



Innovative Small Farmers' Outreach Program (ISFOP): WEST CENTRAL REGION

Hydroponic Fodder Production (Part I)

By Jim Pierce, Jeff Yearington and Susan Jaster, Farm Outreach Workers

The idea of sprouting grains for feeding livestock has been around for at least one hundred years. Today, hydroponic fodder systems are being presented as a potential solution to drought, a way to meet nutritional needs, and as a least-cost feed supplement.

The basic process for producing fodder hydroponically (in water, without soil) is to soak the grains in clean water for 24 hours and then drain. The second step is to rinse the seed from eight to ten times a day (about every two hours) to as little as once a day, making sure to maintain moisture over the seed at all times. The roots will begin to emerge first in a day or two, followed by the cotyledon (the first leaf of a seed embryo that nourishes the emerging plant). Next, the first true leaves appear. This happens (continued on page 3)



The hydroponic fodder set-up inside a semi trailer cargo container at the Moser's farm.

In the Spotlight: Trammell Ranch

By Jim Pierce, Farm Outreach Worker

Bruce and Linda Trammell bought a small farm north of Polo, Missouri in 1993. They named it Trammell Ranch and began raising their children, hay and horses. Linda's background is in the health care industry. Bruce worked as a contractor for Union Pacific Railroad until 2008 when he had to quit after an unfortunate accident. When the children left home, Bruce decided to work in another occupation. He went on a farm tour organized by MU Extension. The visits to some of the Amish vegetable growers in the Jamesport area fueled Bruce's interest in raising vegetables. That winter Bruce and Linda attended the Great Plains Growers Conference for gathering additional information on vegetable production.

The family contacted the Missouri AgrAbility Project (a project that helps physically disabled farmers and ranchers) and received some technical assistance. AgriAbility staff told them of the availability of cost-share funds from the Natural Resource Conservation Service's (NRCS) Environmental Quality Incentives Program (EQIP). Linda applied for and received cost-share funding in 2011 for construction of a high tunnel. Almost immediately, they began construction with the help of friends and neighbors.

Soon the Trammells were told about Lincoln University Cooperative (continued on page 2)

Down to Earth: Reports from the Field

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Linda and Bruce Trammell in their high tunnel.

Trammell Farm . . .

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Extension's (LUCIE) Innovative Small Farmers' Outreach Program (ISFOP). The Trammells contacted Susan Jaster, Farm Outreach Worker (FOW) to learn the program. During the first visit to Trammell Ranch, Susan Jaster, along with FOW Jim Pierce, provided some practical tips to the Trammells on how to finish their high tunnel. They also gave a hand helping to lay plastic cover on the tunnel.

In 2011, based on a soil test, the Trammells added the necessary amendments to the earth and laid plastic mulch over the drip irrigation lines. They planted three varieties of tomatoes (Scarlet Red, Big Beef and Better Boy) to discover firsthand what variety grew best. They also

followed guidelines for pruning staked tomatoes in high tunnels. They observed that pruning helped reduce disease and increase fruit yields. Their initial year was productive. They marketed their produce to local grocery stores and the community.

By season two, their production and marketing skills had improved. They erected a second high tunnel and added more field crops. However, even with all their knowledge, they faced problems. They had purchased locally grown tomato transplants, but as the season progressed, they started to lose the plants due to disease. They sent a plant tissue sample to the Kansas State University Plant Disease Diagnostic Lab in Manhattan, Kansas. Sadly, their worst

fears were confirmed. The cause was a bacterial canker spread by infected seed. For a small grower with limited space, there were few options to correct this quickly. So, in 2013, they started with quality transplants to prevent the return of bacterial canker. They also used copper sulfate as foliar spray to fend off the bacteria.

In 2014 the Trammells plan to add another high tunnel. This one will not only increase productivity, but will also offer the option to rotate crops between the high tunnels, which should lower disease. An important quality for any farmer is tenacity. This is definitely well-rooted at Trammell Ranch as it continues to produce healthy food for its consumers. ■

More information on the Agrability Program can be found here:
<http://agrability.missouri.edu/>

Sustainable Agriculture Research in the Region

Over the years, many projects in sustainable agriculture have been funded by SARE (Sustainable Agriculture Research and Education) Farmer Rancher Grants. This year is no exception. The following are highlights of a few projects that were funded by the SARE Farmer Rancher Grant Program in 2013:

Chicken Tractors in an Integrated Pest Management Program

Rayville, Missouri

What organic methods can be used to keep squash bugs and cucumber beetles off cucurbits? (Cucurbits are plants in the gourd family, such as squash, cucumbers, melons, etc.)? Rocky Creek Valley Farm's project blends three practices into one pest control system. First, cover crops (buckwheat and millet) are planted to attract beneficial insects at the garden's edges. Next, blue hubbard squash are used as trap crops to lure the pests away from the cucurbit cash crops. Finally, chickens in a controlled environment eat the unwanted bugs. Follow the project at www.rockycreekvalley.com/education/studies.html.

Activating Soil Fertility in Mulch-prepared Small Commercial No-till

Leavenworth, Kansas

This project uses a small-plot commercial organic no-till production system. Field pea and buckwheat are the cover crops that precede the fall cash crops. One goal is to find methods to keep fertility high that rely on little machinery and low external input.

Growing with Biochar: Test and Teach Soil Carbon Sequestration

Three farms in the area of Lawrence, Kansas

Biochar is a form of charcoal that is added to soil to increase fertility. It is also helpful in counteracting the negative impact of carbon dioxide emissions. The research and education initiative will do the following:

- Assist growers in using properly prepared biochar in soils on demonstration plots
- Monitor, measure and document these early efforts to use biochar in soils
- Discover and share the most useful

information and insights obtained

- Organize field days and trainings to teach growers carbon-smart farming
- Draft a grower's manual, instructional tools and other information on how to use biochar

Updates on this project are posted at www.dyarrow.org/biochar/.

Exploring Edible Cactus Production as a New Specialty Crop in the Midwest

Kansas City area, Missouri and Kansas

Three farms are working together to grow the edible nopal cactus. The cactus will be raised in pots in the greenhouse at Gibbs Road Farm. It will be grown in a high tunnel at Juniper Gardens. And at Nopal-itos Urban Farm, it will be planted outside. Growers will be looking for best practices to grow nopales; research will also be done on how to market this cactus to the community. Follow their project on Facebook on their page, "Nopales for Kansas City." ■

The next Farmer Rancher grant proposals are due Thursday, November 14, 2013. More information can be found at www.northcentralsare.org.

Hydroponic Fodder . . .

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at about day four or five. At this point, the fodder mat (the layer of seed) is exposed to light to aid in the development of chlorophyll (a green pigment that is needed for photosynthesis, the conversion of light to energy). The fodder mat is harvested around the seventh or eighth day and fed fresh to livestock.

Fodder system components

The first requirement is a building, room or structure to house the system. Some other needs for the growing space are access to water, electricity and surfaces that can be sanitized. For year-round production, heat will be necessary to prevent the tender fodder mats from freezing. High humidity can be a problem as it creates an environment for mold to grow. Using fans and well-placed vents can reduce humidity.

The base of the system is the container for

the seed. Examples are cookie sheets, gutters or commercial seed trays. The container must hold water and be able to be drained when water cycling begins. It must drain to prevent molding and drowning of the seedlings. Typically, to save space and increase production per square foot, the containers are placed on shelves. Next, it is essential to have a system for delivering water. This could be as simple as a hose with a watering wand. Some farmers are using irrigation components from local hardware stores to spray water onto the seedlings along with the use of timers. Since trays are stacked, it is also critical to provide light. The light needs are low; fluorescent or light-emitting diodes (LED) should be used to keep energy costs to a minimum.

To prevent diseases in the fodder, good sanitation is very important. This means routinely washing and sanitizing the trays or gutter systems, the floor and the water delivery system. There have been cases of livestock deaths from feeding moldy fodder.

This system will work with several types of grains. Producers are making fodder from



Chickens enjoying the fodder mat, harvested from the hydroponic fodder system.

oats, corn, rye, barley and wheat. Start with clean seed, and only buy seed with good germination percentages.

For further information about hydroponic fodder, visit: <http://www.extension.org/pages/65651/barley-fodder-feeding-for-organic-dairies-webinar>

IPM CORNER: The Dreaded Spotted Wing Drosophila is Causing Extensive Fruit Damage in Missouri

By Dr. Jaime Piñero, State Extension Specialist—Integrated Pest Management



Spotted Wing Drosophila larvae exiting blackberries.

What is the Spotted Wing Drosophila?

The Spotted Wing Drosophila (SWD) is a small vinegar fly, about 0.1 inch in length. For the past two years, it has become a pest in several areas of the U.S., including the Midwest. It has caused economic damage to berries, grapes and softer fleshy fruit, such as peaches. It is native to Japan, so this insect is invasive to the U.S. In late June 2013, a monitoring system deployed by Lincoln University's Integrated Pest Management (IPM)

Program detected the SWD in Missouri.

Why should I be concerned about the SWD? Is the situation that serious?

The SWD very quickly became a devastating pest of berry crops in Missouri. Adults were first detected in monitoring traps in late June 2013. By early August, infestations of blackberry fruits had already occurred. By mid-August, the SWD was infesting crops statewide.

In addition to small fruit crops, this invasive insect also attacks some stone fruits (cherries, nectarines, peaches), high tunnel tomatoes and wild hosts (including pokeweed, autumn olive, crabapple, nightshade, Amur honeysuckle and wild grape). Raspberries, blackberries, blueberries, elderberries and grapes are at the greatest risk. Picture 1 shows larvae leaving infested blackberries.

How can I monitor for this pest?

It is very important that you learn how to monitor for this invasive pest. To find out whether the SWD is present, you can prepare the most effective and economical trap using a clear plastic deli-type cup. Bait it with a mixture of water (6 oz.), active dry yeast (1/2 tablespoon) and sugar (as shown in figure 1 on next page). Note the small holes that are made on the sides of the trap that allow the flies to enter. A small yellow sticky card can be placed inside the cup. In this way, flies that are attracted by the bait and enter the trap are retained by the card. This will allow you to more easily identify any flies caught in the trap.

How do I know whether flies (trapped or active on fruits) are the SWD?

SWD flies look similar to the small vinegar flies that are found near or on fermenting fruits and vegetables. SWD males have one black dot on each wing. The females do not have dots on their

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About our Program...

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 you meet the following requirements:

- ☑ 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
JasterS@LincolnU.edu
(816) 589-4725
- **Jim Pierce**, Clay & Platte Counties
PierceJ@LincolnU.edu
(660) 232-1096

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



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United States Department of Agriculture

National Institute of Food and Agriculture

IPM Corner...

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wings; they have a serrated egg-laying device called an ovipositor. It is used to cut a slit into the skin of intact fruit to lay eggs. This makes the SWD a more significant pest than other similar flies.

How can I manage the SWD on my farm or in my yard?

Below are some IPM options that can help to reduce larval infestations by the SWD:

1. Exclusion: For small plantings, one option is to use a fine mesh screen with openings that are less than 0.98 millimeter (0.039 inch) wide (18 mesh or finer). Mesh screens will also exclude pollinating insects. Therefore, it is best to cover your plants after the fruit is set.

2. Canopy Management: Thin the plant row to 3-4 strong canes per square foot. As you do so, eliminate weaker shoots, and open the canopy. Or, consider a trellising system to open the canopy. This may make plantings less attractive to the SWD. It will also improve spray coverage.

3. Sanitation: Remove overripe fruit from production areas as soon as possible. Growers in other parts of the U.S. have sent pickers through fields with one container to collect good fruit and another to collect overripe fruit. The purpose is to minimize egg-laying and larval development sites. ■

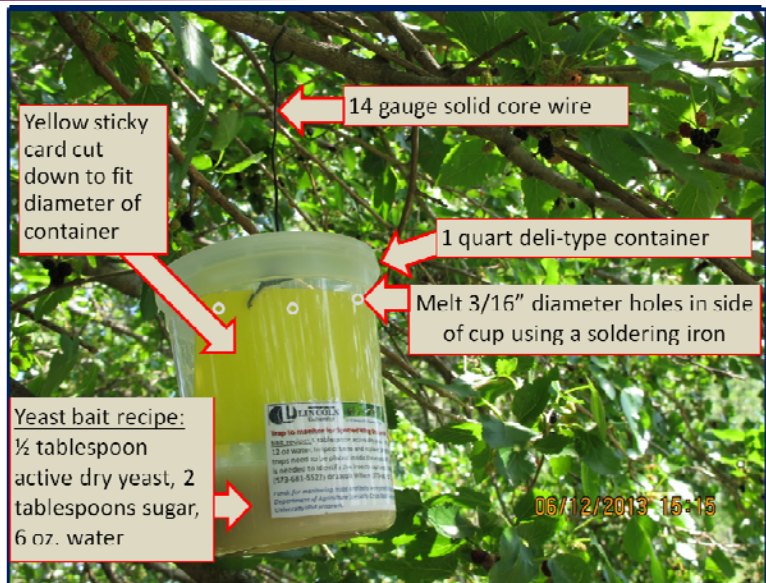


Figure 1. How to make a yeast-baited trap to monitor for SWD.



Spotted Wing Drosophila males have one black dot on each wing.



Female's wings lack the dot on the wings. They have a serrated ovipositor (egg-laying structure) at the tip of the abdomen.