

Research Update – Chemical Control of Asian Citrus Psyllid

ACP Workshop

21 March 2011, Santa Paula, CA

Joseph Morse, Jim Bethke, Frank Byrne, Beth
Grafton-Cardwell, & Kris Godfrey

Citrus Research Board Project 5500-189

4-year proposal funded by the CRB started 11-1-10: “Optimizing Chemical Control of Asian Citrus Psyllid in California

Joseph Morse – Project Coordinator, resistance modeling

James Bethke – Screening trials in Chula Vista; nursery, ornamentals, and pesticide screening expertise

Frank Byrne – background in insect toxicology and resistance mechanisms; research on optimizing neonicotinoid uptake

Beth Grafton-Cardwell – will coordinate outreach and extension efforts; ACP trials once the psyllid reaches the SJV

Kris Godfrey (CDFA) – coordination with state and federal ACP efforts; interest in organic treatments, biological control

Research Objectives (CRB Project 5500-189)

Sub-objective 1. Screen pesticides not evaluated well elsewhere or new pesticides that appear to show promise in ACP control

Sub-objective 2. Verify the 200-250 ppb imidacloprid threshold for effective control of ACP nymphs developed by Dr. Setamou; set thresholds for clothianidin and thiamethoxam

Sub-objective 3. Develop baseline data for ACP susceptibility to key pesticides before pesticide use is widespread in CA and compare these data to resistance monitoring data from FL

Sub-objective 4. Search for materials that are at least somewhat effective and is, or will be approved, for use on organic citrus

Sub-objective 5. Other research objectives as needed (open to ideas)

Accomplishments to Date (Optimizing ACP Control, 5500-189)

1. Hoddle, Morse & Godfrey - CDFA Specialty Crop Grant

\$339,650 over 3 years, 10/10 – 6/13; “Management of ACP in Organic Citrus” – funding arrived December 20, 2010

Letters of support from CRB (Batkin-Polek), CCQC (Cranney), Bob Atkins (SD Ag. Comm.), Pam Marrone (Marrone Bio Innovations), Claudia Reid (Program Dir., CA Cert. Org. Fed.), and Jerome Stehly (planned field cooperater)

Raju Pandey – Morse – Hoddle recently initiated preliminary trials with registered organic products evaluating their impact against ACP and *Tamarixia radiata* inside Quarantine

Accomplishments to Date (Optimizing ACP Control, 5500-189)

2. Study levels of neonicotinoids needed in plant tissue for effective ACP control – studies on ACP inside UCR Quarantine

Confirm Setamou's 200-250 ppb threshold for imidacloprid

Determine thresholds for clothianidin (trunk sprays) and thiamethoxam (combined treatment w/ imidacloprid)

Treat plants outside quarantine via soil application

Measure ppb levels in plant tissue with ELISA

Evaluate impacts on ACP adults and nymphs inside Quarantine

Determine plant tissue ppb levels needed for effective ACP control

Accomplishments to Date (Optimizing ACP Control, 5500-189)

3. Research proposal submitted to USDA-SCRI program 1-31-11

\$3.03 million requested (\$697K to CA), “Sustainable Area-Wide Management of Asian Citrus Psyllid to Overcome Hunglongbing (Citrus Greening) Disease”

10 PIs from FL (Stelinski, Rogers, others), 3 from CA (Morse, Grafton-Cardwell, Byrne), 1 from TX (Setamou)

4 year project - focus is mainly on how to best manage ACP pesticide resistance while still providing effective control

Letters of support provided from CA by CRB (Ted Batkin, Jim Gorden), CCM (Joel Nelsen), CCQC (Jim Cranney), CDFA (Larry Bezark), CCPDP (Nick Hill), Entomological Services Inc. (Joe Barcinas)

Slowing the Development of ACP Resistance to Pesticides

ACP resistance data from Florida are alarming:

> 50X resistance to imidacloprid, cross resistance to thiamethoxam

Significantly reduced mortality of ACP observed in field populations when tested with diagnostic doses of 10 chemicals (abamectin, aldicarb, carbaryl, chlorpyrifos, spinetoram, 3 pyrethroids, 2 neonicotinoids)

We must control ACP effectively in CA

But we must do so in a way that does not rapidly lead to ACP resistance

Start by developing baseline data on the susceptibility of CA ACP populations to key pesticides

Ideas - Methods of Slowing ACP Resistance

Screen and register additional chemistries for ACP control

E.g., learn how to best use rynaxypyr (Altacor) in CA

Study the mechanisms & genetics of ACP resistance in Florida

Develop and test alternative pesticide rotation schemes

Optimize chemical control (reduce the need for rapid retreatment)

Evaluate “windows” for use of certain types of chemistry

Maximize use of non-chemical methods of control – e.g., cultural and biological controls in urban, organic, & traditional settings

Reduce overuse of any one class of chemistry – e.g., neonicotinoid use on nursery & young trees for citrus leafminer, GWSS, eliminate foliar neonicotinoid use (Assail for GWSS, Provado)

Grower and PCA education and input of ideas / methods