

TEXAS A&M PLANT BREEDING BULLETIN

October 2012

This month's bulletin is again devoted to students who recently completed an internship experience with industry. The faculty members at Texas A&M Soil and Crop Sciences Department and the Horticultural Sciences Department have a long history of encouraging undergraduate students to experience an internship. However, we do not have that history with our graduate students but I think that the stories of the students below will suggest that we, and others, might want to rethink that issue.

Laura Masor - The application process for an internship with Monsanto was quite easy. The online application consisted of filling out a form and submitting a resume, which I did sometime in November. A few weeks later, a Monsanto representative contacted me and inquired about my crop preference. Fruits and vegetables are my passion, so she agreed to forward my resume to the breeders at the Woodland, California Seminis-Monsanto site. In January, the fresh market tomato breeder, Dr. Douglas Heath, contacted me. After a brief conversation, he offered me the position. The agreed start date was May 21st with an end date of August 10, 2012.



Fortunately, two of my friends and fellow Aggies also were interns at Seminis-Monsanto in Woodland. This made planning for a three month trip away from home a bit less unnerving. After driving for a couple of days, Juliana Osorio, Sarah Turner and I arranged our scarce furnishings in our small rental house and became anxious about our first day as interns at Monsanto Corp.

Our first days at the Monsanto site were spent mostly together as we sat through orientations and safety meetings. Through these meetings, we met people who worked in various aspects

of the company and with different crops. After a couple of weeks on site, we began to progress into our individual roles with the aid of our supervisors and other research associates.

My supervisor, Dr. Heath, had been with the company since it was Petoseed in the 70s. He had experienced the evolution of a seed company and of vegetable breeding practices and politics. The combination of his knowledge of plant breeding, tomato germplasm, and genetics along with his personality, made him a great mentor.

Dr. Heath set multiple goals for me. These goals included broad goals such as being able to understand the various aspects of a large seed company, and more crop specific goals such as understanding why grocery store tomatoes are tasteless. In addition, I was also given a small independent research project, results of which I presented at the end of my internship.

In order to achieve the level of understanding desired, I spent many hours in the greenhouse and field observing and discussing tomatoes with my supervisor and his research associate. The three month time period from late May to early August, allowed me to witness large scale field plantings and harvests. Sarah, Juliana and I also visited with breeders of other onsite crops such as squash, pepper, onion, melon, and watermelon. We toured their programs, and learned of the various demands, challenges, and rewards of working with these commodities.

While in California, we took day and sometimes weekend trips to see the local attractions. The first weekend found us at the annual Knight's Landing Gourd Festival where we cooed at cucurbits in all shapes, sizes and colors. We also watched whales around the Farallon Islands near San Francisco, took a cruise to the Emerald Bay of South Lake Tahoe and had a bear scare in Yosemite National Park. We ventured one Saturday to Santa Rosa, only an hour's drive from Woodland, to visit Luther Burbank's estate. We paid the 7 dollars for a guided tour of his home and small breeding grounds. It may be the best 7 dollars I ever spent; it was amazingly inspirational!

In summary, the three months that I spent as an intern with Monsanto were truly rewarding. I learned the ins and outs of fruit and vegetable seed production, along with many life lessons. I met exceptional people, who I plan to keep contact with throughout the future, as well as strengthened my relationship with two fellow Aggies. This internship served as a long-term two way interview between Monsanto and myself, with the result being that I now know that

if an opportunity to be employed by Seminis- Monsanto were to arise in the future, I would gladly take it.

Juliana Osorio - The internship was a 10-week program in Woodland, CA, from May to August with the Monsanto-Seminis vegetable division. I worked with the Cell Biology group on improving the melon breeding systems by identifying means to affect genotypic frequencies and improve agronomic characteristics. During the 10 weeks, we were exposed to different activities

within the vegetable division. After the orientation, most of the time was devoted to developing and collecting data for the project that was assigned for the internship. Even though it seemed not to be enough time, we were able to meet with the tomato, squash, melon, mid-day onion, hot peppers, and watermelon breeders to learn about their programs and



their breeding objectives. At the end of the internship we were required to present the results of the project to the Internship Program and to the people in the vegetable division. The internship program at Monsanto is an excellent experience to gain exposure to the process of research and development of breeding in the industry, which is in my opinion, is very different from academia. It is also a great networking opportunity to establish professional contacts and for future job opportunities.

Sarah Turner - Over the summer, I was

fortunate to intern at the Monsanto vegetable breeding site in Woodland, CA. I interned with Dr. Terry Berke, who is the senior hot pepper breeder on site and a fantastic mentor. My project for the summer focused on fine mapping powdery mildew resistance in a BC4F2 pepper population, but Terry ensured that I also was involved in many facets of the breeding program, which included everything from updating seed inventory to



harvesting and quality measurements. I even had a chance to meet with local growers, where I learned how to ask meaningful questions and translate grower needs to practical breeding objectives.

As plant breeding students, we often hear about the pros and cons of industry, but it was truly remarkable to witness the efficiency of a breeding program at the industry level. Working in an industry setting really brought home the importance of effective communication, which is essential for such a large operation to be successful. The division of labor in industry is such that various departments run different stages of an experiment, and communication between departments is key. This was an adjustment from graduate school, where the students are responsible for almost every task related to their project.

This internship was also a great opportunity to network. Laura, Juliana, and I met with all of the breeders on site and received tours of the onion, tomato, pepper, melon, watermelon, and squash breeding programs. The transition from graduate school to a career can be an intimidating concept, so it was especially nice to meet with the newer breeders, who gave us insight into starting a new breeding program. Most importantly, I realized that I genuinely enjoy plant breeding. Perhaps the most amazing moment of my internship was standing in the field next to a pepper plant, which, despite being covered in powdery mildew-laced bindweed, was perfectly healthy.



Julie Rothe - I spent three months this summer working at the Monsanto corn breeding site in Flora, Mississippi. I chose this opportunity to strengthen my field breeding experience and to learn about breeding a different crop than my dissertation research. During my internship, I took part in corn breeding activities from pollination to harvesting. I learned about the many traits on which corn breeders collect data, such as foliar/ear

diseases, ear height, flowering time, stay-green, etc. I was impressed with the rigorous regularity that the Monsanto breeders walk fields to take notes on these traits and to rate their breeding lines. While at the site, I also conducted my own project and wrote a report about the correlation of pollen's viability to the time of day released and the surrounding climatic conditions. The Flora location is Monsanto's newest corn breeding site at only two years old, and thus I also learned of the unique challenges faced by breeders at a completely new breeding site. I had the opportunity to visit other Monsanto stations in Scott, Leland, and Winterville, MS with research activities in cotton, chemical testing, and biotechnology, respectively. Overall the experience was an excellent opportunity to learn first-hand what life is like as a plant breeder in industry, a perspective that will serve me well as I decide whether to go into industry, academia, or the government as a plant breeder in the future. Also it was a fantastic opportunity to be able to connect so many of the ideas that I had learned about plant breeding in the classroom to the actual practice of breeding out in the field.

Eng Hwa Ng – The Monsanto fellowship program is a unique partnership between

Monsanto and several land grant universities to help promote plant breeding due to the growing demand for young breeders. First initiated in 2009, the fellowship program has benefited a total of 59 graduate students in breeding at North Carolina State University, University of Wisconsin, South Dakota State University, University of Illinois Champagne-Urbana, Texas A&M University, Michigan State University, and Iowa State University. As part of the fellowship program, graduate fellows are given the opportunity to participate in the "Guest Scholar Program" to gain hands-on experience in breeding under a corporate setting without actually going through the hiring process. Each guest scholar experience is unique based on the students' interests and availability of Monsanto breeders to facilitate. So

far, three graduate fellows from Texas A&M have benefited from the guest scholar program: Francis Beecher (Summer, 2011), Eng Hwa Ng (Summer, 2012—5th from right in picture below) and Julie Rothe (Summer, 2012—above).



I began my Ph.D. at Texas A&M University in spring of 2010 under the supervision of Dr. Wayne Smith. My dissertation research revolves around improving upland cotton fiber elongation and more specifically attempts to understand the combining ability and breeding behavior of this trait through the use of multiple and diverse genotypes via a diallel and generation means analysis study. During the summer of 2012, I participated in the guest scholar program in Williamsburg, IA under the direction of Dr. Gary Stangland. Dr. Stangland, an Illinois native and Iowa State graduate, has over 30 years of commercial breeding experience in hybrid corn. Throughout his professional career, he witnessed and facilitated the merger of the former Dekalb seed company, into the now multinational Monsanto. During my summer with Dr. Stangland, I learned about commercial hybrid corn production as part of the Monsanto breeding pipeline and how breeding is performed in an industrial setting. As other guest scholars before me, I was charged with various field data

collecting tasks, data analysis, pollination, and a personal project investigating induced flowering delays for hybrid production. Since the Williamsburg site is considered one of the larger corn breeding sites for Monsanto, I had the opportunity to interact with many other breeders in charge of different parts of the breeding pipeline, such as trait integration, inbred development, trait discovery and seed production. As everyone knows, 2012 was one of the worse drought years on record in Iowa and this extreme drought revealed production hazards not encountered in a typical growing season, including, but not limited to, drought stress and root worm pressure. Given the opportunity to visit with some local farmers with Dr. Stangland, I gained insights into some challenges ahead for corn breeders. Moreover, I was fortunate to have the opportunity to contribute to the alleviation of production risks for corn producers by collecting some valuable drought data and making selections on some of the breeding materials.

Other News

Reminder: NAPB Annual Meeting, 2-5 June 2013 in Tampa, FL

Visit <http://www.plantbreeding.org/napb/Meetings/pbccmeeting2013.html> for information on the seventh annual meeting of The National Association of Plant Breeders. The annual meeting is an opportunity for breeders and allied scientists to stay updated on recent innovations in plant science and to discuss public policy issues relevant to plant breeding. The meeting also provides an important venue for graduate students to present their research, meet with potential employers, and become acquainted with plant breeding graduate students from other universities. This year's meeting will be hosted by the University of Florida.

Please direct comments concerning this bulletin to Wayne Smith, cwsmith@tamu.edu or 979.845.3450.