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Down to Earth: Reports from the field

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

Management Practices to Reduce Heat and Drought Stress on Vegetables

by Miranda Duschack, Small Farm Specialist
and Dr. K. B. Paul, ISFOP Director and State Extension Specialist

The summer of 2012 was one of the hottest and driest in recent years, ending in drought throughout the state of Missouri. While many farmers, ranchers and gardeners suffered losses, others had plenty of harvest in spite of the weather. Farmers that combined water saving irrigation systems with soil moisture retaining practices faired the best in the heat. A small-scale vegetable grower may consider including some of the following proven methods into his or her production system for the next time around.

Heat stressed tomatoes inside of a high tunnel.

Increase Soil Organic Matter: Soils that are high in organic matter, that contain a large amount of completely decomposed plant and animal products, have the capacity to hold a lot of moisture. These rich soils have a crumbly texture and dark color, and contain a large amount of porous spaces that hold water for the crops to use as needed. Missouri soils generally contain two to three percent organic matter. Vegetable growers should make an effort to increase organic matter content to about five percent or even more. Manure, kitchen and garden wastes can all be used to increase the soil organic matter, but these should be thoroughly composted before adding to soil. Mix these composted materials with your soil to a depth of about six inches.

Mulch: One of the primary reasons of soil moisture loss is evaporation, the process in which surface water heats up under the sun's hot rays and vaporizes into the atmosphere. Some evaporation is unavoidable. However, too much evaporation may lead to water stress in plants and ultimately put their survival at risk. Adding mulch to the soil surface will block the sunlight and reduce evaporation. For vegetable, small fruit, or ornamentals, use natural materials that are free of weed seeds such as straw, dry leaves, newspaper, etc. Finished yard waste compost that has been screened to remove particles smaller than an inch in size is a great option (fine particles compact and potentially block air and moisture to plant roots). To apply, layer the mulch two-to-four inches deep around the base of the plant throughout the garden bed or row. When the natural mulch breaks down, the organic matter content of the soil will increase.

Plastic mulch does not allow rain or dew to pass through. Therefore, it should be used over drip irrigation lines. Wood chips and pine needles can be used around trees and shrubs. An additional benefit of mulch is that it will keep weeds under control.

Shade Plants: Growers can extend spring and summer harvest of some plants by growing them under partial shade. Shade cloth is a woven material made from polypropylene plastic. Different

(continued on page 2)

Inside this issue:

Reducing Heat and Drought Stress	1 & 2
Saskatoons	3
Noninsured Crop Disaster Assistance	4
Contact Information	4

Reducing Heat and Drought Stress *(cont'd from page 1)*

grades of shade cloth allow for varying degrees of shade. The standard shade cloth blocks 50 percent of the available sunlight. The cloth is held up over the plants by nine gauge wire hoops, poles, or spread over a high tunnel. Leave air space between the cloth and plant. Shade works well for salad mix, lettuce, arugula, and shiitake mushrooms. Cover tomato and pepper plants that do not have a lot of leaves to prevent the fruit from sun scorch. Put shade cloth over developing fall transplants to slow the growth rate and produce stronger plants.

Choose Heat Tolerant and Drought Resistant Varieties: Some plants are bred to withstand hot and dry conditions fairly well. These characteristics can be present in both heirloom and hybrid cultivars. Heat tolerant tomato cultivars (a cloned or hybrid plant) will hold their blossoms and develop fruit even in high temperatures. The Louisiana State University Agriculture Center recommends the following tomato cultivars: Phoenix, Solar Fire, Talladega, Sun Master, Heat Wave II, Bella Rose, Sun Chaser, Sun Leaper, Equinox and Florida 91. Jericho Romaine is a heat tolerant hybrid lettuce variety that, if properly watered and shaded, will develop without a bitter taste and grow to harvest size even in summer heat. Please check with your county Extension office or seed dealer for additional information.

Seeds can be acquired from the following companies: Johnny's, Burpee, Seed Savers Exchange, Territorial Seed Company and Totally Tomatoes. They will be labeled as heat tolerant or drought resistant.

Water Resources: As you know, water is essential to all living things including plants, animals and us! Farming without the guarantee of rainfall or water supply is always an uphill battle. It is very risky to plant a summer crop in Missouri without a dependable irrigation system.

In Missouri, we receive about 45 inches of precipitation annually. The problem is how the water is distributed. Often it does not rain when it is needed the most. Therefore, you should have a standby water supply system, just in case the crop needs water.

As a first step, you need to take an inventory of your water resources. Do you have access to a pond, lake or river? Are there any restrictions? What are the possibilities of digging a well? Then, you should consider water distribution. Water is a very precious commodity, so you will need to be aware of conservation practices. Therefore, surface irrigation may not be a good option because of evaporation.

Temporary Sprinklers, as shown above, can be easily installed to take care of heat and drought conditions.

Of all the available water delivery systems, drip irrigation has emerged as the system of choice for many vegetable and small fruit growers. The initial cost and installation charges may seem somewhat high, but benefits far outweigh the investments. The United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) has an irrigation cost-share assistance program. Please check with them to see if you qualify. Locate your NRCS home page from: www.nrcs.usda.gov/about/organization/regions.html#state and select programs.

It is impossible to discuss all aspects of water and irrigation management systems in such a short article. But it is important to be aware of these topics and to caution you against taking avoidable risks. For additional information, please visit the Extension and the NRCS offices in your county.

For additional reading, see *Drip Irrigation for Vegetable Production* by Penn State University Extension online at: http://agalternatives.aers.psu.edu/crops/Irrigation/DripIrrigation.pdf

Dr. Gu's High Tunnel Tips:

Plants with fruit have heat tolerant genes while others do not have such luck. Cherry tomatoes are more heat tolerant. Shade cloth can be applied in high tunnels. For tomatoes, 97°F is the upper limit for pollination. When temperatures are beyond 102°F, plants will not grow at all.

Saskatoons!

By Jim Pierce, ISFOP Farm Outreach Worker

If you are considering adding a fruit crop to your farm plan, there is a crop emerging for the midwest called saskatoons. There are many names for the saskatoon such as June berry, service berry and Amelanchier *(pronounced ah-ma-lawn-cher).* This deep blue to purple fruit is gaining consumer acceptance and offers a potentially profitable option for small-scale producers. The blueberry looking fruit is very healthy and high in fiber. It also has a high antioxidant value and is highly nutritious. The value-added producer will find that the berry lends itself to products such as jam, jelly, etc..

The Fruit: It is commonly referred to as a berry while technically it is a pome fruit related to apples, plums and cherries. The fruit is similar in size to blueberries. The fruit grows in clusters and ripens evenly for a once-over picking by machine or hand. The berries are an excellent source of vitamin C, manganese, magnesium, iron and a good source of calcium, potassium, copper and carotene. Because the small edible seeds are consumed, the berries are also high in protein, fat and fiber.

The Plant: The Latin name for Saskatoons is *Amelanchier alnifolia*. They are hardy perennials and grow as woody shrubs rather than trees. Saskatoons have been found to tolerate winter temperatures of -50° to -60°F and are considered very hardy. They are also drought resistant. Saskatoons are considered self-pollinated because they don't need bees to produce a crop. Pollination may actually increase the seediness of fruit. Flower buds are formed on wood in year one. Fruit set (when flowers on a plant or tree produce fruit or not after pollination) occurs the following spring forming clusters. Height varies from 1 to 18 feet depending on variety and pruning management. Saskatoon tolerates a wide range of soil types. At one time, Saskatoons were found throughout their native range which included Missouri. The ideal pH range is 5 to 8. Today they are grown commercially in Canada, while in the US they are grown on limited acreage in the north and northwest states. When buying plants, choose those produced from cuttings, division or tissue culture. Plants could stay productive for up to 50 years. Planting should ideally occur in early spring.

Production: Saskatoons are considered wild and there is little literature on production settings. They do tolerate a wide range of conditions and practices. They will do better on a well drained site. This means a soil that does not hold water for an extended time or a soil that has been amended and hilled before planting. A site that has a gentle slope of 1-3 degrees will also facilitate air drainage which will help avoid late frost damage.

Like any crop, enhancing the site where they grow will result in higher yields. Fall application of fertilizer is not recommended as it will promote vegetative growth that will not survive the winter. Therefore, it is recommended to fertilize before planting and early every spring. When considering the economics of applying fertilizer remember higher yields don't necessarily equal more profit. A close evaluation of production costs and resulting income needs to be done when considering applying inputs such as fertilizer. Pruning should be kept to a minimum. Remove dead and diseased branches in early spring.

Thinning the middle to facilitate air movement through the bush will help in preventing diseases that start in the leaves. You can plant around 880 per acre with rows at least 10 feet apart and, depending on farm equipment, 3 to 5 feet in row spacing, reducing competition from weeds that affect marketable yields. Some mulch choices to consider are plastic, woven weed barrier, and organic such as straw and wood chips.

Some mechanical methods for weed control are mowing or cultivating. As a last resort some herbicides are labeled for Amelanchier. Plants begin bearing in their third year with significant yields beginning in the fifth year. Average yields of 3,000-5,000 pounds per acre with well managed orchards reaching 28,000. Fruit is commonly sold for around $2 a pound. Northline, Smoky and Honeywood are the predominant varieties that can be found from orchard stock. Honeywood will produce large fruit while Smoky is commonly suggested for medium sized fruit in a commercial orchard.

Demand/Marketing: According to the USDA, a diet diverse in fresh fruit and vegetable consumption leads to better health. In the US there is a growing awareness of eating locally grown fresh produce for good health and consumers are demanding fresh, local fruits and vegetables. The versatile Saskatoon can be used for fresh consumption or processed adding value in the form of jams, jellies, pies, syrups, muffins and wine. The opportunity exists to market this fruit as high fiber, antioxidant and vitamin C rich. The potential market channels are U-pick farms, farmer's markets, wholesale, or processed into a value added product.

More information can be found at: http://www.prairie-elements.ca/saskatoon/14.3-quality.pdf

Missouri grown Saskatoon berries shown above.

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 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.

How to Contact East Central Regional ISFOP Farm Outreach Workers:

- **Miranda Duschack,** East central Regional Coordinatoor, St. Louis County and City

DuschackM@LincolnU.edu

(314) 604-3403

- **David Price,** Lincoln and St. Charles Counties

PriceD@LincolnU.edu

(636) 358-7097

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

HurstJ@LincolnU.edu

(660) 216-1749

- **Joyce Rainwater,** Jefferson and Washington Counties

RainwaterJ@LincolnU.edu

(314) 800-4076

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

LINCOLN University 1866

Cooperative Extension

Box 29

Jefferson City, MO 65102-0029

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Lincoln University Cooperative Extension (LUCE)
Ms. Yvonne Matthews
Interim Associate Administrator

ISFOP Campus Staff

- Dr. K.B. Paul, ISFOP Program Leader
- Dr. Sanjun Gu, Associate Program Leader and State Horticulture Specialist
- Vonna Kesel, Program Secretary

Publications are available upon request. Contact Pamela Donner, Media Center Coordinator at: DonnerPJ@LincolnU.edu

USDA United States Department of Agriculture National Institute of Food and Agriculture

Noninsured Crop Disaster Assistance Program (NAP)

By Sheria Yancey, Executive Director, Franklin County Farm Service Agency (FSA)

Farming is a risky business. A farmer has to deal with many uncertainties over which he or she has very little control. This is especially true when it comes to weather: too much rain at planting or harvesting time, prolonged periods of heat or drought, hailstorms—any of these could result in crop loss. Then there are disease or insect infestations that could have a devastating effect on crop yield. To provide a safety net to the growers against these unanticipated crop losses, the USDA's Farm Service Agency (FSA) has introduced the Noninsured Crop Disaster Assistance Program (NAP). NAP is a federally funded program that provides financial assistance to producers of noninsurable crops when low yields, loss of inventory or prevented planting occur due to a natural disaster. NAP is only available for crops for which the catastrophic level of crop insurance is not available. If you are applying for coverage, you must file at your local FSA office by the eligible crops application closing date.

Application closing dates vary by crops. In 2012, the closing dates for some select enterprises have been set as follows:

September 1: aquaculture, Christmas trees, ginseng root, turf grass sod, mushrooms, floriculture, and greens.

September 30: strawberries, fall seeded forages and small grains such as annual rye, barley and wheat

November 20: apples, apricots, blueberries, grapes, nectarines, peaches, pears, plums, and prunes

December 1: honey

December 31: potatoes

March 15, 2013: all other crops (for crops not listed above, please contact your area FSA office)

The NAP service fee is the lesser of $250 per crop or $750 per producer (growing three or more eligible crops) per administrative county, not to exceed a total of $1,875 for a producer with farming interests in multiple counties. Limited resource producers may request a waiver of service fees. To qualify for an administrative service fee waiver, the producer must meet certain criteria. For example, he or she should have a household income of less than $25,696 in 2009 & 2012, and also the gross farm sales should have been less than $163,200.

Eligible natural disasters include such things as damaging weather, such as drought, freeze, hail, excessive moisture, excessive wind, and flooding. The natural disaster must have reduced the production by more than 50 percent; or prevented the producer from planting 35 percent of the intended crop acreage. NAP payments are calculated by unit using the crop acres, approved yield, net production, and 55 percent of the average market price of the specific commodity established by the FSA state committee and a payment factor if the crop is not harvested or if it was unable to be planted.

Contact your local Farm Service Agency for all the NAP crop insurance details. The above descriptions clearly emphasize the importance of good record keeping in farming operations. Without proper records, you will never know if you are making or losing money! And if you ever need a loan, or wish to apply for one of the many government assistance programs, you will have to provide adequate, easy to understand farm records.