel method for efficient inoculation of trees with the HLB bacterium	University of Florida
532-1	Foliomonova, Svetlana	Enhancement - A novel method for efficient inoculation of trees with the HLB bacterium	University of Florida
533	Foliomonova, Svetlana	Deployment of a superinfecting <i>Citrus tristeza virus</i> -based vector in the field: a measure to effectively protect field citrus trees against HLB	University of Florida
535	Gabriel, Dean	Exploiting the Las and Lam phage for potential control of HLB	University of Florida
536	Gmitter, Fred	Identification and mapping of the genes controlling resistance to Huanglongbing (HLB)	University of Florida
537	Gmitter, Fred	Characterization of Huanglongbing (HLB) survivors in the severely infected and/or abandoned groves	University of Florida
537-1	Gmitter, Fred	Enhancement - Characterization of Huanglongbing (HLB) survivors in the severely infected and/or abandoned groves	University of Florida
538	Gmitter, Fred	Host genetic control of interference in Asian citrus psyllid life cycles	University of Florida
539	Gmitter, Fred	Creation, Development, and Screening of Citrus Germplasm for Resistance to HLB and Citrus Canker (Core Breeding)	University of Florida
544	Graham, Jim	Improved management of citrus canker through use of systemic acquired resistance and more bioavailable copper bactericides	University of Florida
545	Graham, Jim	Phytophthora damage to roots: a potential contributor to reduced nutrient uptake and decline of HLB-affected citrus trees	University of Florida
546	Graham, Jim	Mechanisms involved in biofilm formation and infection by <i>Xanthomonas citri</i> subsp. <i>citri</i>	University of Florida
547	Grosser, Jude	Applying Advances of Juvenile Citrus Transformation Technology (Continuation of Project #87).	University of Florida
548	Grosser, Jude	Understanding and Manipulating the Interaction of Complex Rootstock Genetics and Constant Nutrition to Enhance the Establishment, Longevity and Profitability of New Citrus Plantings in HLB-Endemic Areas.	University of Florida
548-1	Grosser, Jude	Enhancement - Understanding and Manipulating the Interaction of Complex Rootstock Genetics and Constant Nutrition to Enhance the Establishment, Longevity and Profitability of New Citrus Plantings in HLB-Endemic Areas	University of Florida

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551	Hartung, John	Visualization and detection of proteins produced by 'Ca. Liberibacter asiaticus' in infected sweet orange plants and vector psyllids	USDA-ARS
552	Hartung, John	HLB resistance through transgenic expression of short chain fragment variable antibodies against key Liberibacter epitopes	USDA-ARS
555	Horvath, Diana	TAL Effector Induced Resistance to Xanthomonas	Two Blades
556	Horvath, Diana	Engineering PAMP-receptor mediated broad spectrum resistance to HLB and canker	Two Blades
558	Killiny, Nabil	Disrupt the bacterial growth in the insect vector to block the transmission of Candidatus Liberibacter Asiaticus to citrus, the causal agent of citrus greening disease	University of Florida
558-1	Killiny, Nabil	Enhancement - Disrupt the bacterial growth in the insect vector to block the transmission of Candidatus Liberibacter Asiaticus to citrus, the causal agent of citrus greening disease	University of Florida
559	Killiny, Nabil	Blocking the Vector Transmission of Candidatus Liberibacter asiaticus to Stop the Spread of Huanglongbing in Citrus.	University of Florida
560	LaPointe, Stephen	Application of an aggregation pheromone for management of the Diaprepes root weevil.	USDA-ARS
561	LaPointe, Stephen	Determination of attractive host plant volatiles and sex pheromones of the Asian citrus psyllid using electroantennograms and coupled gas chromatograph-electroantennographic detection	USDA-ARS
562	Lee, Richard	Development of new technologies to eliminate huanglongbing from budwood source trees	USDA-ARS
563	Lee, Richard	Analyzing Liberibacter isolates undetectable by standard diagnostic methods in Florida	USDA-ARS
564	Lindeberg, Magdalen	Expansion of online genome resources for bacterial pathogens of citrus and development of a diagnostic sequence database for Liberibacter species.	University of Florida
566	Lu, Hua	Manipulating defense signaling networks to stimulate broad-spectrum resistance to HLB and other diseases in citrus	Univeristy of Baltimore
567	Mankin, Richard	Acoustic trap for Asian citrus psyllids	USDA-ARS
567-1	Mankin, Richard	Enhancement - Acoustic trap for Asian citrus psyllids	USDA-ARS
570	Mizell, Russell	Using a novel psyllid trap that captures and preserves psyllids and Candidatus bacteria for DNA analyses: understand vector-greening population dynamics and entomopathogens	University of Florida
570-1	Mizell, Russell	Enhancement - Using a novel psyllid trap that captures and preserves psyllids and Candidatus bacteria for DNA analyses: understand vector-greening population dynamics and entomopathogens	University of Florida
572	Moore, Gloria	Study the role of Basal Defense and Chemical Treatments in the Response of Citrus to HLB	University of Florida
573	Moore, Gloria	Use of an early flowering gene in citrus to rapidly transfer disease resistance from citrus relatives into cultivated types	University of Florida
579	Orbovic, Vladimir	Citrus Core Transformation Facility as a platform for testing of different genes and/or sequences that have potential to render Citrus plants tolerant or resistant to diseases.	University of Florida
581	Pelz-Stelinski, Kirsten	Key unknowns about Asian citrus psyllid biology in Florida: Overwintering sites and alternative hosts	University of Florida
581-1	Pelz-Stelinski, Kirsten	Enhancement - Key unknowns about Asian citrus psyllid biology in Florida: Overwintering sites and alternative hosts	University of Florida
582	Pelz-Stelinski, Kirsten	Factors influencing transmission of the huanglongbing (greening) pathogen by the Asian citrus psyllid and methods for interrupting the transmission process	University of Florida
582-1	Pelz-Stelinski, Kirsten	Enhancement - Factors influencing transmission of the huanglongbing (greening) pathogen by the Asian citrus psyllid and methods for interrupting the transmission process	University of Florida
583C	Zale, Janice	Mature citrus transformation for surviving with citrus greening	University of Florida

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584	Powell, Chuck	Rapid and Efficient Delivery of Effective Compounds into Citrus Phloem for Treatment of HLB Bacteria	University of Florida
584-1	Powell, Chuck	Enhancement - Rapid and Efficient Delivery of Effective Compounds into Citrus Phloem for Treatment of HLB Bacteria	University of Florida
586C	Ehsani, Reza	Low-cost solar thermal treatment for in-grove reduction of CLas/ In-field solar heat treatment of HLB-infected orange trees for inoculum reduction inoculum	University of Florida
586-1	Ehsani, Reza	Low-cost solar thermal treatment for in-grove reduction of CLas inoculum - Enhancement	University of Florida
589	Roberts, Pam	Continuation of diagnostic service for growers for detection of Huanglongbing in citrus and psyllids to aid in management decisions	University of Florida
590	Rogers, Michael	Enhancing psyllid control through a better understanding of the effects of pesticide applications on psyllid feeding and mortality	University of Florida
590-1	Rogers, Michael	Enhancement - Enhancing psyllid control through a better understanding of the effects of pesticide applications on psyllid feeding and mortality	University of Florida
592	Rucks, Phil	Protective Structure for Citrus Research Foundation Farm to Enhance USDA Citrus Breeding	Rucks Nursery
593	Schumann, Arnold	Advanced Production Systems (ACPS) for efficient, sustainable citrus groves	University of Florida
594	Schumann, Arnold	Improving the uptake efficiency of nutrients applied to citrus foliage	University of Florida
596	Song, Wen-Yuan	Engineering Resistance Against Citrus Canker and Greening	University of Florida
598	Schumann, Arnold	Bringing young citrus trees infected with <i>Candidatus Liberibacter asiaticus</i> into production using intensive horticultural management strategies.	University of Florida
600	Stansly, Phil	Management Tactics Based on Psyllid Movement and Distribution in Florida Citrus	University of Florida
601	Stansly, Phil	Effective and Sustainable Insecticidal Control of Citrus Leafminer, <i>Phyllocnistis citrella</i> (Stainton) Lepidoptera: Gracillariidae) to Slow Spread of Citrus Canker Disease.	University of Florida
603	Stelinski, Lukasz	Non-neurotoxic chemicals as alternatives to conventional insecticides for Asian citrus psyllid management and prevention of insecticide resistance	University of Florida
603-1	Stelinski, Lukasz	Enhancement - Non-neurotoxic chemicals as alternatives to conventional insecticides for Asian citrus psyllid management and prevention of insecticide resistance	University of Florida
604	Stelinski, Lukasz	Influence of plant nutrient regimes for extending the life of HLB-infected trees on Asian citrus psyllid biology and management	University of Florida
604-1	Stelinski, Lukasz	Enhancement - Influence of plant nutrient regimes for extending the life of HLB-infected trees on Asian citrus psyllid biology and management	University of Florida
605	Stover, Ed	Development of Promising New Scions for Florida Citrus: Exploiting HLB Resistance and Tolerance	USDA-ARS
606	Stover, Ed	Production of Transgenic Commercial Scion Cultivars Resistant to HLB and Canker: Continued AMP Approaches and Novel Transgenic Strategies	USDA-ARS
607	Stover, Ed	A secure site for testing transgenic and conventional citrus for HLB and psyllid resistance	USDA-ARS
608	Wang, Nian	Characterize the effect of application of beneficial bacteria (Microbe Program) on management of Huanglongbing	University of Florida
608-1	Wang, Nian	Enhancement - Characterize the effect of application of beneficial bacteria (Microbe Program) on management of Huanglongbing	University of Florida
609	Wang, Nian	Control of citrus Huanglongbing by exploiting the virulence mechanisms of <i>Candidatus Liberibacter asiaticus</i> and inducing plant defense	University of Florida
610	Wang, Nian	Improve the management of citrus canker by protecting citrus fruits through interfering with biofilm formation and quorum sensing of <i>Xanthomonas citri</i> ssp. <i>citri</i>	University of Florida
611	Wang, Nian	Characterize the causal agent of citrus blight through metagenomic approaches and the effect of HLB on citrus blight diseased trees	University of Florida

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Project No#	Principal Investigator	Project Title	Institution
614	Young, Linda	Enhanced nutritional application and productivity in endemic HLB grove situations in Florida - a statistical approach to determine efficacy	University of Florida
614-1	Young, Linda	Enhancement - Enhanced nutritional application and productivity in endemic HLB grove situations in Florida - a statistical approach to determine efficacy	University of Florida
615	Gmitter, Fred	Evaluation of Rootstocks Appropriate for Higher Density Groves and Advanced Citrus Production Systems Leading to a Sustainable, Profitable Florida Citrus Industry	University of Florida
616	Rogers, Michael	Ultra High Performance Liquid Chromatography – Pesticide Residue Analysis	University of Florida
617C	Powell, Chuck	Screening effective chemical compounds against citrus HLB bacterium <i>Candidatus Liberibacter</i> –Further evaluation of selected compounds in greenhouse and field	University of Florida
617-1	Powell, Chuck	Screening effective chemical compounds against citrus HLB bacterium <i>Candidatus Liberibacter</i> -Further evaluation of selected compounds in greenhouse and field. Enhancement	University of Florida
618C	Dawson, Bill	RNAi InnoCentive Project Extension (Phase II): In planta Characterization of dsRNA Effect on all Psyllid Life Stages and Selection of Target(s) to Advance to Commercialization.	University of Florida
701	Allan, Sandra	Exploitation of Visual Stimuli for Better Monitoring and Management of ACP in Young Citrus Plantings	USDA-ARS
701-1	Allan, Sandra	Enhancement - Exploitation of Visual Stimuli for Better Monitoring and Management of ACP in Young Citrus Plantings	USDA-ARS
702	Baldwin, Elizabeth	Investigate effect of nutritional sprays on healthy and HLB-diseased orange fruit and resulting juice quality	USDA-ARS
707	Schumann, Arnold	Are there declines in hydraulic conductivity and drought tolerance associated with HLB?	University of Florida
710	Etxeberria, Ed	Identification of potential pathways for the spread of HLB through citrus vascular systems	University of Florida
711	Bonning, Bryony	Identification of <i>Bacillus thuringiensis</i> endo-toxins active against Adult Asian Citrus Psyllid	Iowa State University
712	Dandekar, Abhaya	Rapid testing of next generation chimeric antimicrobial protein components for broad spectrum citrus disease control	UC Davis
715	Dewdney, Megan	The leaf litter cycle of citrus black spot and improvements to current management practices	University of Florida
716	Dewdney, Megan	Improved fungicide control measures for pre- and post-harvest management of citrus black spot	University of Florida
717	Duan, Yongping	Control Citrus HLB by Blocking the Function of two Critical Effectors Encoded by <i>Candidatus Liberibacter asiaticus</i>	USDA-ARS
720	Duncan, Larry	Beyond BioVector: Can cold-tolerant nematodes effectively manage <i>Diaprepes</i> root weevil in advanced citrus production systems?	University of Florida
723	Gabriel, Dean	Exploiting the Las phage for potential control of HLB: year 2.	University of Florida
724	Gmitter, Fred	Accelerating Citrus Gene Discovery for HLB Tolerance/Resistance	University of Florida
726	Gonzalez, Carlos	A Bacterial Virus Based Method for Biocontrol of Citrus Canker	Texas AgriLife Research
726L	Gonzalez, Carlos	A Bacterial Virus Based Method for Biocontrol of <i>Liberibacter</i>	Texas AgriLife Research
728	Gowda, Siddrame	RNAi-mediated gene knock-down of selected members of ' <i>Candidatus Liberibacter asiaticus</i> ' induced citrus transcriptome with CTV based silencing vector to prevent HLB infection of young citrus	University of Florida
730	Graham, Jim	Monitoring streptomycin resistance in <i>Xanthomonas citri</i> in support of FireWall registration for canker	University of Florida
731	Graham, Jim	Calcium carbonate may reduce root health and exacerbate HLB expression	University of Florida

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Project No#	Principal Investigator	Project Title	Institution
731-1	Graham, Jim	Enhancement - Calcium carbonate may reduce root health and exacerbate HLB expression	University of Florida
732	Graham, Jim	Understanding and reducing early root loss in HLB affected trees	University of Florida
733	Grishin, Nick	Molecular basis of Citrus Greening and related diseases gleaned from genome analyses of hosts and pathogens	UT Southwestern Medical
736	Gruber, Barrett	Expedited Indian River Evaluation of Tetrazyg Rootstocks Surviving the HLB-Gauntlet	University of Florida
749	Li, Yi	Development of Technologies Important for Creation and Commercialization of Transgenic HLB Resistant Citrus	UConn
750	Ma, Wenbo	Identification of key components in HLB using effectors as probes	UC Riverside
752	Moore, Gloria	Cell Penetrating Peptides for Citrus Genetic Improvement and Disease Resistance	University of Florida
754	Mou, Zhonglin	Application of a natural inducer of systemic acquired resistance and engineering non-host resistance in citrus for controlling citrus canker	University of Florida
758	Ramadugu, Chandrika	Further characterization of HLB resistant clones of selected citrus varieties	UC Riverside
759	Santra, Swadeshmukul	Fixed-Quat: A novel alternative to Cu fungicide/bactericide for preventing citrus canker.	UCF
760	Setamou, Mamoudou	Development of a novel system for dissemination of a pathogenic fungus to manage Asian citrus psyllid in abandoned citrus groves	Texas A&M
760-1	Setamou, Mamoudou	Enhancement - Development of a novel system for dissemination of a pathogenic fungus to manage Asian citrus psyllid in abandoned citrus groves	Texas A&M
763	Stansly, Phil	Optimizing Spatial Distribution of Pheromone Traps for Monitoring Citrus Leafminer and Related Species	University of Florida
765	Stelinski, Lukasz	Continuation of insecticide resistance monitoring and management for sustainable control of Asian citrus psyllid.	University of Florida
765-1	Stelinski, Lukasz	Enhancement - Continuation of insecticide resistance monitoring and management for sustainable control of Asian citrus psyllid	University of Florida
766	Stelinski, Lukasz	Biotic and abiotic factors that cause Asian citrus psyllids to accept hosts: potential implications for young plantings and pathogen transmission.	University of Florida
767	Triplett, Eric	Rapid identification of antibiotics useful in the control of citrus greening disease	University of Florida
769	Triplett, Eric	A team approach to culturing <i>Ca. Liberibacter asiaticus</i> .	University of Florida
771	Moudgil, Brij	Soft nanoparticle development and tree uptake to deliver potential HLB bactericides	University of Florida
773	Wang, Nian	Control HLB by developing antimicrobial compounds against <i>Candidatus Liberibacter asiaticus</i>	University of Florida
773-1	Wang, Nian	Enhancement - Control HLB by developing antimicrobial compounds against <i>Candidatus Liberibacter asiaticus</i>	University of Florida
775C	Nelson, Mark	Investigation of Non-Antibiotic Tetracycline Analogs and Formulations Against HLB	Echelon Biosciences Inc.
776C	Albrigo, Gene	Frequent Low Rate Application of 2-4,D and Cytokinin to study plant symptom reduction in HLB affected trees	University of Florida
777C	Albrigo, Gene	Plant Growth Regulator late winter application for pre-harvest drop control in Valencia orange-Grower trials	University of Florida
778C	Albrigo, Gene	Plant Growth Regulator late winter application for pre-harvest drop control in Valencia orange-comprehensive PGR trials	University of Florida
779C	Albrigo, Gene	Plant growth regulator fall applications for preharvest drop control - Valencia orange-Single application Grower trials	University of Florida
780C	Wang, Nian	Evaluation of Soil-Based Antimicrobials as Control Agents against HLB.	University of Florida
780nu	Shatters, Bob	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	USDA-ARS

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Project No#	Principal Investigator	Project Title	Institution
781nu	Falk, Bryce	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	UC Davis
782nu	Hartung, John	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	USDA-ARS
783nu	Bartels, David	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	USDA-ARS
784nu	Brown, Judy	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	University of Arizona
785nu	Grafton-Cardwell, Elizabeth	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	UC Riverside
786nu	Polek, MaryLou	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	CRB
787nu	Galindo, Celestina	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	CA Dept Food & Agriculture
788nu	Hay, Bruce	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	CIT
789nu	Rohrig, Eric	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	FL Dept Consumer Services
790nu	Coop, Leonard	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	Oregon State University
791nu	Setamou, Mamoudou	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	Texas A&M
792nu	Giulianotti, Marcelo	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	Torrey Pines Institute
793nu	Gang, David	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	Washington State University
794nu	Pelz-Stelinski, Kirsten	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	University of Florida
795nu	Turpen, Tom	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	TIG
796nu	White, James	Rear and Release Psyllids as Biological Control Agents - An Economical and Feasible Mid-Term Solution for Huanglongbing (HLB) disease.	J White
782	Triplett, Eric	Evaluation of Candidate Antimicrobial Compounds or Combination of Compounds using <i>Liberibacter crescens</i> adday, for Efficacy in Reducing Titer in Bacterium <i>Candidatus Liberibacter asiaticus</i> as Control Agents Against HLB Individually and in Combination	University of Florida
803	Duan, Yongping	Characterization and manipulation of the prophages/phages of ' <i>Candidatus Liberibacter asiaticus</i> ' for the control of citrus huanglongbing	USDA-ARS
805	Long, Sharon	Functional genomics of <i>Liberibacter</i> in a model system	Stanford University
809	Albrigo, Gene	Citrus preharvest drop related to HLB disease-Nature and control	University of Florida
816	Etxeberria, Ed	Identification of potential pathways for the spread of HLB through citrus vascular systems: Supplement	University of Florida
818	Etxeberria, Ed	Determining the contents of citrus phloem sap and its directional movement throughout the year	University of Florida
827	Irey, Mike	Continued funding of the Southern Gardens Diagnostic Laboratory	Southern Gardens
834	Duan, Yongping	Optimizing Heat Treatment in the Fields and Understanding the Molecular Mechanism Behind the Success of Thermotherapy for the Control of Citrus HLB	USDA-ARS
838	Morgan, Kelly	Effect of selected concentrations of calcium bicarbonate on expression of HLB in the greenhouse and grove	University of Florida
850	Albrigo, Gene	Scheduling ACP spring spray selection based on the Citrus Flowering Model	University of Florida
853	LaPointe, Stephen	Why is <i>Poncirus trifoliata</i> resistant to colonization by Asian citrus psyllid?	USDA-ARS
858	Santra, Swadeshmukul	New non-phytotoxic composite polymer film barrier as ACP repellent for controlling HLB infection	UCF

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Project No#	Principal Investigator	Project Title	Institution
860	Sharma, Parvesh	Optical and physical deterrent for preventing ACP vector attack on citrus.	University of Florida
873	Lee, Richard	Application of new technologies to expedite cleaning of new accessions for use in Florida	USDA-ARS
880	Gurley, William	High-throughput screen of seedlings for resistance to citrus greening based on optical sensing.	University of Florida
894	Gruber, Barrett	Are there declines in hydraulic conductivity and drought tolerance associated with HLB? Supplemental support to expand plant growth regulator trials.	University of Florida
898	Dandekar, Abhaya	Rapid testing of next generation chimeric antimicrobial protein components for broad spectrum citrus disease control	UC Davis
899	Etxeberria, Ed	Strigolactones type growth regulators to combat HLB in Florida	University of Florida
903	Gruber, Barrett now Brian Boman	Establishing citrus nutrition trials for young & mature trees in the Indian River Region to promote plant growth, mitigate HLB, decrease fruit drop, and improve postharvest fruit storage properties	University of Florida
907	Johnson, Evan	Zinkicide: A novel therapeutic zinc particulate based formulation for preventing citrus canker and HLB.	University of Florida
909	Moudgil, Brij	Soft nanoparticle development and delivery of potential HLB bactericides	University of Florida
910	Powell, Chuck	An integrated approach for establishment of new citrus plantings faced with the HLB threat	University of Florida
916	Wang, Nian	Screening and application of antibacterial producing microbes to control citrus Huanglongbing	University of Florida
919	Dewdney, Megan	A method to monitor for Guignardia citricarpa (Gc) ascospores in Florida groves.	University of Florida
921	Schneider, William L.	Determining the role of a novel virus in Citrus blight.	USDA-ARS
922	Wang, Nian	Control citrus canker by manipulating the EBE (effector binding element) of CsLOB1 which is the citrus susceptibility gene for citrus canker disease	University of Florida
925	Dutt, Manjul	Diaprepes control using a plant based insecticidal transgene approach	University of Florida
926.1C	LaPointe, Stephen	Sub on Large-scale mating disruption of citrus leafminer validation and product launch	USDA-ARS
926.2C	Stelinski, Lukasz	Sub on Large-scale mating disruption of citrus leafminer validation and product launch	University of Florida
926.3C	Urrutia, William	Large-scale mating disruption of citrus leafminer validation and product launch	
927C	Rogers, Michael	Field Trial Support for CRDF CPDC	University of Florida
928.1C	Sutherland, Dudley	Field Trial of Naturally Occuring Microbes	
928.2C	Booker, Brad	Field Trials of Soil Microbials to combat HLB - Ridge Site crop Consultant	
928.3C	Yonce, Henry	Field Trials of Soil Microbials to combat HLB - Southwest FL Site crop Consultant	
928.4C	Wang, Nian	Field Trials of Naturally occurring microbes to combat HLB	University of Florida
929.2C	Rucks, Phil	Field Trial of HLB Tolerant Rootstocks	Rucks Nursery
931C	Gonzalez, Claudio	In Vitro testing of chemicals on tree leaves collected from HLB-infected trees to determine their efficacy against HLB	University of Florida
932.1C	Keesling, James	Mathematical Modeling to evaluate Psyllid Shield Concept	University of Florida
933C	Minter, Tom	Oversee Field Trials of Plant Growth Regulators	
934.1C	Wang, Nian	Soil Drenches of products to combat initial HLB infection in young citrus trees	University of Florida
934C	Curtis, John	Soil Drenches of products to combat initial HLB infection in young citrus trees	

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Project No#	Principal Investigator	Project Title	Institution
935C	Wang, Nian	Assays - continuation testing of Powell RSA 1 - antimicrobials	University of Florida
936C	Richardson, Taw	Firewall Section 18 Grapefruit Canker (and HLB) Field use Evaluation	AgroSource, Inc.
937C	Richardson, Taw	Firewall Canker Efficiency on Round Oranges	AgroSource, Inc.
938C	Richardson, Taw	Large Scale Lab/Greenhouse/Field Trial Evaluation - HLB	AgroSource, Inc.
939C	Richardson, Taw	Bactericidal Studies Section 18 Exemption/Section 3 Registration	AgroSource, Inc.
940C	Beeson, Richard C.	Propagation of Rootstock Tree Production in Greenhouses by Seed, Stem Cuttings and Tissue Culture to Accelerate Budded Tree Production for Outplanting	University of Florida
941C	Pelz-Stelinski, Kirsten	Influence of Thermal Therapy on Transmission of Candidatus Liberibacter asiaticus	University of Florida
942.1C	Minter, Tom	Field Trials of Plant Growth Regulators	
942.2C	Yonce, Henry	Field Trials of Plant Growth Regulators	
943C	Rogers, Michael	Support for scale-up of Thermal Therapy Treatment: Evaluation before and after thermotherapy heat treatments to combat HLB	University of Florida
944C	Pelz-Stelinski, Kirsten	RSA - Small plant assay for testing the efficacy of antimicrobial materials against HLB	University of Florida
945C	Gonzalez, Claudio	RSA - Rapid Evaluation method to evaluate drug's effectiveness directly from tree samples	University of Florida
946C	Nufarm	Mycoshield Magnitude of Residue Study for Citrus Crop Group.	NuFarm
15-002	Bowman, Kimberly	Development of Supersour and Other Promising Rootstocks for Florida.	USDA-ARS
15-003	Bowman, Kimberly	Metabolomic profiling to accelerate development of HLB tolerant rootstocks	USDA-ARS
15-005	Dewdney, Megan	Asexual inoculum production of Guignardia citricarpa, the causal agent of citrus black spot	University of Florida
15-008	Etxeberria, Ed	Determination of CLas signal in HLB-affected citrus trees	University of Florida
15-009	Gabriel, Dean	Exploiting the Las phage for potential control of HLB	University of Florida
15-010	Gmitter, Fred	Development and Commercialization of Improved New Disease Resistant Scions and Rootstocks - the Key For a Sustainable and Profitable Florida Citrus Industry	University of Florida
15-013	Grosser, Jude	Understanding and Manipulating the Interaction of Rootstocks and Constant Nutrition to Enhance the Establishment, Longevity and Profitability of Citrus Plantings in HLB-Endemic Areas.	University of Florida
15-016C	Hall, David	High-Throughput Inoculation of Transgenic Citrus for HLB Resistance	USDA-ARS
15-017	Killiny, Nabil	Disrupt LuxR solo quorum sensing that mediates plant virulence and insect transmission of Candidatus Liberibacter asiaticus to control the disease	University of Florida
15-020	Mou, Zhonglin	Create citrus varieties resistant to Huanglongbing (HLB) through transgenic and nontransgenic approaches	University of Florida
15-021	Pelz-Stelinski, Kirsten	Regulation of Las transmission and microbial colonization by the Asian citrus psyllid immune system	University of Florida
15-022	Reuber, T. Lynne	Engineering citrus for canker resistance	Two Blades
15-023	Schumann, Arnold	Citrus nutrition studies for improved survival of HLB-affected trees	University of Florida
15-024	Stelinski, Lukasz	Predicting When, Why, and Where Asian citrus psyllids move to increase effectiveness of insecticide sprays.	University of Florida
15-025	Stover, Ed	HLB Resistance and Tolerance in Citrus Scion Breeding	USDA-ARS
15-026	Stover, Ed	Implementing Transgenic Tools to Produce Commercial Scion Cultivars Resistant to HLB and Canker	USDA-ARS
15-027	Triplett, Eric	Developing a culture medium for Liberibacter asiaticus through comparative multi 'omics analysis with its closest cultured relative, L. crescens	University of Florida
15-028	Wang, Nian	Control citrus Huanglongbing (HLB) by counteracting the SA hydroxylase of Candidatus Liberibacter asiaticus	University of Florida

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Project No#	Principal Investigator	Project Title	Institution
15-030C	Rogers, Michael	Continuing Field Trial Support for CRDF CPDC	University of Florida
15-031C	Etxeberria, Ed	Development of a laser-based system to deliver antimicrobials to citrus trees: Greenhouse testing.	University of Florida
15-032C	Irey, Mike	Continued Support for the Southern Gardens Diagnostic Laboratory	Southern Gardens
15-033C	Orbovic, Vladimir	Support role of the Citrus Core Transformation Facility remains crucial for research leading to production of Citrus plants that may be tolerant or resistant to diseases.	University of Florida
15-034C	Roberts, Pam	Continuation of diagnostic service for growers for detection of Huanglongbing in citrus and psyllids to aid in management decisions	University of Florida
15-035C	Rogers, Michael	Continuing support of Citrus Health Management Areas (CHMA's)	University of Florida
15-036C	Rogers, Michael	Correlating pesticide residue analysis with psyllid feeding to improve protection of young trees	University of Florida
15-037C	Santra, Swadeshmukul	T-SOL™ antimicrobial for the management of citrus canker and HLB	UCF
15-038C	Stelinski, Lukasz	Insecticide resistance monitoring and management in Florida citrus to maintain sustainable control of Asian citrus psyllid within Citrus Health Management Areas	University of Florida
15-039C	Stover, Ed	Secure site for testing transgenic and conventional citrus for HLB and psyllid resistance	USDA-ARS
15-040C	Triplett, Eric	Rapid turn-around evaluation of up to 1200 promising antimicrobial compounds (or combinations), using the L.crescens assay	University of Florida
15-042	Wang, Nian	Control citrus Huanglongbing using endophytic microbes from survivor trees	University of Florida
15-043C	Wang, Nian	Rapid turn-around evaluation of up to 25 antimicrobial compounds for efficacy in reducing titers of the bacterium Candidatus Liberibacter on diseased 6-year old trees Hamlin on Swingle.	University of Florida
15-045C	Zale, Janice	Continued Funding for the Mature Citrus Facility to Produce Disease Tolerant, Transgenic Citrus	University of Florida
15-046C	Curtis, John	Evaluation of GRAS/biopesticide products as a protectant and therapy for HLB on Valencia oranges.	
15-048C	Minter, Tom	Field Trials of Bactericide Application Methods.	
15-049C	Booker, Brad	Evaluation of GRAS/biopesticide products as a protectant and therapy for HLB on Valencia oranges.	
15-050C	Behlau, Franklin	Effect of windbreaks, copper bactericides and citrus leaf miner control on temporal and spatial progress of citrus canker	Fundecitrus
16-001	Li	Enhancing Genetic Transformation Efficiency of Mature Citrus	Uconn
16-005	Wang	GFP labeling of Candidatus Liberibacter asiaticus in vivo and its applications.	University of Florida
16-007	Duan	Field evaluation of the selected variants of Ruby Red grapefruit volunteer seedlings for greater HLB resistance/tolerance.	USDA-ARS
16-009C	Triplett	Developing second generation antimicrobial treatments for citrus greening disease.	University of Florida
16-010C	Dewdney	Enhancement of postbloom fruit drop control measures.	University of Florida
16-011C	Adair	Increasing the yield and decreasing the bearing age of citrus trees in new plantings by using metalized reflective mulch while determining ACP populations.	Florida Research Center
16-012C	Triplett	Antimicrobial assay for inhibition of Liberibacter crescens, the closest cultured relative of the citrus greening pathogen, Ca. L. asiaticus. RSA	University of Florida
16-015C	Irey RSA	Enhanced Fruit Quality Assessment from Field Trials. RSA	Southern Gardens
16-016C	Irey RNAi	Use of RNAi delivered by the Citrus Tristeza Virus Ciral Vector to control the Asian Citrus Psyllid	Southern Gardens
16-017C	Tetard	Quantitative Detection and Mapping of Bactericides in Citrus	UCF
16-019C	Pelz-Stelinski	RSA - Small plant assay for testing the efficacy of antimicrobial materials against HLB.	University of Florida

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Project No#	Principal Investigator	Project Title	Institution
16-020C	Vincent	Dyed kaolin to repel Asian citrus psyllid in field conditions.	University of Florida
16-022C	Richardson	Large Scale Lab/Greenhouse/Field Trial Evaluation - HLB	AgroSource, Inc.
16-023C	Etxeberria	Determining the Efficacy of a New Class of Adjuvants in Increasing Penetration of Antimicrobials into Citrus Leaves.	University of Florida
16-024C	Ables	A Review of the Citrus Greening Research and Development Efforts Supported by the Citrus Research and Development Foundation.	NAS
16-025.1C	Drouillard	Comparison of chemical uptake with laser ablation and conventional foliar application – Phase One.	Ablate BioTech LLC
16-025.2C	Booker	Comparison of chemical uptake with laser ablation and conventional foliar application - Phase 1 Crop Consultant.	
16-025.3C	Wang	Quantification of oxytetracycline in plant samples.	University of Florida
16-026C	Bayer Crop Science	Establishment and application of tools to allow a systematic approach to identify and characterize hits with confirmed in planta HLB activity.	BCS
16-026C	CRDF/Bayer Crop Science NIFA funding	Establishment and application of tools to allow a systematic approach to identify and characterize hits with confirmed in planta HLB activity.	BCS
16-027C	Futch	Determine impact of Reglone application on killing abandoned citrus trees in mature groves - A demonstration.	University of Florida
17-001C	Stelinski	Insecticide resistance management in Florida citrus production.	University of Florida
17-002C	Irey	Continued Support for the Southern Gardens Diagnostic Laboratory	Southern Gardens
17-005C	Vincent	Effects of heat treatments on antimicrobial uptake and translocation in citrus trees.	University of Florida
17-006C	Triplett	Monitoring of citrus groves for non-target antibiotic resistance prior to and after application of streptomycin and oxytetracycline.	University of Florida
18-004	Bowman, Kim D.	Development of SuperSour and other outstanding rootstocks with tolerance to HLB	USDA-ARS
18-006	Dewdney, Megan	Understanding the underlying biology of citrus black spot for improved disease management	University of Florida
18-007	Dutt, Manjul	Investigating the role of transgenic rootstock-mediated protection of non-transgenic scion.	University of Florida
18-010	Gmitter, Fred	Upgrading Citrus Genome Sequence Resources: Providing the Most Complete Tools Necessary for Genome Editing Strategies to Create HLB Resistant Cultivars	University of Florida
18-011	Gmitter, Fred	Part A - The UF/CREC Core Citrus Improvement Program (Complementary to Part B - The UF/CREC Citrus Improvement Program's Field Trial Evaluations)	University of Florida
18-013	Jones, Jeffrey B.	Using a Multipronged Approach to Engineer Citrus for Canker Resistance	University of Florida
18-016	McNellis, Tim	Testing grapefruit trees expressing an anti-NodT antibody for resistance to HLB	Penn State University
18-017	Mou, Zhonglin	Establish early-stage field trials for new HLB-tolerant canker-resistant transgenic scions	University of Florida
18-018	Pelz-Stelinski, Kirsten	Disrupting transmission of Candidatus Liberbacter asiaticus with antimicrobial therapy	University of Florida
18-019	Rogers, Elizabeth E.	Phloem specific responses to CLAs for the identification of novel HLB Resistance Genes	USDA-ARS
18-020	Santra, Swadeshmakul	Novel multi-metal systemic bactericide for HLB control	University of Central Florida
18-022	Stover, Ed	Delivery of Verified HLB-Resistant Transgenic Citrus Cultivars	USDA-ARS
18-024	Triplett, Eric W.	Foliar phosphate fertilization: a simple, inexpensive, and unregulated approach to control HLB	University of Florida
18-025	Wang, Nian	Optimization of the CRISPR technology for citrus genome editing	University of Florida

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Project No#	Principal Investigator	Project Title	Institution
18-026	Wang, Nian	Control citrus Huanglongbing by exploiting the interactions between Candidatus Liberibacter asiaticus and citrus	University of Florida
18-028C	Albrecht, Ute	Comparison of field performance of citrus trees on rootstocks propagated by seedlings, cuttings, and tissue culture	University of Florida
18-029C	Albrecht, Ute	Evaluation of citrus rootstock response to HLB in large-scale existing field trials using conventional and automated procedures	University of Florida
18-032C	Alferez, Fernando	Preventing young trees from psyllids and infection with CLAs through use of protective netting	University of Florida
18-033C	Ampatzidis, Yiannis	Automated root mapping to enhance field trial evaluation of citrus rootstocks in the HLB era	University of Florida
18-034C	Dewdney, Megan	Improved postbloom fruit drop management and exploring PFD spread in Florida	University of Florida
18-036C	Duncan, Larry	Cover crops and nematicides: comprehensive nematode IPM across the grove landscape	University of Florida
18-037C	Ferrarezi	Performance of newly released grapefruit cultivars and rootstocks in the Indian River Citrus District	University of Florida
18-039C	Grosser, Jude W.	Part B - The UF/CREC Citrus Improvement Program's Field Trial Evaluations (Complementary to Part A - The UF/CREC Core Citrus Improvement Program, being submitted as an RMC proposal).	University of Florida
18-040C	He, Zhenli	Evaluation of the spatiotemporal dynamics of bactericides within the citrus tree via different application methods	University of Florida
18-041C	Johnson, Evan	Characterizing HLB-pH interaction to improve management of root function and tree health	University of Florida
18-042C	Kadyampakeni, Davie	Development of Root Nutrient and Fertilization Guidelines for Huanglongbing (HLB)-Affected Orange and Grapefruit	University of Florida
18-050C	Niedz, Randall P.	The effect of the ionization state of iron and citric acid on the health of HLB-infected trees.	USDA-ARS
18-051C	Pelz-Stelinski, Kirsten	Improving bactericide therapy for young tree protection and inoculum reduction	University of Florida
18-052C	Qureshi, Jawwad	Sustainable Management of Asian citrus psyllid (ACP) and Citrus Production	University of Florida
18-055C	Qureshi, Jawwad	Optimizing Benefits of UV Reflective Mulch in Solid Block Citrus Plantings	University of Florida
18-056C	Stelinski, Lukasz	Functional IPM for Asian citrus psyllid under circumstances of chronic HLB	University of Florida
18-058C	Stover, Ed	Fort Pierce Field Test Site for Validating HLB and/or ACP Resistance	USDA-ARS
18-059C	Strauss, Sarah	Citrus row middle management to improve soil and root health	University of Florida
18-061C	Vashisth, Tripti	Evaluating sustainability of yield and fruit quality of sweet oranges with use of controlled release fertilizer and micronutrients	University of Florida
18-064C	Wang, Nian	Evaluation of the control effect of bactericides against citrus Huanglongbing via trunk injection	University of Florida
18-065C	Stover	High-Throughput Inoculation of Transgenic Citrus for HLB Resistance	USDA-ARS
18-066C	Orbovic, Vladimir	Support role of the Citrus Core Transformation Facility remains crucial for research leading to production of Citrus plants that may be tolerant or resistant to diseases.	University of Florida
18-067C	Zale, Janice	Continued Funding for the Mature Citrus Facility to Produce Disease Tolerant, Transgenic Citrus.	University of Florida
19-001C	Irey, Mike	Continued Support for the Southern Gardens Diagnostic Laboratory	Southern Gardens
19-002	Stelinski, Lukasz	Why spray if you don't need to? Putting the IPM back into citrus IPM by ground truthing spray thresholds	UF-CREC
19-009	Johnson, Evan	Whole tree vs. rootstock or scion tolerance to HLB	University of Florida
19-010	Johnson, Evan Dewdney, Megan	Determining new cost-benefit guided Phytophthora propagule treatment thresholds for HLB-affected citrus	University of Florida
19-015	Killiny, Nabil	Evaluation of the tolerance of newly developed citrus cultivars, on different rootstocks, to Huanglongbing	University of Florida

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19-016	Duncan, Larry	How do subterranean pests and diseases affect root health of trees with and without HLB?	University of Florida
19-020	Ritenour, Mark A.	Improved Data Collection for Citrus Field Trials	University of Florida - IRREC
19-023	Vincent, Christopher	Which commercial adjuvants achieve systemic delivery of antimicrobials?	University of Florida
19-024	Wang, Yu	Near-term approaches of using alternative HLB-tolerant cultivars for increased production and improved juice quality	University of Florida
19-027	Zchori-Fein, Einat	Large-scale testing of the endophytic bacterium <i>Frateuria defendens</i> , a potential biocontrol agent of HLB	Agricultural Research Organization
19-029C	Carlson, Kristen	Citrus Research and Field Trials (CRAFT) Program Year One	CRAFT, Inc.
19-030C	Albrecht, Ute	Use of compost and interaction with low- and high-vigor rootstocks to accelerate young sweet orange tree establishment and enhance productivity.	University of Florida
20-002C	Diepenbrock, Lauren	Developing near and long-term management strategies for Lebeck mealybug (<i>Nipaecoccus viridis</i>) in Florida citrus	University of Florida
20-003	Ferrarezi, Rhuano	Fertilization of high-density plantings	University of Florida
20-004	Kadyampakeni, Davie (Johnson, Evan)	Organic acids compared to conventional acidification for improved nutrient uptake and root physiology	University of Florida
20-011	Vashisth, Tripti	Right Leaf Sampling-The first and most critical step to good nutrition program	University of Florida
20-014	Dutt, Manjul	Understanding the role of systemic acquired resistance (SAR) in enhancing tolerance to HLB in the Parson Brown sweet orange	University of Florida
20-015C	Leslie, Michele Elemental Enzymes	Vismax™: A novel peptide-based therapeutic for mitigation of citrus diseases, including HLB	Elemental Enzymes
20-018C	Davis, Christine (UCD) NIFA Subaward	Collaborative approach between academics, growers and agrochemical industry to discover, develop and commercialize therapies for citrus huanglongbing (HLB)	UC Davis
20-019C	Mandadi, Kranthi (TAMU) NIFA Subaward	Collaborative approach between academics, growers and agrochemical industry to discover, develop and commercialize therapies for citrus huanglongbing (HLB)	TAMU AgriLife
20-020C	Batuman, Ozgur (UF) NIFA Subaward	Collaborative approach between academics, growers and agrochemical industry to discover, develop and commercialize therapies for citrus huanglongbing (HLB)	University of Florida
20-021C	Carlson, Kristen (CRAFT)	Citrus Research and Field Trials (CRAFT) Program Year Two	CRAFT, Inc.
21-001	Pederson, Clay	Trees for Rootstocks Grower Cooperator Phase 3 Trials	Agromillora
21-002C	Irey, Mike	Continuing Support for the Southern Gardens Diagnostic Laboratory	Southern Gardens
21-003	Jin, Hailing	Using a stable antimicrobial peptide with dual functions of treating and preventing citrus Huanglongbing	UC Riverside
21-004C	CRAFT, Inc.	Large Scale Field Trials	CRAFT, Inc.
21-005	Albrecht, Ute	Comparison of field performance of citrus trees on rootstocks propagated by seed, cuttings, and tissue culture	University of Florida
21-007	Alferez, Fernando	Reducing fruit drop by altering hormonal responses within the tree through nutritional and hormonal therapies: a mechanistic affordable approach	University of Florida
21-008	Bowman, Kim D.	Development of Next-Generation SuperSour rootstocks with tolerance to HLB	USDA-ARS
21-012	Dewdney, Megan	Evaluating the role of greasy spot and peel disorders in the greasy green defect on citrus fruit	University of Florida
21-013	Duncan, Larry	Integrated management of sting nematode in newly planted citrus trees.	University of Florida
21-014	El Mohtar, Chooa	CTV-T36 vectors as a tool to induce efficient flowering in citrus seedlings	University of Florida
21-021	Pelz-Stelinski, Kirsten	Clas Inhibition with Antisense Oligonucleotides for Management of Citrus Greening Disease	University of Florida

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21-024	Schumann, Arnold	Determine optimal timing for application of fertilizer to improve fruit quality and reduce preharvest drop	University of Florida
21-025	Shatters, Robert (E. Stover proposal, retired)	Transgenic capable field site to assess HLB-resistant and other improved citrus	USDA-ARS
21-028	Wang, Nian	Generation of non-transgenic HLB-resistant sweet orange varieties using CRISPR-Cas technology	University of Florida
21-032	Albrecht, Ute	Assist with CRDF Phase 3 Rootstock Field Trials	University of Florida
21-033	Albrecht, Ute	Subcontract to 18-004 K.Bowman bridge funding extension, Development of SuperSour and other outstanding rootstocks with tolerance to HLB	University of Florida
21-035	Albrecht, Ute	Subcontract to 21-008 K. Bowman: Development of Next-Generation SuperSour rootstocks with tolerance to HLB	University of Florida
22-001	Albrecht, Ute	Directed research – Evaluation of different trunk injection devices and oxytetracycline formulations for efficacy against HLB, phytotoxicity, and feasibility	University of Florida
22-002	Santra, Swadeshmakul	Management of tree health and huanglongbing disease pressure using advanced Zn formulations	University of Central Florida
22-003	Alferez, Fernando	Determining best timing for Brassinosteroid (Brs) application to achieve maximum beneficial effects on citrus tree health and fruit yield and quality	University of Florida
22-006	Curtis, John	CRDF Study on Preharvest Fruit Drop Prevention Using Plant Growth Regulators (PGRs)	Better Crops LLC
22-007	Alico, Inc.	Grower Cooperator - CRDF Rootstock Trials	Alico
22-008	Laurent, George	Grower Cooperator - CRDF Rootstock Trials	Center Ridge Caretaking
22-009	Thayer, Thomas A. Jr.	Trees for Scion Trials	Southern Citrus Nurseries
22-010	Wood, Tamara	Large Scale Field Trials Cycle IV	CRAFT, Inc.
22-011	Chater, John	Using high-throughput phenotyping to screen germplasm and ongoing field trials for promising citrus accessions in HLB-endemic Florida	University of Florida
22-012	Niedz, Randall	Identifying Healthy Individuals in the USDA -ARS Citrus Breeding Program and Replicated Second Stage Trials Using Drone Technology and Subsequent Image Analysis	USDA-ARS
22-013	Diepenbrock, Lauren	Getting to the root of the problem: Managing Diaprepes root weevil on trees with HLB	University of Florida
22-014	Diepenbrock, Lauren	Developing management for Bulimulus bonariensis snails in Florida citrus	University of Florida
22-016	Dutt, Manjul	Preliminary field trial to evaluate the ability of HLB tolerant rootstocks to protect commercial scions against HLB	University of Florida
22-017	Levy, Amit	Improving the Systemic Uptake of Therapeutic Compounds by Trunk Injections	University of Florida
22-019	Dutt, Manjul	Understanding the HLB tolerance and reduced fruit drop in Parson Brown and evaluation of other early season sweet oranges	University of Florida
22-020	Turgeon, Robert	Protecting citrus trees from citrus greening with anchored, single-chain antibodies	Cornell University
23-001	Stelinski, Kirsten	Effects of trunk-injected oxytetracycline on tree infection and health, psyllid pathogenicity, and vector population	University of Florida
23-002	Albrecht, Ute	OTC Directed Research Solicitation: Use of CRDF Rootstock Trial Locations for Testing Bactericides Inserted into Trees Through Systemic Delivery Devices	University of Florida
23-003	Ritenour, Mark	Evaluation of Potential HLB Tolerant Grapefruit Rootstock/Scion Combinations in Florida	University of Florida
23-004	Wood, Tamara	CRAFT Existing Trees Therapies Program: Phase Targeting CRDF and Their Priorities	CRAFT, Inc.
23-005	Albrecht, Ute	Bac. Trial 1: Use of CRDF Rootstock Trial Locations for Testing Bactericides Inserted into Trees Through Systemic Delivery Devices	University of Florida

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23-006	Deng, Zhanao	Evaluating Novel Gene-edited Duncan Grapefruit Mutants for Resistance to Huanglongbing (HLB)	University of Florida
23-009	Curtis, John	Bac. Trial 2: Use of Bactericide in Combination with GA and 2,4-D (Plant Growth Regulator) (Separate from ongoing CRDF PGR Trials)	Better Crops, LLC
23-010	Curtis, John	Bac. Trial 3: Impact of Bactericides inserted through systemic delivery on improving tree health and root density over time	Better Crops, LLC
23-011	Curtis, John	Bac. Trial 5: Alternative Insertion Sites for Bactericides	Better Crops, LLC
23-012	Yonce, Henry	Bac. Trial 6: Bactericide Combined with Vismax TM	BioTek Agriculture USA
23-013	Yonce, Henry	Bac. Trial 8: Yield Comparison Between Bactericide and Non-treated Control Blocks on Yield and Tree Health	BioTek Agriculture USA
23-014	Batuman, Ozgur	Determining the effect of oxytetracycline when rotated with additional crop antimicrobials on citrus phytotoxicity and CLas reduction	University of Florida
23-018	Mandadi, Kranthi	Truck injection-based evaluation of novel anti-CLas chemistries and OTC combinations for Florida citrus and HLB disease management	TAMU AgriLife
23-019	Yonce, Henry	Tank mix 3-day test of 2 products	BioTek Agriculture USA
23-020	Black, Larry	Participation in CRDF Rootstock Trials	Peace River Packing Company
23-021	Brlansky, Ron	Improved Diagnostics and Determination of Triggers for Citrus Blight	University of Florida
23-025	Minter-Yonce	Evaluation of PT 150, PT 159, and TPR 1 for ACP and HLB control in Florida Citrus.	Minter Family Farms
23-026	Wood, Tamara	Large Scale Field Trials and Existing Tree Therapies Cycle V	CRAFT 5.0
23-027	Wang, Yu	Exploring the efficacy of natural antibacterial agents for CLas control via trunk injection	University of Florida
23-029	Chater, John	Consolidation of citrus breeding plant material to vacate space for Stage I and Stage II field trials and to exploit tolerant germplasm for gene editing strategies.	University of Florida
23-030	Mou, Zhonglin	Evaluate new transgenic rootstocks for HLB tolerance	University of Florida
23-031	Johnson, Weston TCCC	Accelerate Establishment of Stage 2 Citrus Trials to Combat Citrus Greening Disease	The Coca Cola Company
23-032	Triplett, Eric	Proof of concept for phage therapy in the reduction CLas titer and HLB symptoms in citrus	University of Florida
23-034	Messina, Charles	Taking aim at Citrus Greening: Activating the IFAS Crop Transformation Center (ICTC) to implement an idea to product framework	University of Florida
23-035	Yonce, Henry	RFP 1: Phos acid & Copper	BioTek Agriculture USA
23-036	Albrecht, Ute	RFP 2: OTC in a pH neutral solution	University of Florida
23-037	Chaires, Peter	M. Mattia, USDA-ARS, re-fly and data collection	FL Citrus Research Fdn.
23-038	Schirard, Pat	Grower Cooperator - field trials of molecules for their ability to mitigate the effects of HLB on citrus trees	Patrick Fruit Company