



Week 13: Empire Farm Days

Posted on **August 13, 2015** by **Jonathan Hunn**



— Empire Farm Day Welcome Flag.

This week I volunteered at Empire Farm Days located in Seneca Falls, NY. Empire Farm Days is the largest agricultural exposition in the northeast, featuring the newest and latest technologies, demonstrations, and exhibits to help farmers succeed. This event attracts thousands of individuals across the East Coast, ranging from Massachusetts to Florida.

For Empire Farm Days, I assisted Emily Staychock, a CCE Educator from Yates County, with the CCE Invasive Species Program exhibit and interacting with the public. Throughout the day, many people approached us with questions and anecdotes about



— Cornell University exhibition barn.

knapweed and swallow-wort, the two invasive plant species that I worked with this summer. Many farmers approached us with specific questions about how to control or remove knapweed from their open fields. For example, one man told us how knapweed has completely invaded his 40 acre hay field, which has severely reduced the quality of his hay. Since the knapweed has reduced the quality so much, it's been difficult for him to sell the hay and is creating a financial strain for his family.

Hearing these people's heart-felt stories about invasive species in person was a powerful experience for me. Ever since I've been working with invasive species, I've merely read about how invasive species can displace crops causing "economic and social" impacts; which for me never quite captured the full extent of how much invasive species can impact one's life.

However, standing in front of them and listening to them talk about how invasive species is taking over their land, I can hear the exhaustion in their voice, see the frustration in their eyes, and feel their disappointment as they try to fight the invasion. For me, hearing their stories in person helped me see and feel the impact that invasive species can have on the community.

Overall, I'm very grateful and delighted that I had the opportunity to volunteer at Empire Farm Days. It was a great learning experience for me. Furthermore, it reinvigorated my interest to pursue a career in invasive species management and to help the members of our community in their struggles against invasive species.

invasive species, such as wild parsnip, emerald ash borer, late blight, and giant hogweed. Working alongside Emily, I learned much more about the current status of invasive species within New York state and different career paths in the field of invasive species management as well.

The most noteworthy part of the day for me was that many people approached us with concerns about



— Emily Staychock and I tabling at the CCE Invasive Species Exhibit.

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Week 12: Out in the field

Posted on **August 9, 2015** by **Jonathan Hunn**

Last week, I traveled with the USDA Agricultural Research Service to collect field data on meadow knapweed (described in my second blog, “The Pilot”) at a nearby private farm. This Fall, the USDA ARS and Cornell University will commence a long term study on meadow knapweed demography and populations around New York State. The purpose of the study is collect field data to determine demographic properties of New York populations of meadow knapweed and parameterize a matrix model for invasive species managers. This work is important because providing more information for invasive species managers means they can make better and well-informed management decisions.

For this field visit, the USDA conducted a randomized survey of the field site using quadrats, collecting data on plant height, number of flowers, and number of young seedlings in a given square meter. Additionally, they collected voucher specimens for genetic analysis. Since meadow knapweed is a hybrid of black and brown knapweed, the researchers are interested in comparing DNA sequences between the three species and connecting those sequences to phenotypic traits expressed by each the species.

Overall, I learned a great deal about the complexity and extent of conducting field studies of invasive species and I look forward to continue doing so throughout this upcoming week.

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Week 11: Stone Barn Farm

Posted on **August 2, 2015** by **Jonathan Hunn**

This week I had the pleasure of traveling with Dr. Chuck Mohler for his organic farming workshop at Stone Barn Center for Food and Agriculture, a nonprofit farm and education center outside of New York City. Dr. Mohler is the founder and Project Director of the Cornell Organic Cropping Systems project, a large multi-experimental investigation of organic farming and co-authored books on organic farming.



— Stone Barn Center

demonstration of a flame-weeder. His organic farming workshop is part of the center's Growing Farmers Initiative, which aims to increase the number of sustainable small and mid-farm size farms in the North East and provide the next generation of farmers with the knowledge and experience to create resilient farm-businesses.



— Dr. Mohler demonstrating his flame weeder.

Personally, I had a great experience at the Stone Barn Center. I met and talked with young local farmers, who were either inheriting their family's farm business or starting their own! Furthermore, I learned important information

At Stone Barn Farm, he presented and conducted exercises on weed management and ecology, which included a group exercise focused on developing a long-term weed specific removal plan and a



— Observing the center's organic farm plot.



— Weeds that have been flamed.

about the organic weed management, such as the different types of cultivators, cover crops, and various forms of weed reproduction. On our tour of the center, I learned about Stone Barn Center's relationship with universities and corporations, which includes testing new strains of crops and engineering new farming technology for them.

Overall, I had a great time at the beautiful Stone Barn Center and learned a great deal of useful information from Dr. Mohler. I look forward to more learning experiences in my last few weeks of this internship.

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Week 10: National Weed Science Contest

Posted on **July 25, 2015** by **Jonathan Hunn**

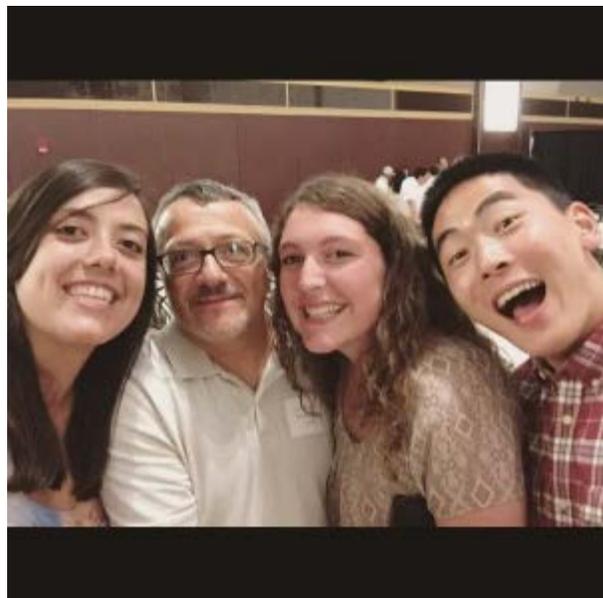
The best word to describe this week is: weeds.

This week, the other interns and I participated in the 2015 National Weed Science Contest in South Charleston, Ohio with Dr. Toni DiTommaso and his staff as our coaches. The Weed Science Contest is an annual contest that calls forth undergraduate and graduate students from across the country to put their weed science and agronomy expertise to the test. So what does the Weed Olympics entail? The Weed Olympics is comprised of four parts: weed identification, sprayer calibration, identification of unknown herbicides, and a farmer problem simulation.

According to Dr. DiTommaso, several colleges are quite competitive and have their students studying and practicing for this contest several months in advance. Although it's important for his students to compete, Dr. DiTommaso stressed that his goal for participating in weed science competitions is not to win, but to use it as an educational tool and networking opportunity. Looking at the contest from this viewpoint, students, who may not come from an agricultural science background, can be encouraged to explore and immerse themselves in the culture of weed science. For instance, our undergraduate team consisted of students from biometry, communication, entomology, and even engineering! By participating, I met and talked with several students from other universities such as Penn State, Arkansas, and Kentucky and gained a deeper understanding of the types of problems farmers face everyday. The type of problems can range from over-saturated soils to herbicide resistant plants to even poor application of an herbicide.

For me, the most valuable part was gaining a deeper understanding and insight of how natural resource management relates to agriculture. As a student of Natural Resources, I'm learning how intricately complex commercial agriculture and natural resources conservation can overlap with one another. For example, agriculture can have a direct impact on the surrounding natural areas by contaminating water bodies or even reducing the species diversity through herbicide and fertilizer use. On a much broader scale, the elimination of weeds or undesirable plants in a field may actually be removing an important food source that other wildlife depend on. In the end, Cornell University did take home the 1st place trophy in the National Weed Science Competition, but Cornell

sure had a great time and learned a lot from the experience.



— Amy, Toni, Meghan, and Jon at the award ceremony. Photo Credit: Meghan Joline



— The official 2015 weed science contest t-shirt!

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Week 9: Aurora Farm Field Days

Posted on **July 17, 2015** by **Jonathan Hunn**

During my 9th week, I was pleased to attend the annual Aurora Farm Field Day with research staff. The Aurora Farm Field Day showcases cutting edge research on field crops, soil, and pest management conducted at Cornell University's Musgrave Research Farm in Aurora, attracting local farmers, agricultural consultants, and research students from around New York State. The event features farm tours, demonstrations, and presentations conducted by professors and graduate students from Cornell University.



— Looking at the tines of a John Deere cultivator.



— Demonstration of a cultivator in a plot of soybean.

I found the presentations and demonstrations interesting and informative. They discussed and highlighted the main challenges that farmers face everyday, such as nutrient poor soils, proper cultivation techniques, and herbicide-resistant weeds. In particular, I learned how cultivators are operated and properly managed to prevent damage to the crops. Furthermore, I became aware of the technological advancements in the field of agronomy. For example, I

learned about the GreenSeeker (see bottom left picture), which is a high-quality optical sensor that uses red and infrared light to measure plant vigor. By knowing the vigor of their crops, farmers can make better nutrient management decisions for their crops.



— GreenSeeker: a device used to measure plant vigor.



— Dr. Margaret Smith presentation on disease resistant corn.



— Standing in front of the Muskgrave Farm facilities.

Overall, Aurora Farm Field Day was a great experience. I gained a better insight into agricultural research by listening to the presentations and talking with professional workers in agriculture. As the summer rolls on, I will continue digging and learning about the field of crops and soil sciences.

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Week 5 & 6: Training for the Olympics

Posted on **July 3, 2015** by **Jonathan Hunn**

Week 6: July 3rd, 2015

During my 5th week, I spent most of my time writing project reports for Cornell Cooperative Extension. Therefore, I had little time for any other noteworthy activities. But with my project reports submitted, I was released from the clickety clack of my keyboard, quick double clicks from my computer mouse, and the glow from my computer screen.

This week, we started to prepare for the National Weed Science Contest, called the Weed Olympics. The purpose of this national contest is to provide an educational experience for students that can enhance their applied skills in weed science. The Weed Olympics is comprised of four parts: weed identification, written test and sprayer calibration, identification of unknown herbicides, and a weed problem solving simulation. This year's contest will be hosted by Ohio State University in South Charleston and attended by university students from across the country in late July.

In preparation, Courtney Stokes, a PhD graduate student from the Weed Ecology and Management laboratory, led the interns and I to the Cornell's Weed Garden near Caldwell Fields to practice weed identification. The Weed Garden is the home to a variety of weeds, ranging from invasive to poisonous types. Once there, Courtney taught us how to identify common weed species by their leaf shape, stems, and flowers. For example, we learned how to identify grasses by their ligules (an outgrowth where the leaf and leafstalk meet) and morning glory by their leaf shapes.

Overall, this week was very educational and helpful in learning about various weed species and I look forward to continue my training in the upcoming weeks.



— Courtney educating us about wild onions at Cornell's weed garden.

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IMAGE

Week 4: Morning Glory

Week 4: June 18th, 2015

On my fourth week, I tied up my muddy work boots, tossed my wide brimmed straw hat on my head, and drove out to Caldwell Fields. The highlight of this week was starting a new field study that focuses on ivy leaf morning glory and corn. We are interested in ivy leaf morning glory because its climbing vines can crowd out and out-compete field crops. Therefore, the goal of our study is understand how ivy leaf morning glory density may affect corn production. For this field study, the staff and I marked up and set up several test plots at Caldwell Fields and planted over 800 morning glory! As the hot sun was beating down on my less-than-fashionable but still useful straw hat, I had the opportunity to work with our lab technician and entomologist, Scott Morris. One of the most interesting parts of this week was just talking with Scott about insects that were scurrying about the muddy fields, such as ants, click beetles, and spiders. For example, I learned there exists a species of butterfly larvae that can produce ant pheromones to disguise itself as ant larvae. Having been fooled, the ants will nurture and feed these impostors until it forms its cocoon! After a long day of planting and talking about insects, we had finally completed setting up our field study for the summer. Overall, it was another nice week of the simple life.

– Farmer Jon





— Myself holding a tray of ivy leaf morning glory.



— Planting morning glory into the test plot.

June 18, 2015 by Jonathan Hunn

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Week 3: Looking through the PRISM

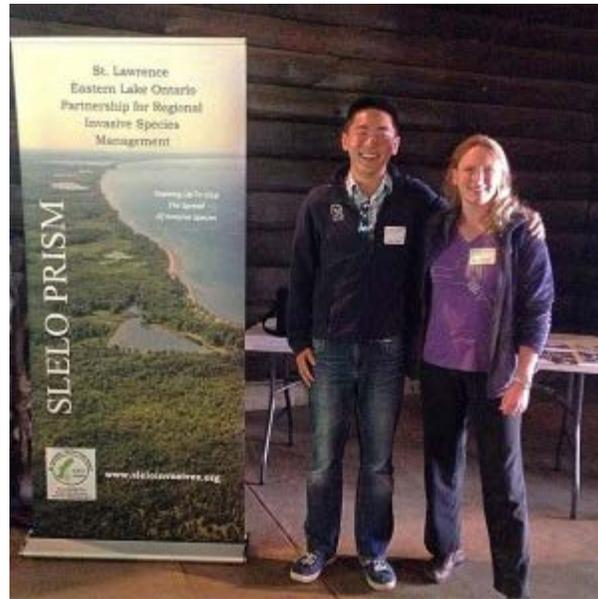
Posted on **June 12, 2015** by **Jonathan Hunn**

Week 3: Friday, June 12, 2015

This week I had the great honor and pleasure to attend the St. Lawrence Eastern Lake Ontario Partnership for Regional Invasive Species Management [SLELO PRISM] symposia with my supervisor, Caroline Marschner and intern, Kyjana Barnett! This event showcased expert knowledge on the management and post treatment restoration of habitats affected by invasive species from organizations such as the Nature Conservancy, United States Department of Agriculture, Department of Environmental Conservation, and even Cornell University (just to name a few). The presentations specifically addressed latest research and restoration work in invasive species management ranging from transgenic American chestnut trees to feral swine! My three take aways from this event are: 1) there is currently a strong emphasis and focus on adaptive management for invasive species, where management is viewed as a cyclic process rather than a unidirectional one, 2) the studies of genetics and genetic engineering is becoming more important and relevant in natural resources management (i.e. transgenic chestnut trees), and 3) Cornell University is a key partner and player in providing valuable research and support for invasive species management in the state of New York. Overall, I am very happy and grateful that I could attend this event and have the opportunity to meet and talk with invasive species managers from the Eastern Lake Ontario region. Furthermore, this event strengthened my interest in possibly pursuing invasive species management as a career

after I graduate next semester.

Finally, I wish to thank my supervisor, Caroline Marschner, for waking up quite early (6:00 AM) and driving two hours away from Cornell, just so that I could attend the PRISM symposium and have this educational experience. Thank you so much for the experience and I look forward to next week!



— My supervisor, Caroline, and I at the SLELO PRISM Symposia in Selkirk Park, New York.

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Week 2: “The Pilot”

Posted on **June 7, 2015** by **Jonathan Hunn**

June 6, 2015:

This week marked the beginning of the pilot study on meadow knapweed (*Centaurea x moncktonii*) and spotted knapweed (*Centaurea stoebe*), two invasive plants species introduced from Eurasia. What is a pilot study? It’s a small scale preliminary study to evaluate and improve upon feasibility, cost, time, sample sizes, and experimental design before conducting the large-scale study. In other words, it’s a test run.

At the moment, there are only a handful of studies aimed at distinguishing the traits of meadow knapweed.

Therefore, the goal of the study is determine how the germination and early growth of the hybrid knapweed species known as meadow knapweed (*Centaurea x moncktonii*) is different from its parental species, black and brown

knapweed.

For the first part of the study, I planted 100 meadow and 100 spotted knapweed seeds in petri dishes and then allowed them to germinate in Bradfield's growth chambers. For two weeks, I will record and document how many of each species germinate to determine the average germination time.

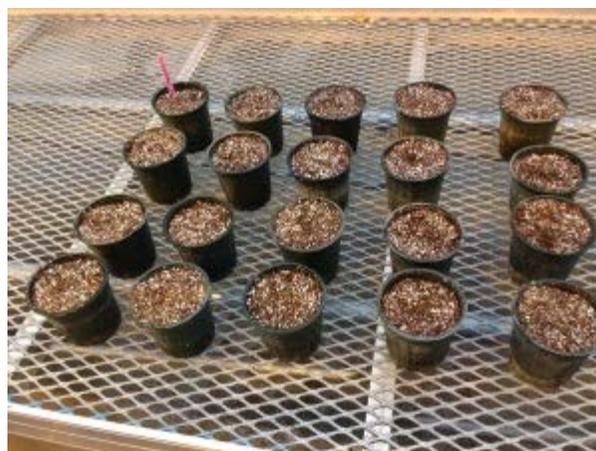


— Meadow knapweed seeds germinating.

For the second part of the study, Scott Morris, the lab's research technician, and I planted both spotted and meadow knapweed seedlings into 40 pots in the Guterman Greenhouse across from the Vet School. We aim to determine the differences in early growth stages of spotted and meadow knapweed, such as leaf size, stem height, and root length. We'll be recording the measurements into a customized data sheet and taking pictures as well.



— Potted knapweed.



— Potted meadow knapweed seedlings in Guterman.

Other than the experiments, this week I met the full research staff for the summer and learned about cool events that I can attend, such as the Eastern Lake Ontario Invasive Species Symposium and the Northeastern Weed Science Competition held in Ohio! Overall, it was an eventful and productive week! Plus, I found this humorously dramatic, but educational video about knapweed! http://www.youtube.com/watch?v=anu_FPxdF_g

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Farmer Jon: First Week on the Job

Posted on **May 29, 2015** by **Jonathan Hunn**

May 29th, 2015:

As soon as I finished my last final exam, I pulled on my work boots and drove the Ford pick-up truck to Caldwell field for my first week on the job.

For my first week, I assisted Chuck Mohler, senior research associate in the Department of Crop and Social Sciences, with his cover crop experiment. The goal of his experiment is to determine whether cover crops (such as rye and hairy vetch) influence the seed survival of agricultural weeds.

For his experiment, he has 15 field plots with rye, hairy vetch, or no cover crops (control plots). In each plot, he buried 8 mesh bags with weed seeds inside and metal washers attached to them. For this project, I helped locate the mesh bags using a metal detector that we rented from downtown Ithaca! After we collected the mesh bags, the test plots were rototilled, mixing the cover crops into the soil.

Back at the lab, we chopped up rye and hairy vetch and inserted them into half of the mesh bags to mimic the cover crops that were rototilled in the field; the other half of the bags were sent to Cornell's New York State Agricultural Experiment Station (NYSAES) in Geneva to be analyzed for seed viability. We then reburied the mixed bags back into the test plot to be collected for next year.

Throughout this week, I learned much about cover crops, experimental design, plant and tree identification, and how Chuck has been involved at Cornell University for more than 20 years! I even had the great opportunity of using a metal detector for the first time. Overall, I've had a great first week and looking forward to the weeks to come.

– Farmer Jon



— Day 1: Collecting hairy vetch from

Caldwell Field.

- Day 1: Qaiser Maqsood, visiting PhD scholar from Pakistan helping out with cover crop collection.



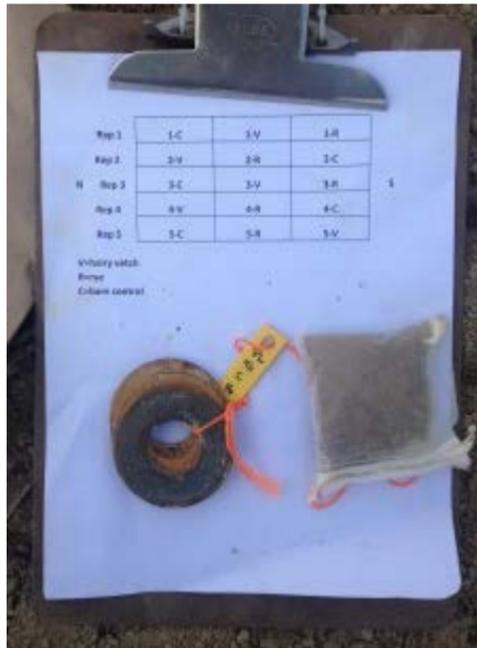
- Day 2: Chuck Mohler using the metal detector to find the mesh seed bags.



- Day 3: Rototilled test plots.



- Day 3: Inserting chopped up rye and hairy vetch into seed mesh bags.



- Day 4: Example of a mesh seed bag with metal washers and picture of the plot map.



- Day 4: Reburying the mesh seed bag into plot.

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blog preface

Posted on **May 29, 2015** by **Jonathan Hunn**

May 22th 2015:



— Cold room experiment for zebra and quagga mussel study.

I'm a senior undergraduate in the Department of Natural Resources with an interest in invasive species management. Since 2012, I've compared the distribution and clearance rates of invasive zebra and quagga mussels (*Dreissena polymorpha* and *Dreissena rostriformis bugensis*) in the Great Lakes and Finger Lakes with PhD student, Amy Hetherington and research associate, Dr. James Watkins. I am beyond thrilled and excited to expand my knowledge and understanding for invasive species management by moving my research focus from

aquatic invasives to invasive agricultural plants. For my Cornell Cooperative Extension's Invasive Species Program internship, I will be studying the germination of spotted and meadow knapweed (*Centaurea stoebe* and *Centaurea jacea* x *nigra*). I hope to better understand and identify the distinguishable characteristics of the hybrid meadow knapweed species in comparison to other invasive knapweeds throughout their growth stages. Furthermore, I will be assisting the USDA Agricultural Research Service with their biocontrol experiments for invasive swallow-worts.

– Farmer Jon

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