



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

Management Practice to Reduce Heat and Drought Stress on Vegetables

By Miranda Dushack, 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 fared 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.

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 *(continued on page 2)*

In the Spotlight: Nile's Home for Children

By Katie Nixon, Small Farm Specialist

Nile's Home for Children was founded in 1883 and has been a safe place for children to come ever since. Located in the heart of Kansas City Missouri, a productive farm is not something most people would expect to find when they first arrive at Nile's, but that is part of the magic of the Nile's Garden.

The project was started in 2006, through the vision of the farm manager, Marty Kraft. From its inception, the garden has been designed with nature in mind. Kraft follows the practice of no-till gardening and is constantly thinking about how he can enhance the natural environment around the garden to benefit the annuals and perennials that are cultivated there.

The garden is a place for the children that live at Nile's and others who come daily to experience the natural world as well as learn about where their food comes from. On any given day at the garden, you will find young people working with Kraft to plant, harvest, and consume or-

ganically grown produce. The strawberries were so prolific this year that the children could not pick them fast enough.

The other aspect of the garden is the entrepreneurial opportunity offered there. The children have the opportunity to sell the produce, which they helped grow, at the weekly seasonal farm stand. People from the neighborhood and staff from Nile's support the farmers market taking home fresh vegetables to their families. For some customers this is the only source of fresh produce for miles as there are no supermarkets in the area.

Recently, Nile's Garden received a Get Growing Kansas City (GGKC) mini- *(continued on page 4)*



Marty Kraft inspecting the tomato plants inside his high tunnel.

Down to Earth: Reports from the field

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

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 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



Heat stressed tomatoes in a high tunnel.

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 Ro-

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.

maine 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 dis- (continued on page 3)

LOOKING FOR HAY?

If you are having trouble locating hay in these dry and lean times, check out the resources below:

Missouri Dept. Of Agriculture (MDA) Hay Directory-several states listed-see right sidebar: <http://mda.mo.gov/abd/haydirectory/>

Use this site to place your "need hay" or "have hay" ad on USDA/FSA website:

<http://www.fsa.usda.gov/FSA/webapp?area=online&subject=landing&topic=hay>

APHIS alert about fire ants from quarantine areas:

<http://www.aphis.usda.gov/BaledHayIndustryAlert.pdf>

Internet Hay Exchange-many states listed:

<http://www.hayexchange.com/>

Hay and other Missouri products-free registration for membership to see all products: <http://www.missouriexchange.com/index.php>

Feed and nutrition page for dairy cattle from MU:

<http://agebb.missouri.edu/dairy/feed/>

**CONTACT YOUR LOCAL LINCOLN UNIVERSITY ISFOP
FARM OUTREACH WORKER!
WE CAN HELP!**

Heat and Drought Stress . . . (cont'd from page 2)

tributed. 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.

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 Ex-

tension 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>



This picture shows sprinklers, which can be used in hot conditions. Temporary sprinklers can be easily installed. It should take care of both heat and drought conditions.

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.

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:

- 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

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Nile's Garden. . . (cont'd from page 1)

grant equaling \$2,500. These grants are awarded through the GGKC program with funding from the Health Care Foundation of Greater Kansas City (HCF). In one of HCF's funding cycles, they saw many requests for the building of community farms and gardens. The reviewers, not being growers themselves, wanted the proposals to be looked at by more experienced eyes. At their suggestion, the GGKC campaign offers these mini-grants.

In mid-March of 2012, Nile's Home for Children implemented the major part of its GGKC mini-grant request, which was buying the materials to build a high tunnel. The high tunnel design is similar to the tunnels found on Foundation Farm in Arkansas, which is owned and operated by Patrice Gros, a well-known no-till farmer. Kraft followed the same no-till practices and wanted to also replicate the high tunnel design Patrice had developed.

The tunnel is fairly simple, using galvanized pipe, wooden hip boards, and greenhouse quality plastic. The total cost was less than \$1,400 and took two days to construct. The construction of the tunnel was turned into a community event. People were invited to participate and learn how to build the same on their farm or garden. Patrice Gros came from Arkansas to supervise and teach. Most of the participants were farmers wanting to build low-tech high tunnels like this one to increase production on their farming operations.

Kraft started using the tunnel right away, planting tomatoes and peppers. He has planted crops which will overwinter in the high tunnel so that he can harvest throughout the winter and into the spring. The tunnel adds a new dynamic to the Nile's Garden and increases the possibilities of what can be grown and when.



Building the high tunnel at Niles's Garden in March 2012 led by Patrice Gros (shown on ladder).

The third round of mini-grants has just been awarded. Look for more news on the exciting projects coming out of that grant cycle. There are still two more rounds for mini-grant funding. For more information on these GGKC grants visit: www.getgrowingkc.org