

Missouri Produce Growers Bulletin

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Prospects for Plastic Recycling in Missouri...by James Quinn and Pat Miller

A Houston company recently contacted some horticulture industry folks about recycling drip tape. While their idea didn't work out, the question sparked some interest into where is recycling of plastics in horticulture in MO?

Use of plastics in horticulture has been hugely beneficial to growers. Greenhouses are cheaper to cover. The various trays, liner, and pots are highly efficient. Anyone remember growing in clay pots? That died in the 80s. Use of black plastic mulch coupled with drip tape has resulted in yield increases of up to 4X.

So plastics are here to stay and the once used material is a

disposal problem, a recycling issue or a case of reusing. Only for certain greenhouse trays and containers are reuse practical. (See the article below about sanitizing these materials.) So for drip tape, greenhouse film and plastic mulch, the options are either recycling or landfilling.

In Missouri these plastics should not be burned. Only household quantities of plastics are allowed for burning, and once a crop is grown and sold from these plastics, it is of commercial quantity. Commercially generated plastics are also forbidden from private land disposal.

Realizing that, we looked for

a community which has set a disposal process that could serve as a model for others. Rich Hill developed this approach many years ago. They have 2 large roll off boxes dropped off in different locations that are convenient to many. They are delivered in early September and are left until the end of October. There has not been a problem of individuals taking advantage of these boxes and putting in garbage.

One person (each) handles the payment for a roll off box. That person then collects from growers using it, who pay a rate per acre. It is then taken to a local landfill.

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Sanitizing Greenhouses.....by Dave Trinklein

Greenhouse growers who year-after-year find themselves battling root rots such as *Pythium* and insect pests such as fungus gnats might not be doing an adequate job of greenhouse sanitation. Prevention is by far the best cure for both disease and insect problems, and proper sanitation is the first step in prevention. Greenhouse sanitation is a two-step process involving both cleaning and disinfecting. This is especially important in the propagation area to prevent the transfer of infested plant material to an otherwise clean greenhouse.

Cleaning involves physically removing weeds and all living plant material from the greenhouse. This step cannot be overemphasized since living plant material is an ideal refuge for

problematic pests such as aphids and mites. Plant debris, spilled potting medium, etc. also should be eliminated prior to disinfecting a greenhouse. Shop vacuums are useful in removing debris from concrete and covered floors. Additionally, there are cleaning agents on the market (e.g. STRIP-IT™) that can make the job of algae, grime and fertilizer residue removal easier. Using a power washer with soap and water is another possibility. Care must be taken, however, since soap can leave residues that can inactivate certain disinfectants (i.e. the quaternary salts) used later in the sanitation process.

Owners of greenhouses with floors of bare soil or gravel might consider the installation of weed barriers to make cleaning floors easier. In addition to prevention

weed growth, weed barriers make algae management easier to accomplish. Weed barrier should not be used below a gravel greenhouse floor, it tends to trap soil and moisture, creating an ideal environment for weeds, diseases, insects and algae.

Once the greenhouse is clean it is time to disinfect it. To a certain degree, a number of pathogens (e.g. *Pythium* or *Rhizoctonia*) can be managed by the use of disinfectants. Dust particles or other organic residue in the greenhouse might contain bacteria or fungus inoculum which disinfectants can eliminate. In addition to plant pathogens, some disinfectants are also labeled for managing algae. The latter tends to promote populations of fungus gnats and shore flies to develop.

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*I wish you could
have seen that
high tunnel
raspberry planting
where I took the
photos... fruit flies
everywhere!
Horrible.
Sometimes they
weren't as bad,
but other times
they were in
everything. I think
I even brought
some home in my
truck, and it
wasn't close to the
high tunnel.
—Tim Baker*



Figure 1: SWD on raspberry. Photo by Tim Baker

Sanitizing Greenhouses...continued

There are four disinfectants commonly used in greenhouses. When possible/practical, rotation between these four is recommended. The four disinfectants include:

- Alcohol (70% isopropyl) is an effective disinfectant that kills microbes on contact. Since it is volatile, its effect is not long-lived. Alcohol is best suited for disinfecting propagation equipment such as knives or shears by dipping or wiping.
- Bleach (sodium hypochlorite) probably is the most widely used disinfectant in greenhouse management. Additionally, it is the least expensive product to use. Bleach should be used within two hours of mixing since its active ingredient (chlorine) is quite volatile. Typical household bleach contains 5.25% chlorine. A mixture of one part of bleach to nine parts of water produces a solution with 0.5% chlorine which is quite satisfactory for killing microbes associated with

greenhouses and related equipment. When disinfecting pots or flats with bleach, first wash out all excess growing medium since organic matter tends to neutralize the chlorine in the bleach solution. Bleach should be used in a well-ventilated area for personal safety. Also, it should be noted that bleach can be phytotoxic to some plants, (e.g. poinsettia).

- Hydrogen dioxide is available under a number of brand names such as ZeroTol®, OxiDate® and SaniDate®. Hydrogen dioxide is a potent oxidizing agent that kills a wide range of microbes and their inoculum on contact. It is very effective in sanitizing benches, pots, tools, etc. as long as the solution used is still active. Kits are available which allow growers to test the solution to determine it has lost its potency. At such time more hydrogen dioxide must be added. Note: Special care should be taken when using hydrogen dioxide; it is extremely harmful to the eye.

- Quaternary ammonium chloride salt (e.g. Physan 20®, Green Shield® and Klean Grow™) is an effective disinfectant that, unlike bleach and hydrogen dioxide, does not lose potency as it is being used. As with bleach, it is important to remove organic matter from the surfaces of items (pots, flats, etc.) being disinfected. Physan 20® also is labeled for use on seeds, cut flowers and plants. Carefully read and follow label instructions.

In summary, effective greenhouse sanitation requires growers and greenhouse managers to develop a “think clean” mindset. Proper greenhouse sanitation does require time and attention to detail. However, the benefits of following good sanitation practices will be evident when used effectively and consistently. A clean greenhouse leads to healthy plants, and healthy plants lead to happy growers and greater profits.

The SWD Insert & IPM Workshops Being Planned

Spotted Wing Dryophila or SWD

Spotted wing dryophila surged across Missouri this summer, being especially problematic on blackberry and fall raspberry plantings. They begin building up their population after overwintering in relatively small numbers. So they don't seem to affect gooseberries or strawberries as bad. However, we did receive a report that high tunnel strawberries were more favorable to them. It may be because of the protected climate in a high tunnel.

This pest is new to Missouri and likely here to stay. It is very much an ongoing issue that will be changing. More insecticides will be labeled for their control and with more exacting recommendations (the insert has what is available now). Also ongoing will be the extent of the crops they plague. We believe they are likely to be a problem on cherry tomatoes. There were also reports that regular or large tomatoes with fruit cracks could be infested. This was considered more likely in a protected environment like a greenhouse or tunnel. However, we have not seen this yet.

I like to describe this little beast 'like a fruit fly with a knife'. The barrier to a common fruit fly is that it has to wait for a crack, fissure or other 'entry point' to get into fruit, then it can lay its eggs. And everyone knows how quickly they reproduce. One bad peach and poof, 5 days later it seems there is a million. SWD doesn't have to wait for the entry point. Once the fruit nears ripeness, then its egg laying 'ovipositor' can go through the skin to insert eggs. Can it get worse? Yes! You don't see any cuts, but open up the fruit, and there they are! Dozens of tiny squirming worms (maggot technically, these are flies after all). Yuck!

Three IPM Workshops Being Planned

Lincoln University has some funding to sponsor several IPM oriented workshops. We are considering three in February. Locations thought the best, as they have worked out well in the past, were Jamesport, Lamar, and Morgan County Seeds.

Two Interesting Watermelon Problems of 2013....by James Quinn and Zelalem Mersha

We saw two interesting problems on a watermelon field this summer. While both are rather odd, and not likely to occur regularly, they both offer an opportunity to learn from their situation.

The first problem became apparent in July. In the low areas plants began to wilt and die. Fortunately, the grower pulled a sample and sent to Kansas State's diagnostic clinic. They found extensive insect damage which their Entomologist then diagnosed as fungus gnats. They thought this seemed weird but then ended up seeing it a couple more times in the summer and on cucurbits. The lab diagnostician noted, fungus gnats like it wet, and it's been wet.

Also interesting was that this is a greenhouse pest that was carried into the field. In cold and rainy springs, many greenhouses back up with plant material, and this becomes outstanding habitat for fungus gnats. So it is likely that this greenhouse pest was carried to the field and then the mild and rainy weather in June increased their level to the point they were causing recognizable damage. So why didn't the problem become apparent more quickly? This was on the first planting. Answer –

probably because his first insecticide treatment was imadicloprid, which is labeled for control of the larvae. But eventually, with the June rain and cool conditions they made a comeback. He then used an insecticide and it checked the spread.

The second problem occurred nearby but was separate. It was a later planting, looking good and about ready for the 1st picking. He then noticed some plants seemed off; some wilting, some leaves that should be holding up, kind of flipped over. This coincided to about a week following 3 weeks of that cool and wet weather that stretched from the end of July to mid-August. While they did get a 1st picking, none after that. There was no fruit rot, the symptoms were all with the plant. The plants began to wilt more and more. A sample to the Kansas lab came back showing nothing. On subsequent visits it was the same, the roots/crown looked good but eventually all plants were devastated. Was it a physiological? Or some strange disease? Or something else?

There is a disease syndrome described as "Mature Watermelon Vine

Decline". Syndrome was used to first describe this disease, as a pathogen had not been identified. It is typical when the root system is too small or compromised for vines with lots of fruit maturing. We had all the right conditions line up for it to occur. Wet, heavy soil conditions prior to full fruit load. We also had lots of moisture during plant establishment, so that the root system would be shallow. One nearby grower had very similar early symptoms, but the planting hung in there and finished ok. But by then, we were back into ideal summer watermelon weather.

While weather brings on the condition, they have been able to induce it with soil from a field where it occurs. In 2011 a fungus was identified. When it has occurred rotating out of cucurbits for 3 years is advised. Also, varieties resistant to Fusarium wilt may be less likely to have this problem. Lastly, cultural techniques to promote healthy root growth will reduce the incidence. It is associated first in low areas of a field. Purdue University has a fact sheet on this disorder. Let your nearby specialist know if you'd like a copy.

Horticulture Plastics Recycling or Disposal.....continued

While recycling of plastic didn't work for Missouri this year, it may in the future. A major limitations to the value of these materials is they are dirty; that was why the Houston company only wanted drip tape. Separating drip tape from the mulch film may require an extra step as these are pulled up, some growers informed me. The materials are also heavy, thus transportation can quickly erode their value.

I learned that New Jersey is one of the leading states for recycling of drip tape and plastic mulch, their program serving as an example to other states. On transportation they have an advantage, it is a small state, with concentrated vegetable acreage, and facilities that reuse the materials are nearby. They are also highly populated and regulations on dumping or burning would be more stringently enforced. Hard to burn it when an environmental activist would jump to report you!

For greenhouse film they have 2 collection sites and for drip tape and plastic mulch they have 4. Both are open year round. Vehicles that transport these products direct from the farm do not have to meet more strict waste hauling requirements. There are instructions on how to bundle the materials. Greenhouse film collection sites charge \$20 per ton to receive the material (called tipping fee). Drip tape and mulch

were more difficult to assess. Only one site quoted a price, and then only for drip tape- \$30 per ton. They said this was 1/2 the typical landfill cost. Another site said their tipping charge averaged 24% less than landfill cost. A third site said they would have a lower tipping fee for plastic mulch and drip tape if separated, but could take them together. Lastly, the fourth site offered to pick up the material, and asked for photos of the product and then would quote a price. One could imagine that would be pretty efficient, to run a truck around to growers close together.

So these materials have 'no real value' as a material. They just cost less to dispose of, if at a recycle facility. And likely strong enforcement of burning or improper disposal has forced growers into having a strong interest to participate. Nonetheless it is good to see a state making headway on recycling of spent horticultural plastics.

Publications Used for Article-
Facts on Open Burning Under Missouri Regulations
<http://www.dnr.mo.gov/pubs/pub2047.pdf>
New Jersey Agricultural Recycling Programs
<http://www.nj.gov/agriculture/divisions/md/prog/recycling.html>

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About this mailing list

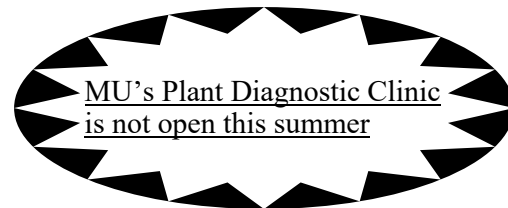
You are being mailed this newsletter because you were involved in some type of MU Extension program recently. Names and addresses are only kept by your local specialist or James Quinn. They will not be shared with anyone else. If you would like to be removed please let me know-

James Quinn

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Tomato Planting Intention Survey Coming SoonBy James Quinn

For most growers, tomatoes are their top cash crop. One of the most important questions relating to tomatoes is what variety to grow in the given cultural situation (greenhouse, high tunnel, or field). Growers frequently discuss this amongst themselves, review new releases and look for recommendations from various reputable sources. Comments from customers are also critical to any decision.

To help growers gain a better understanding on the situation, both statewide, and amongst their auction growers, a survey could be helpful. I will be working with University of Missouri's Assessment Resource Center to conduct one in November or early December. They also conducted the IPM survey in late winter of 2012. So, what types of information will be asking for, how will we analyze it, and how will we share it?

Two basic questions will be asked. What tomato variety or varieties do you intend to grow this year and why? For growing, we'll likely group together-

- Greenhouse and heated high tunnel
- Unheated high tunnel
- Open field.

For why, we'll likely ask to rank which factors are most important to your making your selection-

- Market factors (e.g. taste, fruit size)
- General performance (e.g. growth, yield)
- Pest resistance or other factor (e.g. resistance to leaf mold, heat tolerance)

Given enough responses, we will be able to give results specific to a community. So the more that reply, the better. That way you can understand what are the most popular varieties and why at the different auctions (including your own) and the average for the entire state.

We hope to be able to share the results in either the winter or spring newsletter. The results aren't likely to be in time to have anyone adjust their planting for 2014 (that's why its called a planting intention survey), but it might give you something to think about as the season progresses, and may assist you for the 2015 year.