
Meeting called by:	Peter Ellsworth	Type of Meeting:	All hands meeting to discuss project logistics and objectives
Note taker:	Al Fournier Naomi Pier		
Attendees:	John C. Palumbo	Wayne Dixon	
	Nilima Prabhaker	Lydia Brown	
	Steve Castle	Julianne O'Brian	
	Yves Carriere		

Minutes

1. Introductions

1-1 Naomi Pier

- Graduate student officially beginning in August
- Currently working on project

1-2 Julianne O'Brian

- Working with Wayne to correct data

2. Update on ARDP Budget, Subcontracts and IKMP Project Initiation

2-1 ARDP Budget

- Main funding source for personnel
- Direct all ARDP questions to Al

2-2 Subcontracts

- USDA subcontract is pending sign-off at ALARC
- UCR subcontract is in place

2-3 IKMP

- Funded but contract not yet available – contract still under review at Monsanto
- USDA subcontract will be available following contract approval
- UA funds will not be in place until at least July 1

3. Project Scope Expansion (IKMP)

3-1 How IKMP and ARDP Projects are Related

- Geography: CA desert valleys adjacent to AZ will be incorporated in 2016 research & outreach
- MoAs Examined: 6 whitefly MoAs are included now
- Intensity of Sampling Efforts: at least 10 locations/populations per chemistry
- Duration of Project
 - Extending to June 30, 2017
 - ARDP ends August 31, 2016
 - Grants overlap in time
- Includes funding for a graduate student: Naomi

3-2 Crop Maps and Data

- To generate CA crop maps, we will need to integrate CDPR pesticide use data into our database

- Peter will contact Pete Goodell about obtaining crop maps from CA and continue following up with Leighton Liesner to secure current AZ agriculture field map data
- Yves can use remote sensing with ground truthing to obtain data on current crops with 98% accuracy (does not include melons)
 - Need to decide soon if remote sensing with USDA satellite imagery is to be used
 - Possibly need a separate meeting to discuss

4. Data Cleaning

4-1 Status of 2014 Data Cleaning

- ADA has stepped up their game
- UA received 1080 data a little behind schedule due to ADA managing their responsibilities during licensing season
 - Majority of the data received the beginning of May. The last of the data was received in the first 2 weeks of May.
- Bit behind the May 1st deadline but the remaining data will be vetted by the end of May.
- “Liesner” sections with ag data refined to add sections with crops and remove those without crops
- Issues
 - Number of errant records in 2014 makes it hard to analyze in sections
 - Best to check data against scanned 1080
 - Location is critical; AI has been having successful/positive conversations with PCAs about errant reporting
 - Agrian does not check all data entered leading to preventable/unnecessary errors (with no physical 1080 to check against)
 - ADA follows up on defective 1080’s creating a data bottleneck
- John and Peter will need to double check maps during June
- Can trust the data at the section level once the 1080’s for project specific crops and years (2014) has been cleaned

5. Outreach

5-1 Specialty Crop Block Grant

- Grant to do outreach ***Update: this grant was just recommended for funding***
- Focus on education; perhaps distributor-specific meetings & training with PCAs
- Used to stress importance of making error checking routine to prevent errant 1080’s/data

5-2 Website Plans

- Focus of Wayne and AI
- Goal is to have website operational by end of June
- Maps will be made available to PCAs through a secure website
 - 6 AIs x 13 map areas or scenes
 - Users will have access to whatever map sets they need
- Site will be scalable for mobile devices
- Security/Access
 - Obtain licensed PCA email address from ADA and AzCPA to create accounts
 - Possibly limit access to those PCAs that have submitted 1080’s within the year (past few years) (≤145 total)

- All licensed PCAs should be in the loop and be able to request access
 - Have an obligation to protect the end user data
 - Growers need to discuss access with their PCAs
 - Industry reps, other non-PCAs, etc. can request access on a case by case basis, these maps may have limited/less information
 - Include disclaimer
- Questions?
 - Should maps be downloadable?
 - On maps with limited information, what information will be provided?
 - Should we provide an interpretation of maps for the PCAs?
 - No, but an explanatory section on what the maps are showing will be needed (crops and chemicals included / excluded; other factors that impact interpretation; and re-enforcement of 1st principles of resistance management)
 - How the information shown is interpreted is up to the individual
 - Can the data be linked to resistance monitoring that Dr. Li works on?
 - This monitoring has been done for 20+ years
 - Okay to say there are chemistries for which resistance risk is increasing; So yes, we will provide generalized insight into those chemistries for which there are identifiable resistance issues, being careful to remind PCAs and others that this is not tantamount to efficacy. Products subject to known resistances can and do still perform; others may not.

5-3 Presentations, Evaluations, and PCA Learning

- Completed about 200 surveys at Extension presentations & meetings
- Needed to find a baseline level of knowledge – “to what degree do you know...”
 - Will require completion of a survey upon first access to website, as well as an exit survey
- Want knowledge to go up
- Second follow up survey in year 2
 - Require PCAs to fill out survey before they can gain access in the second year; receive new password once survey is complete
 - Telephone survey will be done as a follow up with PCAs who are willing. The idea will be to contact them after the end of the season to get comments on the degree to which they used the maps in decision-making.
 - Way to collect retrospective data on the value of the maps
 - Determine number of acres managed by respondents

5-4 Workshops, Meetings, IPM Shorts

- Peter and John are the primaries for outreach workshops and meetings
- Peter would like to hold several meetings to make people aware of the website
 - Opportunity for feedback
 - Offer meetings at least in Yuma and central AZ
 - Possibly speak at distributor meetings
- IPM Shorts
 - Naomi with Lydia’s help
 - How to use the website & interpret maps
 - First principles of resistance management

- Perhaps one on Yves' original work on spatial dynamics of pyriproxyfen resistance
- Follow up meeting in June to discuss outreach

6. Maps

6-1 Outreach

- Goal is to support PCA learning and resistance management decision-making
- Email questions circulated by Peter (see http://cals.arizona.edu/apmc/docs/15P-IRM_04292015_Questions_about_Map_Construction_YC_JCP_Updated.pdf and http://cals.arizona.edu/apmc/docs/15P-IRM_05032015_Map_Construction_Part2.pdf)

6-2 Crops to Include

- Focus is on crops that host whiteflies
- Include crops with few acres (endive, escarole, cilantro, etc.); small size will not make a big difference in maps
- Remove lemons
 - Remove spatially
 - Not much movement
 - Groves near housing
 - Exclude from maps but keep for model
- Alfalfa
 - Dominate feature of our landscape
 - Should it be included in maps for PCA use?
 - Will be included in analysis
 - Can add to maps later
 - Peter thinks alfalfa should be excluded; pyrethroids and diamides (to a lesser degree) put a cast over the maps
 - Data presented by John at DAC on CYSDV suggests that alfalfa may play less of a role in resistance since ostensibly does not play a major role in CYSDV transmission.
 - Believe most of the pyrethroid use on alfalfa is in winter for aphid and weevil control
 - Steve suggests the alfalfa may act as a major refuge host
 - Peter's data suggests not many progeny are produced in alfalfa due to cutting cycle
 - Data on whiteflies in alfalfa is based on information from Imperial County
 - Major refuge in late summer when cotton is deteriorating
 - But alfalfa is a transitory host
 - Whiteflies may not be in alfalfa long enough to pick up virus
 - Alfalfa could be a sink for resistance
 - Second option is to include alfalfa selectively in areas where they appear more relevant (i.e., Yuma, possibly Parker, but not higher elevations)
 - Yves suggest to run correlations between maps with and without alfalfa
 - If correlated, include it or not
 - Decision is to test for correlation (Peter & Naomi will examine)
 - Possibly include alfalfa on diamide maps
 - More consistent mapping approach may be easier
 - Belt use has been increasing, but does it select in whiteflies?

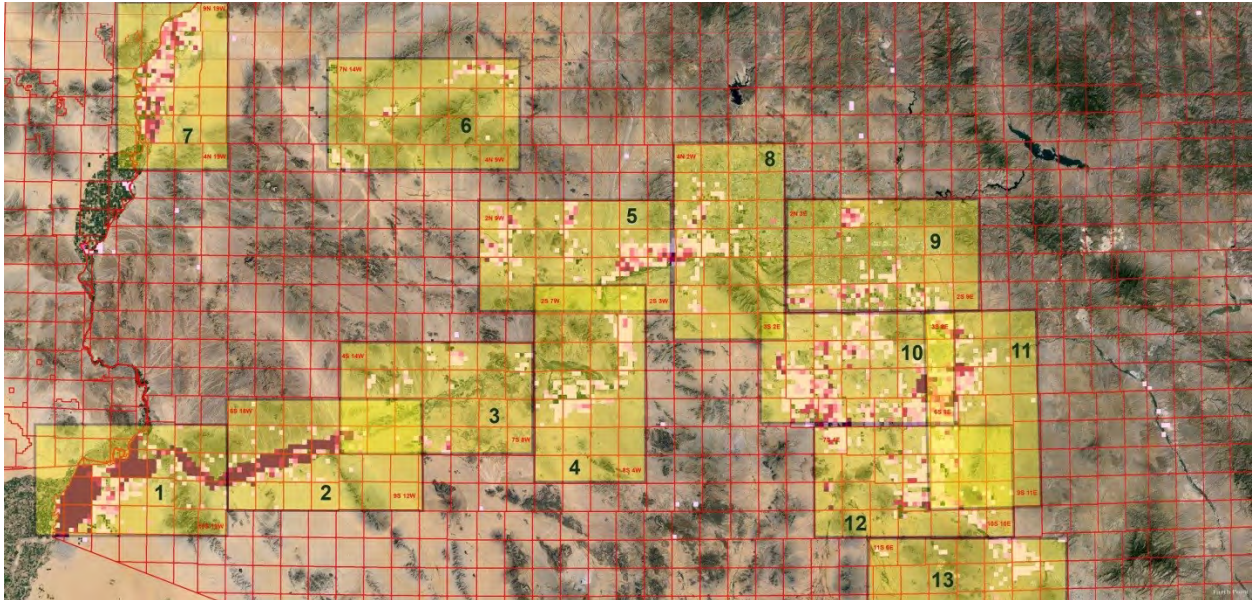
- Neonicotinoids and other chemistry look similar with or without alfalfa
- Can make a case for including seed alfalfa

6-3 Chemistries to Include

- Pyrethroids
 - Plot with and without tank mixes
- Diamides
 - Rynaxypyr
- Soil neonicotinoids
 - Exclude? Follow-up with John, decision exclude all “DEQ=Y” from data
 - Most melons grown in state are on drip with soil applications
 - Drip application is likely universal but is certainly underreported
 - No foliar imidacloprid use on melons
 - Remove use from melons and produce
 - Explain not including soil application in explanatory notes; “assume all melons and produce have an additional application of imidacloprid based on non-reported uses”
 - Possibly only focus on foliar applied neonics (Yes, see above)
 - Look at database to determine where soil uses are being applied; look at melons in particular (see 1st bullet and update)
 - Soil use is more persistent than sprays
 - Need to account for the fact that anything applied over the top will create more selection pressure; open question.
 - Remains a question whether soil applications have more influence than sprays on resistance development
 - Soil use has a longer window of exposure
 - When metabolites are more potent there is less resistance
 - No recorded Vetica use on cotton currently (2014)
 - ***follow-up: based on review of maps with and without soil applications, decision was made to exclude all soil applications and to include notes about this decision in the commentary that will accompany maps.***

6-4 Binning

- Initially divided into 5 categories (20% of use in each bin)
- Can consider more dynamic binning in (see map):
 - Yuma – maps 1 and 2
 - Parker – map 7
 - Augila – map 6
 - Remainder/Central Valley – remaining maps



- Consider different binning approach in Yuma to account for greater pyrethroid and diamide use; other chemistries are more consistently represented statewide
- Need to standardize resistance within region of different scales; no absolute values; i.e., statistically standardize resistance values.
- Questions
 - How should we represent data?
 - Does it make sense to use 20% guideline based on equal proportion of use?
 - Should we consider the distribution of data and vary the scales accordingly?
 - How should we represent non-zero but very low usage (non-zero to 5)?
 - Considered showing this as an outline, or a transparent color
 - < 5% ... >95%

6-5 Target Resistance Monitoring Efforts

- What criteria should we use to identify sections to sample?
- Goal is to compare directly between high and low use areas
- Should we avoid the edges of agricultural areas (near cities and desert) and near CA and Mexico border?
 - Yes, sampling should be done in the middle of those areas where possible
- By 2016 CA (Imperial County) 2013 and 2014 data will be available for analysis
- No reported usage does not mean no usage in areas where reporting is not required (reservations)
 - Identify and exclude
- A range of diagnostic (discriminating) doses will be examined, resistance may shift at the low or high end
 - Need to research best dosages for chemistries involved, but historical data is a very good start. Naomi, Steve and Nilima to investigate.
- Focus will be on chemistries where there is known resistance for determining areas of contrast to focus whitefly collections on.
 - Neonics
 - Pyriproxifen

- Pyrethroids
- Sampling (see table below for sampling overview)
 - Timing is important and must be consistent between years
 - Original start date was July 15 (see http://cals.arizona.edu/apmc/docs/ARDP_PI_MeetingNotes_10-15-14_VF.pdf)
 - Yuma, Parker, then Central AZ (based on available whiteflies)
 - Sampling across multiple crops may reduce *n* for analysis; host effects
 - Need approximately 40 points per chemistry for statistical power
 - 54 bioassays per AI x 6
 - Need to take into account previous year's and current pesticide use in the research model for testing for correlations
 - Facilitate sampling through contact with PCAs (help from Lydia / AI on this)
 - No more than one population within a section; second sample should be one or more sections away
 - Samplers: Naomi, Steve, Nilima, Gilberto, Francisco, Jose, others; help from John's lab?

Timing	Location	PI =Low	PI = Medium	PI = High
15 July	Yuma	3	3	3
15 July (Monsanto, 2016)	Imperial	3	3	3
1 August	Parker	3	3	3
1 August (Monsanto, 2016)	Blythe	3	3	3
15 August	Central AZ	6	6	6

Number of populations collected per chemistry by location. PI = Pesticide Intensity

7. Other Business

7-1 Upcoming Meetings

- Outreach plan discussion
 - TBD
 - Peter, AI, Wayne, Lydia, Naomi
- Group meeting
 - September or October

7-2 Upcoming Tasks

- Peter needs to contact Pete Goodell about obtaining crop maps from CA and follow up with Leighton Liesner to secure current AZ agriculture field map data
- A decision needs to be made about the use of remote sensing
- Wayne, Julianne, and Naomi need to continue cleaning the data
- By the end of June Wayne will have mapping website available; sooner for testing and sharing with focus groups
- Wayne needs to query which areas in Yuma report soil neonic use on melons for John ***This is done already; decision: exclude "DEQ=Y" from data
- John and Peter need to review maps
- Naomi, Yves, Steve, Nilima, Peter, and John need to determine sampling locations
- Naomi, Steve, Nilima, Gilberto, Francisco, Jose, and others need to begin sampling when whitefly populations become available (beginning in July)
- Naomi needs to practice bioassays with Nilima and Steve

- Nilima and Steve (with Naomi) need to determine diagnostic doses to test

7-3 Ongoing and Long Term Objectives

- Develop chemical use maps and conduct outreach (Naomi, Julianne, Wayne, Al, Lydia, Peter and John)
- Test resistance hypotheses (Naomi, Steve, Nilima, Yves and Ben)
- Measure changes in awareness, knowledge, skills behaviors and conditions (Naomi & Al with Peter, John and others)