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From the Editors

by Marilyn Odneal, Managing Editor

Right now we are watching and waiting to see how we recover from the freeze and we will continue reporting on this subject throughout the season. On the brighter side, we have some great articles on blueberries, bush cherries and gardens and Kate Keeley shares her site selection toolbox while James Quinn presents an interesting study on how home landscaping practices impact the soil. Remember always that you can sign up or sign off the Berry Basket at <http://mtngrv.missouristate.edu/newslet.htm>

Berry Basket Newsletter Staff:

Patrick Byers, Gaylord Moore & Marilyn Odneal
Pamela Mayer - proofing, layout and mailing list.

Paula Diggs - printing

Rita Lopez - posting and sending.

Please direct comments to:

Marilyn Odneal

Missouri State University - Mountain Grove
9740 Red Spring Road

Mountain Grove, MO 65711-2999

phone: 417-547-7513, fax: 417-547-7540

e-mail: MarilynOdneal@missouristate.edu

Internet: <http://mtngrv.missouristate.edu>

The Easter Freeze of 2007

By Marilyn Odneal, Patrick
Byers, and John Avery
Missouri State University

Freezing temperatures from April 3 through 7 were devastating to fruit growers whose crops were more advanced in development than usual. **Pat Guinan**, Missouri State Climatologist, commented: "I cannot recollect a period during this time of year where we had such an abrupt transition in temperatures that were averaging 20 degrees above normal to 20 degrees below normal. Some locations across the state were experiencing record highs last Tuesday (April 3) and were setting record lows 4 days later (see Fig. 1). It's nothing short of incredible.

What made this situation even more troubling was that all the cold weather had come on the heels of an unusually long warm period. In fact, preliminary numbers indicate it was the third warmest March on record for Missouri and the warmest in over 60 years for the state. For example, the average high temperature for the last 11 days of March in Columbia was 75° and the average low temperature was 57°, nearly 19° above normal for the period and more typical of the last week of May. It appears we have witnessed a weather scenario that was unprecedented since records began (118 years ago)."

Patrick Byers, Fruit Grower Advisor, noted that "Peach bloom began in mid March, 10 days earlier than normal. Even more surprising was the apple bloom, which began on March 29, easily 14 days earlier than normal. Other fruit crops were similarly advanced in development."

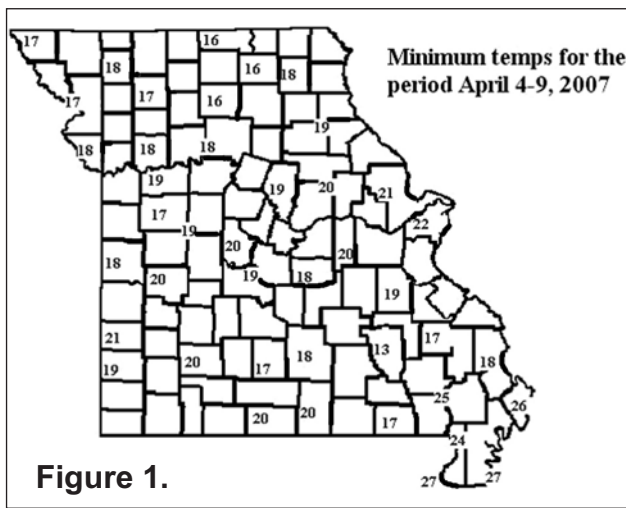


Figure 1.

were about 15 to 20% blossom. Some of his rows were uncovered, some were covered with a single layer of one-ounce row cover and some were covered with a double row of one-ounce row cover. “The uncovered rows were the most severely damaged - the crop is gone and I am think I lost some plants. Under the single row cover, it looks as though I may get 25% of a crop. The good news is that under the double row cover, I hope to get 50 to 75% of a crop.” Wayne tried the double row cover based on what he learned from North Carolina and Arkansas strawberry growers.

John Avery, Research Associate and field supervisor at the State Fruit Experiment Station at Mountain Grove noted “A complete loss of the traditional fruit crops at the station this year. We reached a low of 17°F (see Table 1) and there is not much you can do to protect blossoms and newly set fruit from damage in that case.” **David Diebold**, an orchardist in southeast Missouri, noted a complete economic loss of his peaches, apples and pears. “I come across and occasional live peach bud, but I would say I only have 0.0001 percent of a crop. The apples are lost and as for the pears, I didn’t even have to get out of the truck to see that they were gone - I just rolled down the window.”

Wayne Simpson, a strawberry grower near Mountain Grove, noted that his ‘Chandler’ plants, grown in the annual plasticulture system,



Wayne Simpson checking strawberries for freeze damage.

Table 1. Fruit Experiment Station temperature. *Weather observer - John Avery*

Date	High	Low
4/1	68	49
4/2	74	48
4/3	80	57
4/4	80	31
4/5	48	27
4/6	47	28
4/7	47	17
4/8	38	20
4/9	46	21

Patrick Byers has also assessed strawberry damage in the state. “Missouri growers produce strawberries under several different systems, including perennial matted row, field plasticulture, and plasticulture in high tunnels. Growers with perennial matted row and field plasticulture report levels of damage that range from 50% to over 90% damaged blossoms. Growers reported using single and double layers of heavy row cover in attempt to protect the blossoms, and a few growers sprinkler irrigated plants. The damage was evident within 2 days of the freeze as blackened pistils and receptacles. While many growers will produce

some percentage of a full crop, these plantings (especially plasticulture plantings) will be marginally profitable at best to manage.”

Byers continues: “A recent development in strawberry production systems in Missouri is the use of high tunnels in combination with annual plasticulture. I visited five high tunnel growers in northwest Missouri after the freeze. The plants had primary and secondary fruit already set when the freeze was predicted. In preparation for the freeze these growers placed two layers of rowcovers over the plants. Several of the growers also provided supplemental heat in the high tunnel, while others did not. According to thermometers placed at the soil level, the temperature under the two layers of row cover did not drop lower than 32°F, while the outside temperature ranged from 17-20°F. A few damaged flowers were noted along the outer rows of the high tunnel, but initial damage estimates ranged from less than 1% to 10% damaged flowers.

An unknown factor at present is the amount of crown damage if any. We will be assessing crown damage in the future.”

The damage to grapes was summed up as “Bad, bad, bad!!!” by **Robert Mueller** of Röbblers Vineyard Winery at New Haven, Missouri. **Sonny McMurtrey** who owns and manages 75 acres of grapes with his wife, Joyce, just north of Mountain Grove, said “I won’t be taking the harvester out this year.” Sonny observed that every bud that was not in tight scale was injured. “If it started to push, it was killed. I have observed browning of the vascular tissue to the buds and dead primaries, secondaries and tertiaries. The canes do not look damaged at this point and I have not observed sap flowing from the trunks, which is a good sign, but it is still too early to tell about trunk damage. If I can get 3 to 4 good shoots per vine, I think the vineyards will recover.” Sonny stressed the importance of monitoring the surviving buds for insect damage early in the season. “You don’t want to lose the buds that survive to climbing cutworms.” **Andy Allen**, State Extension Viticulturist, notes “While our



Freeze injured primary shoot on grape.

initial estimate was that we would suffer a loss of about 85%, we have revised it upward to around 95%. As we have had the opportunity to examine more vines in depth we have seen more bud injury than in early evaluations. Trunk injury is still a big question mark right now; I believe the possibility is certainly there, especially with some of the less hardy varieties on less than optimal sites. We are currently advising growers not to do any trunk suckering until it is ascertained whether or not they have experienced trunk injury, as those suckers may be needed for replacement trunks. We will be discussing maintaining vine health and managing vineyards for recovery from whatever level of damage they have suffered at all of our tailgate meetings this year.” (See <http://iccve.missouri.edu> for meeting schedule).

Dr. Ben Fuqua, who has worked in blueberry research for over thirty years, said “It doesn’t look good, but I have seen a few live buds in my trial. The next few weeks will tell us how much is lost. When you get temperature in the low twenties, you know it is serious.” Blueberries, mostly in full bloom in Lampe, Missouri, where **Earnie Bohner**, of Persimmon Hill Farm, has suffered a total economic loss on blueberries. “I may find a live bud here or there, but economically, the crop is gone.” Earnie also produces and markets value added jams, jellies and sauces and estimated those sales to suffer due to the loss of the main draw to his farm

- fresh blueberries. "I hope to find alternative sources of fruit this year to continue to supply my customers, but that will be difficult."

Earnie notes as far as blackberries, which bloom later in May, "we will have to wait and see, but it seems that they have fared pretty well so far." Wayne Simpson also has some blackberries but noted dead flower buds on everything but the Triple Crown. There may be some secondary crop and time will tell what percentage of the blackberry crop will be lost.

It is also a sad time for ornamental enthusiasts. Just before the freeze, we visited the Missouri Botanical Garden where the tulips were in full bloom and the azaleas were just about to peak. **Chip Tynan**, the Missouri Botanical Garden Answer Man, in (excerpts from) an email to MBG members on April 9th recommends "in the aftermath of the recent record-breaking cold spell, gardeners must be patient with their damaged plants, especially our trees and shrubs. At this time it appears the worst injury is limited to open flowers, new buds, and new foliage. Spent flowers will be shed and most of the damaged leaves will continue to deteriorate in the days ahead, eventually drying up and falling off. Perennials with damaged leaves and stems can be cut back to the ground and will respond with rapid new growth. However, resist the temptation to prune frosted trees and shrubs. (Also) Resist the temptation to fertilize heavily. With the loss of flower buds, all of the trees energy will be channeled into vigorous vegetative re-growth. Reducing water stress may be the single best thing you can do to help your plants recover this summer."

Scott Woodbury, of the Shaw Nature Reserve noted that "many of the native plants in bloom in the wildflower garden were not damaged by the freeze! Oak, persimmon, redbud, and hickory trees were another story. Cold got the flowers on them and I suppose it will be a poor fruiting year. Off the top of my head here is a summary of what I'm seeing in the Whitmire wildflower garden today (April 13). The following plants were in bloom or fruit last weekend.

Flowers/fruit and foliage not affected at all: Jacob's Ladder, Blue-eyed Mary, golden ragwort, false rue anemone, barren strawberry, wild strawberry, wild sweet William, wild columbine, wild ginger, serviceberry (fruit), leatherwood (fruit), hairy buttercup, wild hyacinth, false onion, hoary paccoon, western wallflower, golden Alexander, carex spp, sand phlox, Ozark spiderwort, yellow honeysuckle (in bud), (maiden hair fern, wood fern, fragile fern, lady fern, royal fern)

Flowers damaged (25-50% die-back) /foliage not affected: celandine poppy, bluebells, red buckeye, Ohio buckeye, wild geranium, wild geranium, Virginia spiderwort, flowering dogwood, green hawthorn (in bud), pagoda dogwood (in bud), paw paw, (Christmas fern, broad-beech fern)

Flowers and foliage damaged (50-100% die-back): bellwort, redbud, all oaks except bur, (ostrich fern, sensitive fern)

Trees/woody vines that were not in flower but foliage died back 100% include persimmon, hickory, hackberry, some fringetrees, elm, sycamore, American wisteria, and willow.

Trees/woody vines that had not leafed out yet include walnut, yellowwood, bur oak, black gum, supplejack, pipevine, Carolina moonseed, and bittersweet.

Basically nearly all other shrubs and herbaceous native plants leafed out but not in flower were unaffected by 22°F except American spikenard." **Dallas Dawson**, a Tri-County Master Gardener at Mountain Grove, noticed the loss of oak flowers on his land as well. "The loss of fruit and nuts will definitely affect our wildlife."

Some people are calling this the Fifty Year Freeze. Others are calling it the Easter Freeze. Still others, the Freeze of 2007. Whatever you call it, it was bad and we hope not to see one like this again. We look forward to the recovery of our crops and ornamental plants and will follow the recovery and management of freeze injured crops in future issues of the Berry Basket.



Cold injured apple blossoms



Cold injured peach fruit



Freeze injured strawberry fruit



Healthy strawberry leaf at left next to cold injured leaf at right



Healthy strawberry blossoms



Cold injured strawberry blossoms will not bear fruit.

Editor's note: Please send any observations on the spring freeze and recovery to us at MarilynOdneal@missouristate.edu for possible use in future articles.



Note the line of demarcation between strawberries that were covered with row cover (top) and strawberries that were not (bottom) at Wayne Simpson's Farm.

Growing Blueberries - Organic or Conventional Production?

By Ben Fuqua

Professor, Soil Science

Missouri State University

Blueberries are a crop in high demand by consumers. Blueberries are delicious when eaten as fresh fruit or processed into pies, muffins, jams and other “value-added” products; they are also good for you - a “healthy” food choice. While highbush blueberries have been grown in Missouri for more than 30 years, in 2007 the demand for fresh blueberries is still far greater than the supply. Blueberries are a “fun crop” to grow and despite specific challenges (e.g., cultural requirements for blueberries are rather exact, long-term investments in money and labor are required, and yields are always dependent on weather and other uncontrollable environmental factors) can be successfully grown using either conventional (chemical) or organic production systems. While many of the cultural recommendations for growing blueberries organically are identical to those for conventional production, other practices require a completely different approach in order to produce high yields of quality berries

Similarities:

1. Site selection and soil preparation: A good blueberry site should have a well-drained, high organic matter soil with a pH between 4.8 and 5.2, be located in an area of full sunlight, have good air circulation, be free of “frost” pockets, and be close to a clean, adequate water source. While very few sites in Missouri possess all these characteristics, the soil's physical and chemical characteristics can usually be sufficiently modified to grow blueberries. For example, incorporation of winter and summer cover crops will increase the organic matter content of soils, setting plants on 10-15 inch high berms will improve drainage around the

plant roots, and the pH can be adjusted (lowered in most soils) to meet the 4.8-5.2 requirement.

Site preparation for either production system should be done well in advance of actually planting the blueberry plants. Two or even 3 years may be needed to get the soil ready to grow blueberries. During this time, emphasis should be placed on increasing the soil organic matter content, adjusting the soil pH, eradicating perennial weed such as Johnsongrass and Bermudagrass, forming berms, and locating irrigation, fertilizer, and harvesting supplies. Developing a sound marketing plan should also be done early in the planning process and certainly BEFORE plants start producing fruit.

2. Variety selections and planting: The same blueberry varieties can generally be grown using either conventional or organic systems. The most important concern is that the variety selected be adapted to the climate conditions in which the plants will be growing. Visiting with blueberry growers in the area, seeking advice from University Extension Horticulturist and other blueberry researchers are invaluable when choosing good varieties to plants. Growers should only purchase plants from reputable nurseries to insure good, healthy plants.

Planting follows the same processes for both conventional and organic production systems. Some organic advisors recommend using more peat moss (approximately 1/3 more) in the planting hole to give roots additional space to grow and apply more (2-4 inches more) mulch around the plants.

3. Marketing: Selling blueberries is probably the easiest and the most enjoyable part of the blueberry operation. Both conventionally and organically grown blueberries practically "sell" themselves. Consumers will get up early and drive considerable distances to pick and buy blueberries. Most of the blueberries in Missouri are sold by U-Pick, although on-farm and organized farmers' markets are also viable options for selling fresh berries. Organically grown blueberries do have one major advantage; they commonly bring 20-25% more than conventionally grown blueberries. For growers

willing to put forth the effort and time to grow and market organically grown blueberries, an expanding market for consumers wanting "non-chemical" fruit is rapidly developing. Organic growers must follow certain rules and regulations (USDA National Organic Program standards) to market blueberries as "organically grown". Since the Missouri Department of Agriculture no longer certifies organic growers, blueberry growers must be certified by an independent certifying agency to legally advertise and sell "organically grown" blueberries.

Differences:

Fertilization, disease control, insect control, and weed control methods are obviously going to differ for organic and conventional blueberry production systems. While there are several good organic and chemical fertilizers available to supply nutrients to blueberry plants, the choices for controlling diseases, insects, and weeds are more limited, particularly for organic growers.

1. Fertilization: Organic growers have a number of fertilizers to use for providing nutrients to blueberry plants. Feather meal, blood meal, soybean meal, cottonseed meal, and fishmeal are all good sources of nitrogen, while steamed-bone meal and seaweed are good organic sources of phosphorus and potassium, respectively. Mined materials such as potassium chloride and rock phosphate and some synthetic products such as sulfur, magnesium sulfate, soluble boron and most micronutrient sources (no nitrates or chlorides) are permitted in the organic production standards. Composted animal manure is not recommended for blueberry production because of their high content of base-forming nutrients that tend to increase the soil pH above the recommended 4.8-5.2 ranges. Conventional growers also have a number of chemical (mined and synthetic) materials to provide needed nutrients. Fertilizers such as ammonium sulfate, ammonium nitrate, and urea can be used to supply nitrogen; triple super phosphate and

diammonium phosphate provides phosphorus; and potassium chloride and potassium sulfate will supply potassium. Many other chemical sources are available to supply needed macro- and micro-nutrients.

Major differences between organic and chemical fertilizers occur in the amount of fertilizers needed and the timing of the fertilizer application. Since organic fertilizers generally have a lower (%) nutrient content than chemical fertilizers, larger amounts the fertilizer must be applied to provide the proper amounts of plant nutrients. Organic fertilizers have to be broken down (mineralized) to make nutrients available to plants, so fertilizers must be applied several weeks before plants actually need the nutrients. The mineralization processes takes time and depends heavily on the microbial activity in the root zone and only 30 to 50% of the nutrients in organic fertilizers will be mineralized in the year of application, thus again making the higher application rates necessary. For example; to supply 90 #/A of nitrogen (assuming a 50% mineralization rate) would require 1400 pounds of feather meal (13% N) or 2600 pounds of soybean meal. In comparison, the same 90 #N/A requirement could be met by applying 430 pounds of ammonium sulfate (21% N), a chemical fertilizer. Ammonium sulfate is also water-soluble (as are most chemical fertilizers), making the nitrogen immediately available for root uptake.

The positive side of the large amounts of organic fertilizers required during the first year is that rates may be reduced in subsequent years as a gradual buildup of nutrients occurs over time. Regardless of whether growers use organic or chemical fertilizer, regular soil and leaf testing are still recommended as an essential tool in monitoring the nutrient status of blueberry plants.

2. Weed Control: Weed control is difficult - in both conventional and organic production systems. Controlling weeds between rows and within the blueberry row can be accomplished by using a number of mechanical and/or chemical means. Maintaining a 4-6 inch deep

mulch layer around plants greatly helps reduce weed pressures as well as conserves soil moisture for plants. For organic growers, weed control is primarily done by shallow cultivation, hoeing, or hand weeding. Other control methods, including "weeder geese", smothering weeds with plastic or cardboard, "weed barrier" fabrics, flaming, and some approved sprays (such as vinegar) have been tried, but with varying levels of success. For conventional growers, there are many herbicides registered for use in blueberry plantings. Preemergence herbicides can be applied to the mulch surface to prevent weed emergence (generally early spring), while postemergence herbicides are mostly used for "spot" treatments in controlling weeds growing later in the year. When using chemicals to control weeds, growers are reminded to always read and obey instructions on the herbicide label. The label is the law!

3. Insects and Diseases: Diseases (to date) haven't been a major problem in Missouri. Good site selection, proper soil preparation, buying healthy plants, and good sanitation practices go a long way in preventing major disease problems. When diseases become severe enough to warrant control measures, there are several compounds that can be used. For organic growers, synthetic compounds, such as copper sulfate, hydrated lime, elemental sulfur, lime-sulfur and selected horticultural oils (dormant, suffocating, and summer oils) are approved for disease control. While conventional growers also use many of these same compounds to combat plant diseases, there are additional inorganic (chemical) formulations available on the market. Growers should always follow directions on how to safely apply these materials to avoid damaging blueberry plants or berries.

For many years, very few blueberry growers had insect problems severe enough to warrant using control measures. However in the past 3 years, Japanese beetles have damaged several blueberry plantings in Missouri and are becoming more widespread each year. Japanese beetles (as well as other insects) do a great deal of damage to ripening fruit, so a good insect

control plan should always be in place. For organic growers, there are several mechanical and biological control measures that work in controlling many insect problems. Insecticidal soaps, horticulture oils, lime-sulfur, sticky traps, “trap crops”, and growing adjacent plants that attract beneficial insects are just a few measures that have proven to help reduce insect populations. Conventional growers usually rely on various chemical formulations (insecticides) for insect control. Again, growers must read and follow the label to legally use these chemicals.

Summary: So which system, conventional or organic is right for you? While there are both advantages as well as challenges in growing blueberries using either system, the choice is yours. In my opinion, Missouri blueberry growers should not have any difficulty selling all the fresh blueberries they can produce in the foreseeable future, regardless of the production system used. It has been proven that both conventional and organic methods of growing blueberries work in Missouri. The ultimate goal of both production systems is to produce high yields of quality blueberries.

Contact information for authors in this issue:

John Avery - JohnAvery@missouristate.edu

Patrick Byers - PLByers@missouristate.edu

Ben Fuqua - BDF800@missouristate.edu

Kathryn Keeley - KeeleyK@missouri.edu

Marilyn Odneal -

MarilynOdneal@missouristate.edu

James Quinn - QuinnJA@missouri.edu

Jennifer Schutter - SchutterJ@missouri.edu

Soil Testing Reveals Impact of Gardening Practices

*James Quinn, Regional Horticulture Specialist, and Manjula Nathan
Director MU Soil Testing & Plant Diagnostic Service Laboratories*

An interesting duty of a Regional Specialist is to review soil test reports for the area. For Horticulturists that involves the lawn and garden samples as well ones by fruit, vegetable, turf, and ornamental growers. Gardeners often take soil samples if they are having a problem, doing a landscape project, or when it pertains to an area of great interest- i.e. vegetables or roses. Usually only one sample is submitted, sometimes two, and rarely three or more. Have you ever wondered how much your soil might vary across your garden and yard?

As an avid gardener living at the same place for 10 years, I thought my yard would provide a good location to explore this issue. I've done what other gardeners with a range of interests might: improved the soil in the annual flower beds, started a raised bed vegetable garden, established numerous trees, planted small fruit and an orchard, hauled in dirt to make a berm to plant perennials, and built a patio with a rose garden.

For my one acre residence and yard, the soil is all the same type, Mexico-Urban land complex of 1 to 3% slope. A gardener might describe it as a heavy and poorly drained soil with a substantial amount of clay. To improve the drainage and texture I have focused on increasing the organic matter, especially in the raised areas for the annual flowers and vegetables, and for the roses, where the soil seemed especially sticky. The raised area with the perennials was purchased soil that came from 'east of town', so might it test a little different? Around the trees I always mulch, and for the lawns I do as little as possible, and let the clippings drop. The table below provides the results on the most critical factors that would

vary on a similar soil- pH, organic matter, and the nutrients of phosphorus (P), potassium (K), and calcium (Ca).

The results match the amendment efforts. The lower levels of organic matter are in the lawn, orchard and perennials, where little to no effort was spent. And it is highest in annual flowers where the soil was consistently amended with peat moss, humus and bark for the longest duration. The MU Guide, G6955-Improving Lawn and Landscape Soils, advises a minimum of 2% organic matter for lawns and 5% for garden plantings. The only area needing a higher organic matter level would be perennials. Given there is lawn around the shade and orchard trees the 3-4% organic matter level in these areas is reasonable.

The soil test reports recommended no potassium, phosphorus or calcium for any of the areas sampled. Lime was only recommended for the perennials. Thus the only soil needing lime and improved organic matter was the soil purchased to create a raised berm.

Nitrogen recommendations are based on organic matter. If it is sufficiently high, then the natural breakdown (mineralization) of the organic matter will provide sufficient nitrogen. No nitrogen was recommended for 7 of the 8 areas. The exception was for the lawns, where some nitrogen is always advised as the growth and constant clipping of grass requires additional nitrogen to support lush growth.

Many gardeners do not submit soil samples, with time and expense being issues. As this case demonstrates, the cost of purchasing fertilizer is avoided. And the time spent on soil sampling is done in the off season, where fertilizer is spread, and often purchased, during the busier growing season. Early spring is an ideal time to take and submit a soil sample. If you haven't

taken a sample before, or done so in awhile, the publication Garden, Landscape and Lawn Soil Testing (<http://soilplantlab.missouri.edu/soil/gardensoil.htm>) may be worth reviewing.

Water quality emanating from urban landscapes is degraded when fertilizers are over applied. Nitrogen and phosphorus are generally cited as the nutrients of most concern. For several samples phosphorus and potassium levels are rated very high or excess. This does not mean these levels will cause any harm to plant growth, but no further additions are required, and if applied at the wrong time (e.g. during rainy spring weather) might contaminate runoff. Two common sources of synthetic nitrogen available to gardeners are urea and ammonium sulfate, and should be considered when potassium and phosphorus are not recommended. However, fertilizers are often sold in combination to provide multiple elements, with the nitrogen, phosphorus and potassium percentage indicated by numbers (e.g. 12-12-12 for N-P-K). These should be avoided when fertilizing the lawn area in this example, as P and K both tested high. Organic fertilizers with nitrogen almost always contain phosphorus and potassium as well; blood meal is a commonly available exception. The MU Guide 'Organic Gardening Techniques' is a good source of information on organic fertilizers frequently used by gardeners (<http://extension.missouri.edu/explore/agguides/hort/g06220.htm>).

Contact your local University of Missouri Extension Office to obtain Sample Information Forms and sample boxes. You can submit samples through their offices. The Regional Specialists in your area can be a source of information for interpreting and personalizing your soil test reports and recommendations.

Sample area	pH	Organic Matter	P	K	Ca
Annual flowers	6.8	6.8	Excess	Excess	High
Vegetables	6.8	5.2	Very high	Medium	Medium
Roses	6.0	5.8	Excess	Excess	Medium
Perennials	5.9	3.8	High	Very high	Medium
Orchard	6.3	3.6	High	High	Medium
Small Fruit	6.9	5.5	Very high	Excess	High
Shade trees	6.0	4.6	High	Very high	Medium
Lawn	6.3	3.5	High	High	Medium

Creating a Toolbox to Assist in Site Selection

Kathryn Keeley

Agronomy Specialist

University of Missouri Extension

Introduction

You have probably heard the old cliché that “location, location, location are the three most important requirements for successful business.” This holds true for a successful vineyard and orchard businesses as well. Throughout the Mid-America region, there are good fruit growing sites; however growers should keep in mind that a good site is not necessarily a good site for a retail business. Good location/site selection is often overlooked in many business plans. Unfortunately, inadequate sites can lead to crop loss and low quality, which eventually may cause business failure.

The most ideal approach to selecting a site is to understand the land characteristics needed to grow high quality fruit, select varieties, determine the means to market the product and then choose a site specific to your goals. In practice, however, growers often already own the land in which they plan to grow, therefore site selection often involves compromises; in this situation it is important to choose a location that will negatively impact crop development the least. A rule of thumb is that you cannot afford to lose more than 1 crop in 10; this could be 100% loss in year one or 10% each of the first 10 years.

The tendency for severe fluctuation in temperatures is just one of the many challenges facing growers in Mid-America. These and other challenges such as rain just prior to or during harvest, heavy dews, and fog, abundant wildlife, high humidity and disease pressure, as well as numerous insect pests and labor management issues can be reduced by taking the time to select the most advantageous site within your own parameters. Potential growers are encouraged to compile a toolbox with the needed information that will assist in selection

of an appropriate site as well as answer questions for the business plan. Your toolbox should consist of tools that provide information on the following: topography, climate, soils and neighboring lands.

Topography

Topographical features such as elevation, slope, aspect and proper air drainage affect the mesoclimate of the site. Mesoclimate is defined here as the climatic conditions within 10 feet of the ground; it is here that there is the most flexibility in modifying the vineyard or orchard environment through site selection.

Maps that show the topography of a region can be purchased through the United States Geologic Service (USGS) or you can access topographic maps and area photographs at such websites as <http://cares.missouri.edu> or <http://www.terraserver.com> Topographic maps will include elevation, slope and aspect of the land you’re reviewing. It may be beneficial to identify the lands Section, Township and Range. This information can be found in a county plat map. In Missouri you can purchase a plat map at the local county clerk’s office.

Climate

Macroclimate is the climate of a large geographic region. Macroclimate influences a region’s overall suitability for fruit production and determines the types of fruit that can be produced. The climate of a vineyard or orchard is influenced by temperature, precipitation, winds, length of growing season, and humidity. The importance of site selection becomes clear when we examine the climatic factors that can adversely affect grape production and grape quality in this region.

To learn more about historical weather patterns and up to minute weather forecasts visit the following websites: <http://agebb.missouri.edu/weather>; <http://www.nws.noaa.gov>; http://www.nass.usda.gov/statistics_by_state/missouri

Soils

Soil characteristics are critical in selecting a site for fruit production. The soil should be well drained; water should be able to permeate the soil, yet have enough water holding capacity to

support fruit development during dry periods. You can get much information regarding the site's soil by digging a soil pit or consulting your county soil survey. The soil survey can be had through your local University of Missouri County Extension Center or Soil and Water Conservation District.

Although fertilizers can and should be applied, a soil test is recommended before installing your planting. A number of individual soil samples can be taken at a sampling depth of 6 to 8 inches from a field to make one composite sample. You can contact your local University of Missouri County Extension Office for more details on taking soil tests and interpreting the results or visit: <http://soilplantlab.missouri.edu/>

Neighboring lands

Aerial photographs, county plat maps, census data, and information regarding labor and business trends from your local chamber of commerce are tools to help the potential grower to assess neighboring lands.

The proximity of the site to areas that are inhabited by wildlife and woodlots need to be closely assessed. Deer are often very damaging to newly planted vineyards. Several types of birds exist that will feed on the fruit of vines and cause substantial economic loss for the grower. Woodlots can harbor wild vines and promote disease and insects that are harmful to the vineyard planting.

An aerial photograph or topographical map may be useful in locating a reliable water source.

Water is used for a wide range of things in the vineyard or orchard: including irrigation, pesticide application, and frost control. The supply can come from a well, pond, or municipal but must be able to supply enough water when needed.

Humans

People are an often overlooked portion of the site evaluation. It is important to understand the management of the operation and how it may affect the human population surrounding it. It is equally as important to the business to understand the practices being employed on

other areas that may impact the vineyard.

Plat maps will assist you in determining the owners of the surrounding areas to the potential site and aerial photographs will assist in determining the land use. The best defense to problems with your human neighbors is to initiate good and consistent communication. Ask questions and explain your plans. A good neighborly attitude can go a long way in reducing problems.

A knowledgeable and available labor force may also be a component necessary for certain operations. When selecting a site, keep in mind what type of skills you need from your employees and determine if they are available in the area. You may check with your local workforce development board, chamber of commerce and census data to access this information. Missouri census data can be accessed at <http://www.oseda.missouri.edu>

Expansion

A site should allow for expansion of the business if needed. Estimate your future needs and check with county zoning officials to determine if there are regulations regarding your plans.

Site selection encompasses many factors that should be considered in depth before investing in the business. Although there are many excellent sites in the Mid-America region for growing fruit, few will possess all of the ideal characteristics. Some compromises will need to be made along the way, but do not compromise on relative elevation or internal soil drainage. Be sure to check with all the agencies that can provide information and technical assistance. Compile information such as maps and soil tests and talk to as many different experts as you can. And through it all, be sure to frequent other businesses in the industry to learn from those who have gone before you.

Bush Cherries

By Patrick Byers

Fruit Grower Advisor

Missouri State University

Cherries are your favorite fruit, but does the idea of “picking cherries” evoke images out of a Hitchcock movie, battling swirling clouds of hungry birds? Do you have a deadly fear of ladders? If so, then bush cherries will calm your nerves. Bush cherries are derived from several stone fruit species native to the colder regions of Asia and North America. In general, bush cherries are large shrubs or small trees, usually wider than tall, and reaching nine to fifteen feet in height. Plants are hardy, and most of the American varieties available today were developed for the upper Midwest.

While many cultivars of the various types of bush cherries were developed and promoted in the past, only a handful are currently available. Many nurseries provide seedling plants of several bush cherry types, such as the Nanking cherry. While seedling plants are variable in fruit size and harvest season, planting several seedling plants will provide the cross pollination needed for fruit set and development. Bush cherry cultivars, such as ‘Jan’, ‘Joy’, and ‘Joel’ are propagated by tissue culture or other vegetative means. The recently developed bush tart cherry cultivars from the breeding program of Dr. Bors in Canada are exciting but unfortunately not currently available in the United States.

Bush cherries produce abundant crops of small, brilliant red to purple cherries from early to late summer, depending on the type. The fruit is meaty and has a delicious tart cherry flavor. Bushes are easily netted to save the crop from hungry birds. Each mature bush will produce about 15 pounds of fruit, which may be enjoyed fresh or processed in drinks, jellies, or other products.

Bush cherries will grow anywhere from USDA hardiness zones 3 to 6, as long as they have full sun and well drained soil. Seedling,



Nanking Bush Cherries

tissue culture, or grafted plants have deep root systems that resist droughty conditions. Plants are vigorous growers, putting on several feet of new shoots each season until the bush is mature. Bush cherries may live fifty years or more, while commercial plantings in Russia usually last about fifteen years.

Pruning consists of keeping the bush structure open for good sunlight penetration and air movement. Since fruit is born on one year wood (like a peach), annual pruning is important. Commercial growers sometime rejuvenate old, overgrown plants by cutting back to the ground. Bush cherry pests include plum curculio, peach tree borer, and brown rot. Manage these diseases as you would with peach.

Bush cherries are “multiple season interest” plants that can have an important place in the landscape. The profuse white or pink flowers cover the plant early in the spring, and the glossy green foliage contrasts beautifully with the ripening fruit. During the winter the lustrous red-brown bark and branching patterns add to the interest of the bush cherry. An excellent resource for lovers of unusual fruit, including bush cherries, is “Uncommon Fruits Worthy of Attention”, by Lee Reich.

Gardens of Interest

By Jennifer Schutter

University of Missouri Extension

Horticulture Specialist

Tired of planting the same type of garden year after year? If so, try planting something new such as a victory garden or prayer garden this year.

VICTORY GARDEN: The world was at war. Resources of all kinds were being diverted to support national war efforts. Countries asked their citizens to help in every way that they could. People dutifully funded the war by purchasing bonds, they conserved raw materials, they recycled, they rallied behind the troops, they helped their neighbors, they gave their lives, and they planted “*Gardens for Victory*”. Victory gardens, also called war gardens or food gardens for defense, were vegetable, fruit and herb gardens planted at private residences in the United States, Canada, and United Kingdom during World War I and World War II to reduce the pressure on the public food supply brought on by the war effort. In addition to indirectly aiding the war effort these gardens were also considered a civil “morale booster” in that gardeners could feel empowered by their contribution of labor and rewarded by the produce grown. Victory Gardens came in every shape and size. Governments and corporations promoted this call for self-reliance. People in all areas, rural and urban alike, worked the soil to raise food for their families, friends, and neighbors. Victory gardening enabled more supplies to be shipped to our troops around the world. Canned foods were rationed regularly in the United States, but the poster campaign “Plant more in ‘44!” to plant a Victory Garden was answered by nearly 20 million Americans. These gardens produced up to 40 percent of all the vegetable produce that was consumed in the nation.

ROCK GARDEN: Rock gardens are designed to recreate images of rugged mountain landscapes. They have been part of horticulture since the late 19th century. Popularity remains limited, however, as it is a rather intensive form of

gardening and many of the alpine plants require special conditions for both growth and survival. Due to the steady contraction of space available to the average homeowner, many contemporary gardeners do not have the luxury of space. Combined with a recent escalation in interest in gardening and availability of unique plants, space efficient rock gardens offer an opportunity to indulge in a passion for plants without the benefit of acres of land or even a yard.

The soil in a rock garden should be well-drained with only a moderate amount of humus or compost. Most rock garden plants do not like rich soil or heavy fertilization. Good rock garden plants are drought resistant making them choice candidates for hard-to-water areas such as slopes and shallow ground. Watering is most efficiently done in early morning or evening. Rocks hold moisture and release it slowly. Crevices around them provide planting spaces for those plants requiring more than the average amount of moisture. Mulching helps to control weeds and keeps the soil cool.

Rock gardens are traditionally thought of as positioned on a slope in full sun. Some reliable plants for rock gardens include evergreens and conifers which come in many shades of green, blue and yellow. There are also many perennials that grow well in rock gardens such as tickseed coreopsis, candytuft, Missouri evening primrose, lamb’s ear, salvia and speedwell.

WILDFLOWER GARDEN: Some people consider wildflowers hardy and durable and believe they can be grown in the garden with little care. This often is the reason given for growing them. For some plants this is true, but others need very specific conditions to grow and thrive. If they are not given these special conditions, they will decline and eventually die.

Many sites in the landscape are too shaded or too extensive for popular garden flowers. Wildflowers often are well adapted to these sites and do not need extensive maintenance if a less “manicured” landscape appearance is acceptable. It is unlawful to remove any wildflower, endangered or not, from public land. This includes highway right-of-ways.

Anyone interested in growing wildflowers should select those that can be grown from seeds or propagated in other ways for use in the garden. Avoid digging from native locations unless native locations are being destroyed for some reason.

Many people prefer to have an area designed specifically for wildflowers to develop a naturalistic look with relatively low maintenance. The actual placement of plants in the design is very flexible. Nature is very random and the wildflower garden should convey this appearance. Clusters, clumps or individual placements are quite useful. Perhaps the only arrangement to be avoided is that of plants in rows or precise geometric forms.

PRAYER GARDEN: The bible mentions at least 128 plants, from lilies to sage and gourds to almond and olive trees. There are websites that list plants to consider for a prayer garden and tell where they appear in the bible. Before choosing plants, consider the size of your garden, its' soil profile and the amount of sun it gets. Partial shade refers to 4 to 6 hours daily. For an all-seasons prayer garden, choose plants with staggered bloom times. Add a few annual plants in containers to help lend color.

Other types of gardens to consider include: a **Butterfly Garden** which includes planting flowers that attract adult butterflies, and host plants for feeding caterpillars.

Water Gardens, whether it be a water-proof container on the patio, a half-barrel with a fountain or an in-ground pond, can bring the sights and sounds usually found near lakes or streams right into your own backyard. Thanks to modern plastics, the process of installing a beautiful water garden has been reduced to a weekend job requiring only a minimum of easily learned skills. Local garden and home improvement centers now stock everything needed to complete this type of project.

Container Gardens allow you to enjoy plants in areas where a traditional garden is awkward or impossible. Even with limited space in an apartment, you can grow fruits, vegetables, flowers and shrubs just about anywhere in containers.

Coming Events

Missouri Cut Flowers: From Field to Market

Wednesday, September 5, 2007

State Fruit Experiment Station

Mountain Grove, Mo.

Sponsored by Grow Native! and State Fruit Experiment Station.

Morning Session – Free and Open to the Public

8:30 am Meet at the Pavilion

Visit native plant displays and
tour horticulture garden

Hayride to Native Plant Cut Flower
Experiment Site

Afternoon Session – Admission Fee Required

PreRegistration by August 29

Featuring: **Dr. Alan Stevens**, Extension Floriculture Specialist of Kansas State University and cut flower growers **Mary Fritz** of Hermann and **Susan Jones** of Osceola.

Lectures will be held in Faurot Hall
Box lunch and Handouts included
in Admission Fee

For information on these events, contact Pamela Mayer pmayer@missouristate.edu at the Missouri State Fruit Experiment Station, 9740 Red Spring Road, Mountain Grove, MO 65711-2999; telephone 417-547-7500; email StateFruitExperimentStation@missouristate.edu <http://mtngrv.missouristate.edu/>

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Your editors of The Berry Basket:

Gaylord Moore, Area Horticulture Specialist,
University Extension, Springfield, Missouri.



Patrick Byers, Fruit Grower Advisor, and
Marilyn Odneal, Horticulture Outreach
Advisor, Missouri State University Dept. of
Agriculture, State Fruit Experiment Station,
Mountain Grove, Missouri.



Send address changes and comments to:
Missouri State University
Dept. of Agriculture
9740 Red Spring Road
Mountain Grove, MO 65711-2999 or
MarilynOdneal@missouristate.edu
