Down To Earth: Reports from the Field

Innovative Small Farmers' Outreach Program (ISFOP)

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Ways to Manage Excessive Rain in Southwest Missouri

By Stephen "Randy" Garrett, Farm Outreach Worker

The spring and summer of 2015 were especially wet. This caused many farmers to experience losses or reduced crop yields. Because this type of weather is a change from when springs and summers are relatively drier, farmers need to know how to deal with excessive rain.

The Farm Outreach Workers (FOWs) at Lincoln University Cooperative Extension's (LUCE) Innovative Small Farmers' Outreach Program (ISFOP) often teach clients how to increase water retention and to make it more available to fruits and vegetables using a range of irrigation methods. But, today, the biggest challenge clients face results from excessive rain. This causes plant diseases (see photo 1).

Usually, rainfall reduces the cost of labor and irrigation water. However, when rainwater becomes excessive, it creates problems. It can cause plants to drown. Water clogs the air space in the soil and cuts off oxygen to plant roots. When a plant receives too much water, it experiences symptoms that are similar to undergoing drought stress. The plant's leaves turn yellow and wilt. The roots appear black rather than the white color of healthy roots. In addition, the soggy soil smells bad and fungal diseases can occur.

This article describes a few options that farmers can use to deal with water stress and the diseases that too much rainfall can cause.

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Photo 1. Growing crops under plastic mulch prevents fruit and vegetable leaves from contacting wet soil, which can cause diseases.

Soil organic matter: Increasing the organic matter content of the soil is a good way to deal with extra rain. Organic matter in the soil increases its water retention. It also increases water drainage. Organic matter binds soil particles together. This results in aggregates (forming clumps). Soil aggregation creates pores in the soil that allow the water to drain. Water drainage in the soil reduces water buildup on the soil surface. So, drainage lowers humidity around the plants. This reduces the number of plant diseases.

Variety selection: As the number of plant diseases increases with very wet conditions, it becomes critical for farmers to choose plant varieties that are resistant to diseases. There are many disease-resistant varieties on the market. Before buying seeds, think about their resistance to disease as well as the traits customers prefer. Choosing the right varieties can be difficult because some varieties are resistant to disease but consumers do not like them.

Fertilization: To reduce plant disease, provide enough fertilizer to make plants strong. Healthy plants resist diseases better. It is best to test the soil for pH (a measure of the amount of acid vs. base in a substance) and nutrient concentrations. When the soil pH and nutrients are at the recommended levels, stronger plants are produced. These plants are better able to resist pathogens (agents causing disease or harm).

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Monitoring: Plants must be monitored daily for diseases. If a plant part is diseased, contact an Extension agent for a diagnosis. The agent can recommend a management plan to overcome the disease or to reduce its effect. Extension agents might need to send a sample from the diseased plant to a laboratory to find out what disease is affecting the plant.

Sanitation: If a plant is diseased, remove it immediately. Then, burn it or take it out of the field. Do not put diseased plants in the compost. Doing so will produce infected compost. If infected compost is applied to soil, it will affect other plants, including any new plants. Compost reaches high temperatures that kill many pests; however, it may not kill all pests. Perhaps the diseased plants in your compost are not located where the temperature is highest. Or, the temperature of the compost may not be high enough to kill all pests.

Crop rotation: At times, pests stay in the soil until the next season. If you plant the same crop that was planted the last season, then the new crop will be infected. The diagram below indicates a good rotation plan (see figure 1).

Air circulation: Good air circulation around plants reduces the incidence of plant diseases. Spacing the plants properly is vital for good air circulation. The

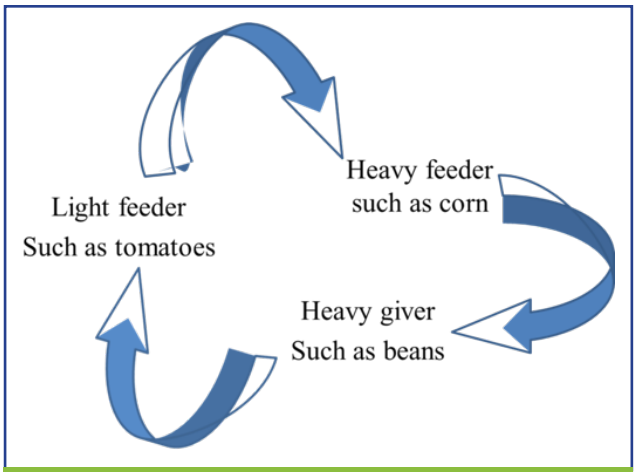

Figure 1. Crop rotation

bigger the foliage (leaf area) of the plant, the greater the space between plants should be. For example, the space needed between carrots is much smaller that the space needed between tomato plants.

Keeping plant foliage off the soil: Plastic mulch (see photo 2) prevents leaves from contacting wet soil,

Photo 2. Plant diseases thrive in wet conditions. Preventative practices help reduce or eliminate the occurrence of diseases.

which might contain pathogens. For example, Tami Fredrickson, a longtime fruit and vegetable farmer from Carl Junction, Missouri, believes that prevention is a key element in protecting plants from diseases in very wet conditions. She plants her fruit and vegetable rows under plastic mulch. She finds that this practice is great for keeping the leaves from the exposed wet soil, which can harbor diseases.

Photo 3. Wet conditions play a big factor in causing tomato fruit to split.

Vine crops grow horizontally and spread over the soil. This means that a great percentage of the plant is in contact with the soil, which might subject it to diseases when the soil is wet. It is a great practice to grow vine plants on a trellis to keep them off the wet soil.

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Excessive Rain (continued)

Irrigation: Sometimes, farmers put their irrigation system on a timer. The irrigation system turns on whether the soil is wet or dry. Keep in mind that overwatering plants can cause fruit splitting (see photo 3). Rainfall should be considered when irrigating. If the irrigation system is on a timer, the farmer needs to take the rainfall into account and shut off the timer when it rains. Irrigation also should occur in the morning so the leaves have time to dry out. This lowers the possibility of leaf fungal diseases.

Pesticide application: As a last resort, pesticides, whether chemical or organic, might be needed to save a crop. Farmers must educate themselves about pesticides and be prepared with pesticide application equipment in case a disease outbreak occurs. Farmers must know the different diseases and the pesticide options for treating them. Read the label and follow the instructions on how to prepare and apply each pesticide. The label also indicates if the pesticide is allowed for use in Missouri. Some pesticides require a pesticide license for application. Do not apply such a pesticide without a license.

In conclusion, being educated about crop production issues during wet weather will help to prevent low yields or crop losses. Educating yourself and using practices that prevent problems during wet weather will help you manage your operation better during wet conditions.

Acknowledgements

Thanks to Dr. Touria Eaton, LUCE State Extension Specialist – Horticulture, Jefferson City, Missouri; Andrew (Andy) Thomas, Research Assistant Professor, University of Missouri Southwest Research Center, Mount Vernon, Missouri; and Tami Fredrickson, farmer, Carl Junction, Missouri, for their input and contributions to this article.

In the Spotlight: Boua Vang, a Hmong Farmer

By Nahshon Bishop, Small Farm Specialist

Hmong farmer Boua Vang.

Boua Vang now owns a farm. But his journey to becoming a farmer took many twists and turns. Vang, a member of the Hmong (pronounced "mong") ethnic group, was born in Laos. After the U.S. withdrew from the Vietnam War in 1973, all Hmong people were sought and executed by enemy forces. The Hmong were killed because many of them had helped American troops by providing intelligence on enemy troop movements or by rescuing stranded American pilots and ground forces. Because of their service, the U.S. government granted Hmong people refugee status.

However, in order for someone to leave Laos and enter the U.S., individuals had to reach refugee camps that were set up in safe zones. The journey that Hmong families made was so dangerous that many died trying to get to these camps.

"Once we made it to the refugee camps, we had to wait until we had a sponsor," Vang explains. "You did not know who it was or what part of the United States you would be brought to." A sponsor was an American citizen willing to take a refugee into their home until the refugee reached adulthood or to orient adult refugees to the English language and to the local community. Finally, in June 1980, Vang received a sponsor. He left Laos for Spokane, Washington.

"Upon arriving in America, I was in [culture] shock. There were so many things I did not understand!" Laughing, Vang stated, "Everything from bathrooms to stoves to refrigeration and the idea of electricity running everything all the time was very overwhelming." New to American food, he lost weight quickly. "I had never heard of things like prepackaged food, and I did not care for the taste." His sponsor was so concerned about Vang's weight loss that they went to the grocery store, where Vang could select what he wanted. "I chose to take home a whole chicken! It was the first thing I had seen in months that I was familiar with, that looked like food. I took it home and ate the entire thing," Vang recalls.

In 1981, Vang traveled to Seattle, Washington. Here, he met his future wife. They were soon married. Vang wanted to continue his

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Increasing Beneficial Insects in Your Vegetable Garden or Farm Using Insectary Plants

By Dr. Jaime C. Piñero, State Extension Specialist - Integrated Pest Management (IPM) Program

Beside honey bees, bumble bees and lady beetles, which are easy to recognize, there are many other beneficial insects (also called "beneficials") that visit your vegetable garden or farm. However, you might not see them often or be able to identify them. These beneficials include parasitic wasps as well as predatory insects, such as lacewings, the larvae (young stage) of hoverflies, lady beetles and minute pirate bugs. Parasitic wasps and predatory insects kill many of the insect pests. Without these beneficials, pests would breed and harm your produce. However, there are a few requirements that most species of beneficial insects must have. First, they need pollen (a source of protein) to reproduce. They also require nectar (a source of sugar used for energy) to survive. In addition, they must have shelter plus prey/hosts to eat. If farms or gardens lack these resources, these beneficials are less effective as pollinators and for natural pest control.

Make sure to have insectary plants during the entire growing season. This might require reseeding some plant species, such as buckwheat and mustard.

You can boost the number of natural enemies of insect pests by planting insectary plants. This helps with the natural control of pests. And these friendly insects also aid in pollination. For example, the larvae of hoverflies are predators; the adults assist with pollination.

What types of plants attract the most beneficials? Below are the top five plants that can be planted annually:

1. **Sweet alyssum (white variety).** This plant belongs to the mustard family. Its flowering period is long (several months). The natural enemies that it attracts include minute pirate bugs, lacewings and ladybugs (predators). It also attracts small parasitic wasps that can attack aphids and other small insects.
2. **Buckwheat.** This plant is very attractive to honeybees and hoverflies. It also attracts predatory insects such as assassin bugs, soldier beetles, predatory stinkbugs, shield bugs as well as parasitic wasps and parasitic flies.
3. **Fennel.** Fennel attracts many lady beetles, wasps and hoverflies. It is also a host plant for the caterpillars of the anise swallowtail butterfly.
4. **Sunflower.** This plant is reported to attract predatory insects such as big-eyed bugs, wasps, lady beetles and predatory bugs.
5. **Mustard.** Mustard plants are very attractive to lacewings, lady beetles and parasitic wasps, which attack aphids and other small insects. ■

Examples of key natural enemies visiting insectary plants


Lady beetle


Minute pirate bug


Big-eyed bug


Tachnid fly


Hover fly


Lacewing


Soldier beetle


Assassin bug


Predatory wasp


Parasitic wasp

For additional information, please contact your local Extension office or Dr. Jaime Piñero, State Extension Specialist – Integrated Pest Management (IPM): (573) 681-5522 or PineroJ@LincolnU.edu. ■

Do the Five Point Check® for Small Ruminant Health

By Susan Jaster, Farm Outreach Worker

How can you tell if your goats or sheep are healthy? They might seem healthy. They eat several pounds of fancy purchased feeds each day. They stay inside the fences. But the grass is shorter. There are no leaves on the lower branches of the trees. You worry when your animals strip bark from the trees. Goats and sheep are supposed to control brush, but the weeds are taller. It only gets worse when your animals start having babies. You feel like you are living in the barn. It is cold, and your animals are walking through mud. Half of the newborn lambs or kids are sick or dying. Where did it all go wrong?

All of this could have been averted if you had done a Five Point Check®. Below are five basic ways to quickly observe the health of your animals. This lowers your costs and helps you select superior herd animals.

1. Clinical indicators: Notice when your animals have a drooping head and tail, nasal discharge, a rough hair coat or an appearance of "dag." Dag is manure clumped on the tail and rear leg hair. A dag score runs from zero to five. Five means that there are many large clumps. These are visual signs of sickness in small ruminants. It is time for you to investigate further.

2. Body condition score (BCS): This is an important practical tool in assessing the body condition of goats and sheep. The BCS indicates available fat reserves. These can be used by the animal in periods of high energy demand, stress or when nutrition is less than optimal. A BCS cannot be assigned by simply looking at an animal. Instead, the animal must be touched and felt in three areas of the body: (1) lumbar (lower back), (2) sternum (breastbone) and (3) rib cage and fat covering the ribs, including the intercostal spaces (between the ribs). With practice, evaluating the BCS of an animal will only take about 10-15 seconds. Scores run from one to five, where one means very thin, and five means very fat. For more details, see http://www2.luresext.edu/goats/extension/BCS_Eng_front_back.pdf.

3. FAMACHA©: The FAMACHA© system was developed in South Africa to estimate the level of anemia (not having enough red bloods cells). This is done by checking the tissue color of the eye in goats and sheep. Anemia is associated with infections of the barber pole worm (*Haemonchus contortus*). Checking the tissue color of the eye can help you make deworming decisions. White means very anemic, whereas bright pink means normal. Learn the proper technique using the color match card found at www.acsrpc.org (American Consortium for Small Ruminant Parasite Control) or http://web.uri.edu/sheepngoat/famacha/ (online FAMACHA© certification).

4. Bottle jaw: This is the informal name for severe intermandibular edema (swelling under the jaw). Bottle jaw is a symptom of struggle elsewhere in the body. It can be caused by *Haemonchus contortus* (barber pole worm), liver flukes (flat worms), copper deficiency (in goats) or coccidia (microscopic parasites). If not treated, death can occur.

5. Fecal egg count (FEC) versus fecal flotation test: An FEC tells how many parasite eggs have floated to the top of the fecal sample. In contrast, the fecal flotation test indicates only that parasite eggs are present. A monthly count of your animals' FEC can be used to prevent overuse of dewormers and to lower your costs. A YouTube video about FEC is available: https://www.youtube.com/watch?v=ZZQyZKe_hs&feature=youtu.be. It provides details about how and why you should use FEC and lists the required equipment.

More information can be found in the free publication *Tools for Managing Internal Parasites in Small Ruminants: Animal Selection* (download at https://attra.ncat.org/attra-pub/summaries/summary.php?pub=398) as well as at www.sheepandgoats.com and http://www.slideshare.net/schoenian/the-five-point-check**.** The basic Five Point Check® for goats or sheep will train your eyes to spot problems more quickly. Then, you can use inexpensive tools to prevent costly mistakes. If you cull the problem animals, your flock or herd will flourish. Then you can start using a serious grazing system. For help with the Five Point Check®, please contact your local Farm Outreach Worker. Contact information is listed on the last page of this newsletter. ■

Minimizing Home Food Waste

By Joyce Rainwater, Farm Outreach Worker

According to the U.S. Environmental Protection Agency (EPA), in 2012, Americans "threw away a fifth of the food that was grown, harvested and bought" (Boehrer 2014). That is a lot of waste. In the previous issue of *Down to Earth*, the article "Minimizing On-farm Food Waste" discussed strategies for farmers to lessen food waste on their farms. Similarly, this article looks at consumers and homeowners, discussing strategies to lessen food waste at home.

❑ Make sure you know how long foods keep

This is important to know, not only for food safety, but to keep in mind when you are buying. It might seem like a good idea to buy extra peaches when they are on sale. However, if this quantity is more than you can eat or process in a week, then those peaches will spoil. In that case, you have wasted the money that you thought you had saved by buying more.

❑ Write a weekly grocery list

Do an inventory of your pantry and refrigerator before you make your shopping list. Think of it as shopping in your home first. Plan your menu and list the items you already have and need to use. This will eliminate much waste.

❑ Only shop when you are NOT hungry

This sounds simple, and it is. Make your list and shop when your stomach is full. This will keep you from purchasing items on impulse that are not needed. Remember your list and stick to it!

❑ Buy based on need

Buy only what you and your household can eat within the shelf life of the item. Do not buy more of something because it is lower in price if your family cannot eat it before it spoils or expires. A good section of the store to visit is the bulk foods section, where you can purchase only the amount you need.

❑ Reorganize so that older grocery items are in front

Take a little time, and rearrange the items in your refrigerator and pantry. Put the oldest in the front and the newest in the back. This can save money and reduce waste. Using this process will eliminate your finding old canned goods that have expired because they have been repeatedly pushed behind the newly purchased items.

❑ Learn to use all parts of produce

Food stretches more when you learn to use all of your produce and meat. Beet tops, for example, make a great side dish. And bones from your meat products can be used to create great stock or add flavor to many dishes.

❑ Be creative when reusing leftovers

Get creative, and use leftovers from one meal to create another new meal for yourself. With some creativity, one night's grilled chicken breasts can be turned into the next night's tacos.

A home canned goods shelf containing (from top to bottom, left to right) salsa, pickled beets, pickles and canned peach slices.

❑ Learn to freeze, can and preserve

If you buy extra produce when it is on sale, then preserving it through freezing or canning is a great way to make it last longer and enjoy it throughout the year. Most Extension offices hold classes year-round on preserving produce safely and properly or, you can find many resources online.

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Food Waste (continued)

❑ **Learn to grow your own**

Many people have no idea about the time, energy and skill it takes to grow your own food. Try growing even just one type of produce and adding it to your diet. Even if gardening is not something you enjoy, it will give you fresh produce. Plus, you will know where your food came from. Learning the amount of work that went into producing the food you buy might make you appreciate it more and waste less.

❑ **Donate foods that are about to expire**

Keep in mind those less fortunate people in your community. Food pantries and community organizations that serve meals are always looking for donations. If you have food that will spoil before you or your family can eat it, consider helping out these local groups and your community.

❑ **Compost unused foods**

No matter what you do, there will always be some food waste. Learn to compost these food scraps instead of throwing them in the trash. This keeps these products out of landfills and provides good compost for your soil.

By following these simple tips, you can reduce your food waste. This saves you money, as you will buy less food. It also reduces methane emissions from landfills and lowers the carbon footprint. Reducing in-home food waste conserves energy and resources. In addition, it supports your community when you think ahead and donate food that would otherwise have gone to waste.

Contact your local Farm Outreach Worker if you are interested in learning more about any of the abovementioned topics.

References

Boehrer, K. "11 Easy Ways to Reduce Food Waste." Last modified Nov. 19, 2014. http://www.huffingtonpost.com/2014/11/19/reduce-food-waste_n_6186410.html. ■

In the Spotlight: Boua Vang, a Hmong Farmer (continued)

education. "I realized that I was too old to return to school, so I began to study and eventually earned my GED. In the process, I taught myself English." From there, Vang worked as a paraprofessional for 16 years. He then moved to Merced, California, and took a job teaching. At the same time, he was a translator for other Hmong in area hospitals and other public service venues. In 1997, two of Vang's brothers moved in with him in California. He also had family members in Michigan who worked in the automotive industry. So, he moved to Michigan to work in that field. During this time, Vang also started a janitorial business. He quit his job in the auto industry because of layoffs but had to seek employment to get insurance benefits for his family.

In 2007, Boua Vang and his family moved to Southwest Missouri where he took a job at Fasco, Inc. "We had family here in Southwest Missouri who owned chicken farms. It was at that point I became interested in farming. I remember thinking, '*This is something I would like to do. I want to own land and be my own boss. I want to own a farm. Now, I do*'." In December 2007, Vang purchased land and began his poultry farm. Along with poultry, Vang raises goats, pigs, beef cattle and horses. "I chose to raise these animals because this is what my parents raised when I was in Laos. This type of farming reminds me of home," says Vang. ■

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 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.

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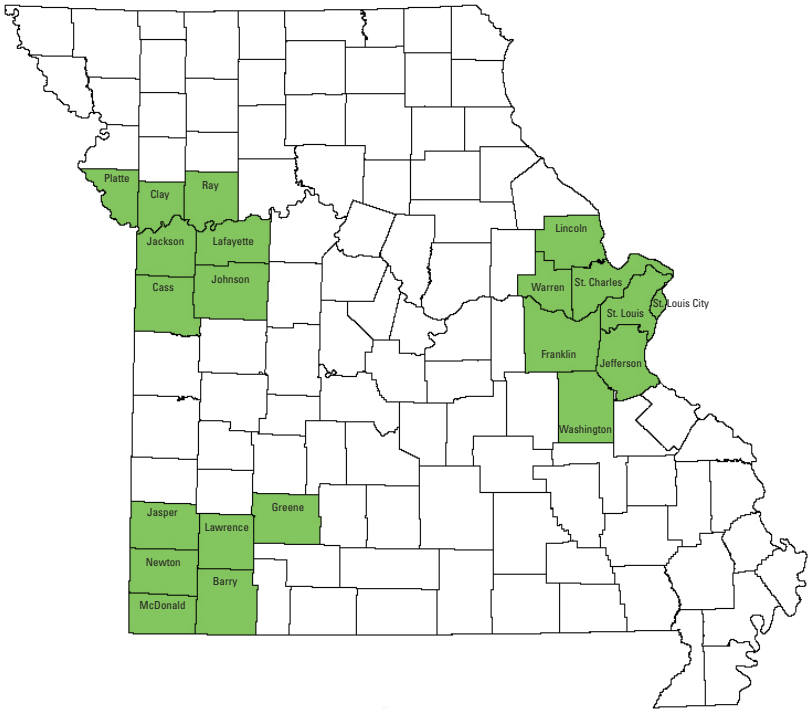
ISFOP Regional Map



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