

# Overall NRC Priority Research Topics (June 2008)

ID	RANK*	RESEARCH TOPIC
1	0.50	Perform Koch's postulates to conclusively demonstrate that Liberibacter is the causative agent of HLB and investigate biological properties of any relevant co-cultures.
2	0.44	Identify psyllid repellents from guava volatiles and other sources.
3	0.33	Construct Liberibacter genomic DNA library. Sequence and assemble full-length genome sequence.
4	0.33	Determine if modified spray techniques/applications etc. can improve psyllid control.
5	0.33	Develop transformation systems for mature tissue of commercial varieties (both rootstocks and scions).
6	0.28	Determine if RNA interference can be used to manipulate psyllid gene expression.
7	0.22	Develop improved (faster and more sensitive) assays for Liberibacter using PCR-, antibody-based, remote sensing, or other methods of detection.
8	0.22	Identify proteins or peptides that have anti-Liberibacter activity.
9	0.22	Examine the effects of oils and particle films on psyllids and HLB transmission.
10	0.17	Characterize the microbiome of citrus phloem tissue.
11	0.17	Identify attractants (chemical, color) in psyllid hosts and from other sources.
12	0.17	Examine effectiveness of flush management in controlling citrus-psyllid interactions and HLB transmission. Ways to improve flush management include high-density planting using micrografting and tree dwarfing (with dwarfing factors, e.g. different rootstock).
13	0.17	Save Rutaceous germplasm; Screen Citrus and Vepris germplasm for Liberibacter resistance and initiate citrus breeding to develop HLB resistant citrus.
14	0.17	Identify biological proteins (Bt-like) that affect the psyllid.
15	0.11	Examine the relationship between environmental factors (light intensity, temperature, etc.) and HLB symptoms and timing of host and pathogen responses.
16	0.11	Develop HLB resistant citrus by mutagenesis and selection.
17	0.11	Perform detailed Liberibacter transmission studies using psyllid, Liberibacter and citrus genotypes found in Florida.
18	0.11	Determine if Liberibacter is seed transmitted in citrus.
19	0.11	Develop a more facile (non-citrus) model system for HLB.
20	0.11	Identify factors related to variability of psyllid acquisition of pathogen; establish why less than 100% of psyllids will acquire Liberibacter.
21	0.11	Develop a fast assay for detecting pathogen in the psyllid.
22	0.11	Determine the latency period between inoculation of citrus with Liberibacter and development of HLB symptoms, under different pathogen titers and different host conditions (phenology).
23	0.11	Study effects of anti-microbial compounds on HLB in citrus.
24	0.06	Examine transcript, protein and metabolite levels in Liberibacter infected citrus to better understand the plants response to HLB.
25	0.06	Determine if citrus explants in tissue culture support high levels of Liberibacter.
26	0.06	Grow nursery and production stock under screen until fruit-bearing age.
27	0.06	Conduct economic feasibility studies of alternative citrus production systems (i.e. high density planting, hydroponics, screen house propagation/culture, intercropping with guava).
28	0.06	Develop a detailed understanding of the mechanism of HLB transmission, including Liberibacter acquisition time, mechanism of attachment to psyllid, inoculation period. Determine the mechanism and location of attachment of Liberibacter in psyllids.
29	0.06	Examine life cycle of psyllid in detail, including mating cues (acoustics), migration/dispersal patterns, stylus formation etc.
30	0.06	Develop better methods for monitoring and determining the presence of psyllids in the environment.
31	0.06	Develop psyllids by breeding or transgenic approaches that do not vector Liberibacter.
32	0.06	Synthesize repellents or engineer microbes to synthesize repellants.
33	0.06	Sequence an EST library of psyllid genes.
34	0.06	Examine seasonal distribution of Liberibacter in citrus (both levels and location within a tree). Analyze the distribution of Liberibacter in symptomatic and asymptomatic citrus tissues.
35	0.06	Develop molecular research tools for Liberibacter including monoclonal antibodies to Liberibacter, reference strains of Liberibacter and psyllids, cDNA and genomic libraries of Liberibacter.
36	0.06	Examine effectiveness of different methods to stimulate systemic acquired resistance to HLB in citrus.

\* All topics considered priorities by the NRC expert panel. Ranked by proportion of experts (out of 18) choosing them as these priority topics.