**S-1068 Meeting**

**Integrated Management of Pecan Arthropod Pests in the Southern U.S.**

**Location: Hilton Garden Inn, Ardmore, OK**

**Date and Time: June 11, 2019 at 1:30 pm to 5 pm**

**Attendees**:

 Texas: Texas A&M, Bill Ree

 Georgia: Univ. of Georgia, Angel Acebes-Doria,

 Oklahoma: Noble Research Institute, Charles Rohla, Charlie Graham and Camille Carey (Intern)

 Oklahoma State Univ, Phil Mulder

 New Mexico: New Mexico Dept. of Agriculture, Tiffany Johnson

 Arkansas: Univ. of Arkansas, Jackie Lee (attended via phone)

* The meeting was held in conjunction with the 2019 Oklahoma Pecan Growers Association Annual Conference and Trade Show in Ardmore, OK.
* The S-1068 project group was called to order at on June 11th by project chair Bill Ree.
* The project advisor, Dr. Henry Fadamiro (Auburn University), was out of the country so he was not able to attend the meeting.
* Motion to accept the minutes from the 2018 project meeting held in San Marcos, TX was made by Phil Mulder, seconded by Charles Rohla and approved by the majority at the end of the meeting.
* The 2020 meeting location was discussed to be held in New Mexico in conjunction with the New Mexico Pecan Growers Conference. The location and date details will be finalized based on when the conference will be conducted. An option for members to attend via Zoom will be made available. An in-person meeting was encouraged by the majority.
* The secretary position for the 2020 meeting will be assigned by the group at a later date.

**Below were the updates provided by the group members for each project objective.**

**Objective 1: Improved Monitoring and Forecasting Methods for Field Populations of Pecan Arthopods**

Bill Ree, TAMU: Pecan IPMPipe is now functional with PNC forecast operational since late May 2019. The server was moved to the Southern IPM Center. Joe LaForest (SIPM co-director) re-wrote the codes for the system. It was mentioned that the PecanIPM Pipe worked well in TX and the timing was perfect in OK (as per Phil Mulder’s assessment). Other IPMPipe utilities such as the toolbox and library are also functional. However, the color-coded symbols for the PNC forecast are not available in the current version.

 There was a discussion that there might a way to include monitoring numbers for PNC with the PNC forecast.

 First generation of PNC was light to medium, and may have been because of the rainy weather in TX. Some growers have reported PNC pheromone lures not working in TX. Provided PNC traps to new people to engage them in monitoring for PNC.

 Pecan Weevil: Bill Ree communicated with agents and growers in NM to make sure spread is monitored. TX tried to do a legislative rule to handle pecan weevil spread (license buyers to specific data from buyers, origin dates, source).

 Collaborating with Angel Acebes in surveying and monitoring for ambrosia beetles in pecan orchards using ethanol-baited traps.

Phil Mulder, OSU: OK had little to no PNC eggs monitored. Severe weather events may have affected the low infestation rates of PNC in OK. Similar to the TX reports, there were reports of PNC pheromones not working in OK. Trece PNC lures worked in OK. It was discussed to find out the pheromone manufacturer and trace the link. Trece PNC lures contain pheromones from two strains while Scentry lures only have one.

 Twig girdlers were bad last year in Oklahoma. Options for monitoring of adult emergence (caging fallen infested twigs) and management were discussed.

Angel Acebes, UGA: An mobile App, Farm Dog, is being tested to record scouting data on pest populations in GA commercial orchards. Data are recorded and stored through a cloud account and is accessible to the team leader. The app can be used on and offline, user-friendly and is fully customizable based on the needs of the user. It is free to use for Extension purposes and available for a fee for commercial use.

 Survey and monitoring of ambrosia beetles in commercial pecan orchards are being done in GA. Bottle traps baited with ethanol lures were deployed along woodlines bordering pecan orchards with young trees. Captures were primarily *X. crassiusculus* (granulate ambrosia beetle), some were *X. germanus* and *X. compactus*. Infested trees were also dissected and confirmed the three species attacking pecan trees. Log traps baited with commercial ethanol lures vs log traps with liquid ethanol were compared showing that traps baited with liquid ethanol had more ambrosia beetle attacks than the other trap. Studies on ambrosia beetles in GA pecan orchards are done in conjunction with studies in the ornamental and tree fruit systems.

 A study monitoring for *Prionus* rootborer beetles using pheromone-baited traps in a pecan commercial orchard is ongoing.

 Brown marmorated stink bug trapping is also being conducted across various locations in Georgia associated with pecan production. Established populations are found in middle GA but none have been reported as of yet in the southern locations (closer to the GA/FL border).

Charles Rohla, Noble Research Institute: A mobile app can be used for scouting/monitoring and for recording spray logs. A functionality where users can submit photos may also integrated. This could be tied in with the technology being developed by Dr. Amy Gooch at TAMU which can pull photos from the App and run through a system for insect identification. Students at TAMU were able to conduct studies at Noble Research Institute using weevil traps with an imaging technology to monitor insect captures. The trapping assembly was done in a short period of time with minimal costs.

Tiffany Johnson, New Mexico: PNC monitoring was ongoing and they were still catching moths (24-60 per trap/night). Hickory shuckworms (HSW) are not yet captured in New Mexico. HSW populations may be affected by humidity and treatment of PNC 2nd generation. They are pursuing an eradication program for pecan weevil. Monitor for pecan weevil will start in mid to late July). Research on pecan weevil pheromone is being continued and they are working on getting a grad student to work on the behavioral analyses of mated males and conduct olfactometry work (volatile collection of plant materials). They are also monitoring for the invasive brown marmorated stink bug when they scout for other stink bugs on pecans.

**Objective 2: Improved Control Systems for Pecan Arthropod Pests**

Bill Ree, TAMU: Pesticide list will be updated before Bill retires (August 2019) and be made available to the group.

Charlie Graham, Noble Research Institute: Compiling a list of pesticides (fungicides and insecticides) with grazing system protocol. Communicated with chemical companies (Bayer, Syngenta) to obtain the said information. It was mentioned that not enough testing is done to test for residues found in grass.

Phil Mulder, OSU: Provided PNC traps to growers and collaborators to assist in monitoring for PNC in Oklahoma.

 An aphicidal trial (on Kansas variety) comparing four insecticidal treatments (2.75 oz/ac Closer, 8 oz/ac Movento. 2.4 oz/ac Carbine and 2.8 oz/ac) was conducted. Populations of black margined and yellow aphids were assessed. The highest count was 4000+ aphids/compound leaf. The aphid populations were enhanced by spraying Silencer two weeks before the trial. Seven days after treatment, only trees treated with Closer had aphid numbers below the threshold.

 Options on management strategies to address aphicide resistance development was discussed highlighting the different modes of actions of the products available in the market.

Jackie Lee, Arkansas State Univ: Started working as the director of the station she is based at so not able to do a lot of research work the past year. Worked on pecan scab management tool and did insect pest monitoring.

Tiffany Johnson, New Mexico: Reported testing a currently unlabeled aphicide by BASF, Sefina, showing lack of residual effectively, 1-1.5 wks after trial. New Mexico growers are interested in pesticide-free recertification (test for residuals after a certain period of time), the same as testing for phosphite residue.

Angel Acebes, UGA: Tested deltamethrin-impregnated netting against pecan weevils under lab and field conditions (in collaboration with Ted Cottrell). Results: Pecan weevils were easily affected upon exposure to the insecticidal netting (within 10s). Pecan weevil adults exposed to the insecticidal netting had higher mortality than those that were not under field conditions. Future Directions: Testing the longevity of the netting in the field

 Preliminary investigation on the use of drone in releasing predatory mites on pecans (Collaborators: David Shapiro, Ted Cottrell, Glen Rains and Will Hudson). Glen used a 3-D printed release device to release predatory mites from a drone We had 3 treatments: hand release, drone release vs no release. The released mites were not recovered across all the treatments after 1 or 7 days post-release. Future Studies: Collaborate with drone release service providers to release natural enemies in the pecan system, assess establishment of released NEs and figure out the optimal and economical release rates in a commercial setting.

 Insecticidal trials: Tested the following materials:

Aphids: Sefina BASF (unlabeled for pecans), Closer, Carbine

Mites: Nexter, Magister

**Objective 3: Integrate Pecan Arthropod Pest Control Methods with Pecan Production Methods**

Charlie Graham, Noble Research Institute: Working on the herbicide list and someone is working on fungicide list to be added to the website together with the insecticides. There were discussions regarding the effectiveness of combination products and generic materials.

Angel Acebes, UGA: Investigated the effects of pecan hedging on the population of pests and natural enemies (Collaborators: Lenny Wells and David Shapiro). Results Summary: Populations of pests and NEs were generally the same, black pecan aphid injury was low on hedged trees, parasitism rates were higher early in the season on hedged trees. Study will be continued in the coming years comparing old hedged vs non-hedged trees, summer vs winter hedging. We will assess disease infestation (scab and wood rot fungi), belowground communities (entomophathogens), horticultural aspects (nutrition, water-use, yield and quality) and economics.

**Objective 4: Develop Real-time Decision Aids for Delivery on the Internet**

Angel Acebes, UGA: The “My IPM” with Pecan Insect information is already functional and available to growers for free of charge. It is App that serves as a fact/sheet and spray guide resource for growers and county agents. It contains info on pests (life history, descriptions, pictures) and materials labelled for management. Currently, there are only three pecan insect pests but more will be added in the coming months. The plan is for a student to be assigned to add more information into the App.

Bill Ree, TAMU: The upload data capability in the My IPMPipe is not available at this point. A discussion risk window yellow green red is not available at this point. The goal is to get the forecast system up and running, and get the other functionalities added in. Issues regarding PNC monitoring was discussed including incorrect identification and regular checking.

Charlie Graham, Noble Research Institute: A company in California had developed a delta trap with a camera (tiny camera, that takes pictures of traps) which could be used for trapping PNC.

The other group members who were not present during the meeting (David Shapiro and Ted Cottrell) were to be requested for their respective research summaries.

The meeting was adjourned at 4:37 pm.