

Connections Newsletter

The Ohio State University South Centers, Piketon Ohio

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Aquaponics research trials being conducted at OSU South Centers. Photo by Thom Harker.

Sustainable aquaponic
co-production >>Pages 1-2

South Centers Academic Editor
received recognition >>Page 3

OSU-RIO Collab>>Pages 3-4

Gao receives specialty crop block
grant >>Pages 5-6

OCDC awarded Rural Cooperative
Development Grant>>Page 7

OSU researchers build research
capacity in Ghana>>Pages 8-9

Lumber grading training creates
opportunities>>Page 10

Horticulture program receives
USDA grant>>Pages 11-12

Peer recognition awards
>>Pages 12-13

Sustainable aquaponic vegetable and fish co-production in Ohio

**By: Brad Bergefurd, MS, Horticulture Specialist and Extension
Educator**

Producing vegetables and fish in a linked hydroponic plant and aquaculture fish co-production system is called aquaponics. Plants can use the water and nutrients from the aquaculture tank, thus reducing water and fertilizer requirements and significantly reducing waste discharges from the aquaculture system. Producing plants hydroponically and farming fish using aquaculture have their own special requirements in order to properly manage each system. When combining the two, it adds a layer of complexity for the commercial grower when systems are maintained at plant and fish population levels recommended for maximum yields. This article provides some basic aquaponic guidelines that have been developed from research conducted by the Ohio State University Piketon Research & Extension Center. *(continued on page 2)*

Sustainable aquaponic vegetable and fish co-production in Ohio(*continued*)

Aquaponic Systems

The most common aquaponic systems currently in use employ either a media-filled plant bed, nutrient-film technique (NFT), or a floating raft system for the plant growing area integrated with a recirculating aquaculture tank system (RAS) for the fish production area. Almost any type of vegetable production system can be linked to an aquaculture system, including open field production, if recycling water back to the aquaculture unit is not required. This technology is young and trialing is recommended, especially for untested systems.

Crop and Fish Choices

Any plant commonly grown in hydroponic systems will adapt to aquaponics including the most common types – leafy salad crops, herbs, tomatoes, peppers, and cucumbers. The most common aquaponic fish is tilapia, which grow well under a wide range of water quality conditions. Other fish adapted to aquaponics but requiring more stringent water conditions than tilapia are rainbow trout, largemouth bass, yellow perch, bluegill, and koi. Catfish can be grown in aquaponics but would not compete economically with commercial pond culture. Barramundi is a common aquaponic fish species in Australia and gaining in popularity in the Midwest. Barramundi grow under a wide range of conditions but are still being researched for aquaponics production.

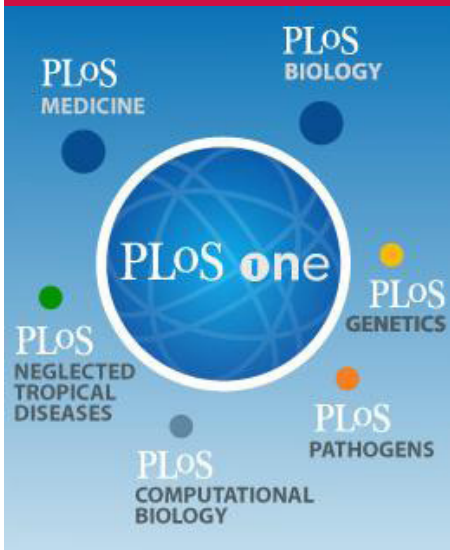
If you are interested in learning more about aquaponics and research that is being conducted, if you would like to join our Ohio Aquaponics or Horticulture email listserv, or for more information, visit the OSU South Centers website: <http://southcenters.osu.edu/aquaculture/boot-camp/introductory> or contact Horticulture Specialist Brad Bergefurd, bergefurd.1@osu.edu or call the OSU South Centers 1-800-860-7232 or 740-289-2071 ext. 132.



Aquaponics training programs are offered by the OSU South Centers.
Photo by Brad Bergefurd.

OSU South Centers Academic Editor received recognition from PLOS ONE

By: Sarah Strausbaugh, Program Assistant



Recently, OSU South Centers Senior Research Scientist, Dr. Hanping Wang received recognition from PLOS ONE for his contributions to the journal as an Academic Editor. PLOS ONE has a high impact, being the world's largest peer-reviewed science and medical journal published by the Public Library of Science (PLOS).

In 2013, Dr. Hanping Wang was selected and appointed to be the journal's Academic Editor and board member for the section of Biology and Genetics of Aquatic Animals. Dr. Wang has handled thirty-five manuscripts for the journal in the past two-and-a-half years. During this term, Ms. Joy Bauman has played an important role in assisting Dr. Wang with completion of editing the manuscripts. In addition, Dr. Tom Worley and Ms. Marsha Amlin have been very supportive to this academic service by Dr. Wang and Ms. Bauman.

Dr. Wang was invited to a recognition reception held in Baltimore, Maryland on October 7, 2015. Congratulations, Dr. Wang!

OSU-RIO collaboration broadcasts update

By: Patrick Dengel, OSU - RIO Grande Collaboration Coordinator and Business Development Specialist

OSU-RIO collaboration broadcasts are multi-media (Radio, TV, YouTube and live Internet streaming) educational shows with a host of different topics that promote small businesses, business support organizations, programs at The Ohio State University South Centers, and educational programs at the University of Rio Grande/Rio Grande Community College.

The shows air on Wednesday afternoons at the Radio and TV Studio at the University of Rio Grande. Guests include a variety of people representing educational, business development, community and organizational programs. These broadcasts are a collaborative effort of the two Universities that are hosted by individuals representing organizations and local communities, the University of Rio Grande/Rio Grande Community College and The Ohio State University. *(continued on page 4)*

OSU-RIO collaboration broadcasts update *(continued)*

The ultimate mission of these collaborative media programs is to be an educational learning lab for students enrolled in the business and communication programs at the University of Rio Grande as well as to be a promotional tool for educational programs at the University of Rio Grande/Rio Grande Community College and the business and agricultural programs of The Ohio State University South Centers. The OSU-RIO collaborative educational broadcasts assist students with understanding and using different formats of social media, including: Radio, TV, YouTube and live Internet streaming.

This educational project had its inception February 2010 using a weekly Internet Blog-Talk Internet podcast program. This program provides business majors and MBA students with experience in using different media formats as part of their entrepreneurial course work. It has been the goal to have students plan the media show schedule, schedule guests for the program, use different marketing/advertisement formats, co-host interviews, undertake the behind-the-scenes broadcasting duties, and maintain statistical information.

In January 2012, the shows began simulcasting with the Rio Grande Educational Channel 17 TV station. This public access TV program broadcasts under the Time Warner Cable System using one of the Public Educational Channels. Viewers from four southern Ohio counties can view broadcast shows live as well as listen on the Internet Blog-Talk Radio site. All completed broadcast shows are uploaded onto university YouTube channels. Consequently, all shows are archived on Blog-talk radio and YouTube video channels for viewing and listening again. According to statistics of YouTube and Internet Radio, people from over 170 countries have viewed or listened to at least one of the broadcasts and over 45,000 have listened or viewed to one of the archived shows.

These broadcasts provide subject information on varying topics ranging from interviewing people from small businesses, personnel from business support organizations, programs managers and educators with The Ohio State University South Centers, and faculty/administration on various educational programs with the University of Rio Grande/Rio Grande Community College. Different show formats include:

- South Centers Chat – hosted by Dr. Tom Worley discussing OSU South Centers Partners and OSU educational programs
- Agri-Talk – focusing in on agricultural topics in Southern Ohio
- Strictly Business – focusing in on regional small business owners
- Tech-Talk focusing on new types of technology in the educational and business worlds
- Pawsitive Learning – dog training segments
- Exposition – art and artisan culture
- Bank-Talk – financial and economic programs
- Voice of Rio Grande – hosted by Dr. Michelle Johnston, educational programs and organizations that support higher learning
- Voice of Rio Grande – hosted by Dr. Richard Sax, educational programs inside the University of Rio Grande
- Voice of Rio Grande – Hosted by Dr. Lawrence and Dr. Mitchell, Deans, interviewing faculty at the University of Rio Grande
- Safe-Guard with Police Chief of Rio – safety issues for students and individuals
- International Culture – focusing on different cultures throughout the diverse world
- Babylon Radio – featuring musical artist
- Business Talk – featuring different southern Ohio small businesses
- Chamber Exchange – Gallia County Chamber of Commerce, featuring area businesses and organizations



Row covers are an effective method of winter protection for cold sensitive crops. Photo by Gary Gao.

Gary Gao receives specialty crop block grant

By Gary Gao, Ph.D., Extension Specialist and Associate Professor

Fruit production in containers in a home landscape setting is not necessarily a new concept. However, commercial fruit production in containers is. A few production practices need to be worked out before growers can successfully adopt such a production system. Container production can be a way to minimize winter injuries. This system can also help growers get around poor soil conditions. Polar vortexes during the last two years have caused major problems to fruit production in Ohio and beyond. Effective production systems to deal with winter injuries need to be developed to help fruit growers mitigate risks. Whether we will have El Niño or La Niña during the next a few years, a reliable production is still needed to grow relatively cold sensitive fruit crops.

There are a few benefits with fruit production in containers. One of them is that containers can be moved into a sheltered area before extreme cold temperatures arrive. Fruit plants in containers can also be set on their side so that protective covers can be placed over them for winter production. Another benefit is ease of soil selection and modification. Since artificial soil media will be used, “prescription soils” can be used to meet the specific requirements of each crop. A third benefit might be higher harvest efficiency. Another benefit is season extension since fruit plants in containers can be moved to warmer environments earlier or later to speed up or delay the fruit harvest season to maximize profit margin.

We will also study the effectiveness of Chemigation (pesticide delivery through micro sprinklers) for pest management, especially those that can cause significant damage during fruit ripening and harvest season. Chemigation can save time and labor on pesticide applications while reducing fruit loss potentially caused by driving sprayers through a fruit planting. *(continued on page 6)*

Gary Gao receives specialty crop block grant *(continued)*

Our new project starts in October, 2015 and will last two years. We are very excited about this new project. We extend our sincere appreciation to Ohio Department of Agriculture and U.S. Department of Agriculture for their financial support of this new project. Stay tuned for more information.



Chemigation (Pesticide delivery through micro sprinklers) can be an effective method of pest management in fruit plantings. Photo by Gary Gao.

Welcome to OSU South Centers, Mick Whitt!

Mick Whitt is the new Manufacturing Business Development Specialist for the MTSBDC. He holds a Machine Trades Certificate from Pickaway-Ross CTC, a Business Management Degree from Ohio Christian University, as well as having nearly 20 years of experience in a variety of manufacturing facilities in production support, quality control, and management.

Prior to Mick's employment with OSU, he was a Quality Manager at a gray iron foundry that specialized in green sand molding.

Mick's professional background is in machining where he spent 15 years as a manual machinist, CNC mill operator and programmer, pattern maker, and 5s facilitator before going into quality control and management.

Mick is the newest member of the Business Development Team, and as the Manufacturing Specialist, he will be concentrating on several key areas to assist in developing and improving processes and productivity for small manufacturers:



- Lean manufacturing
 - efficiency
 - time management
 - downtime (tracking)
 - waste/scrap reduction
 - organization (5s = Sort, Straighten, Shine, Standardize, Sustain)
- Process Flow
 - New buildings, add-ons, new businesses
 - Improving flow in existing structures
- Process and Quality Control
 - Quality issues
 - Quality controls
 - Control standards (setting deviations and standards)
 - Work Instructions
- Working within the SBDC Team
 - Connecting businesses with the proper people at OSU South Centers to meet their business needs.

OCDC awarded Rural Cooperative Development Grant

By: Hannah Scott, OCDC Program Manager

The Ohio Cooperative Development Center (OCDC) at the OSU South Centers located in Piketon, Ohio, was recently awarded funding to continue providing assistance to new and emerging cooperatives in Ohio and West Virginia. The funds were awarded through the U.S. Department of Agriculture Rural Cooperative Development Grant (RCDG) program, a competitive program that provides support to cooperative development centers across the nation that work to “improve the economic conditions of rural areas through cooperative development.”

In the upcoming year, OCDC will continue to focus cooperative development efforts in the Appalachian regions of Ohio and West Virginia, particularly in industries such as local and regional food and agriculture, energy, transportation, forest and wood products, and others. The center will provide services and resource linkages based on the individual needs of clients, developing an ongoing relationship with clients to ensure their continued success.

OCDC services will include:

- formation counseling
- member education
- bylaw development
- board training and consultation
- assistance with feasibility studies, strategic plan development, business planning, and policy development

RCDG funding will also support OCDC's 2015-2016 Seed Grant program, a matching grant program that provides funds to new and emerging cooperatives to support activities such as professional services, feasibility studies, development of marketing materials, and more.

If you would like to learn more about OCDC, please contact Hannah Scott at 740-289-2071 ext. 227 or scott.1220@osu.edu.



Rafiq Islam with a group of the participants in the field workshop.
Photo by Emmanuel Amoakwah.

OSU researchers build research capacity in Ghana

By: Rafiq Islam, PhD, Soil and Water Specialist

Dr. Rafiq Islam, Senior Research Scientist and Soil, Water & Bioenergy Program Director at The Ohio State University South Centers and Dr. Warren Dick, Professor in the School of Environment and Natural Resources, Ohio State University recently traveled to Ghana from August 26- September 5, 2015 to deliver an innovative workshop entitled “Climate change, sustainable agriculture and soil health” at the University of Cape Coast.

The visit stemmed from their earlier participation in the Norman E. Borlaug International Agricultural Science and Technology Fellowship Program - a short-term research program, funded by the U.S. Department of Agriculture's Foreign Agricultural Service, which aims to address critical issues related to food security with a collaborating researcher from a developing or middle income country.

These two Borlaug programs were managed by the Office of International Programs in Agriculture at The Ohio State University. While Dr. Islam advised Emmanuel Amoakwah, a research scientist at the Council for Scientific and Industrial Research's (CSIR) Soil Research Institute in Kumasi, Ghana, in 2013, Dr. Dick mentored Kwame Frimpong, a professor in the Department of Soil Science and a colleague of Emmanuel's, shortly after in 2014. Both Ghanaian researchers completed three-month research fellowships with their respective advisors at The Ohio State University's College of Food, Agricultural, and Environmental Sciences, and are now back in Ghana applying the skills that they acquired and advancing novel research in the field of soil health and quality.

Ghana's University of Cape Coast, specifically its Department of Soil Science, hosted the two day workshop and welcomed more than 75 participants including university faculty members, graduate students, and research scientists from Ghana, Burkina Faso, and Liberia. *(continued on page 9)*

OSU South Centers researchers...(continued)

During the workshop, several field-based measurement techniques such as residue measurement, soil texture, diversity of soil fauna, available nitrogen and phosphorus, soil pH, and active carbon tests were all demonstrated to the participants. In addition, a ready-to-use soil quality analysis handbook was provided to each participant as a future reference, along with an economic and convenient field-based soil test kit, which participants were taught how to use in field sessions.



Workshop participants are learning about the soil health test kit. Photo by Rafiq Islam.

Dr. Dick presented on soil organic carbon and quality of science, while Dr. Islam delivered instruction on soil quality and sampling, and a systems approach to sustainable agriculture. One of the highlights of the workshop was a brain-storming session led by Dr. Islam to identify priority-based research needs in Ghana to sustain agricultural production systems. According to Dr. Islam, the session prompted serious, but healthy debate amongst participants on the appropriate research approaches needed to promote greater soil health in a region of the world that is directly experiencing the effects of climate change.

“Low soil fertility and climate change are already affecting Ghana’s dwindling natural resources and agricultural productivity,” says Kwame Frimpong. “There’s an urgent need for a clearer understanding and implementation of soil fertility management strategies that will promote increased agricultural productivity and food security in a socially equitable and an environmentally and economically sustainable manner.” Moreover, Dr. Islam conducted another workshop at the CSIR-Soil Research Institute, Kumasi on August 27, 2015 along with Emmanuel Amoakwah (Borlaug fellow 2013).

Both Dr. Dick and Dr. Islam, along with Rian Lawrence, an undergraduate student in the School of Environment and Natural Resources who assisted with the development and delivery of the workshop, all deemed the workshop an overwhelming success.

“It was probably one of the most beneficial international programs I have been associated with,” shared Dr. Dick, who has been engaged in international teaching and research, especially in Africa, for decades. “I definitely see this workshop style as a model for similar types of training activities in the future.”



OSU South Centers recently offered a Lumber Grading workshop for those employed in timber and related industries. Photos by Stephanie Stanley, Pike County News Watchman.

Lumber grading training creates opportunities for workforce

By: Hannah Scott, OCDC Program Manager

In 2010, the forest products industry employed close to 12,000 people in southeast Ohio and contributed over \$511 million dollars in labor income alone to the region. The importance of the forest and wood products industry to the region prompted the OSU South Centers Business Development Network, in conjunction with the National Hardwood Lumber Association (NHLA), to host two Lumber Grading Short Courses over the summer of 2015. More than 30 participants in the NHLA-taught courses learned the basics of hardwood lumber inspection and received hands-on grading training; skills that will help them as they pursue opportunities across the forest and wood products industry or work to improve their company's processes to become more profitable.

Most of the course participants were current employees of local lumber businesses; however, a few of the attendees were local high school students interested in the forest and wood products industry as a career opportunity.

Participants who successfully completed the course received the NHLA lumber grading certification; a certification that is highly regarded in the lumber industry. Previously, this training and certification was only offered several hours away from Pike County which made it hard for employers and employees to participate.

Business development specialists at the OSU South Centers worked with the Appalachian Partnership for Economic Growth (APEG) to secure reimbursement grants to cover the costs of the workforce development training through the "Make It In America" grant program. The cost of the training was covered for approximately 25 of the 32 participants through the program.

The success of both courses has prompted the OSU South Centers Business Development Network to make plans to offer the course on an annual basis and will return in 2016. You can read more about the June training in the Pike County News Watchman at <http://bit.ly/1FFe4H3>.



Strawberries in research plot. Photo by Brad Bergefurd.

Hort program receives USDA grant

By: Brad Bergefurd, MS, Horticulture Specialist and Extension Educator

Ohioans consume over 89 million pounds of strawberries annually, however, Ohio farmers currently only produce 1.8 million pounds annually (USDA, NR-15-06, 2015). The additional 87 million pounds of strawberries, currently sourced from farms outside of Ohio, has an estimated annual farm level value of \$165.3 million. Ohio being home to several food industries such as the J.M. Smucker Company in Orrville, Ohio which utilize a large portion of strawberries for their processing operations, and Sanfillipo Produce Company in Columbus which utilizes fresh market strawberries for direct as well as wholesale produce markets, there are many Ohio markets for fresh, local strawberries and growers who are able to provide an extended season crop often have the marketing edge.

Traditionally, Ohio growers have produced strawberries using the matted row or ribbon row production methods. In 2001, the Ohio State University Piketon Research & Extension Center began to pursue a new strawberry field production technique to help growers harvest an earlier crop – the plasticulture strawberry production system.

Based on the increased interest in buying locally grown and produced items, Ohio growers are investing in producing specialty crops, including strawberries, for the Ohio consumer market. However, research driven production guidelines for insect and disease management, irrigation and fertilization needed to produce strawberries for an extended season in an ecological and economically sustainable manner are lacking. Further, Ohio growers are left without sufficient resources or knowledge for connecting to Ohio markets and meeting required food safety guidelines.

For those willing to make the investment in time and resources, the strawberry plasticulture system may be a good choice for some farms. Strawberries are increasingly being planted on plastic mulch covered beds as a popular way to extend the harvest and marketing season outside of the traditional June market window, thus capturing a profit from the high demand for local strawberries. *(continued on page 12)*

Hort program receives USDA grant (*continued*)

This system allows the grower to have berries up to one month sooner than growers using the traditional matted row system. One of the main advantages of this system is a potential earlier harvest, providing a competitive edge in the marketplace relative to traditional matted row strawberry production systems. Other potential advantages include higher yield, enhanced fruit quality, less disease and increased harvest labor efficiency.

Thanks to support from the Ohio Department of Agriculture and the USDA Specialty Crop Block Grant program, OSU South Centers horticulture researcher Brad Bergefurd has received funding to conduct research and Extension programs to identify techniques that maximize strawberry production, increase harvest windows and provide winter protection of strawberries through cultural management.

For future reports or information from the strawberry research and Extension program, to view previous year's trial results or to be added to our commercial horticulture email list, visit our web site at <http://southcenters.osu.edu/hort/> or contact Brad Bergefurd, Bergefurd.1@osu.edu or Charissa Gardner gardner.1148@osu.edu or call the OSU South Centers 1-800-860-7232 or 740-289-3727 extension #136.



Carter and Dengel win peer recognition awards

By: Ryan Mapes, Endeavor Center Manager and Business Development Network Program Leader

The Ohio Small Business Development Center held its annual conference this past month and two of our business counselors received awards. Melissa Carter received the Peer Recognition Award and Patrick Dengel received the Collaboration Award. These awards are given annually to recognize the extraordinary efforts of SBDC counselors and staff across the State of Ohio.

The Marketing Award is given to the person who generates and implements activities and/or techniques specifically targeted to Ohio's entrepreneurs and small business owners for the purpose of increasing awareness and encouraging use of SBDC products, services, and/or events.

(continued on page 13)

Carter and Dengel win peer recognition awards (*continued*)

Melissa Carter won the Marketing Award for her implementation of social media and online marketing techniques for both the OSU South Centers Business Development Network and for businesses.

To be considered or nominated for the Collaborative Award, the candidate must show strong evidence of creating or strengthening a collaborative relationship. Examples of collaborative partnerships can be with other entities within our own organizations or can involve an outside organization with similar goals, and with various business-oriented groups.

Patrick Dengel won the Collaboration Award for his partnership with the University of Rio Grande. Patrick works diligently with the University of Rio Grande by utilizing their television and radio equipment to organize weekly broadcasts to showcase the businesses and partners throughout the region.

These activities and techniques deliver value to the SBDC by increasing the SBDC's economic impact on the state's economy, and to its clients by satisfying the owner and partner objectives and fostering their success.



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