rotations of organic insecticides applied alone, with horticultural mineral oil or with insecticidal soap — are being compared with a standard conventional program for ACP control and conservation of beneficials in a block of Valencia and Hamlin oranges. Dormant sprays of the natural pyrethrum PyGanic EC 5.0 alone (17 oz./acre) or with 435 oil (2% v/v) or M-Pede (2% v/v) applied in November, December and January, and Danitol 2.4 EC applied at 16 oz./acre in January all significantly reduced ACP through March. By then, adults started to escalate above a provisional growing season threshold of 0.1 per tap sample. Danitol provided more ACP reduction than PyGanic, especially when applied both in November and in January.

Thus, two dormant sprays were better than one. PyGanic with M-Pede or 435 oil performed better than PyGanic alone. There is no threshold for dormant sprays, which are critical for year-round ACP control.

The last two winters were warm with some rain events, which resulted in unexpected flush and greater than normal populations of ACP. It may be necessary to add another dormant spray under such conditions.

Growing Season Management of ACP: Factors to consider for control of ACP during the growing season include abundance of nymphs or adults, other pests which also need to be controlled, cost, and effects on beneficials. Just seeing one or two adults per 50 taps or single infested flush may not be sufficient to justify spraying an entire block. Thresholds based on annual accumulation of ACP in mature blocks with high HLB incidence have been developed (see Citrus Industry magazine, February 2015). Flush protection is critical because when an infected female has access to a new bud or shoot, it not only lays eggs, but injects the pathogen into those soft tissues, thus spreading the infection to the tree, its progeny and other colonizing adults.

We have been using a provisional 0.1 adults per tap sample threshold.

As we move through the current production and harvest season, the Citrus Research and Development Foundation (CRDF) has been initiating plans and activities to continue delivering HLB solutions in 2017. This article summarizes some of the directions that CRDF is taking.

- CRDF is implementing results of strategic planning concluded in 2016. Initiative 1 is short-term solutions (less than 3 years to grower delivery). Initiative 2 is medium/long-term solutions requiring more than 3 years. Subcommittees of the Executive Committee are evaluating these two initiatives, and discussions will occur at 2017 committee and board meetings to make these the highest priorities for CRDF investment.

- CRDF initiated in-house review of all active and recently ending projects to determine progress and value to continue. Each year, CRDF conducts this portfolio review, beginning with project managers and the Scientific Advisory Board. Reviews and recommendations from these first steps are provided to the Research Management Committee and the Commercial Product Delivery Committee (CPDC). The board ultimately determines the final recommendations to invite new or revised proposals for CRDF review. An additional outcome of the portfolio review is to identify research results to advance to the field through the CPDC.

- At its December board meeting, CRDF approved a project for an independent, comprehensive review of HLB research conducted over the recent decade in Florida, but also to include research sponsored by other institutions and funding programs. This 1-year evaluation will provide further direction for the topics that most likely will lead to HLB solutions, and recommend specific priorities to accomplish delivery of solutions to growers. Publication of the full report of this comprehensive review is slated for early 2018.

- CRDF has intensified oversight of research and delivery topics, reducing the breadth of individual projects being funded and encouraging more team efforts toward field evaluation. A significant component of current CRDF activity is the conduct of field trials and grower evaluations to advance early results. Project managers will report regularly in 2017 on progress in these priority areas.

- Finally, CRDF continues to coordinate with the California Citrus Research Board, the U.S. Department of Agriculture’s (USDA) National Institute of Food and Agriculture Specialty Crop Research Initiative, Citrus Disease Research and Extension Program and the USDA’s Animal and Plant Health Inspection Service HLB Multi-Agency Coordination Group. Where different groups are working independently, teams can be encouraged to rapidly bring forth best options for management of citrus in the presence of HLB.

Please visit citrusrdf.org to follow CRDF activities and programs.

Harold Browning is Chief Operations Officer of CRDF. The foundation is charged with funding citrus research and getting the results of that research to use in the grove.