



Cooperative Extension

Down to Earth: Reports from the Field

Innovative Small Farmers' Outreach Program (ISFOP): EAST 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 first begin to emerge 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 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

The hydroponic fodder setup inside a semitrailer cargo container at the Moser's farm.



Inside this issue:

| | PAGE |
|---|-------|
| Hydroponic Fodder Production (Part I) | 1 & 2 |
| Profit from Your Farm Forest | 2 & 4 |
| IPM Corner: Act Now to Lower Disease Pressure | 3 |
| Program & Contact Information | 4 |

(continued on page 2)

Hydroponic Fodder Production...(continued from page 1)

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

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



Upcoming Events:

Missouri Organic Association Annual Conference

Feb. 6-8, Springfield, MO

For more information go to <http://www.missouriorganic.org/ConferencesandEvents/MOAAAnnualConference.aspx>.

Minority Landowner and Limited Resource Farmers Conference

March 20-21, Jefferson City, MO

Contact your local Farm Outreach Worker for more information.

Profit from Your Farm Forest

By Janet Hurst, Farm Outreach Worker

Agroforestry is a way to use land that combines forest products with farming. This helps farmers create new markets for their forest products. The United States Department of Agriculture (USDA) lists five types of agroforestry practices in the US:

- 1) Field, farmstead and livestock windbreaks
- 2) Forest buffers along waterways
- 3) Silvopasture, which combines forestry with livestock so that trees, livestock and forages grow in a system
- 4) Alley croppings, meaning that annuals are planted between rows of high-value trees and shrubs
- 5) Forest farming, where food, herbal (botanicals) and decorative products are grown under the protection of a managed forest canopy

Overall, agroforestry means that crops are harvested from woodlands. Missouri

grows pecans, pawpaw (a fruit), elderberries and shiitake mushrooms. They also cultivate the woody ornamentals used by florists.

Here is a closer look at specialty forest products, grouped into four categories:

A) Medicinals and botanicals: This group includes substances made from plants. They are used in food supplements. They also are found in herbal health creams, cosmetics and more. Two popular examples are St. John's wort and ginseng. Sumac, slippery elm and other wild-crafted (harvested from the wild) plants fit in this group. To learn more about the botanical industry, contact American Botanicals (P.O. Box 158, Eolia, MO 63344; (573) 485-2300) or go to www.americanbotanicals.com.

B) Woody-based food products: This group includes food made from trees and shrubs. Nuts, fruits and some mushrooms are



Fresh, just picked persimmons.

members of this group. Many nuts can be grown to sell. They include the black walnut, Chinese chestnut, pecan, hickory, butternut, hybrid hazelnut and ginkgo. Commercial nuts are sold in many forms: in-shell, whole and crushed kernels, and as oils and confections.

Many fruits can be grown to sell. These include chokecherry, highbush cranberry, sand cherry, currant, cornelian cherry, dogwood, elderberry, saskatoon, jostaberry, Nanking cherry, chokecherry, buffaloberry, pawpaw and persimmon.

Gourmet mushrooms can be grown on logs and often

(continued on page 4)

IPM Corner: Act Now to Lower Disease Pressure on Your Next Crop

By Dr. Zelalem Mersha, State Extension Specialist—Plant Pathology

As we plan for the next growing season, here are some housekeeping reminders to help growers have fewer pest and disease problems. This article highlights sanitation, which includes disinfecting tools, high tunnels, greenhouses and farms. These practices should be done year-round for growers who extend the seasons with high tunnels and greenhouses.

Recordkeeping: Often, growers can repeat the success of a production cycle by keeping good records. Lessons can be learned from pitfalls or successes to craft a better plan for the future. **If you already keep good records, please continue. If not, start this year!**

Calendar-based integrated disease management strategies: Managing the diseases of vegetables and small fruits must be done all year. It doesn't matter if those plants are in a backyard garden, low or high tunnels or on a small or large farm. Below is a set of to-do lists and best management practices; they are detailed in an outline based on the time of year for their use.

You reap what you sow: First, get your seedling transplants from a reliable source! Start with a resistant variety or transplant. Then, nurture your seedlings for fast and vigorous growth. Most seed companies supply information about disease resistance. For example, let's say that you buy Big

Beef tomatoes from Johnny's Selected Seeds. On the packet where it talks about

Disease Resistance:

| | |
|------------|-----------------------------|
| AS | Alternaria Stem Canker |
| F2 | Fusarium Wilt (Races 1 & 2) |
| L | Gray Leaf Spot |
| N | Nematodes |
| TMV | Tobacco Mosaic Virus |
| V | Verticillium Wilt |

Figure 1.



Get your transplants from a reliable source. Seedlings grown on raised benches in a well-sanitized and ventilated greenhouse are highly desired.

disease resistance, you will find detailed information (Figure 1).

Based on your field history, choose a variety that best suits your situation. Be careful when buying seeds for organic production; some seeds are sold pretreated with chemicals.

Sanitation: This is a very simple but often overlooked process. It is needed to avoid or control pathogens (anything that produces a disease). At the end of the season, a cleanup is needed. This will help to ensure that the next year's crop is a success. If neglected, this cleanup could be one reason why many pests and diseases infect gardens or farms. Sanitize properly. Disinfect and sterilize tools and surfaces; this is a good way to remove and/or prevent the spread of insect and spider pests, algae and pathogens in growing areas. Disinfecting and sterilizing is no guarantee against a plant disease; however, regular sanitation will greatly reduce the risk of a disease outbreak. Sanitation works by reducing the amount of the initial disease present. It also provides a better chance to manage diseases.

Many products are available to disinfect tools. However, each has its pros and cons, so you need to decide what will work best for you. Products such as chlorine bleach, Green-shield®, Phyan 20® and Oxidate® are approved by the Organic Materials Review Institute (OMRI); they can be used to sweep floors and wipe down nursery and greenhouse benches. Here is a link from Purdue University to a list of products for greenhouse use:

<http://www.extension.purdue.edu/extmedia/HO/HO-250-W.pdf>.

Disinfect anything that you reuse. This includes containers, staking materials (wire trellis or wood sticks) and more. It is essential to rinse with pressurized water to remove plant debris and soil particles. A 10 percent solution of household chlorine bleach could be used to soak containers or trellises. A minimum of 30 minutes to one hour is needed. Don't forget to rinse the



Rinse the dirt off using pressurized water and disinfect greenhouse surfaces, your tools etc., right before and after using them. Trellis and wood staking should be soaked (e.g., at least 30 min. in 10 percent bleach) right before each use.

containers with water afterwards; this keeps the toxic material away from the plants. No matter which type of disinfectant is used, you must be careful. Read the labels. Be sure to wear proper personal protective gear. ■

Postharvest and preseason

- Clean fields, greenhouses and equipment
- Plant cover crops (legumes, crucifers [such as cabbage or broccoli], etc.)
- Apply quality compost or chemical fertilizers
- Select a site without diseases
- Create a rotation plan: a 3- to 7-year plan works best for disease management
- Plan your planting material: where and what will you buy?

Preplanting and planting

- Prepare soil and field
- Prepare potting mix and containers
- Monitor weather and seedling diseases at planting and transplanting
- Use best management practices to achieve fast growing, vigorous and healthy seedlings
- Plan to use disease-resistant planting materials (seeds or transplants)

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 for 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 East Central Regional ISFOP Farm Outreach Workers:

- **Miranda Duschack**, East Central Regional Coordinator, St. Louis County and City

DuschackM@LincolnU.edu

(314) 604-3403

- **Janet Hurst**, Franklin and Warren Counties

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



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Lincoln University in Missouri and the U.S. Department of Agriculture Cooperating. Yvonne Matthews, Interim Dean, College of Agricultural and Natural Sciences. Distributed in furtherance of the Food and Agricultural Act, 1977 PL 95-98. Dec. 22, 1981.

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United States
Department of
Agriculture

National Institute
of Food and
Agriculture

Meet Our New Farm Outreach Worker for St. Charles and Lincoln Counties

Meet our new Farm Outreach Worker, Reneesha R. Auboug. She replaces David Price who resigned from our program as of June 2013.



Auboug is a 1998 cum laude graduate of Lincoln University. She majored in agriculture; her minor was business. At LU, she found ways to gain hands-on experience. As a work-study student, she took care of the research greenhouse on campus. Auboug had three summer internships. One was with the Talladega National Forest in Alabama; there, she worked as a forestry technician. The second was at the University of Missouri's Bradford Research Farm; she was a corn research technician. The third was with the Environmental Protection Agency (EPA) as an environmental specialist. She took part in two study abroad programs; one was in Africa and the other, in Central America. After she graduated, Auboug took a job with the United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS); she was a soil conservation aide and camp counselor. She also lived and worked on a farm in the country of Mexico. She now volunteers at an organic farm in Ferguson, Missouri. Auboug speaks Spanish, Haitian Creole and French. She and her husband Yves are the proud parents of a six-year-old girl.

Auboug is excited to meet and work with you. ■

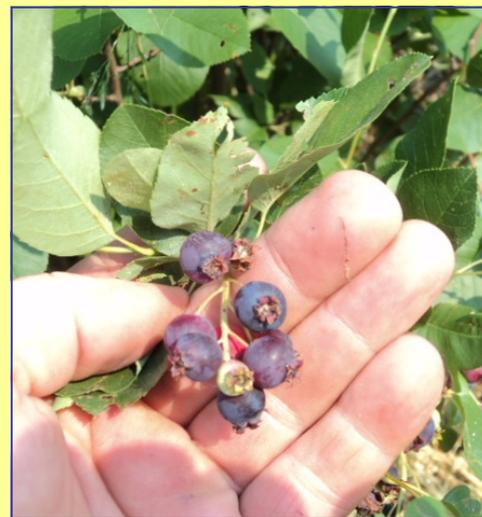
Profit from Your Farm Forest...

(continued from page 2)

bring top dollar. The most commonly cultivated are shiitake and oyster.

C) Woody and decorative florals: This group includes twigs, stems or other woody ornamentals. Examples in our area are bittersweet, willows, forsythia, early fruit tree blossoms, etc. Often these crops can be produced on the edge of the forest; they can grow in places where other crops cannot.

D) Handicrafts and specialty woods: This group includes any wood or other natural substance used by craftspeople. Furniture can be made from wood that is harvested from your farm. Baskets can be made from willow; walking sticks can be made from saplings. Pinecones or pods can be gathered and sold to the floral industry.



Saskatoon Berries

Do you have woodland products growing on your farm? Would you like to harvest them for extra income? The University of Missouri offers help on this topic. Check out <http://www.centerforagroforestry.org/>. Or, to learn more about how to get the most from this often untapped resource, ask your LU Farm Outreach Worker. ■