**2025 - NC246 Conference, Hampton Inn, Pensacola Beach, FL
Brief Summary of Meeting Minutes
January 21-23, 2025**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Tuesday, January 21, 2025: In person – 35, Online - 10**

**7:35AM – Introduction by local arrangements team (Paula-Moraes)**

**7:42AM – Introductions (Seiter)

7:46AM – Call for next secretary and next meeting location (Seiter)**

**7:48AM – Administrative Update (Ruberson)**

* IPM labs renamed AgInnovation Centers
* SAES-422 Annual report due March 25, 2025 (60 day after meeting)
* Excellence in Multistate Research Award due February 28, 2025

**8:08AM – State Reports**

* **Texas:** Pat Porter/Jose Santiago Gonzales (TAMU)
	+ Corn leafhopper is emerging issue in vegetative stage corn in valleys. Efforts are aimed at monitoring populations with sentinel plots starting next week, and evaluating prevalence of resistance to Cry toxins. Corn leaf aphid causing up to 30% yield losses in some fields. Appearing in other states like Indiana, Illinois, and Michigan. Biological control is abundant in infested fields.
* **Louisiana:** Fangneng Huang (LSU)
	+ No report of surprising or emerging pests. Bt resistance monitoring in corn did not yield any surprises.
* **Mississippi:** Mike Caprio (MS State, information touched on in talk)
	+ Modeling resistance of Lepidopteran pests to Bt technology*.* Develop a resistance hazard map for the US based on county level crop distributions
* **Alabama:** Alana Jacobson (Auburn)
	+ Monitoring for corn leafhopper. Plant pathologist found corn plants in a garden in S. Alabama that tested positive for spiroplasma pathogen. Unknown how widespread it is.
* **Florida:** Silvana Paula-Moraes (UF)
	+ Galen’s sentinel plots, looked for ECB – did not find anything. Saw experimental plots with high corn earworm infestations which was odd for time. Used hydrogen isotopes to evaluate migration of CEW and FAW, with particular response to hurricanes. Identified signs of reverse migration by CEW.Detecting CEW populations introgressing with H. armigera in Colorado.
	+ As Endangered Species Act Liaison to EPA, Science Policy page article published that discusses restrictions of pesticides. Report includes Endangered Species Act information and list coming changes for chlorpyrifos and herbicide plan.ological testing has been completed, mitigation measures including herbicide plan has been published
* **Georgia:** David Buntin (UGA)
	+ Corn acreage down due to prices and trouble with pollination due to heat. Corn leaf aphid and corn leafhopper abundant in late planted crops. Galen’s sentinel plots - found no earworms in Vip corn treatments. CEW was huge problem in sweet corn, resistance has been documented elsewhere, typically use pyrethroids except they failed this year. All registered products not providing effective control. Pressure in field corn moderate, same with fall armyworm.
* **South Carolina:** Francis Reay-Jones
	+ Galen’s sentinel plots – Vip is working great. Bt working well in field corn. Unusually high earworm pressure early in season, not typical. No CEW in traps. FAW not a problem in timely planted corn. Did get 50% infestation in late planted corn (June). Bt traits are looking good. Stink bug still major pest – not major issues last year, very patchy distribution
* **North Carolina:** Dominic Reisig
	+ Really bad drought in coastal plain, flooding in western part of state. Brown stink bug is significant pest – appears early, becoming more abundant over time. Injury occurs right before tasseling, during ear formation. Seed treatments control stink bugs during seedling stage. However, damage is often done before you know it. WCR was everywhere in western part of state and surviving on all Bt traits, but impacted by RNAi. Very few ECB.
* **Virginia:** Tim Bryant (VT)
	+ Started position in August. Bad year for corn with droughts – harvested enough to get insurance claim. Few insect problems, mainly stink bugs. Galen’s sentinel plots – observed no larvae or injury in Vip plots
* **Delaware:** David Owens (UDel)
	+ Fairly dry April and May. Some slug reports in NW part of state. One report of significant cutworm activity in organic field corn, had to be replanted. Survey found that half of corn is irrigated, nearly all will receive fungicide, 90% mixed with insecticide. No stink bug in late terminated small grain cover crops. Little to no ECB in pheromone traps.
* **Maryland:** Kelly Hamby (UMD)
	+ Growing season started really wet, then very dry and hot. Western MD, worst slug year in 20 years. Corn yields were low regardless, difficult to distinguish between slugs and weather. Very little corn borer pressure. Collaborating with FL to trace migration, and VT to promote natural enemies of CEW.
* **Connecticut:** Kelsey Fisher (CAES)
	+ Found evidence of ECB in all traits planted in a sentinel plot trial. Surveying farmers to understand management practices and ECB resistance. Overall, low ECB numbers and low resistance detected.
* **Massachusetts:** Erik Dopman (Tufts)
	+ Evidence of ECB in popcorn around Boston. ECB heavily infesting areas of Hudson Valley in eastern NY. Has surveyed populations over number of seasons so far, mainly from sweet corn. Found no evidence of ECB in upstate NY.
* **New York:** vacant position
* **Kentucky:** Raul Villanueva (UK)
	+ Drought lasted end of June to mid-July and affected corn yields. Corn leafhopper outbreak was high but short lived, no pathogens detected. Corn aphids lasted for two weeks, then disappeared. Stink bug populations very low this year but increased in abundance in September. ECB very low, mainly in central KY.
* **Missouri:** Ivair Valmorbida (UM); Dalton Ludwick (USDA ARS)
	+ Corn leafhopper found, problematic in late planted corn in SW. Confirmed presence of corn stunt spiroplasma in plants and insects. Populations peaked in October, then moved to volunteer plants through November. Brown stink bugs abundant. Trying to rear CRW continuously on artificial diet. Flooding interfered with ECB project, low numbers trapped. Distribution of MCR and WCR suggests niche partitioning. Mexican possible resistant to Qrome Cry34/35 trait.
* **Nebraska:** Julie Peterson (UN)
	+ WBC numbers high in north central and northeast regions. Corn leafhopper found in several southeastern and central counties late season, Spiroplasma found in some SE counties. AMT reports published on WBC, spider mite, WCR. Research found Trichogramma successfully targeting egg masses in lab, but not adapted to dry environmental conditions in field. Looked at how irrigation and proximity to CRP land influences biological control of corn pests and confirmed lady beetles moving from adjacent habitat and eating WBC egg masses after coming in from adjacent habitat. Persistent nematodes not impacting CRW population, no reduction in feeding.
* **Iowa:** Aaron Gassmann (ISU), Brad Coates (USDA ARS), Craig Abel (USDA ARS)
	+ Erin Hodgson led ECB field day with Bayer/ISU/ARS how to sample and scout in the field. Research detected CEW introgression with H. armigera. 6 corn borer genomes now available. Very low corn borer pressure. WBC populations increasing with 571 caught in traps, but none found around trap. Plant breeding projects focused on CEW, FAW, ECB resistant - seed is available for trials. WCR larval density dependent mortality higher in Bt corn, and dose calculations assume less mortality happening. Rootworms adapting to Cry3 traits.
* **Tennessee:** Juan Luis Jurat-Fuentes (UT)
	+ CEW - Short list of resistance gene candidates identified. FAW resistance mechanism involves lack of processing and binding to 3A. Developing multiplex targeted sequencing that works very well for ECB resistance to Cry1; panel available for assessing field populations. SWCB looks susceptible to CryAB11.5(?).
* **Illinois:** Nick Seiter, Joe Spencer (UIUC)
	+ Corn leaf aphid found in 50-75% pre tassel plants, seeing more fields like this. Differences observed among hybrids. Most companies had at least one highly susceptible population. Some infestations had 100% kill off from pathogens/parasitism. Intense CRW pressure along border with Iowa where continuous corn is prevalent. Rotation variant seems to be disappearing. CRW Bt resistance - SmartStax isoline WCR had 17% survival, no different from single trait, NCR had 2% survival on SmartStax Pro. 20-40% NCR sampled had extended diapause in western part of state
* **Indiana:** Not present
* **Ohio:** Kelley Tilmon (OSU)
	+ Very quiet insect year in general in Ohio. Corn leaf aphid outbreak – light, not terrible, natural enemies and fungi took care of it quickly. Trapping network for WBC, FAW, ECB, yielded low numbers. Galen’s sentinel plots – very little pressure.
* **Pennsylvania:** John Tooker (PSU)
	+ Low insect pressure, slugs biggest concern in no-till. Worst slug year in Pennsylvania due to mild winter. Multistate project comparing slug and insect problems at 15-17 locations in Eastern US. Planting green provides benefits at controlling slugs at late and early termination times, and when not using treated seeds. Seed treatments increased weed populations in study due to combination of fungicide and insecticide interfering with weed seed predation. Early season brown stink bug damage is everywhere, after no cover crop, after leguminous cover crop, fallow rye, etc. BMSB is becoming more scarce.
* **Ontario:** Jocelyn Smith (U Guelph), Tracey Baute (OMAFRA)
	+ Slug problems in no-till and cover crops. Cutworm (black, dingy, variegated) problems in corn, canola, forages, barley. CRW pressure similar to last year. WBC slightly up from last year. Mycotoxin issues, corn borer, WBC can increase incidence. Corn borer resistance similar to 2023, pressure lower across country. Single trait resistance problems emerging in Alberta. Galen’s sentinel plots indicate ECB resistance to Vip.
* **Michigan:** Chris DiFonzo (Michigan State)
	+ Very little pest pressure. Slugs were main issue in state. Bt trait tables – checklist of trait packages, EPA registration numbers, list of events. Report changes or mistakes to Chris. Modified in last year so historical stuff (from 2006) that is not available alone is included.
* **Wisconsin:** Emily Bick (UW)
	+ Record low CRW year - flooding early season, messed with planting dates, adult populations halved, significantly less damage. Anything SmartStax suffered some damage, but less than control. Insecticides are also working. No ECB sampled. CEW is active and being monitored by pheromone trapping network. WBC major problem this year in sweet corn. Record slug damage: 65 calls just this year. SlugNet – shingle trap counting network will assess scale of problem.
* **Minnesota:** Bill Hutchinson, Fei Yang (UMN)
	+ Galen’s sentinel plots – CEW none in VIP. Seeing differences in Vip resistance allele frequency. Corn leaf hopper found in field corn grown for frost tolerance, likely contained pathogen via plant symptoms, but not tested. ECB – Cry2B2 resistance very high, Cry1 not very high, but survivors being observed. CRW populations down from excessive rain in late May/early June, primarily westerns this year. Infested field planted with Qrome with lots of lodging. Monitoring sentinel plots for ECB.
* **South Dakota:** Brad McManus (SDSU), Adrian Pekarcik (USDA ARS)
	+ Excessive rainfall in early summer. CRW – efficacy trials throughout the state, saw half node to 2 nodes damage in untreated corn. Corn borer infestation at one site – non-traited plots with prevalent larval damage. Galen’s sentinel plots – low pressure for CEW. Few corn leaf aphids but too late in season to do anything. Bt efficacy traits, holding up well in some parts of state, but not others. Genetics vary in grower fields. 18 WCR populations and their resistance phenotypes varied in susceptibility to infection by 5 different EPN species.
* **North Dakota:** Not present.

**3:45PM – Urban, rural, and historical comparisons of H. zea flight-to-light behavior (Avalon Owens, Harvard University)**

* Fewer moths are being caught in blacklight traps, and it is unclear how artificial light plays a role.
* Moth population trends differ between blacklight and pheromone traps, but decline only observed in light traps.
* Experiments indicate urban moths are less attracted to light than those in forests, and genetic studies planned to understand this change.

**4:10PM – Genome Assemblies for ECB (Brad Coates)**

* Compared genomics among ECB variants with short and long post diapause development time (Pdd) and of different pheromone strains(E and Z)
* Identified Z inversion on four different chromosomes.
* Inversion most frequent in populations that differ in pheromone strain and voltinism.

**4:30PM – Pheromone strains and voltinism ecotypes of the European corn borer moth (Erik Dopman)**

* Hypothesis: the spread of Bt resistance will be slowed by divergent selection with respect to voltinism ecotypes and pheromone strains.
* Conducted population genomic study across northeast with over 700 individuals to assess whether there is evidence for divergent selection between populations for both short and long post diapause development times.
* Most chromosome show little genetic differentiation implying substantial gene flow between strain and ecotype, suggesting either selection against hybrids can be weak in some environments, high recombination allows genetic variants to escape selection (& flow between populations), or that dispersal capacity might be high, for at least part of the population.

**4:50PM – Modeling resistance of Lepidopteran pests to Bt technology (Mike Caprio)**

* Develop a resistance hazard map for the US based on county level crop distributions
* Oviposition preferences vary for the (up to) five generations a year
* Can use Bayesian approach to probit analysis to quantify differences in LC50 values among populations.

**Wednesday, January 22, 2025: In person – 35, Online - 16**

**7:35AM – Introduction for online attendees (Seiter)**

**7:37AM – Reports of southwestern corn borer resistance to Bt technology (Pat Porter/Jose Santiago Gonzalez)**

* Southwestern corn borer with Cry1 and Cry2 resistance found in Antelope Wells and Animas New Mexico and Willcox Arizona – 5% seed blend refuge areas, small valleys isolated by desert.
* Objectives are to determine resistance allele frequencies for four Bt proteins, evaluate insecticide efficacy, and reassess life history characteristics of resistance populations.

**8:10AM – Reports of ECB resistance to Bt technology: current geographic distribution, impact, and migration recommendations for resistance management. (Jocelyn Smith, Kelsey Fisher, Dalton Ludwick)**

* ECB resistance to Bt toxins monitored by Galen’s sentinel network/split stalks, pheromone trapping network, and ECB impact on yield study
* Presence of ECB was concentrated to east coast (Maryland, Connecticut) and Canada (Winchester, New Brunswick, Nova Scotia) where contracted farmers grow non-Bt corn.
* Will continue monitoring in North America using sentinel plots and pheromone traps, and assessing populations with molecular tools, to better understand resistance occurrences.

**9:08AM – Rootworm IPM Recommendations (Aaron Gassmann), open discussion**

* Open discussion regarding IPM recommendations for CRW management across the country.

**Main takeaways:**

* Thresholds have been around for larval management and spraying adults to reduce egg laying. Recommendations are on paper, but not used in practice by farmers
* Development of Bt resistance and inconsistency in performance for traits is concerning
* Continuous corn = major challenge for corn rootworm - crop rotation, even done every 3-4 years is simplest solution. Some success in Nebraska growing sudangrass sorghum hybrids for forage.
* Recommendation to use non-Bt variety with soil applied insecticide, or use variety with RNAi and no insecticide.

**10:15AM – Bt corn summary of 12 years (Francis Reay-Jones)**

* Looked at how planting date affected levels of control by Bt traits.
* Strong negative relationship between yield and kernel injury, and limited leaf injury in Bt varieties for FAW observed.
* Yields decline with planting date, and benefits of Bt corn increase in later planting date. Although the factors responsible for increased yield are unclear for Bt.

**11:00AM – Biocontrol nematodes and rootworm management: Successes and limitations to date across the corn belt (Elson Shields, Persistent Biocontrol)**

* The addition of EPNs with failing Bt traits or a low dose seed treatment insecticide improves root growth and/or yields in plants.
* Multi-year persistence observed after single application, and root growth improved irrespective of rootworm pressure.
* Application timing can occur anytime soils are above 50F, but abundance and efficacy may be affected by host availability, timing of application, and soil features.

**2:30PM – IRM Framework Update and PIPs – Matthew Carroll (ABSTC)**

* Annual 2024 update for the Agricultural Biotechnology Stewardship Technical Committee (ABSTC) – formed in 2000, supports and promotes stewardship and acceptance of PIPs and crops of modern biotechnology include proactive stewardship and development of industry practices and standards.
* Members include Bt corn registrants (BASF, Bayer, Corteva, Syngenta) with related responsibilities for insect resistance management
* Use corn earworm and corn borer resistance monitoring via sentinel plots and follow communication processes for suspected resistance that involves ABSTC, state extension, and EPA.

**3:25PM – Insect Resistance Surveys (Graham Head)**

* Presented status of resistance in major pests to major products and emphasized concern that field relevant resistance and lab selected resistance is not distinguished in Bt trait table.
* Conduct survey where group answers questions regarding whether registered insecticides, transgenic traits, etc., are effective or not for major pests in major crops, then summarize information.
* Advantage of survey – may not have efficacy data on X pest on Y crop, then one year you have an outbreak, can pull list of products used in region and see all the results in one location

**4:10PM – Matt Carroll (Bayer) restricted**

* Presented an update on the status of resistance in corn borers and highlighted management strategies and recommendations.
* Discussed path for resistance to Bt proteins in MON 89034 and observed similar patterns for ECB and SWCB
* Preliminary findings regarding ECB resistance in Canada and SWCB resistance in New Mexico

**Thursday, January 23, 2025: In person – 33, Online - 6**

**7:30AM – NC246 Final Business (Seiter)**

* Incoming Secretary – Kelly Hamby self-nominated, unanimous approval by group
* 2026 Meeting location: either Cleveland, Ohio, or Madison, Wisconsin, likely to be held third week of January.

**8:00AM – Occurrence and impact of corn leafhopper, *Dalbulus maidis* in Texas (Jose Santiago Gonzalez)**

* Corn leafhopper is historical pest of corn in the south that is reemerging as a problem. Especially in VE-V5 corn for pathogens, and up to V8 for yield.
* Can vector Red Stunt Disease which is caused by a “Complex” of bacteria and viruses including CSS (corn stunt spiroplasma), MBSP (maize bushy stunt phytoplasma), MRFV (maize rayado fino virus), and MSMV (maize striate mosaic virus)
* Management currently relies on early planting and high rate seed treatments, especially for late-planted corn. Potentially some tolerant varieties, need screening still. Sivanto appears affective, needs testing.

**8:40AM – Insect Eavesdropper – Bridging lab research and field applications in entomology (Emily Bick)**

* Research goal is to use digital entomology to develop a fundamental understanding of insect populations dynamics, then translate this understanding into novel tools and strategies that enable data-driven agricultural decisions.
* Insect Eavesdropper - $120 per one. Utilizes Raspberry Pi program (can support 4 microphones at a time), a USB sound card and hub, and 3D printed case. Free for academic use license, but still working on data interpretation. Has been tested successfully for large and small insects.
* Future directions will focus on implicit ground truthing and fine tuning software.

**9:25AM – Natural resistance against Ostrinia nubilalis in modern corn under varying densities (Dalton Ludwick)**

* Do we have natural resistance in modern varieties?
* Pilot study in 2024 looked at ECB movement in response to different hybrids, three egg densities (0, 1 egg mass, and 2 egg masses). When 2 egg masses placed, started to see increase in tunnel length in immediately adjacent plants
* Future work will summarize and analyze data points, troubleshoot protocol, and reconduct study in 2025.

**10:00AM – NIFA updates (Erica Kistner Thomas, NIFA)**

* Provided overview and updates on funding opportunities from USDA-NIFA
* Seeking volunteers to serve on panel <https://nifa.usda.gov/about-nifa/what-we-do/panelist-information>
* Will send slideshow

**10:40AM – EPA pesticide office updates (Silvana Paula-Moraes)**

* Review of insecticides will provide update about chlorpyrifos. Accepting public comments through Feb 5.
* Report is available on website.
* EPA – final resolution will be in effect for some products, but will depend on states as some have banned products.

**10:45AM – Items for Discussion (Nick Seiter)**

* Location of next meeting, to be held week of January 19:
	+ Cleveland hotel gave clause that if weather caused event to cancel, would not be liable for room block.
	+ Madison, WI – Emily reached out to location of Madison location.

**End of Meeting**