

Summary of the TPB Project (Alternative Approaches to Tarnished Plant Bug Control) Team Meeting held on Tuesday April 12, 2016.

Meeting started at 10:00 am with participation of Clint Allen, Bryce Blackman, Nathan Little, Randy Luttrell, Katherine Parys, O. P. Perera and Maribel Portilla.

Current TPB project term: December 4, 2015 to December 3, 2020.

Initial discussion was centered on information about APHIS regulations for experimental plots 10 acres or less and EPA regulations for large-scale experimental plots. Maribel Portilla indicated based on information obtained from APHIS, Pest, Pathogens and Biocontrol Permitting, that APHIS would not require a permit for movement and use of native isolates of *B. bassiana*, including small scales (total research area of 10 ac or less). However, EPA would require a permit for large-scale use. For both small and large scale *B. bassiana* use, EPA stipulated that no part of the plant that may have the experimental material on it will be able enter the “food or feed” stream. Therefore, the sprayed crop or yield cannot be used for human consumption or forage/feed for livestock or other animals (Crop should be destroyed in the field). All attendees agreed that this regulation would consume our project funds very quickly. No final information has been obtained from EPA about the cost of the permit for large-scale use.

Following the discussion Maribel Portilla stated that there is enough NI8 inoculum to cover the field experiments for the year of 2016. However, more tech powder (pure spores) needs to be produced for the next years. The National Biological Control laboratory (NBCL) has produced 2 Kg of NI8 to be used the year of 2017. Dr. Jaronsky (USDA ARS Northern Plains Agricultural Research Laboratory) is willing to produce 10 Kg of NI8 for our project, which will be used for the large-scale field experiments in 2017-2018.

Next discussion was centered on the project goals set by milestone tables. Emphasis was on increased accountability and improving project productivity.

Objective 1: Determine key factors that naturally regulate TPB population increases and develop new tools for managing TPB, included bio-control strategies.

Sub-objective 1A: Quantify the impact of natural control on TPB seasonal abundance and distribution (Portilla/Blackman/Parys/Perera/Luttrell/).

Sub-objective 1B: Identify and develop new biological and cultural control options (including entomopathogens, entomophagous insects, host manipulation and possibly behavioral modification) as possible regulators of TPB population growth (Portilla/Blackman/Parys/Perera/Luttrell/).

Sub-objective 1C: Identify sampling methods for TPB that are cost and time effective for landscape level monitoring, and evaluate their use as tools in TPB population management (Parys).

Maribel Portilla is taking the lead in research outlined in the sub-objectives 1A and 1B under the Objective 1. Several thousand of TPB adults have been collected from different locations within the Mississippi Delta. The impact of biological control (microbial and parasitoids) on TPB seasonal abundance have been identified and quantified for 2015. New microbial agents have been isolated from field samples. Enough data for adults and fifth instar nymph were collected in 2015 for life table constructions. Data for second, third and fourth instar will be collected in 2016. Life tables will determine how mortality patterns and expectations of life expectancy are altered when some causes are eliminated. Samples from 22 MS counties and over 300 sites are being coded for obtaining DNA for population genetic analysis. The coded samples will be given to OP Perera who is taking lead on the last part of the research outlined in the sub-objective 1B.

Katherine Parys is taking the lead in research outlined in the sub-objective 1C under the Objective 1. She stated that Dr. David Hall from The Natural Resources Institute, University of Greenwich, UK provided the pheromones for her research. She is identifying field locations for this study. Parys is also leading the stable carbon isotope analysis. Field collection of 500 sweeps in areas with known population of TPB across the Delta were made weekly in 2015. Both adults and nymphs were removed from each weekly collection and processed for SCI. Parys indicated that the data is evaluated and will be presented in Brazil at the International Cotton Conference in May of 2016. The 2016 population of TPB is being processed.

Objective 2: Develop novel alternative ways to deploy TPB control agents, and evaluate effectiveness of these deployments methods in large-scale field experiments.

Sub-objective 2.A: Determine if spray of NI8 applied alone and in combination with novaluron will suppress TPB population colonizing adjacent cotton (Blackman, Portilla, Parys, Luttrell).

Sub-objective 2.B: Measure impacts of NI8 and new biological control agents identified in sub-objective 1B on TPB population infecting wild hosts and crops in the Mississippi Delta (Blackman, Portilla, Parys, Luttrell).

Bryce Blackman is taking lead on the research outlined in the two sub-objectives under the Objective 2. Patches of wild host growing on field borders and ditches have been identified. NI8 application was initiated and some sprayed plots paired with untreated plots have been established. New plots will be identified and will be sprayed throughout the year.

Randy Luttrell requested to enquire about the possibility of producing NI8 by commercial companies.

Filed experiments of 2016 and priority for *B. bassiana* use were discussed. Nathan Little will continue with a second year experiment of *B. bassiana* application in large sprayed and unsprayed field plots against commonly used insecticide regimes. This study began in 2015 using 1,384 g of pure spores of NI8 from Portilla's stock. Portilla will provide about 1,200 g of NI8 for this research to be continued in 2016.

The next meeting for the Bt project will be the second Tuesday of October 2016.

Summary of the TPB Project (Alternative Approaches to Tarnished Plant Bug Control) Team Meeting held on Tuesday August 16, 2016.

Meeting started at 10:00 am with participation of Bryce Blackman, Randy Luttrell, Katherine Parys, O. P. Perera, Jeff Willers, and Maribel Portilla.

Current TPB project term: December 4, 2015 to December 3, 2020.

Randy Luttrell welcomed Dr. Jeff Willers who has joined SIMRU as a Research Entomologist. Luttrell made a short explanation on how our current project assignment changed. He mentioned that Jeff Willers will be covered the vacant position and 50% of his time will be assigned to the TPB project, Portilla's time increased 10% and Parys' decreased 24%. Maribel Portilla made a brief summary to inform Jeff Willer about APHIS regulations for experimental plots 10 acres or less and EPA regulations for large-scale experimental plots. Her updates were based on previous information obtained from APHIS, Pest, Pathogens and Biocontrol Permitting. All attendees still agreed that this regulation would consume our project funds. Portilla mentioned that no final information has been obtained yet from EPA about the cost of the permit for large-scale use. She finished her updates stating the total production (7 k) of technical powder of *Beauveria bassiana* that was produced the year of 2016 at SIMRU and NBCL.

Next discussion was focused on the project goals set by milestone tables.

Maribel Portilla is taking the lead in research outlined in the sub-objectives 1A and 1B under the Objective 1 (See Summary TPB Meeting 4-12-16). Several thousand of TPB adults have been collected from different locations within the Mississippi Delta. The impact of biological control (microbial and parasitoids) on TPB seasonal abundance have been identified and quantified for 2015 and 2016. New microbial agents have been isolated from field samples in 2016. Enough data for adults and fifth instar nymph were collected in 2015 and for third and fourth instar nymphs were collected in 2016 for life table constructions. Data for first and second instar will be collected in 2017. Field samples of microbial isolated from feral TPB population from 2015 have been cultured and single spores have been stored for codification. The coded samples will be given to OP Perera who is taking lead on the last part of the research outlined in the sub-objective 1B.

Jeff Willers will take the lead in the research outlined in the sub-objective 1C under the Objective 1, which was led by Katherine Parys. However, Parys will continue working with Dr. David Hall from The Natural Resources Institute, University of Greenwich, UK who is providing the pheromones for her research. No field studies were done for the sub-objective 1C in 2016. Parys will continue leading the stable carbon isotope analysis for 2016. Parys indicated that the data of 2015 was presented in Brazil at the International Cotton Conference in May of 2016. The 2016 population of TPB is being processed.

Bryce Blackman is taking lead on the research outlined in the two sub-objectives under the Objective 2. Blackman mentioned that different host plants have been targeted at different times of the year. Fifteen applications of NI8 with concentrations of 6×10^{12} have been applied on

patches of wild host growing on field borders and ditches and on crops (sorghum, soybean, and corn) during 2016. Sprays (using back sprayers calibrated to deliver 10-20 gpa) have been done on plots paired with untreated plots. Number of plot per application depended upon area availability. Portilla explained that TPB adults and nymphs, in addition to other arthropods collected from 20 sweeps per plot are brought back to the laboratory (0, 5, 10 days after spray) where they were held on artificial diet for observation and survival. Mortality and infection has been analyzed and applications will be continued throughout the end of the year 2016 and January, February, and March of 2017 if possible.

Portilla mentioned that Nathan Little finished the second year experiment of *B. bassiana* application in large sprayed and unsprayed field plots against commonly used insecticide regimes. Portilla provided about 1,200 g of NI8 for 2016.

General ideas about future large-scale field experiments were discussed. It is uncertain at this time if we will be able to complete objective 2B under objective 2. Requirements from EPA about the large-scale application are the main obstacles.

The next meeting for the TPB project will be the second Tuesday of February 2017.