Missouri Produce Growers Bulletin

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SUMMER 2010

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MINI CLINIC DATES/ LOCATIONS

Central MO Produce Auc	July 30th
North MO Produce Auc	Aug. 13th
Clark Produce Auction	July 6th
Highway C Produce Auc	June 29th
4 County Produce Auc	July 27th
Bates & Vernon Counties	Aug. 4th

Gray Mold vs. Leaf Mold on Tomato

By Dave Trinklein

The incidence of fungal molds on high tunnel and greenhouse tomatoes has increased in recent years. Management of these diseases begins with an understanding of the difference between the two major types of fungal molds and their control strategies.

Gray mold is caused by the fungus Botrytis cinerea and is a common pathogen of nearly all plants, including tomato. Symptoms include light tan or gray spots on the leaves. These spots later become covered with a grayish-brown fungus. Ultimately the leaf collapses and dies. The fungus also can cause cankers on stems and kill flowers and fruit.

Leaf mold is caused by the fungus Fulvia fulva (Cladosporium fulverum) and affects only tomatoes. Because of its need for high humidity to become infective, leaf mold is almost entirely a disease of greenhouses and high tunnels. Symptoms include pale-green or yellowish areas on the upper surface of leaves. Lower leaves are affected first; younger leaves show symptoms later. At the same time discoloration appears, the fungus begins to grow on the undersides of the leaves in the same area as the discoloration. The mold that results is more deeply colored toward the center of the affected areas. As the disease progresses, the leaf spots turn yellowish-brown and the leaf curls, withers and ultimately dies. Leaf mold differs from gray mold in that the fungus appears only on the underside of the leaf.

There is genetic resistance for leaf mold which is the best way to prevent the disease. Most tomato varieties bred for greenhouse production (e.g. 'Trust', 'Quest', 'Geronimo') carry genetic resistance to leaf mold. Conversely, most tomato varieties bred for outdoor production do not have genetic resistance. This is of little concern outdoors since the environment is not conducive to leaf mold infection. Growing the same varieties in a greenhouse or high tunnel provides an ideal environment for the disease to become problematic, and it frequently does.

Continued on next page

Disease Update

As part of the mini clinics we have been pulling some samples that we are unsure of, or find of interest, and having them confirmed at a diagnostic lab. I'll review those results, but first-

- Late blight of tomato and potato has continued moving westward, but is still safely away from Missouri. It has been confirmed in Michigan, Eastern Indiana, Ohio & Kentucky.

From Southwest Missouri in late June two samples were submitted-

- Southern Blight on tomatoes has been confirmed. This is not a common disease in the Midwest, but tends to occur with hot humid weather and damp conditions. There is no fungicide treatment for this.
- Anthracnose fruit rot (ripe rot) was found in a high tunnel, that also had Early Blight.

From the Clark area-in early July-

- Fusarium stem rot was confirmed on bell peppers. Wet conditions and high humidity aggravate the disease. No fungicide treatment available.
- Bacterial speck on tomato fruit, but where the foliage had no apparent infection.

ALL ARTICLES BY JAMES QUINN UNLESS NOTED OTHERWISE

Weeds! Spray It Again Sam?

Preemergent and burndown herbicides can be mixed for early season application and extended weed control. Paraquat & Command in photo

The third wet growing season in a row has left many growers struggling to control weeds, again. A recent Vegetable Crops Hotline newsletter article (Purdue Univ.) addressed this issue.. Unfortunately they couldn't offer much advise other than spray them again with glyphosate, cultivate or mow them off.

If glyphosate is not controlling weeds like you expect, note the weed control tips in the water quality article on page 3. Hard water can reduce the effectiveness of glyphosate.

FOR NEXT YEAR, some growers may want to try including a herbicide that provides some residual control against germinating weeds with a burndown (glyphosate or gramaxone) to the row middles. Three products to consider obtaining are:

- Command– Fairly broadly labeled, peppers (but not tomatoes), Cucurbits, green beans & Cole crops.
- Dual Magnum II– Tomatoes (but not peppers), green beans, and sweet corn.
- Sandea (Permit)- As both a pre and post emergent herbicide, it has a lot of flexibility and is labeled. For peppers, tomatoes, Cucurbits and green beans. For some crops it can be sprayed over the top. And for the rest some drift, from directed spray to the row middle, causes minimal damage.
- Want to explore others? Look into Curbit & Prowl.

Gray Mold vs. Leaf Mold on Tomato

Continued……...

Both gray mold and leaf mold favor cool temperatures and high relative humidity greenhouse tomatoes are especially at risk. The cultural control of these two diseases involves keeping greenhouse temperatures warm (above 70° F) and relative humidity as low as possible. It is important to understand that the cooler air is, the less water vapor it takes to saturate the air.

"For applying pesticides, a high tunnel is considered a field when the vents are open, and a greenhouse if closed. If open, they should be left that way for the REI.

Producing greenhouse type tomatoes in high tunnels with supplemental heat has become quite popular

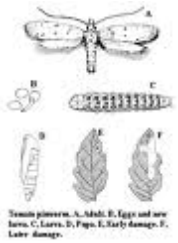
Therefore cool greenhouses normally have high relative humidity. On the other hand, keeping temperatures warm tends to lower relative humidity to a desirable point, at least temporarily.

Encouraging good air movement by adequate plant spacing and leaf pruning helps to lower the humidity around the leaf surface. Additionally, good sanitation practices including the removal of all plant debris between crops helps to reduce inoculum of the diseases but will not prevent them entirely.

For optimal control, an integrated approach should be followed. In addition to the previously mentioned cultural practices, fungicide use should be considered. Chlorothalonil is effective in gray mold control and copper compounds are also labeled; maneb, mancozeb, copper compounds and chlorothalonil are all labeled for leaf mold control. Growers should remember that most fungicides are preventatives, not curatives. Therefore application of fungicides before symptoms appear gives best results.

One grower in Central Missouri prevented leaf mold on Goliath in 2008 & 2009; Goliath is a greenhouse tomato without resistance. He applied Bravo (chlorothalonil) first in early April, and then about two weeks later. Some growers have noted that Bravo (also Echo & Equus) are labeled for field application only. A high tunnel is considered a field when fully vented, and a greenhouse when closed. Remember if vented, it should be left that way for the reentry interval (REI).

Reduced Risk Pesticides, at What Price?



A grower with tomato pinworm found a natural product (Botaniguard) to provide adequate control. Ironically he found it when spraying the product to control whitefly.

The price of some of the newer pesticides can be almost shocking. The funding of this project committed us to try and raise awareness about reduced risk products. So I thought it would be of interest to see how several reduced risk products fare with their prices.

So what is a reduced risk product? They are conventional products that have-

- Low impact on human health
- Low toxicity to nontarget organisms (birds, fish, etc.)
- Lower use rates
- Low potential for groundwater contamination
- Low pest resistance potential
- Compatible with IPM

The determination is made on specific uses of the pesticide, so it may be reduced risk for Cucurbits but not fruiting vegetables. And, oddly enough, 'natural products' or biopesticides are not considered as they are in a separate group.

I decided to compare an insecticide, a fungicide and a miticide.

Perm-up 3.2EC is labeled on the Cole crops at 4 oz/acre. Thus at $65 per gallon it would provide control for about $2 acre. Contrast this to Spintor which sells for $670 for 2&1/2 gallon or $2 per ounce. But its use rate is about 1/2 of Perm-up, so its cost is about $4 per acre. But who wants to lay out $670 to begin with! Radiant is a new product with a similar chemistry to Spintor that sells for $191/qt and applied at 10 oz/ac comes to $60/ac– tough sell!.

Quadris is reduced risk and costs $395, and at 15 oz/ac costs about $45 per acre. Penncozeb (similar to Mancozeb) can be purchased for $5 per pound and applied at 3 lb/ac for just $15 per acre. But a competing systemic fungicide with a more novel mode of action (Cabrio) costs $188 for 5 lb and costs about $37 per acre.

Lastly, there are fewer miticide options available now. Acramite is a reduced risk product that can be purchased for $68 per lb and that amount is applied per acre. Agri-Mek is a competing product but sells for $476 per gallon and if applied at 16 oz/ac comes to $60/ac.

So are reduced risk products more? Sometimes yes, sometimes no. But a key determination on what a grower may be willing to purchase is the $$ one has to pay for the minimum size container.

Could someone please work on the packaging and put some of these in a smaller unit size for smaller grower. No grower really wants a 5 or 10 year supply of a pesticide!

"The designation of reduced risk does not appear on a products label. It has been incorporated into the Midwest Vegetable Production Guide for Commercial Growers."

Irrigation water quality

Growers are encouraged to test their water every couple of years so they can be confident about their water source, and make adjustments if needed. While irrigation water quality is more critical for nursery and greenhouse crops then vegetables, high tunnel production of vegetables could develop problems, especially over time as the soil does not receive rainfall that would leach out accumulating salts or carbonates. .

Water from a well source is more likely to have alkalinity, pH or salt problems then surface sources. A significant concern with surface water is contamination from agricultural practices, especially row crop herbicides.

So what parameters do we want from our irrigation source?

- A pH within 5.5 to 6.5;
- Alkalinity– less than 400 ppm of $CaCO_3$, ***the lower the better!***
- Salt- EC below 0.25 is considered excellent; 0.25 to 0.75 is considered good. Irrigation water is permissible all the way up to an EC of 2.0 if precautions are taken. Above 2.0 is doubtful.

Did you realize some pesticides are negatively effected by water that is high in pH? For example, the Round Up Original Max label says with hard water conditions, that the addition of 1 to 2% dry ammonium sulfate may improve the performance on annual and perennial weeds.

A tip from an MU Specialist in SW Missouri, where the water is 'hard', if you don't have any ammonium sulfate, try substituting household vinegar, at these rates-

- For water with a pH over 7, use one ounce per gallon of mix;
- For water with a pH less then 7, but over 6.5, use one tablespoon per gallon of mix.-

Two teaspoons of Dawn liquid detergent per gallon of mix is an acceptable household substitute for crop oil. Crop oil is advised for some tough to kill weeds, usually those where the leaf surface is

Cabbage looper (top) and imported cabbage worm (lower) are common in this family. There are several reduced risk insecticides for their control.

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Serving Caldwell & Daviess Counties

IPM is a systematic science-based approach to solving pest problems that provides pest management strategies through all appropriate control methods (both chemical and non-chemical) to keep pest populations below economically damaging levels while minimizing detrimental impacts to the environment. IPM utilizes knowledge about insects, weeds and diseases to provide an effective strategy for managing pests in all arenas. This includes agricultural, residential, public areas and wild lands.

The 5 steps for effective IPM– 1) Identify pest and their damage; 2) Regularly monitor primary pests; 3) Determine economic threshold; 4) Chose best management tactic & 5) Go back to evaluate it.

The Midwest Vegetable Production Guide for Commercial Growers 2010, is on the web http://www.btny.purdue.edu/Pubs/ID/id-56/

Emerging pest– Japanese beetles

The Japanese beetle is probably the most devastating pest of urban landscape plants in the eastern United States. Japanese beetles were first found in this country in 1916, after being accidentally introduced into New Jersey. Until that time, this insect was known to occur only in Japan where it is not a major pest.

The eastern US provided a favorable climate, large areas of turf and pasture grass for developing grubs, hundreds of species of plants on which adults could feed, and no effective natural enemies. The beetle thrived under these conditions and has steadily expanded its geographic range north to Ontario, west to Missouri and Arkansas, and south to Alabama.

The adults emerge in June, later in the month if cool, and early if the season is hot.

Fortunately for vegetable growers this pest has NOT become significant. However, there is a good chance you will encounter it on some of its other favorite edible crops– raspberries, blackberries, stone fruit and apples. Two other favorite popular plants are roses and hibiscus.

Adult Japanese beetles are 7/16-inch long metallic green beetles with copper-brown wing covers. They feed on about 300 species of plants, devouring leaves, flowers, and overripe or wounded fruit. Leaf feeding results in a skeletonized pattern.

Insects don't read the books about what they are supposed to eat, and there could be times if their population is high and their preferred food supply is short, that they may feed on vegetables. A smaller planting might require a pesticide application to prevent economic damage.

Sevin (carbaryl) is widely available insecticide that is well regarded on its effectiveness against this pest. Trapping the pest is also an option. However, research has shown that the traps attract many more beetles than are actually caught. Consequently, susceptible plants along the flight path of the beetlesand in the vicinity of traps are likely to suffer muchmore damage than if no traps are used at all.