



Cooperative Extension

Down to Earth: Reports from the field

Innovative Small Farmers' Outreach Program (ISFOP): West Central Region

Smart Planning for Drip Irrigation

By Robert Schultheis
Natural Resource Engineering Specialist
University of Missouri Extension

Drip irrigation is an efficient way to water vegetable and fruit crops; it increases crop yields by 50 to 100 percent. It also reduces water use by 30 to 50 percent compared to other irrigation systems.

To get a good system that meets your needs, you must plan well. You also need to know what resources are available. Bob Schultheis, Natural Resource Engineering Specialist with University of Missouri Extension, says you have to ask yourself, "How much water will the soil hold? How much water do the crops need? Is the water source adequate, reliable and of high quality? How much time do I have to work with the system?"

Soils in Missouri usually store 1.5 to 2.5 inches of water per foot of soil depth. However crop water used by crops in summer can exceed 0.25 inches per day. So soil that is two feet (continued on page 2)



Photo credit: Bob Schultheis

Field drip irrigation. Photo by Bob Schultheis

In the Spotlight: Wolf Creek Family Farm

By Jeff Yearington

Wolf Creek Family Farm is a family operation located in Peculiar, Missouri. It was started in 2006 by Arcenio and Karin Velez. Their three children help with the farm work. The family raises vegetables and sells them at four farmers' markets in Lee's Summit, Raymore, Belton and Peculiar. In 2007, they added a Community Supported Agriculture (CSA), where they sell shares to 50 members. Each member receives a box of fresh vegetables weekly for 24 weeks.

In 2012, the Velez family purchased 40 acres to expand their farm. They added an orchard and more crops and livestock. The new land had not

been planted with crops for over 20 years. They are working to get the infrastructure (irrigation and fencing) in shape for the 2013 growing season. Social media is a powerful tool that this family farm (continued on page 2)



Karin Velez running the farm tractor. Photo from Karin Velez

Table with 2 columns: Article Title and Page. Includes 'Smart Planning for Drip Irrigation', 'Wolf Creek Family Farm', 'Farewell to Dr. Sanjun Gu', 'IPM Corner: Field Sanitation', and 'New State Plant Pathologist'.

Irrigation . . . (continued from page 1)



Drip irrigation inside a high tunnel is the best way to irrigate.

deep can only hold a 9- to 15-day supply of water.

These soils often soak in 0.2 to 0.7 inches of water per hour. This means that most heavy rains may run off because they are not retained in the soil for use by crops.

Crops under drip irrigation usually need a water supply that provides 2 to 5 GPM (gallons per minute) per acre. That compares to 4 to 7 GPM per acre for sprinklers.

"A house well can sometimes be used to irrigate up to two to three

acres of vegetables or fruits in addition to supplying the household needs," says Schultheis. "But a larger pressure tank may be needed to avoid burning out the pump from excess cycling."

Drip systems operate at 6 to 20 psi (pounds per square inch); that is lower than sprinklers, which run at 25 to 45 psi. Thus, a drip system needs smaller pipes and pumps. It also makes fewer energy demands. Other advantages include less evaporation and runoff and fewer weeds. It can also be set up for automatic watering 24 hours a day. Fieldwork can be done while irrigating. Plus, fertilizers can be applied through the system.

Test the water supply for pH and hardness to get the best results when applying agri-chemicals through the system. Use check valves to prevent back suction of fertilizers and pesticides into the water supply.

A good filter with a 150 to 200 mesh screen is critical to prevent clogging of the water emitters; these dispense wa-

ter at 0.5 to 2 gallons per hour. A well is a better water source than a stream or pond because filtering costs less. Also, a well is less likely to run dry in hot weather.

For proper system design, accurate measurements are needed. You will need the dimensions and elevations of the field; you will also need the distance to water and power sources. You must consider the crops to be grown, row and plant spacing, and hours of operation.

"There is a bit of a 'learning curve' to running a drip system profitably and efficiently," Schultheis says. "Most producers find that it takes one to three years of in-season experience to learn their system and the irrigation management strategies it requires."

For more information about drip irrigation and a list of equipment suppliers contact Bob Schultheis at (417) 859-2044 in Marshfield, Missouri or go online to extension.missouri.edu/webster/irrigation. ■

Wolf Creek Family Farm . . . (continued from page 1)

uses to spread the word about their products. This media is also used to stay in touch with customers and to communicate with each other while at the markets. They use free internet tools, such as Facebook, Pinterest and Localharvest.org. They also connect with their customers through their website and the Kansas City Food Circle.

Another marketing outlet they used in 2012 was the Baker Creek Spring Planting Festival. There they sold heirloom vegetable and flower plants. At that event, they also found new CSA customers and made people aware of their business. They plan to return to the festival this year, hoping for the same success.

The Velez farm uses only methods that preserve the integrity of the land. They are also committed to providing wholesome, chemical-free food for their customers. This means no chemical fertiliz-

ers, pesticides or herbicides. The compost they use for their crops is made on the farm from plant debris and animal manure from their livestock. This practice maintains soil fertility. Pests and weeds are controlled by using many methods: companion planting (planting extra crops that help the original crop grow), trap cropping (planting crops to attract pests so that the crop you want will be pest-free), cover crops (crops that add humus to the soil and prevent erosion), hand weeding and lots of mulch.

Their growing season starts early in the year with their greenhouse and high tunnel. One of the goals of the farm is year-round production. This means that the farm stays busy all year. Starting this spring, Karin and Arcenio will be full-time farmers. "It is a big step, but we are at a point where we cannot work off the farm and continue to grow the farm busi-

ness," Karin commented.

Livestock are a large component of the farm. The Velez family raises their animals humanely. They focus on heritage breeds that thrive in pastures. The poultry are free-ranging; the hogs are pasture raised; and the cattle are raised and finished on grass. None of the livestock are given antibiotics or hormones. The animals' diet is not supplemented with grain.

The Velez farm offers quality produce, homegrown meats and eggs. They believe in what they do and eat from the same fields as their customers. People respond positively to their philosophy of natural farming. Customers feel connected to this small farm when they hear about Wolf Creek Family Farm's commitment to providing fresh local food. ■

Farewell to Dr. Sanjun Gu *By Dr. K.B. Paul*

I write this “farewell” piece with mixed emotions. While I helped to bring Dr. Sanjun Gu to Lincoln University, I was powerless to keep him here. Dr. Gu, a native of China, received his undergraduate training in horticulture in his home country. Then he earned a PhD at the University of Nebraska. He later worked at Kentucky State University as a researcher in horticultural crops. In January 2008, Dr. Gu joined Lincoln University Cooperative Extension (LUCE) as a State Extension Horticulture Specialist.

As the senior member of LU’s research and extension plant science faculty, I became his mentor. It was kind of a “Guru-Shisha” relationship (the teacher-disciple relationship found in ancient Hindu texts.) I also chose him as the Associate Program Leader for the new Innovative Small Farmers’ Outreach Program (ISFOP). Sanjun then developed his own statewide horticulture program. As a result of his own talent, ability and personality, he became the leading vegetable specialist in the state of Missouri. His outstanding grant writing, organizational and multitasking skills helped him to be a leader.

Vegetables are raised on both small and large farms; these are also the main crops that growers plant in community and backyard gardens. Sanjun touched the lives of many of these growers. It seems puzzling that when so much was going for him, he decided to move to another university. He truly loves Lincoln and he loves the folks he worked with every day. The last thing he wanted to do was to leave the farmer-collaborators without expert help. He shared with me the job offer and asked for my honest advice as to what he should do. I helped him to make his final decision. I thought that this particular move would be good for his career and for his family. He would also have more opportunity to take the art of vegetable production to a new height.



I want Dr. Gu to know that we at LUCE love him and respect him. We wish him and his family only the best but the truth is, we already miss him a lot. ■

IPM CORNER: Using IPM in Urban Farms and Community Gardens

By Dr. Jaime Piñero, Integrated Pest Management Specialist

Integrated Pest Management (IPM) is a complete and environmentally friendly approach to solving pest problems. It relies on a combination of common sense preventive practices. Examples include the use of resistant varieties, plus cultural practices such as sanitation and crop rotation. It also includes the use of trap crops (explained below) and the creation of habitat for pollinators and natural enemies (e.g., parasitic wasps and predatory insects). Pest monitoring/scouting is a critical part of an IPM program. If needed, treatments are made using least-risk options. These target the pest without harming beneficial insects and the environment.

Top ten IPM tips for effective insect and disease management in vegetables:

Prepare the soil. Give plants a head start on pest problems by choosing the proper site, testing the soil and rotating crops. Create

raised beds, if needed. Also, provide the right amount of organic matter.

Planting. Select varieties that are resistant to disease. Use transplants that are disease-free. Plant closely related vegetables in separate areas of the garden.

Use good fertilization and irrigation programs. Healthy, fertile soils will produce more vigorous, healthy plants. These plants are more able to withstand harm caused by arthropods (insects, spiders, etc.) and diseases. When possible, avoid overhead irrigation; this will minimize long leaf wetness periods. Space plants to provide enough air movement to quickly dry foliage, flowers and fruit.

Maintain good weed control. This reduces competition for nutrients. It makes scouting easier. It also makes it harder for pests to find places to live. In particular, it will make

it harder for those that carry pathogens (causes of disease). The use of organic mulches is an ideal anti-weed treatment. As they decompose, nutrients are released. They also increase the presence of predatory beetles and spiders.

Maintain good sanitation. Remove and destroy diseased plant material; remove plant refuse soon after harvest. Also, disinfect garden tools and shears.

Identify the pest. In the case of insects, know that not every insect on a crop is a pest. Do not kill a useful insect!

Use trap cropping. Trap crops are planted next to a higher value crop. In this way, they attract pests as a food source or a place to lay eggs. This prevents or makes it less likely that pests will reach the cash crop. Insects collected in or on trap crops can be more (continued on page 4)

ISFOP

If you are a small farmer and need information, please contact an ISFOP Farm Outreach Worker (FOW). FOWs live and work in your community. They can provide information on ways to better manage your resources, reduce expense and increase income. They can also provide information on other programs and resources that may increase your income and the overall quality of life for you and your family.

You are eligible to participate if:

- Your family lives on a farm, rural or urban.
- Farm products or income from the farm are necessary for you to live where you do.
- Your family provides the management and most of the labor for your farm.
- Your total annual family income is less than \$50,000.

How to Contact West Central Regional ISFOP Farm Outreach Workers:

- **Katie Nixon**, West Central Regional Coordinator and Jackson County
NixonK@LincolnU.edu
(816) 809-5074
- **Jeff Yearington**, Cass & Johnson Counties
YearingtonJ@LincolnU.edu
(816) 899-2181
- **Susan Jaster**, Lafayette & Ray Counties
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PierceJ@LincolnU.edu
(660) 232-1096

**For general information
call the LUCE ISFOP office at (573) 681-5312.**



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IPM CORNER... (continued from page 3)

easily attacked by natural enemies. They can also be killed by insecticides or by other physical means. Blue Hubbard squash is an excellent trap crop because it is very attractive to cucumber beetles and squash bugs. Also, it is not susceptible to bacterial wilt, a disease spread by cucumber beetles. For a garden having just a few zucchinis, cucumbers, etc., only 2-3 Blue Hubbard squash plants might be needed. Once the insect pests are lured to those plants, they can be killed. For bigger plots (greater than one-half acre), two perimeter rows of Blue Hubbard squash can be planted two weeks before the cash crop.

Promote buildup of natural enemies. Lady beetles, lacewings and beneficial wasps are only some of the many organisms that help control insect pests. However, they must be present in large enough numbers. Limit the use of insecticides and incorporate a variety of plants in the landscape to increase such populations; they will then keep pests in check.

Determine if control is needed through pest monitoring. Growers should inspect representative areas of the fields regularly. In this way, they can see if pests are nearing a damaging level. Until that point, the cost of yield and quality loss will be less than the cost of control.

Use the least toxic option, and only if control is needed. Learn what types of insecticides are most effective and least costly. Remember that even over-the-counter insecticides can be very toxic to humans and pets. Always read the labels and follow the directions. ■

New State Plant Pathologist at LUCE

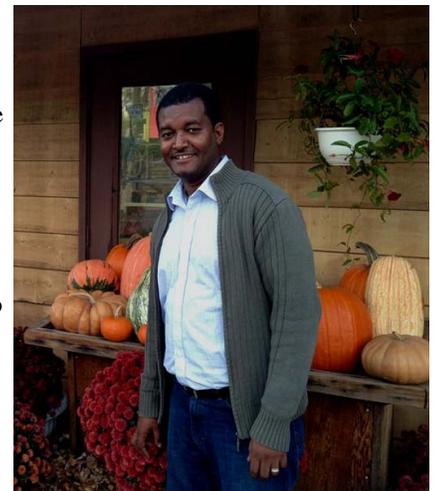
At Lincoln University Cooperative Extension (LUCE), scientists work as a team to deal with problems with vegetable and small fruit production in Missouri. It is my great pleasure to join that team.

My name is Zelalem Mersha. I am a state extension specialist in plant pathology (disease). I was born and raised in a farming family in Ethiopia, so I have been close to agriculture all my life. I was always excited to come home during summer breaks as a senior high student. I would then work with my dad who was a tractor operator on a state-owned farm.

I also helped care for our home garden. It was a demonstration garden for our community. I was moved by the gratitude expressed by the members of the community as they visited and tasted the fruits and vegetables. I knew then that I wanted to share agricultural knowledge with farmers and the general public.

My graduate and postgraduate studies taught me the width and breadth of disease management of vegetables and small fruits. I have worked in Africa, Asia, Europe and North America. In September 2008, I began working with extension and research in Florida. There I mainly focused on vegetable disease management. I worked with tomatoes, beans, basil, pepper, eggplant, okra, squash, beans, cucumber, and more.

As the newest member of the LUCE team, I look forward to meeting with all vegetable and small fruit farmers to assist you with crop disease problems. My office is located on the Lincoln University campus at 214 Allen Hall, 900 Chestnut St., Jefferson City, Missouri 65101. You can reach me via email at MershaZ@LincolnU.edu or call me at (573) 681-5634. ■



Dr. Zelalem Mersha, Lincoln University Cooperative Extension's new State Plant Pathologist.