



Down to Earth: Reports from the field

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

Smart Planning for Drip Irrigation

By Bob 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 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

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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 water 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. ■

Farmer Profile: Paula Dace

By Janet Hurst

"Use it up, wear it out; make it do, or do without" is an old adage that comes to mind when visiting with Paula Dace. A small farmer from St. Clair, Missouri, Paula is finding great satisfaction in retirement. For over 30 years, Paula was a rural mail carrier for the US Post Office. She retired three years ago and has been busy ever since.

Paula and her partner, John Krygiel, raise bees, rabbits and chickens. Last year they installed a high tunnel, which has opened up a whole new world for them. "It is incredible to go out to the tunnel in January and have fresh vegetables," says Paula. She is quick to add that high tunnel growing takes time and experience. "I'm really just getting started with the tunnel. There is a lot to learn."

Paula learned her sense of frugality as the youngest of 13 children. She grew up just three miles from her current location. "I grew up on a small farm, and my mother made the most of eve-

rything we had. We always had a garden, a creek to play in and chores to do each day. When I had a family, I wanted to have those things for my own children. To have that dream come true and to be able to live in this place has been such a blessing," Paula said.

As Paula raised her children, Dr. Jenni-

fer Davis and Mr. Josh Dace, the values learned on the farm were again passed down. Paula feels that "raising bucket calves, showing horses and caring for the animals instilled a sense of responsibility in my children." Now, the third generation is working with their grandmother in the gardens and at the Route 66 (continued on page 3)



Paula with a loyal Route 66 Farmer's Market customer, Tegan Stokes.

In the Spotlight: Dr. Zelalem Mersha

New LUCE and State Extension Plant Pathologist

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

Farmer Profile...(continued from page 2)

Farmer's Market in St. Clair, where Paula serves as the Market Manager. Paula states, "To see the cycle repeat and my grandchildren take an interest in the farm is very rewarding. They have a deeper understanding of where their food actually comes from and what goes into raising it."

Paula is a constant at the market each Saturday in St. Clair. She is creative and innovative in her marketing, often decorating her table with fresh flowers to create a welcoming environment for her customers. She raises everything from lettuce to tomatoes and turnips, offering an array of produce each week. She is an avid knitter, seamstress and craftsperson and features handmade items for sale at the market.

A strong advocate for her hometown, Paula is also active in the community and serves as the president of the Phoebe Epperson Hearst Historical Society. ■

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-risking 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, nutri-

ents 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 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 (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 your and for 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.

IPM Corner...

(continued from page 3)

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. ■

How to Contact East Central Regional ISFOP Farm Outreach Workers:

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Farewell to Dr. Sanjun Gu By Dr. K. B. Paul, ISFOP Program Leader

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.



Dr. Sanjun Gu

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. ■