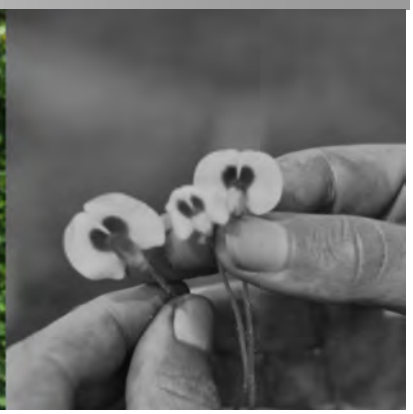
Spring 2021

Institute of Plant Breeding, Genetics and Genomics
College of Agricultural & Environmental Sciences
UNIVERSITY OF GEORGIA



2020 IPBGG Highlights

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"A pessimist sees the difficulty in every opportunity; an optimist sees the opportunity in every difficulty"

Often attributed to Winston Churchill, but likely from Bertram Carr, it nevertheless embodies a clear distinction between two outlooks.

Note from the Director—
Descriptors for 2020 that are apt but negative I will try to avoid and focus on the positive—learning new ways to connect even though we had to physically distance. Those of us in the College of Agricultural and Environmental Sciences are no strangers to distance learning, since it has long been a necessity for remote campuses in Tifton and Griffin. Now that faculty in other Colleges have been compelled to use tools for virtual learning, we may benefit in the longer term with even greater access to courses for our students who are not in Athens.

While virtual networking does not bring the same dynamic as face-to-face, our virtual retreat coffee break with random assignment to breakout rooms did bring people together who might not otherwise have gravitated towards one another. And our virtual seminar series organized by graduate students last fall engaged a spectacularly diverse and distinguished group of speakers who likely would not have been accessible in person.

In spite of some delays due to the COVID shutdown, faculty and students have shown their adaptability, resilience, and motivation to keep research going. Time away from the bench meant more time for the field, data analysis, and writing, at least for those who didn't have additional responsibilities as caregivers and K-12 teachers.

National and international meetings pivoted to virtual, saving travel dollars for better times and allowing those who couldn't afford to travel the opportunity to learn about current advances in plant breeding and biology and improve their communication skills to a broader audience. The virtual platform even allowed me to fulfil my commitment to teach part of the plant breeding course within the UGA-UNIPD dual MS program last spring. It was a rewarding experience even without the cultural immersion.

We hope to never repeat the scale of disruption experienced in 2020 but can carry forward many lessons learned including efforts to embrace diversity and inclusion.

Evaluating smut in Argentina. Although pre-COVID, the now ubiquitous mask was a safety precaution against smut spores. Smut is a devastating disease that infects peanut pods in Argentina but has not yet made its way to the US. Research on genetic resistance is high priority for this emerging disease.

Cultivar Releases

A field of breeder seed increase for wheat.

One of IPBGG's missions is cultivar development. Cultivar release committees review proposed releases and make recommendations to the Dean. Approved releases in 2020 include three new peanut cultivars, one Valencia and one runner-type from Bill Branch, and one runner-type from Corley Holbrook, Ye Chu, and Peggy Ozias-Akins. These cultivars will expand options for Georgia peanut growers and beyond.

Several soybean releases from Zenglu Li and collaborators targeted the high oleic acid market, herbicide tolerance, different maturity groups, disease resistance, and improved yield. These are anticipated to be of interest to growers across the southeastern US.

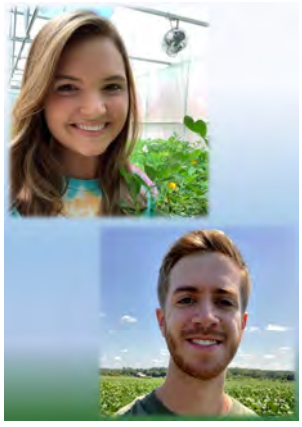
The wheat breeding program under the direction of Mohamed Mergoum, also has been very active with three new cultivar releases that offer some level of scab resistance and high-ranking regional performance.

Germplasm Releases

Pods from an allotetraploid peanut formed by crossing diploid Arachis ipaensis x A. correntina, then doubling the chromosomes.

IPBGG breeders not only develop cultivars protected as intellectual property, they also release germplasm that has been partially improved and has useful traits for downstream breeding. These materials become publicly available and typically are deposited in the USDA germplasm collection for global distribution. In this space, four synthetic allotetraploids and two cultivated germplasm lines were released through a collaboration between Tifton and Athens (Ozias-Akins, Chu, Holbrook, Bertiolis). Two additional cultivated germplasm lines were released from the joint USDA-UGA program with Holbrook, Chu, and Ozias-Akins. These materials have useful genetic resistance to diseases including late leaf spot and tomato spotted wilt virus.

Graduate Student Awards



Raegan Holton—Broadus Browne MS winner; Sam McDonald—1st place in the Soybean Workshop student poster competition.

Another essential part of the IPBGG mission is to train graduate students in the science but also the profession. The PBGG program had 43 students in Fall 2020, 60% at the PhD level. Their excellence is recognized in the number of internal and external awards received.

Ed Beasley placed 2nd in the Beltwide Cotton student competition; **Sam McDonald** (1st) and **Renan Souza** (3rd) in the Soybean Breeders Workshop student poster competition; and **Chandler Levinson** (1st) in the student competition at APRES. **Raegan Holton** won the E. Broadus Browne MS award in the College and **Chandler Levinson** was a 3MT finalist.

GSA Activities

In spite of COVID restrictions, students were very creative at finding ways to network. One was a Netflix "watch party" that provided the opportunity to socialize at a distance. Another was to sponsor a 5K "fun run" with a set date, but time tracking using the honor system.

On the professional side, since we were unable to hold our face-to-face retreat, GSA member **Alexandra Ostezan** organized a virtual professional development session with Corteva breeder, Sarah Potts. **Hallie Wright** and **Chandler Levinson** took the lead to organize a virtual PBGG poster competition that was very well attended. **Melissa Mitchum** assembled a panel of judges who provided feedback to students and selected winners in several categories.

An outstanding set of fall seminars was organized that included speakers from the Sainsbury Lab in the UK (Jonathan Jones), CSIRO in Australia (Evans Lagudah), CIP in Kenya (Jan Low, a World Food Prize recipient), and Swedish Royal Academy member, Rony Swennen. All speakers provided live lectures then spent additional time to discuss topics of interest with students.

Evans Lagudah, chief scientist at CSIRO, is internationally recognized for his research on wheat rust resistance.

Virtual Retreat

To prevent Zoom fatigue, the virtual retreat only included speakers from UGA which provided us the opportunity to learn more about research of our most recent members and of students receiving John Ingle Plant Breeding Innovation Awards. Students who received research awards, which included **Katherine Catching** (turf), **Mark Miller** (soybean), and **Yasin Topcu** (tomato) were provided the opportunity to present their results at the annual retreat.

New members from Plant Pathology, **Bochra Bahri** and **Melissa Mitchum** presented on wheat yellow rust and nematode control of plant cellular processes, respectively. **Jessica Barb**, Crop and Soil Sciences, presented her incipient research on sunflower and pearl millet breeding.

Sugar beet cyst nematode on Arabidopsis roots featured on the cover of Plant Physiology. Image from Anju Verma, Mitchum lab.

Faculty Recognitions

High-quality student training is made possible through both student and faculty excellence. Faculty excellence was demonstrated by numerous awards received in 2020.

Two Georgia Seed Development Endowed Chairs were established, one in peanut (**Bill Branch**) and one in soybean (**Zenglu Li**).

Wayne Hanna and **Brian Schwartz** were recognized by the Georgia General Assembly with a resolution commending the development of drought tolerant TifTuf.

Katrien Devos was named a UGA Distinguished Research Professor for her international recognition and creative research.

Esther van der Knaap received the DW Brooks Award for Excellence in Research.

Wayne Parrott received the 2020 ASTA Distinguished Service Award.

Corley Holbrook and **Juliet Chu** received Corteva Agriscience Awards for Excellence in Education and Research, respectively.

Katrien Devos, CRSS, conducts pioneering research on several grasses including switchgrass, pearl millet and seashore paspalum.

Director, Peggy Ozias-Akins
Graduate Coordinator, Esther van der Knaap
Administrative Manager, Deborah Franco
Webmaster, Tracey Vellidis

Additional Steering Committee Members:
Zenglu Li, CRSS, Athens
Dario Chavez, HORT, Griffin
Peng Chee, CRSS, Tifton

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Plant Breeding, Genetics and Genomics *is the science of creating new and improved plant varieties that are higher yielding, more disease resistant, more nutritious, or simply of greater ornamental value. The Institute faculty actively engage in training of graduate students, the development of new crop varieties, and basic research on the genetics and understanding of crop traits important to agriculture and human kind. The Institute has a strong philosophy that modern plant breeding should be integrated with modern genomics and biotechnology to achieve maximum efficiency.*

2020 Scholarship Recipients

Hallie Wright

Chandler Levinson

The Glenn and Helen Burton Feeding the Hungry award recipient was **Chandler Levinson**. The purpose of this award is to help educate Ph.D. students and keep alive research that involves breeding food crops. The newly established Roger and Cindy Boerma Plant Breeding Excellence award recipient was **Hallie Wright**. The purpose of this award is to help support outstanding Ph.D. students whose projects are involved in plant breeding and genetics; to motivate graduate students to create plant breeding innovations; and to pursue a career in plant breeding and genetics.

John Ingle Innovation Award Presenter Topics

Left: Phenotyping disease resistance to dollar spot on Seashore paspalum. Research of Katherine Catching

Right: Research into semi-determinate growth habit is important for soybean breeding in the southeast. Marker-assisted selection for growth habit is now a possibility. Research of Mark Miller

Above: Diversity in tomato holds promise for introducing genetic resistance to blossom end rot in cultivated types. Research of Yasin Topcu

Front page: While peanut is self pollinating, flowers also display UV-reflective patterns that likely attract bees. Research of Chandler Levinson

Screening for smut resistance of peanut in Argentina. The disease has not yet been reported in the US.