

# Missouri Produce Growers Bulletin

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## Berries for Produce Auctions...by Patrick Byers

A common comment heard at the produce auction – “We need more berries!” Growers and buyers alike recognize the need. In addition to great market demand, these crops (strawberries, blackberries, blueberries, raspberries) are valuable crops, with a reliably profitable return for growers. Tunnel production offers potential to extend the harvest season earlier and later for berries, and in some cases can allow production in regions otherwise ill-suited for certain berries (raspberries in southern Missouri, blackberries in northern Missouri). The establishment and maintenance costs for these crops are affordable, especially when compared to tree fruits or

grapes. Equipment needs are similar to those used for vegetable production.

Berries have many of the same cultural requirements as vegetables – a site with full sun; moderately fertile, well-drained soil; and an adequate supply of water for irrigation. Site preparation is also similar – remove perennial weeds, apply soil nutrient amendments and organic matter as guided by a soil test, and consider cover crops in advance of planting. Berms or raised ridges can greatly benefit berry crops – a berry berm is typically 2-3 feet wide and 12-18 inches high.

As is the case with vegetables, berries are usually hand harvested.

Berries are perishable, and must be promptly cooled and held under refrigeration to preserve quality and shelf life. Berries for sale at produce auctions are often packaged in 1/2 pint, pint, and quart containers, typically plastic clam shells. The clam shells are packed in cardboard flats that have 6, 8, or 12 containers.

Pest management with berry crops, though generally less intense than for tree fruits or grapes, recently was complicated by the arrival in Missouri of the spotted wing drosophila (SWD), a tiny fruit fly that attacks berries as the fruit ripens.

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## Cover Crops are Soil Health....by Jaime Pinero & Jacob Wilson

Like many other pairings in life (cookies and milk, table and chair) cover crops and soil health can exist independently, but they are at their best when working together. Thanks to Universities, seed companies and satisfied farmers, most vegetable growers in Missouri now have some knowledge of cover crops. In the following article, we won't focus on all the benefits or varieties of cover crops, but zoom in on just a few that are easy to use, highly versatile, and very effective at increasing soil health throughout the growing season and beyond. Among other important roles, cover crops increase soil health through preventing erosion, scavenging nutrients, adding organic matter, relieving compaction and suppressing harmful nematodes. Focus

here is on spring and summer cover crops.

**Spring** is one of the most challenging seasons to get a planting established, especially for those of us with heavy, poorly drained soils, but options do exist. Frost seeding small seeded cover crops can be done anytime from now until late March. For those of you not familiar with this practice, frost seeding is basically broadcasting a small seed into a field that was tilled in the fall or that had the previous crop frost killed. The tiny seeds then work their way into the soil during the contraction and expansion of soil as it thaws and refreezes as well as with early spring rains. Traditionally, farmers have frost seeded legumes into

existing pastures, but this practice is just as applicable for vegetable growers that would like to get an early cover crop in before late planted winter squash or pumpkins. Clovers are the traditional pick for frost seeding, but other small seeded, cool season crops-- such as turnips-- can work. Having an early spring cover crop will prevent those March and April rains from leeching all of your hard earned nitrogen into the nearest pond, ditch or stream.

**Summer** is prime cash crop time, and it can be hard to find the occasion or the energy to get a cover crop established, but it is well worth the effort!

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# Foliar Feeding...by Dave Trinklein

**Application of excessively concentrated foliar fertilizer can lead to leaf burn (see photo below).**

Foliar feeding of plants involves the practice of applying water soluble fertilizer to their leaves. The assumption is the leaves of plants are more efficient at taking up nutrients than are the roots. This rationale dates back to research conducted at Michigan State University in the 1950's using radio-isotopes of certain essential mineral elements. It has been demonstrated that plants can take in minerals through pores in their leaf cuticle called stomata, through the leaf cuticle itself via pores (cracks) called ectodesmata and, in certain cases, through hair-like projections from the leaf epidermis called trichomes. One researcher advanced the argument that the essential mineral elements can be supplied to plants up to 20 % more efficiently via foliar feeding oppose to the soil application of fertilizer.

Not everyone in the scientific community "bought into" this assumption. It is well-known that many things can happen to nutrients applied to the soil before roots have the chance to absorb them. Runoff, leaching, microbial activity, chemical precipitation, etc. all can reduce the supply of nutrients applied to the soil that are available to plants. However, after nutrients have been taken up by the roots, their translocation to other parts of the plant is

much more efficient than when those same nutrients are taken in via the leaves. This is especially true for those elements (e.g. iron) which are considered to be "immobile" in the plant.

Additional research demonstrated that species vary greatly relative to their ability to take in nutrients through their leaves. Differences in cuticle thickness, stomata number and resistance as well as genetic and environmental factors all influence the ability of a species to taken in foliar-applied nutrients. If spray concentrations are increased to offset the restricted ability of a plant to take up foliar-applied nutrients, leaf burn can be a serious problem. The latter also can occur when applying the macro-nutrients (e.g. N, P, and K) which are needed in large amounts by the plant, making concentrated solutions a necessity.

Does this mean foliar feeding should be discouraged? The answer is "not necessarily". Given the circumstances, foliar feeding can be helpful in managing the nutritional well-being of a crop, especially in correcting micro-nutrient deficiencies. The following are a few points to consider when contemplating initiating a foliar feeding program:

- Foliar feeding should not be considered a substitute for good soil fertility management.

- Since foliar feeding tends to be expensive, the crop must be of high dollar value.
- Foliar feeding the micro-nutrients appears to be much more effective than the macro-nutrients.
- If practiced, foliar feeding should be done when the air is relatively cool (around 72°F). For most summer crops this dictates early morning or late evening application.
- Do not apply foliar fertilizer to the point that droplets form on leaf surfaces—this encourages leaf burn.
- It is better to apply weaker concentrations of foliar feed more frequently than stronger concentrations less frequently.
- As with any new cultural practice, initiate foliar feeding on a trial basis first.

In short, foliar feeding is usually not the most cost effective method of supplying nutrients to plants. However, it has proven to be an effective method of treating certain nutrient deficiencies and (perhaps) boosting plant growth in times of stress. Growers wishing to initiate a foliar feeding program should research the subject well before proceeding.



| Name  | Season        | Seeding Rate lb/A Drilled/Broadcast | Benefits  |
|---|---------------|-------------------------------------|---|
| Medium Red Clover                                       | Spring/summer | 8-10/10-12                          | Adds N, conditions soil                               |
| Sorghum X Sudangrass(sudex, Sorgho, sorghum x Sudanese) | Summer        | 35/40-50                            | Suppress weeds, lots of biomass, breaks up compaction |
| Cowpeas   | Summer        | 30-90/70-120                        | Adds N, suppress weeds                                |
| Radish(Oilseed, Tillage*Graza*Groundhog*)               | Fall          | 8-13/10-20                          | Breaks up compaction, scavenges nutrients             |
| Winter Rye(cereal rye, rye grain)                       | Winter        | 60-120/90-160                       | Suppress weeds, lots of biomass                       |
| Hairy Vetch   | Winter        | 15-20/25-40                         | Adds N, suppress weeds                                |
| Buckwheat   | Summer        | 48-70/50-90                         | Smoother crop, fast growing, breaks down quickly      |

## Cover Crops *are* Soil Health.....continued

Summer cover crop mixtures such as sorghum X sudangrass and cowpeas can pack on several tons per acre of biomass, while relieving compaction, suppressing weeds and providing forage for livestock. Both sorghum x sudan and cowpeas are easy to establish, and they thrive during the dog days of summer.



Sorghum X Sudangrass between rows of tomatoes at Lincoln University, mowed every week or two.

Cow peas provide nitrogen to the soil and break down quickly when incorporated. Sorghum x Sudan grass can even be mowed regularly and maintained as a turf between rows of tomatoes or hayed once, then left to grow tall and provide organic matter to the soil. The vast fibrous root system of sorghum x sudan even relieves compaction, especially if mowed once or twice during the season (this stimulates root growth). There is even a summer cover crop that will mature in 30 days if you have minimal time in your rotation. Buckwheat is easy to establish, super fast maturing and when seeded thickly it will smother out weeds. Buckwheat residue is also quick to break down so it is easily incorporated into the soil.

So as you are browsing seed catalogs and longing for the warm sunny days of spring, remember cover crops *are* soil health, and to be productive the soil needs to be healthy in all four seasons.

Note table at the bottom of page 2 for seeding rates and times for several cover crops that are compatible with vegetable production. The Seeding rates are taken from:

[Managing Cover Crops Profitably 3<sup>rd</sup> Edition, SARE](#)

## Berries for Produce Auctions.....continued

The resulting tiny white larvae within the fruit are a serious problem for growers and consumers alike. Initial observations in Missouri (confirmed by experience elsewhere) suggest that SWD overwinters in small numbers, and populations build during the spring until reaching damaging numbers in late June and July. Junebearing strawberry, early ripening blueberry, and early ripening florican blackberries and raspberries may escape serious damage. Later ripening berries are at risk. Management at present is focused on trapping to monitor SWD populations, and the consistent, frequent application of insecticides to the fruit near harvest that target the adult fly. Details on labeled insecticides (both organic and inorganic) are found in the Midwest Small Fruit and Grape Spray Guide. Additional information on SWD, including assistance with trap construction and use, as well as SWD identification, is available from the Lincoln University IPM program.

Blueberry plants are hardy and consistent producers of tasty fruit, which ripens in June and July. A planting may remain in profitable production for 20 years or more. The fruit is less perishable than other berries, and fruit that is promptly chilled and properly stored can have a 7 day shelf life. With the exception of SWD and birds, pest management is reduced compared to other fruits and many vegetables. On the negative side, blueberries may require additional site preparation to lower soil pH and raise organic matter level.

Strawberry offers potential for field and tunnel production. June bearing or short day strawberries ripen in May and early June (or as early as late April in tunnels), and day neutral strawberries produce fruit through the summer and fall (except during hot periods). Shelf life is shorter than blueberry (3-5 days), but better than brambles. Junebearing strawberries may ripen before

SWD populations build to damaging levels, but the later day neutral harvest will be at risk. Strawberries are commonly grown as a perennial crop (matted row); annual plasticulture offer potentially greater yields of good quality fruit, though the input costs are also greater.

Brambles (raspberry and blackberry) are available in either florican (single crop) or primocane (double crop) types. Field plantings typically produce profitable crops for 8-10 years. Tunnels offer huge potential for brambles - raspberries in particular respond well to tunnel production, especially in warmer climates; blackberry production is now possible in colder climates in tunnels. SWD is a serious problem with the primocane (late summer-fall) bramble crop, and can attack the florican (late spring-summer) crop as well. Tunnel growers are exploring the use of screening to exclude SWD from tunnels. Bramble fruit is quite perishable (2-3 days) and growers must market fruit promptly.



Blueberry harvest takes place from mid-June to mid-July

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**M** Extension



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About this mailing list

You are being mailed this newsletter because you were involved in some type of MU Extension program recently. Names and addresses are only kept by your local specialist or James Quinn. They will not be shared with anyone else. If you would like to be removed please let me know-

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## Food Safety and Other Announcements .....by James Quinn

This issue was delayed for two reasons:

- So that the results from the tomato planting intention survey could be included. Please find the complete report as an insert. Once you have looked at it, please take a minute or two to return the postcard, so we know if it was helpful to you.
- And we were putting on IPM workshops at Lamar (2/12), Morgan County (2/19), and Jamesport (2/25).

Food safety or GAPs update:

- The proposed rule from 2013 of the Food Safety Modernization Act will be redrafted and released sometime this spring. This effectively means the final rule is unlikely until 2015. The FDA press release said several items are likely to be revised. Most notable for affecting produce auction growers were the recommendations for manure application and the standards/testing for water quality.
- On January 17th a food safety training was held at Morgan County Seeds. It was coordinated by the Central Missouri Produce Auction, Morgan County Extension Center and MU Extension. About 100 growers attended, and Lloyd Schrock from Kentucky assisted; Lloyd is with the Food Safety Team representing produce auctions. One item requested at this training was where to send irrigation water for testing.

Water testing for GAPs certification:

- For the next newsletter issue (planned for April) we will describe how to submit water tests to the county health department and provide a listing of additional private labs. The problem with these water tests is the samples must be received the day after sampling. The requirement/need to have a sample tested within one day is challenging for growers in rural areas, which is where a lot of vegetables are grown, especially by produce auction growers.
- In the meantime, Midwest Labs (which many of you are familiar with because of their soil testing services) does the correct test. The cost is \$20 and is called "Generic E. coli and Total Coliforms". But they request one contact them ahead of time. They will ship you the correct sample containers and form to fill out. Their phone number is 402-334-7770. The test is under the 'Environmental-microbiology' area. Unfortunately only NW Missouri is close enough to Midwest Labs for Ground Rate UPS to deliver to them the next day. Thus next day shipping would have to be used for other areas of Missouri, at a significant increase in shipping cost.