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Julia Angstmann¹, Brandon Sorge², Grant Fore², and Amber Rollings²  
¹Center for Urban Ecology, Butler University  
²STEM Education and Innovation Research Institute, IUPUI  

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Dana Frank¹, Michael Foley², Autumn Hockenbury¹, Kelsey Straub¹, Markos Miller¹, Jamie Huntsman-Coulter³, Jenny Fisher⁴, and Melanie Hughes⁵  
¹Indiana University – Southeast  
²University of Louisville  
³Indiana University – South Bend  
⁴Indiana University – Northwest  

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2018 POSTER ABSTRACTS

DePauw University’s Campus Farm
Malorie Imhoff
DePauw University

The purpose of this presentation is to share the narrative of DePauw University’s campus farm, a small-scale, student-driven initiative that has grown substantially over the past five years. The project has just been significantly enhanced by a $1 million alumni contribution to create the Ullem Campus Farm and Center for Sustainability on DePauw’s campus. Through the poster presentation, my students and I will share the practices we have used to increase student interest in sustainable agriculture, partner with community organizations, and provide a vibrant opportunity for increased well-being. We will also share our vision for the future and how we hope to build upon our successes.

Growing Sorghum as Local Sugar in Northern Indiana
Miguel Rodriguez and Jon Zirkle
Merry Lea Environmental Learning Center of Goshen College

Sweet sorghum production in northern Indiana is limited to a few counties, yet there are many reasons why growing a local sugar product could have appeal to the region. In 2017, three farms in northeast Indiana set out to raise sorghum together along with Merry Lea Environmental Learning Center of Goshen College. A student was hired to help with data collection, labor, and field documentation. Sorghum was harvested and processed together with shared efforts and equipment. The project was supported by a SARE farmer-rancher grant and will continue in 2018. Lessons learned thus far will be shared through this poster, and a field day will be held at Merry Lea in October 2018 for the public.

Undergraduate Courses Document Ecosystem and Community Impacts of Sustainable, Urban Agriculture
Julia Angstmann1, Brandon Sorge2, Grant Fore2, and Amber Rollings2
1Center for Urban Ecology, Butler University
2STEM Education and Innovation Research Institute, IUPUI

Colleges are recognizing the benefit of campus farms to undergraduate education, with the number of campus farms expanding annually. Despite their ability to generate informative data about the environmental and community benefits of sustainable urban farms, most campus farms do not formally assess or disseminate this information. Butler University is increasing the impact of its campus farm to urban farmers through the implementation of sustainable agriculture research modules in existing undergraduate science courses. The curriculum was designed using place-based experiential learning pedagogy, recognized to enhance content knowledge, critical thinking, and civic mindedness. More relevant to practicing farmers, the modules utilize student capital to collect data on impacts of urban farms to ecosystem and community. In fall 2017, 75 students in the Ecology and Evolutionary Biology course measured soil respiration and invertebrate abundance on the campus farm and adjacent prairie and forest to explore the impact of sustainable agriculture best practices to ecosystem health. They found that the farm had higher soil respiration and invertebrate abundance than adjacent habitat types. Additionally,
22 students from the Introduction to Environmental Studies course interviewed managers at two urban farms on their motivations in pursuing a career in urban agriculture. The data will inform best practices for specific ecological outcomes and may help farmers justify operations to funders and the communities in which they reside. Over the next year, two new courses will research carbon cycling, microbial diversity, and soil contaminants. Future endeavors will expand this approach to topics including business planning, marketing, and education.

**Early Season Production of Grafted Seedless Cucumbers in High Tunnels**  
*Wenjing Guan, Daniel S. Egel, Larry D. Sutterer, and Alexander D. Plummer*  
Purdue University

Seedless cucumber (Cucumis sativus) is a popular and high-value crop found in many local food markets. Worldwide, it is the third most important high tunnel crop following tomato (Solanum lycopersicum) and pepper (Capsicum annuum). One challenge of growing seedless cucumbers in high tunnels is low soil temperatures in the early season that suppress plant growth even when air temperatures would be adequate. Grafting cucumbers to enhance crop’s tolerance to suboptimal temperature stresses has been widely used in Asian countries. However, little information is available in the U.S. about graft compatibility, cold hardiness, and seasonal extension potential of growing grafted seedless cucumbers in high tunnels. In this study, we tested the effects of grafting with two squash (Cucurbita moschata) rootstocks (‘Titan’ and ‘Marvel’) on vegetative growth and yield of three seedless cucumbers (pickling cucumber: ‘Excelsior’; Beit Alpha cucumber: ‘Socrates’; and long-type cucumber: ‘Taurus’) in high tunnels located in USDA hardiness zone 6. Results of the study indicated that cucumber grafting can be a valuable tool for high tunnel growers to extend early season cucumber production. Without supplemental heating, grafting in conjunction with row covers can extend cucumber harvest as early as in the middle of April in the USDA hardiness zone 6, which is 1 to 2 months earlier than typical cucumber production in the area.

**Feeding Minds: Identifying Indiana’s Assets to Nourish Students and Communities**  
*Dana Frank¹, Michael Foley², Autumn Hockenbury¹, Kelsey Straub¹, Markos Miller¹, Jamie Huntsman-Coulter³, Jenny Fisher⁴, and Melanie Hughes¹*  
¹Indiana University – Southeast  
²University of Louisville  
³Indiana University – South Bend  
⁴Indiana University – Northwest

The main purpose of this grassroots, student-led project is to discover ways to counter student food insecurity on regional campuses and in nearby communities. IU Southeast received a grant from The Regional Campuses of Indiana University Grand Challenges Initiative with the goals of making Indiana healthier and smarter. The problem addressed by this research is primarily reducing and understanding food insecurity of college students, which ranges from 14-59% in the United States. An important reason to address this issue is to mitigate the negative effects food insecurity has on academic success, as well as to promote the general health and well-being of college students and local residents. Methods involved interviewing members of the community such as students, faculty, farmers, and food pantries. Information gained from these individuals will be organized through asset mapping. Researchers at IU regional campuses have learned about barriers to students obtaining and preparing fresh food, such as fruits and vegetables, or utilizing the campus food pantry. These barriers include financial difficulties, time constraints, transportation issues, dietary restrictions, and lack of awareness of food resources. Faculty and students have planned programming such as a speaker series and healthy food cooking demonstrations, providing fresh, locally farmed produce from New Roots, Inc. Community organizers’ outreach efforts have
resulted in stronger relationships between the campuses and local communities to reduce this problem. Continued efforts will grow student enthusiasm and engagement. This work can serve as a model for other regional campus efforts to overcome student food insecurity.

**Exploring Purslane as a Living Mulch**  
*KC Cifizzari and Heather Reynolds*  
Indiana University- Bloomington

This study was designed to examine the potential of using common purslane (Portulaca oleracea) as a living mulch in an organic production system. Purslane is often considered a weed although its edibility and growth properties make it an excellent candidate for use as a living ground cover. In other research, purslane performed well as a living mulch for broccoli production. Three crop treatments were utilized in this study to determine purslane’s efficiency as a living mulch for organic kale production. The treatments were classified as periodic mechanical (PM), conventional cover crop (CCC) using annual ryegrass (Lolium multiflorum), and non-conventional cover crop using common purslane (PCC). Thirty plots were arranged in a randomized block design with one replicate of each treatment per block. Cover crop seeds were broadcast by hand one and one-half weeks prior to transplanting starts of the cash crop, kale (Brassica oleracea). Cover crop plots were maintained by mowing and PM plots by hoeing, with hand weeding within the kale row as necessary to prevent weed competition. Inputs in the form of time, petroleum, and labor were recorded for each plot in order to compare net yields between treatment groups. Percent weed density as well as soil moisture content were also measured. Kale was harvested and weighed to determine marketable yield. Results showed purslane was unable to crowd out and compete with the crabgrass growing in the plots, and net yield of the kale crop was less with either of the two living mulches compared to traditional periodic mechanical management.

**New Technologies for Specialty Crop Dehydration by Solar Power in Indiana**  
*Diana Ramirez, Klein Ileleji, Ariana Torres, and Jodee Ellett*  
Purdue University

As part of Purdue University USDA-NIFA Small Farms project on “A Collaborative Study on the Feasibility of Value-added Solar Drying of Specialty Crops for Small Growers in Georgia and Indiana”, solar dehydration is being studied as value-added processing of specialty crops like garlic, tomatoes, ginger, chili peppers and apples, for small growers in Indiana. Drying crops is one of the most feasible low-cost means of reducing post-harvest losses and aflatoxin contamination. Open sun-drying is still the most common means of drying specialty crops. However, this method is not efficient and sometimes results in poor product quality due to poor phytosanitary conditions and handling losses. We will present our work on the development of simple but innovative solar dehydrators for small growers and engage with growers on the potential of value addition of sun dried fruits and vegetables.

**Ball State Student Farm**  
*Carson Wright and Jessi Ghezzi*  
Ball State University

Over application of herbicides and fertilizers is an environmental problem that’s led to herbicide resistant weeds and environmental degradation. Cover crops are a popular conservation technique. Legume cover crops can offset the application of nitrogen fertilizer. When interseeded into standing row crops, certain cover crops can help reduce weed biomass accumulation and have the potential to reduce anthropogenic inputs of fertilizers and herbicides. A study site in northeastern Delaware County was utilized in a cover crop study. Study objectives included a) utilizing a winter triticale and hairy vetch cover crop mix on weed biomass accumulation and available soil nutrients; and b) Spring planted sweet corn interseeded with red clover at varying times was utilized with the
objective to examine red clovers’ effect on available nutrients and weed biomass accumulation as well as sweet corn yield. Mehlich 3 extraction for soil analysis included potassium, calcium, sodium, and magnesium by Mehlich 3 extraction while phosphorus was analyzed using the Strong Bray method. Organic matter was determined using the loss on ignition method. Soil nitrate and ammonium was determined using the KCl extraction method with a cadmium reduction column. Weed biomass was collected in quadrats at regular intervals using a randomized block design. Statistical variance was analyzed using ANOVA. Preliminary results indicate suppression of weed biomass, indicating reduced need for future herbicides.

Ball State Student Farm: Experiential Learning at its Best!
Jessi Ghezzi and Carson Wright
Ball State University

Experiential learning has proven time and time again to provide the ultimate college experience to prepare students for careers, especially within the agricultural sector. The Ball State Student Farm is run and operated by students, with a goal to provide sustainable agricultural research for farmers while providing students an outdoor classroom. Over 400 students have visited the farm since its inception in 2016, where students learn about growing over 179 varietals of produce while performing research on cover crops for local farmers. Current research includes a variety of cover crop initiatives and student experiential learning in STEM/Agriculture. This research indicates promising outcomes for soil health and education within the field of agriculture.

Small Grower Drying Technology for Chinese Medicinal Plants
Zusongying Zhao¹,², Klein Ileleji¹, and Zhian Zheng²
¹Purdue University
²China Agricultural University

With the development of a healthy society, the demand for medicinal plants has increased in recent years. China is the country with the largest consumption of medicinal plants. Chinese medicinal plants (CMP) are commonly dried for preservation, decreasing toxic side-effects, and enabling the preparation of prescriptions used in traditional Chinese medicine. However, current open air sun-drying practices by small growers lead to poor drying and quality. Our research analyzes problems associated with drying CMP, quality requirements, and processing methods for applying simple/innovative solar drying methods for small growers.

Estimating Harvest Date for Winter Production in Central Indiana
Daniel Garcia
Garcia’s Garden

Winter production in high tunnels is a great way to maintain access to fresh local produce throughout the year. For commercial operations patrons may experience reduced switching costs with a consistent supplier throughout the year. Days to maturity for winter hardy crops increases as daylight diminishes, and for new growers estimating harvest dates is challenging. A prediction model was created to estimate days to maturity for a 40 day crop in an unheated high tunnel for Garcia’s Gardens in Indianapolis, IN. The 40 day crop is defined as one that matures in 40 days at June 1st and September 1st. Sowing and harvest data were collected for 12 years (1996-2008) at Four Season Farm, Harborside, Maine. From geographical coordinates of Four Season Farm and Garcia’s Gardens generated from maps.google.com, daylight tables were calculated from...
The total daylight hours of planting to harvest periods for each location was used to approximate location. The prediction model should only be used for sowing dates Sept 1st 2018 through May 23rd 2019. The RMSE of the prediction model is 1.4 days with an R^2 of 0.99. Predictions should be adjusted accordingly for crops with days to maturity not equal to 40. There are all sorts of variables to consider - cloud cover, shading, etc. This is just a starting point. Have fun, and do good work.

**Growing Sorghum as Local Sugar in Northern Indiana**

*Miguel Rodriguez and Jon Zirkle*

Merry Lea Environmental Learning Center of Goshen College

Sweet sorghum production in northern Indiana is limited to a few counties, yet there are many reasons why growing a local sugar product could have appeal to the region. In 2017, three farms in northeast Indiana set out to raise sorghum together along with Merry Lea Environmental Learning Center of Goshen College. A student was hired to help with data collection, labor, and field documentation. Sorghum was harvested and processed together with shared efforts and equipment. The project was supported by a SARE farmer-rancher grant and will continue in 2018. Lessons learned thus far will be shared through this poster, and a field day will be held at Merry Lea in October 2018 for the public.

**Indiana University Campus Farm**

*Kerry Ryffel, Lea Woodard, and James Farmer*

Indiana University Campus Farm

The purpose of our poster is to introduce attendees to the Indiana University Campus Farm’s history, mission, structure, and goals. The IUCF is a new initiative that has received a grant from the IU Office of Sustainability to grow organic produce for the IU and Bloomington community. Focusing on regenerative agriculture, urban farming practices, and food justice, the mission of the farm is to promote sustainable food systems education through research, creative activity, service, and outreach to the campus, community, and beyond. The IUCF is located near campus with five acres available for crop production, three acres available for pasturing, and two acres with established fruit and sap trees. With two high-tunnels already funded, we will focus on year-round, specialty crop production and may develop animal husbandry at a later date. We will sell to campus dining retailers and a farm stand, and donate to the IU campus food pantry. Once established, we plan to provide a CSA program. We will pursue organic certification and follow GAP and FSMA standards. The IUCF will foster campus sustainability through teaching, research, and service. The advanced year-round crop production facilities will provide a space for experiential learning through service-learning, class visits, and faculty or student research. Service-learning and volunteer labor will help us meet the labor needs of the farm, but we will also employ several paid students and a part-time manager. Through these opportunities, the IUCF will serve as a laboratory to engage the IU community with sustainability and teach career-applicable farming skills.

**Purdue Student Farm 2.0: Continued Growth**

*Chelsea Maupin, Avery Savage, Grace Torrence, Sabrina Myoda, and Michael Keller*

Purdue University

Food systems need reform both in the United States and around the world. Since 2010, the Purdue Student Farm's focus on experiential learning allows students to gain the education and experience required to work toward such systems-wide change. Now located just northwest of Purdue's West Lafayette campus on Cherry Lane, the Purdue Student Farm is a fully-functional operation that is both a fresh food producer and a "living laboratory". As the farm settles into its first full year at its new home, production and sales continue to grow. Currently, most produce is sold to Purdue Dining and Catering, but other markets are being explored. Even
more importantly than increasing sales, the Student Farm’s integration into curricula and student groups across campus continues to expand as the farm becomes a distinct entity and a part of Purdue Extension's Diversified Farming and Food Systems initiative. The Purdue Student Farm Organization (PSFO), the student organization affiliated with the Purdue Student Farm, believes that small-scale, sustainable farms are an essential piece of a global food supply. Students within PSFO strive to increase both their own and the community’s knowledge of sustainable agriculture techniques by acting as a link between the Purdue student body and the Student Farm. By providing a venue for students to learn, the group is investing in the future of sustainable agriculture and fostering systems-based thinking about major agricultural challenges. Individuals from all backgrounds are welcome— the only requirement is the desire to learn!

Evaluating the Participatory Approach Used to Create a Local Food Systems Course for Cooperative Extension Agents
Colleen Kelly
Purdue University

This case-study evaluated the collaborative instructional design process used to develop a graduate-level course on local food systems (LFS) targeting extension field faculty in North Carolina, Virginia, and South Carolina. Over 40 participants, organized into five interdisciplinary Planning and Advisory Committees (PACs), convened to help brainstorm, prioritize, and structure the course content and learning activities. This research more specifically sought to better understand the motivations of PAC members to participate, perceptions of the participatory approaches employed throughout, and whether this process and resulting course would help create a “community of practice” around LFS within the region. The findings suggest that the PAC members held a positive view of the process, admired the initiative, and believed that the resulting course would be an important step in enhancing CES’s ability to strengthen and expand LFS. Participants observed contrasting sides of the process; it was both inclusive and exclusive. Those invited to the table felt their ideas were heard, but noted that some in-group voices carried more impact and that not all voices were present or in abundant number. The perspectives and needs of county-level agents, farmers, and proponents of conventional agriculture may not have been given equal weight. This shifted the focus of the resulting course content. Farmers’ LFS concerns revolve around creating markets and marketing more so than creating social justice. PAC participants expressed apprehension of how the movement will integrate divergent cultural groups, farming operations, and philosophies.

Extending the Tomato Season for Both High Tunnel and Outdoor Production
Karen Carlisle
Cicero Farm Market

In 2015, weather related challenges led to productivity and yield loss at the Cicero Farm Market. Extensive rain followed by high summer heat in 2015 reduced or even destroyed much of the outdoor plantings and even negatively affected many of the plants inside the hoop house due to saturated soils. Because of the uncertainty of weather, we came up with a low cost planting technique that addresses these unpredictable weather related problems. The new techniques proposed combine aeroponics, root air layering, and root air pruning using above ground polypropylene grow bags in containers with semi-automated water and nutrient delivery system. Use of aeroponics technique, coupled with root air layering has potential to continuously generate hardy and mature starter plants on a monthly basis from mother plants. In the unheated hoop house, the growing season can start earlier with already mature blooming plants and extend yields well into the Fall beyond the first frost.
Thank you to SARE for providing educational publications to all of the poster presenters!