National Association of
Plant Breeders Newsletter

April 2018

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2018 NAPB Annual Meeting

August 7—10, 2018

University of Guelph

Guelph, Ontario, Canada

Inside this issue:

Special points of interest:

- Congressional Day Visit
- USDA Statement on Plant Breeding Innovation
- Announcements of upcoming events

Meeting highlights:

- Welcome reception featuring the local band, The GMOs.
- Pre-conference tour of the Vineland Research and Innovation Centre where the highly-skilled research team will demonstrate some of their leading edge projects and breeding programs including sweet potatoes, apples, tomatoes and roses. A guaranteed highlight of the tour will be the walk-through of Vineland's Collaborative Greenhouse Technology Centre which houses the largest greenhouse, with a footprint of approximately one acre.
- Field Tours at the Elora Research Station, The University of Guelph's main agricultural field research station. Tour stops will include soybean, cereals, dry bean, corn, and Russian dandelion breeding programs, the recently completed "big data" dairy barn, and the DNA Barcoding Biobus.
- Poster sessions and 1-minute poster introductions.
- Award talks by
  - Rob Duncan, 2017 NAPB early career scientist award winner, University of Manitoba
  - John Clark, 2017 NAPB Impact Award Winner, University of Arkansas
  - Robert Allan, 2017 NAPB Career Award Winner, USDA-ARS & Washington State University
- 2018 Awards
- NAPB Banquet catered by the University of Guelph's award-winning chefs.

Find detailed program for the meeting here.

Registration is now OPEN!

Registration link

Regular and Student registration includes: All sessions, opening reception, Elora Research Farm Tour and BBQ, Lunches and Banquet.

Daily registration includes: Talks and lunch only (Elora tour and Banquet not included)

Spousal registration includes: Opening reception, Elora Research Farm Tour and BBQ, Banquet and Lunches

Important deadlines:

Early Bird Registration Discount Cutoff: May 18, 2018

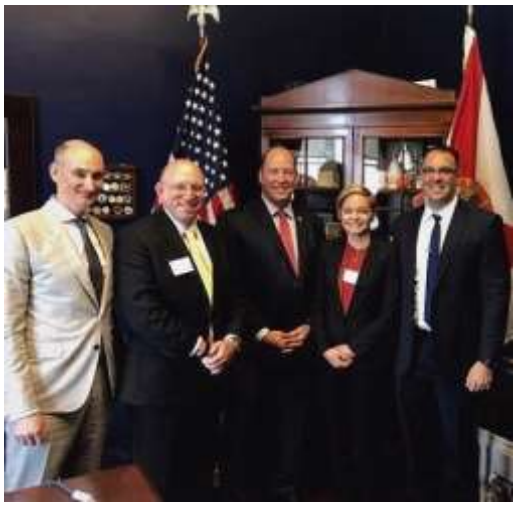
Abstract Submission Deadline: May 18, 2018

Final Registration Deadline: July 27, 2018

2018 Congressional Day Visit

"So it turns out that the government is run by a bunch of 25 year olds!" This was one of the main messages that stuck with Matt Mattia (University of Florida) and Tara Burke (Washington State University) during the initial training webinar for the 2018 Congressional Visits Day (CVD). Mattia said, "It was really remarkable that most staffers that we met with were our contemporaries and knowledgeable about agricultural research." Mattia and Burke are two plant breeding students that were selected to represent NAPB at this year's CVD. CVD is coordinated by the Agronomy, Crop, and Soil Science Societies of America. This event was created to bring graduate students, university faculty, and certified crop advisors to Capitol Hill as agricultural experts with the goal of spreading awareness and rallying support for the funding of agricultural research. This message is conveyed to legislators from every state in both the House and the Senate, along with specific "Asks" which vary from year to year depending on the political climate. In preparation for CVD, Mattia and Burke attended three training sessions, two webinars hosted by the tri-societies, and a conference call with the chair of NAPB's advocacy committee, Julie Dawson. The trainings focused on how to communicate science effectively to a general audience and the basic structure of the meetings that would occur with congressmen, senators, and their staffers. When they arrived in D.C., Mattia and Burke were paired with crop advisors, students, and college faculty from their states and were given a list of 6 to 8 meetings with representatives, congressmen, and staffers for the following day.

CVD was a whirlwind of agricultural and plant breeding discussion and back-to-back meetings that took place in the high-energy environment surrounding the capitol. Most participants were met with interest and support from staffers about agricultural and plant breeding research specifically regarding USDA's Agricultural and Food Research Initiative (AFRI) funding. Mattia and Burke were able to specifically highlight their research, discuss the importance of support for public breeding program variety development, and the training of high-quality graduate students to maintain plant breeding successes. "I was shocked with the amount of young people with no ties to agriculture that knew about the gene editing technology CRISPR and current research in citrus variety improvement" says Mattia "They have some exposure to what we do, but we were able to be the face of NAPB and reinforce some key points". Burke pointed out that "legislators seemed to be well versed on the issues facing agriculture in their respective states, which allows us to bring the importance of agricultural and plant breeding research into focus during the CVD meetings. Meetings like these are how we can keep federal funding for agricultural research relevant among the many other issues on the table". Overall, Mattia and Burke walked away with a deeper understanding of the congressional process, funding allocations, appropriations, and even some "hill jargon" that can be used to generate future support for agricultural research funding.



Above: Florida team at CVD. Far right is Matt Mattia and center is Congressman Yoho

Secretary Perdue Issues USDA Statement on Plant Breeding Innovation

Sonny Perdue is the 31st and current United States Secretary of Agriculture

On March 28, 2018 U.S. Secretary of Agriculture Sonny Perdue issued a statement providing clarification on the U.S. Department of Agriculture's (USDA) oversight of plants produced through innovative new breeding techniques which include techniques called genome editing.

"Plant breeding innovation holds enormous promise for helping protect crops against drought and diseases while increasing nutritional value and eliminating allergens," Perdue said. "Using this science, farmers can continue to meet consumer expectations for healthful, affordable food produced in a manner that consumes fewer natural resources. This new innovation will help farmers do what we aspire to do at USDA: do right and feed everyone."

Want to read the full article?

Find it here.

As USDA works to modernize its biotechnology regulations,

Under its biotechnology regulations, USDA does not currently regulate, or have any plans to regulate plants that could otherwise have been developed through traditional breeding techniques as long as they are developed without the use of a plant pest as the donor or vector and they are not themselves plant pests. This can include plant varieties with the following changes:

- Deletions—the change to the plant is solely a genetic deletion of any size.
- Single base pair substitutions—the change to the plant is a single base pair substitution.
- Insertions from compatible plant relatives—the change to the plant solely introduces nucleic acid sequences from a compatible relative that could otherwise cross with the recipient organism and produce viable progeny through traditional breeding.
- Complete Null Segregants—off-spring of a genetically engineered plant that does not retain the change of its parent.

Seed Central

Seed Central is a public-private partnership with a purpose to energize the seed and agbiotech industry cluster surrounding UC Davis and to contribute to the economic development in the region and beyond. It facilitates communication & research collaboration between the seed and agbiotech industry and UC Davis in order to bring science to market faster.

Established in 2010, Seed Central is an initiative of the Seed Biotechnology Center at UC Davis and SeedQuest, joined by a growing number of companies and organizations in the global seed and food industry.

Benefits of membership include access to the Plant, Seed & Food Science Partnership Program (PSSPP), access to DISCOVER Series and Toolkit, and access to Seed Central events that comprise of panel discussions, forums, field trips, career development workshops, career fairs and special networking events. Members also receive facilitated access to undergraduate and graduate students at UC Davis for shadowing experiences with industry researchers, dinners with R&D and HR managers, mentorship program and a chance to offer grand-prize internships during networking events. A calendar of event can be found here with listing of all upcoming events.

François Korn is one of the two founding members of Seed Central.

NAPB Webinar Series

Register today for the NAPB Webinar Series!

Register here.

The Early Career Working Group has partnered with the Education Committee to prepare a series of panel discussions this spring focused on future challenges and prospects in plant breeding.

The first webinar will be April 10 at 1PM EDT and will feature NAPB Leadership Dr. Wayne Smith, Dr. Todd Campbell and Dr. Klaus Koehler.

Register today: https://learn.extension.org/events/3385

If you have questions you'd like to see addressed in this webinar series, please submit them here.

Plant Breeding Success Story

Experimental Cotton Line with Resistance to Reniform Nematode derived from GB713 Accession

Mustafa McPherson, PhytoGen Cotton Seed Company, Stoneville, MS

Picture 1. A commercial cotton variety susceptible to reniform nematodes planted in a field near Clarksdale, MS that is heavily infested with reniform nematodes with the four rows to the left of the sign treated with Telone to control nematodes and the four rows to the right of the sign left untreated.

Picture 2. An experimental cotton line with a GB713-derived QTL for reniform nematode resistance planted in a field near Clarksdale, MS that is heavily infested with reniform nematodes with the four rows to the left of the sign treated with Telone to control nematodes and the four rows to the right of the sign left untreated.

PhytoGen Seed Company recognizes the value of the National Plant Germplasm System with regards to providing essential genetic diversity for the improvement of cotton cultivars. One of the clearest examples of this utility has been in the availability of cotton germplasm lines that were screened by the USDA, ARS for resistance to reniform nematodes. This work identified Inca Cotton GB713 (GB713) as having a high level of resistance as indicated by a reduction in reniform reproduction and better plant growth under reniform pressure. PhytoGen obtained seed of GB713 from the USDA cotton germplasm bank at College Station, TX. PhytoGen and Dow AgroSciences associated molecular markers with two quantitative trait loci (QTL) in GB713 that were closely associated with reniform resistance. PhytoGen has developed advanced transgenic lines with the primary QTL for reniform resistance and has demonstrated that these lines can be expected to suffer minimal yield loss in reniform-infested fields. In 2017, a field study was conducted at three locations to evaluate the effects of Telone fumigant on two susceptible commercial varieties and an experimental line with the primary QTL on chromosome 21 for reniform resistance derived from GB713. Averaged over the three locations, the two susceptible varieties yielded 28% higher in response to the Telone treatment, while the resistant experimental line yielded only 9% higher. The pictures above illustrate this effect at a rainfed field near Clarksdale, MS where the yield response to Telone was 67% for the susceptible varieties and 8% for the resistant experimental line.

Graduate Student Spotlight: Rachel Frank Greenhut

Rachel Frank Greenhut, a masters student at University of California, Davis.

Connect with Rachel on Linkedin here.

Where do you come from and what is your background ?

I grew up in rural upstate New York where my mother's vegetable gardening inspired me to study plant science at Cornell University. After graduating with honors in research, I moved to Naples, FL to work for Syngenta Seeds as an assistant melon and watermelon breeder. I later moved to Davis, CA and worked as a USDA biological science technician. I rediscovered my interest in plant breeding while working on crown gall disease resistance in walnut. I decided to challenge myself to better understand plant genetics by furthering my education.

What institution do you attend, and what is the focus of your research? Who is your advisor?

I am a recent graduate of the Horticulture and Agronomy Graduate Group at UC Davis. I completed my master's degree focused in plant breeding under Drs. E. Charles Brummer and Allen Van Deynze. The focus of my research was breeding baby-leaf spinach for reduced cadmium uptake. Spinach is an accumulator of cadmium, a toxic trace element. I screened over 500 spinach accessions from international germplasm collections and found wide variation in cadmium accumulation. I identified a number of candidate cadmium regulation genes in spinach and began work on marker development. The UC Davis spinach breeding program is currently working to incorporate low cadmium accumulating genotypes into elite breeding material.

What would you like to do after graduate school?

A career in plant breeding excites me because at heart I am both a scientist and vegetable gardener, and my passion is to grow beautiful, flavorful and nutritious foods. I hope to work in a breeding program where I can participate in all aspects of vegetable breeding.

What, according to you, is the biggest plant breeding challenge of our time?

I believe one of the biggest plant breeding challenges of our time is feeding the world in an ever-changing climate. In my career, I will aim to develop new varieties with resistance to biotic and abiotic stresses, thereby increasing crop resiliency.

Graduate Student Spotlight: Mitchell Feldmann

Where do you come from and what is your background ?

My passion for plant science was inherited from my father. I worked under the guidance of Dr. Noah Whiteman utilizing Arabidopsis thaliana as a host for Scaptomyza flava, an herbivorous fly, as we sought to understand the plant genetics controlling larval performance and female preference. I received my Bachelor of Science Degree in Ecology and Evolutionary Biology alongside a minor in Mathematics from the University of Arizona.

What institution do you attend, and what is the focus of your research? Who is your advisor?

I am a third year PhD candidate and a part of the UC Davis Strawberry Research Program lead by Dr. Steven Knapp. My PhD thesis aims to provide novel insights into the genetics of fruit yield, shelf-life, and flavor through the implementation of contemporary methodologies in quantitative, population, and statistical genetics. Through this research we hope to understand the limitations of genomic-enabled breeding strategies and to assess our ability to improve the flavor and nutritional content in strawberry. I collaborate with the Department of Computer Sciences and the Department of Biological and Agricultural Engineering to develop new imaging platforms to rapidly and accurately study the complete surface morphology of fruit and to understand the visual features indicative of disease status in strawberry.

What would you like to do after graduate school?

I hope to complete my tenure at UC Davis in the Spring of 2020 and move into post-doctoral positions where I will continue exploring image-based and high-throughput phenotyping in horticultural crops. I have spent much of my life surrounded by plant sciences and, as a result, I feel very much at home in research facilities and on academic campuses, where I hope to stay. I hope to continue learning from collaborators, colleagues, and students, and to also spread my passion for plant science and genetics to young people who may not have had the inspiration that I was privileged to have early in my career.

What, according to you, is the biggest plant breeding challenge of our time?

From my point of view, the greatest challenge facing plant breeders is the increasing need for collaborations of mixed disciplines. The scale of many modern breeding programs requires the affordable assessment of many tens, hundreds, or even thousands of experimental accessions in a multitude of environments. Mechanized options thus will need to be reliable, deployable, and able to assess biologically relevant traits to enhance breeding efforts.

Mitchell Feldmann, a Ph.D. Candidate at University of California, Davis in a green house.

Follow Mitchell on twitter: @MitchFeldmann

Or connect with him on Linkedin here.

Recent Graduate Spotlight: Francisco E. Gomez

Dr. Francisco Gomez works as a post doctoral research associate at North Carolina State University

Connect with Francisco on Linkedin here.

Or follow him on twitter @FranciscoEGZ85

Where do you come from and what is your background?

I earned a B.S. in Agriculture Operations Management at the University of Florida (UF). During my undergrad I worked on genome size evolution in Drosophila with Dr. Spencer Johnston and then studied whole-genome duplication in plants in the Lab of Molecular Systematics Lab & Evolutionary genetics at UF under Drs. Pam and Doug Soltis. I have always wanted to work on aspects of the applied plant sciences that have real world applications, so I decide to pursue my PhD in Plant Breeding.

What institution did you attend, and what was the focus of your research? Who was your advisor?

I attended Texas A&M University for my M.S. and Ph.D. in plant breeding under Dr. William Rooney studying sorghum breeding and genetics. My research focused on investigating the genetic architecture and identification of QTL associated with mechanical traits that are known to affect stem lodging. I also focused on developing a high throughput phenotyping platform using X-ray computed tomography to quantify important morpho-anatomical traits related to yield and mechanical traits that can be used as a selection tool in large-scale breeding program.

Where do you currently work and what are you doing?

I am currently a postdoctoral research associate at North Carolina State University. One of my projects is understanding the genetic architecture of glandless cotton in order to develop molecular tools that breeders can utilize to select plants with low seed gossypol. I am also working on analyzing deep sequencing of 52 historically important cultivated *G. hirsutum* lines in order to determine genes associated with fiber quality and yield.

What was the most important skill you gained during graduate school that help prepare you for the work force?

Being adaptable. Plant breeding is an evolving field and we must keep up with the science.

Announcements

- Borlaug Scholars Applications for Undergraduate Students are still open! Undergrads can initiate their nominations until April 11 and finalize reference letters by April 18th for the travel grant and awards program for attending the NAPB annual meetings August 7-10, 2018 at the University of Guelph. Apply here: https://agronomy.org/awards/view/206
- April 6-7: The Ohio State University Plant Sciences Symposium: Website link
- April 16th: UC Davis Plant Breeding Symposium: Website link
- April 20: Clemson Integrated Plant Science Symposium: Website link
- May 4: UC Berkeley's Plant Genome Engineering Symposium: Website link
- May 9: University of Georgia Plant Science Symposium: Website link
- Registrations are now OPEN for CUCURBITACEAE 2018: Registration link Draft program link

Stay in touch with NAPB!

Website: https://www.plantbreeding.org/

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Have an idea for a future newsletter? Email the communication committee:

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National Association of Plant Breeders
NAPB
Improving Plants to Improve Lives

NAPB: Improving Plants to Improve Lives

Our Mission: The National Association of Plant Breeders strengthens plant breeding to promote food security, quality of life, and a sustainable future.

Our Vision: The NAPB works to help create a future in which 1) Strong public and private sectors work independently and together to deliver varieties and improved germplasm to society, 2) The value and importance of plant breeding to food security, quality of life, and a sustainable future are known and appreciated by the public, and 3) Plant breeding is viewed as dynamic, problem solving, and creative. The NAPB intends to become a recognized and valued advocate for plant breeding research and education, helping to guide and implement a cohesive national plant breeding agenda.

Join us today!