Missouri Produce Growers Bulletin

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AUTUMN 2010

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UPCOMING EXTENSION SPONSORED EVENTS

Great Plains Growers Con.	Jan. 6 -8
Farm to School Workshop*	Jan. 21
Missouri Organic Assn Annual Con.	Feb. 10-12
Farm to School Workshop	Feb. 16
Agritourism and Small Fruit Con.	Feb. 21-23
Food Safety Workshop**	Mar 10

* Kirksville
** St. Louis

Successful IPM Ideas from 2010

By James Quinn

A number of growers trialed different products or techniques for pest control this summer, with support from this outreach project funded by the EPA. Some growers just tried things 'on their own'. Maybe you'd guess it, the latter ideas stood out more, to me anyway. Thanks to the articles submitted by my colleagues, I only have room to mention a few.

With this project I got to visit the Iowa produce auctions. A grower Elma selling to the Cedar Valley auction put up a 1/2 acre Haygrove for around $35,000. He says he's making all his money back in the first year, and will not grow tomatoes outside anymore. Well it's cold up there, but aa significant of reason he said was disease control. 'When the plants get beat up by winds and hard rain, then the bacterial diseases seem to start up'.

Weeds were tough to control with all the rain, again. One grower in Rich Hill showed an interesting technique, drilling holes through black plastic mulch, and then putting it down 'between the raised beds, applying straw over the top.

And a grower selling to the Central auction attained excellent weed control on pumpkins. After they came up he spot sprayed with glyphosate, but the key was just before they runnered out, he sprayed around them with a preemergent, like Command. It was a bit of hand work but he seemed to think it was worth it

A few other notes:

- Assail received praises for aphid control, especially late season. Fulfill would also work well, but is hard to find.
- I haven't heard back about how effective Quintec was.
- Various insect traps for monitoring were tried. Reports were not positive.
- The biodegradeable black plastic tears easily.

Why Onions Bolt, Failing to Bulb?

By Sanjun Gu

Many onion plants bolted this summer instead of forming bulbs. This is truly frustrating, but why did it take place?

Onions (Allium cepa) are biennials. Naturally, they grow vegetatively into bulbs before the hot summer, go dormant, and sprout and flower the next spring. The bulb, the edible part to human, protects the growing point from damage in summer and winter. Onion, like other plants, needs to go through vernalization to flower. A simple definition of vernalization would be the required exposure to low temperatures for flowering.

The low-temperature requirement satisfying vernalization varies from species to species. Some vegetable species do not need the low-temperature exposure (sweet corn, tomato, peeper, eggplant, most cucurbits, etc); some species definitely need it (beets, cabbage, carrots, onion, etc); and some species fall in between. While the geminating seeds of most plants would be able to sense and accumulate low temperatures for vernalization, onions need to have about five leaves for capturing the low-temperature effect (celery and cabbage are also in this category) .

Generally, onion seedstalk formation may be initiated before the bulb matures if plants are subjected to temperatures below 50°F for 3-4 weeks, and the lower temperatures (above freezing point) contribute more to vernalization. Therefore, we have observed more boltings in onions from sets or transplants this year, thanks to the irregular cool weather. Bolting in onions is not induced by photoperiod, as is sometimes believed. However, bulb formation of onions requires long days (short nights) of 12-16 hours depending on cultivars and types.

The low-temperature effect is accumulative. Once the chilling units are met, bolting is not avoidable. However, devernalization is possible. Exposing previously vernalized sets or transplants to high temperatures could possibly reverse the plant to nonflowering stage. Onion sets that are vernalized by storing at near freezing temperatures could be devernalized by exposing them to temperatures beyond 80° F for two to three weeks before planting.

Removing seedstalks may help with bulb formation but the effect is limited, depending on the stage of plants. If onion sets bolt shortly after planting, formation of bulbs would be next to impossible. Probably the best option if you see onions bolting is to pull those and sell them as bunched green onions, the sooner the better.

Coulda, Shoulda, Woulda.....by James Quinn

Anthracnose of tomatoes cause lesions on the fruit surface, sunken, circular, starting tan and becoming gray, then black. Warm, rainy weather favors it.

The spring started wet for most produce auction growers, and for many, it stayed that way until October. This, combined with the hotter and more humid weather, led to some common disease and weed problems. Which led to some growers confirming that they coulda, shoulda or woulda done more, if only they had known. Here's 3 examples to consider.

Anthracnose of tomato took top honors as more troublesome than normal. It got off to a strong start with the wet weather and benefits from the disease presence of Early Blight, which started early, possibly activated by the warm breezy weather in late March/early April. A common name for Anthracnose is 'ripe rot'. So what coulda you done woulda you known? Apply protective fungicides early and maintain those season long. And once it's present, you shoulda picked the fruit a little less ripe.

We confirmed some root or stem rots, two being Fusarium Stem Rot on bell peppers and Southern Blight on Tomato. Coulda you done anything? Probably not. Locations were usually in low spots of the field and following excessive rain.

Foliar diseases of tomato– why don't I get control like I used to? I got this question several times. Unfortunately several growers acknowledged they really haven't been rotating away from previous plantings like they woulda or shoulda like to! Cultural management says to not plant back to the same ground for a minimum of 3 years (Bacterial Speck) and up to a maximum of 5 years (Early Blight).

This Year's Poor Fruit Set of Zucchini

By Sanjun Gu

There were complaints about poor fruit set of zucchinis this year. This was caused mostly by weather.

Most zucchinis, except for several pathenocarpic cultivars, have male and female flowers positioned in different part of a vine and need pollination/fertilization to fruit. Fruit development is a result from auxins released from developing seeds, which are developed from fertilization. Pollination is conducted by honey bees and other native pollinators in nature. When outside temperatures are low, pollinators are not active for pollinating. Also, under low temperature (or extreme high temperature) and wet conditions, male flowers may not release pollens or pollen tubes fail to develop. All these will result in failed fertilization that is necessary for producing seeds, which ultimately leads to fruit abortion.

Fruit abortion can be corrected by artificial pollination—choosing same day bloomed male flowers and female flowers, pollenize female flowers by gently rubbing anthers to stigma. Chinese farmers spray 10-25ppm (1ppm=1mg in one liter of water) 2,4-D to stigmas around 9am and have had very good results. When spray, make sure not to spray the fruit part to avoid fruit malformation. Please note that 2,4-D acts as a growth regulator, not an herbicides at this concentration. As a herbicides, 2,4-D cannot be used on zucchini.

Most of times, there are confusions between aborted rotten fruit and Choanephora wet-rot fruit. Caused by the fungus Choanephora cucurbitarum, Choanephora wet-rot is developed on wilted blossoms and spreads to attached fruit. Once infected, fruit rots rapidly and fungus mold appears on the rotted area. The fungus growth resembles small black-headed pins stuck into the fruit. This disease is spread by insects, wind, and splashing water. Disease development is promoted by high moisture conditions. Normally Choanephora wet-rot does not affect mature healthy fruit but it is difficult to distinguish between fruit abortion and wet rot. There are no effective control practices available for wet rot. Fungicide sprays are impractical since new blossoms open daily and need to be protected soon after opening. Drip irrigation under black plastic will help.

"Fruit washes after harvesting tomatoes won't control Anthracnose. It can infect the fruit early . The symptoms are expressed when the fruit are mature."

Choanephora wet-rot develops on wilted blossoms and spreads to the fruit. The fungus growth resembles small black-headed pins stuck into the fruit

Fall Cleanup- Tomatoes as an example

By Dave Trinklein

There is an old saying that states "an ounce of prevention is worth a pound of cure". While these words have a practical application for many aspects of life, they are especially true for vegetable growers. Insects and diseases arguably rank as two of the biggest problems growers face each season. While fall cleanup cannot eliminate them from our plantings next year, it can help to make control a bit easier.

The structures that overwinter and give rise to plant diseases the following growing season is referred to as inoculum. While they vary in nature from pathogen to pathogen, in most cases they are referred to as "spores". Spores are part of the natural reproductive cycle of many fungal diseases such as grey mold of tomato. Many spores have the ability to survive very harsh conditions during the winter and yet "spring to life" when the environment is more favorable the following growing season. The greater the population of spores in the immediate area to begin with the more difficult pest management becomes.

We have long advocated an integrated approach to pest management in horticulture crops production. IPM, as it is known, involves a series of measures designed to give optimum pest control with minimal chemical input. One of the tenets of IPM is exculsion. The latter attempts to eliminate disease inoculum (and insects or their eggs) that might overwinter in the field by practicing good sanitation. Without practicing sanitation, a population of pests is present and waiting for crops to emerge or be planted in the spring, and the job of pest management becomes much more difficult.

Using tomato as an example, the spores that cause the leaf disease early blight overwinter in the soil. If there is an abundant supply of these spores from plant refuse from last year's crop the job of controlling the disease becomes even more challenging. The same can be said for insects whose eggs might overwinter on tomato leaves or other plant debris allowed to remain after a crop is finished.

Best management practices dictate that strict sanitation be observed in all stages of plant production, ending with a thorough cleanup of the production field. This means that all plant material should be removed each fall from the previous year's crop as carefully as possible and disposed of properly. Any leaf that is allowed to remain in the field is a possible source of disease infestation for next year. Therefore after removing plants from the field go back and do a thorough sweep of the area to collect as much remaining debris as possible. This is especially important in greenhouses and high tunnels where environmental conditions for pest infestation are more favorable than out-of-door.

Proper disposal involved taking the material to a safe place and discarding it. Burning the debris is very effective but must be done with great care especially during the fall when humidity is low and conditions often windy. Avoid placing discarded plant debris in a compost pile. The temperature reached inside the pile may not be hot enough to kill disease and insect inoculums. Spreading this compost back on the production field will inoculate the soil with pests—the exact opposite of what was intended by removing the old plants.

Unfortunately, sanitation by itself is not enough to prevent diseases and insect pests in the greenhouse or production field next year. However, it can go a long way to reducing infestation and make control of that infestation less expensive.

Ten Comments on Vegetable Nutritional Quality

By James Quinn

A recent article in the Vegetable Grower News reviewed some work by two researchers on the nutritional quality of vegetables. (Gene Lester with the USDA-ARS and Don Davis, retired from the University of Texas) It gave 10 rules of thumb for getting the most out of vegetables. One reason buyers want local produce is it is perceived as higher quality, and this is an important factor. They were as follows:

- There can be big differences between cultivars or varieties. Unfortunately, nutritional quality is not normally indicated or rated in seed catalogs.
- Produce grown on clay soil is usually higher in nutrients than produce grown on sand.
- Higher yields achieved by high rates of nitrogen fertilizer, irrigation (especially close to harvest) or choice of variety can result in produce with lower levels of nutrients or poorer quality protein, an effect known as dilution.
- Crops grown in the fall are nutritionally better than those grown in the spring.
- Foliar fertilization with calcium and potassium during fruit growth produces firmer, more flavorful fruits and vegetables.
- Over-fertilization with nitrogen is generally detrimental to produce quality.
- Color intensity is a good indicator of nutritional value.
- Riper is better.
- The larger the fruit or vegetable, the more nutritious it is in general, perhaps because it is more mature.
- Harvest time affects nutrition. Cooler morning hours provide a more nutritious fruit or vegetable.

For the potassium spray, application was made starting at fruit set until harvest. A solution of 800 ppm or 0.08% potassium (as potassium chloride) applied with the regular fungicide and/or insecticide applications was a minor product expense and no additional application cost.

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We hope to continue with this newsletter next year. We will also be sending out a survey in a month or two.

Special thanks to the EPA Region 7, Strategic Agricultural Initiative Program for another year of support.

Is Organic Control of Cucumber Beetles Possible?

By Jaime Pinero

.As the popularity of organically-grown produce increases, with consumers, growers, in particular small, limited-resource farmers, there is a need for more affordable, effective, and environment-friendly options to manage pests. At Lincoln University (LU), research aimed at developing a mass trapping system for cucumber beetle management was initiated this past summer. Emphasis has been made to (1) evaluate various commercially available lures for attractiveness to cucumber beetles, and (2) compare the effectiveness of the most attractive lure(s) identified with various commercial and home-made trapping devices. Combined results from various field tests conducted at LU Carver Farm indicate that particular combinations of lures and home-produced 'wet' and 'dry' traps are effective at trapping cucumber beetles and thus there is the potential of using mass trapping

Fall management of cucumber beetles through field sanitation (e.g. destruction of all plant residue) is recommended to help decrease the number of beetles overwintering that will pester your crops in the spring. The pathogen that causes bacterial wilt overwinters inside the gut of the beetle..

as part of an environment-friendly, sustainable Integrated Pest Management approach for cucumber beetle management. Trapping has been extended well into the fall season to determine its potential to suppress overwintered populations. A grant was obtained from the North Central IPM Center to support the continuation of this research starting in early spring 2011.

One of the long-term plans of the Lincoln University IPM Program is to develop effective, environment-friendly IPM strategies that integrate relevant visual, olfactory as well as physical (e.g., use of deterrents) stimuli for improved and sustainable management of key insect pests of vegetables.