

Missouri Produce Growers Bulletin

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Rainy Summer Spurs Prices Higher

By James Quinn & Pat Byers

Missouri had the 2nd rainiest May to July period since 1981, creating difficulties for vegetable growers to get in the field to plant successive crops. And growers reported yields were low for 1st field plantings for important crops, like tomatoes. This led growers talking about higher prices in early August at two auctions in Mid-MO, Clark and Central. There was some discussion about whether the increase was due just to the lower supply, or if it was also due to increased demand. And was it statewide? Below is a table that looks at 3 exemplary summer crops, toma-

atoes, zucchini, and watermelons, and their respective prices at the St. Louis wholesale market and 3 auctions in different regions. Two dates were selected, about 2 weeks apart in August. It ap-

pears Central was a bit higher on tomatoes and notably higher on zucchinis. But it appears the prices were decent in both the North and SW on watermelons and tomatoes.

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Product	Date	Unit	Central	North	Barton*	St. Louis
Tomato- L or XL, VR		\$/LB				
	Aug. 12		1.80	1.33	1.27	0.80 (CA)
	Aug. 25/26		1.45	1.55	1.56	0.88 (MX)
	Avg		1.63	1.44	1.42	0.84
Watermelon, Sdls-R		\$/ea				
	Aug. 12		1.47	3.61	1.84	3.44 (IN)
	Aug. 25/26		2.45	3.42	1.30	3.22 (IN)
	Avg		1.96	3.52	1.57	3.33
Zucchini (and yellow)		1/2 bu				
	Aug. 12		16.60	5.20	6.00	15.50 (Midwest)
	Aug. 25/26		10.40	14.00	11.00	16.00 (Midwest)
	Avg		13.50	9.60	8.50	15.75
* Aug. 21 for 2nd date						

Timber Rot on Tomato.....by Dave Trinklein & Zelalem Mersha

Timber rot is a sporadic but also devastating disease of tomato that can cause significant plant and yield loss if cool weather and high humidity prevail for a longer duration. The increasing number of greenhouses and high tunnels that grow tomatoes year-after-year has made the disease much more prevalent today, compared to decades ago.

Timber rot (sometime called "white mold") is a stem rot disease that is caused by the fungus *Sclerotinia sclerotiorum*. The latter has a wide host range of over 300 crops and frequently vegetables such as beans, cabbage, lettuce, sunflower, carrots,

cucumbers, peas, pumpkins and squash. A number of common weeds such as lambsquarters, pigweed, Canada thistle, and wild mustard also are susceptible and can serve as a source of infection.

Symptoms of timber rot mostly begin as water-soaked areas from the stem axils or instem joints, either at or above the soil level. The fungus enters from at the soil level if senescent tissue is present. Once established, the disease progresses from these areas. In time, the stem becomes covered with white "cotton-like" fluffy mycelium and girdled; later, the water-

soaked area becomes dry, discolored (bleached appearance) and hard; and the plant (eventually) wilts, collapses, and dies.

As the disease progresses, hard, grayish-black sclerotia about the size of a plump grain of rice develop. Sclerotia are hardened masses of mycelium containing food reserves. Their role in the life cycle of the disease organism is to detach from the host and remain dormant (in the soil) until environmental conditions favorable for infection occur.

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Timber Rot on Tomato.....continued

Slicing the diseased stem longitudinally reveals these embedded structures, making positive identification fairly easy.

Timber rot infection usually does not occur until after flowering has begun. At this time soil moisture usually is high and soil temperature low because of the shading provided by leaves. Under this combination of cool, moist conditions, the above-mentioned sclerotia produce mycelium that infect the stem of the plant.

These sclerotia also produce sexual spores called ascospores from structures called apothecia (cup or little mushroom like structures). Ascospores of timber rot are wind-borne and can cause infection within several days after landing on the leaf of a plant. Again, cool (e.g. 60-70o F), moist conditions favor infection.

Timber rot in greenhouses and high tunnels that produce tomatoes year-after-year is problematic because of the buildup of sclerotia in the soil from diseased plants of previous crops. Crop rotation along with less favorable environmental conditions makes timber rot on outdoor tomato plantings much less of a problem. Control of timber rot should follow an IPM approach. First, rotating tomatoes with non-susceptible crops can reduce disease inoculum. Unfortunately, this is not an option for most greenhouse or high tunnel tomato growers. Even then, the fact that this fungus attacks a broad range of crops makes the smart rotation option very difficult. For field plantings, however, rotating grasses like corn or small grain will help slow down the inoculum buildup.

Deep plowing (e.g. at least 12 inches) can help to reduce disease severity by reducing the number of sclerotia at the surface of the soil. However, disturbing the soil through tillage will reduce the effectiveness of this practice by bringing the sclerotia back up to the surface.

Strict sanitation is helpful in managing the disease. This includes carefully removing and destroying diseased tissues and plants, thereby reducing the number of sclerotia allowed to remain in the soil to infect next year's planting. Also, maintaining a "plant free zone" around the perimeter of the greenhouse is recommended. This practice will make it more difficult for ascospores from infected host species surrounding the greenhouse to enter. Additionally, it helps control insect entry into the greenhouse.

Pyraclostrobin (Cabrio®) and fluxapyroxad + pyraclostrobin

(Priaxor®) are two materials labeled for the suppression of timber rot on tomato for field plantings only. Both are labeled use on a number of crops for the control of a wide variety of fungal diseases.

For greenhouses that already have an established history of timber rot, the beneficial fungus *Coniothyrium minitans* sold under the brand name of Contans® holds a promise. This biocontrol agent colonizes the soil of a greenhouse and feeds on timber rot sclerotia in the process. According to label directions, Contans® should be applied at least three months prior to planting to allow the fungal organism to destroy sclerotia in the soil. Since Contans® is a living organism, proper storage conditions, handling, and proper timing of its application are needed to maintain its effectiveness. For any further information as to the rate and frequency of applications, growers are highly encouraged to read and follow the label of this product.

Currently, there are no varieties of tomato known to be resistant to timber rot.

Editor's notes:

- A high tunnel is considered a field planting if fully open for the reentry interval (REI).
- For high tunnel or greenhouses with a history of this disease it may be best to limit cover crops to grasses, such as oats, ryegrass, etc.
- Manure from cattle or horses can contain the sclerotia, and composting may not destroy them. Poultry litter and compost from it should pose minimal risk for having sclerotia.

Typical symptoms and signs of timber rot disease on tomato plant (right), and close-up pictures of the infected stem showing mycelia (middle) and sclerotia (right). Photo by Z. Mersha.



Z. Mersha.

Higher Auction Prices.....continued (from front page)

Reasons for increased demand centered on two:

- local demand was up by consumers (failed personal gardens)
- and 'the California drought effect'.

On the first, horticulture specialists around the state heard many variations of failure. Furthermore, the two authors of this article have been part of a statewide pricing and quality survey project of farmers markets for this summer and last. We have noticed poorer quality and slightly higher prices. We saw a shortage of zucchini and cucumbers in August! So yes, local demand would be up.

Assessing the effect of the CA drought is more difficult. For the St. Louis terminal, CA is often not the main competition for these 'in-season' crops. Note is was only once in 6 sample points.

Secondly, one can't tell if there is a domino effect, that a shortage of CA product in another terminal tightens the supply in several others. Nonetheless, it is obvious from the price of tomatoes, that they can be bought for less, so the fact that buyers come to the auction means they want local quality. On zucchini and watermelons, the terminal prices were often higher, which means buyers are likely getting a better deal at auctions.

Growers have commented they are bringing less product to the market, and that the higher prices will help balance things out. The good news is that the quality at the auction has more or less been good. That's a positive note considering that it's been the rainiest May to July since produce auctions began.

'Outgassing' and High Tunnel Mystery....continued from back page

Two questions still remained:

- One location used straw, which we thought was 'safe', as it is not mentioned as a risk, e.g. in the publication insert.
- Why the delayed response? The tomato crops grew well for some time. And in none of the 3 locations, did the symptoms occur just after the hay or straw was put between the beds.

Regarding straw, there are several herbicides registered on wheat that contain this chemical class. Curtail is a fairly common herbicide containing clopyralid and while the product is mentioned in the publication insert, wheat straw is not mentioned. This chemical class is quite effective on marestalk, which row crop farmers jump at the chance to control, since marestalk is difficult to control with glyphosate or Roundup. Furthermore, the label for Curtail does NOT warn sufficiently about the potential of harm.

On the second question, why a delayed response? Active ingredients from this chemical class can release into the atmosphere, which a MU Weed Scientist termed 'outgassing'. This is more likely to occur when it warms up or gets hot. So if it is cool or cloudy after contaminated old hay, straw or compost is applied, no initial effect is seen.

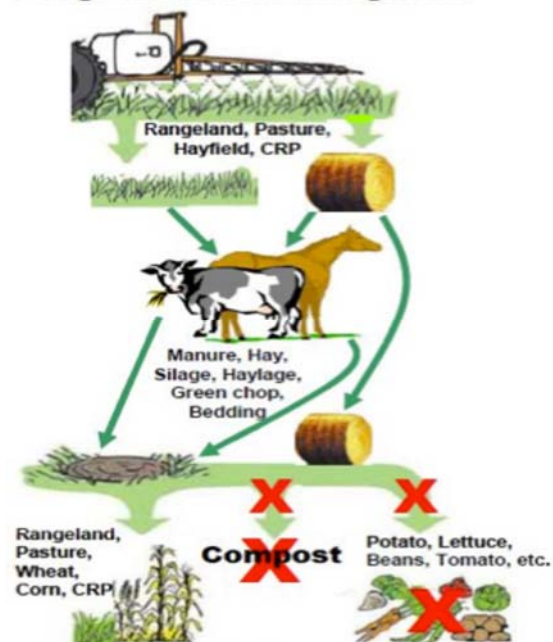
Furthering the oddity is these chemicals are effective in extremely tiny amounts, and when in a closed environment, will be even more potent. And which plants may be more affected might depend on a number of factors such as proximity to contaminated hay and air currents in the tunnel. In 2 of the 3 locations the problem was not substantially damaging. The plants in Clark were first damaged in April, recovered fairly quickly, and by June no damaged foliage was noticeable.

This year we have had numerous reports of contamination in Missouri from compost and old hay. And colleagues in other states have reported these problems seem to be on the rise. The chemical companies are trying to make it clear about the dangers associated with these products (see diagram below), but there is a real disconnect when a farmer doesn't read a label or may hire out his spraying. Consumers have been encouraged to 'know your farmer'. Now we can say horticulture producers need to :

Know
their
manure,
hay,
straw,
and
compost.

*Note-
Poultry
litter and
its com-
post
should not
have this
same risk.*

Forage and Manure Management



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New Auction Opened in Webster County

Webster County Produce Auction opened for business this spring. It operated on Fridays through May, Tuesdays and Fridays June through September, and Fridays through the end of October. Auction start time is 10 a.m.

Where: From eastbound on U.S. Highway 60 from Springfield, take Short Road/Killdeer Road median crossover (at west Seymour city limit sign), turn north, then go back westbound on U.S. 60, 0.3 mile to Berry Road (at Schrable Fertilizer), then north 0.8 mile to auction barn at 801 Berry Road.

From west Business 60 exit at Seymour (near McDonald's restaurant) go west on U.S. Highway 60 about 2.1 miles to Berry Road (at Schrable Fertilizer), then go north 0.8 mile to auction barn at 801 Berry Road.

Contact: Bob Crump, auctioneer, P.O. Box 575, Seymour, MO 65746. Phone 417-935-4039 or 417-464-4040 or email becrump@centurytel.net.

Herbicide Contamination and 'Outgassing' in High Tunnels or Greenhousesby Tim Baker and James Quinn

We have previously written about the risk of herbicide contamination from products like Grazon. If you are unfamiliar with this issue, please see the insert which was distributed previously. This article will focus on a phenomena associated with the active ingredients in this chemical class (the pyridine carboxylic acids), described as '**outgassing**'.

This summer we had 3 heated high tunnels with tomatoes planted in the soil, that all experienced a similar problem. The tomato plants displayed symptoms (see photo to right) consistent with exposure to growth regulator type herbicides (which also includes 2,4-D), but it occurred AFTER the plants had been growing well for anywhere between a few weeks to well over one month. And the symptoms were variable in

severity, typically from none to moderate. The farms where this happened were at 3 different communities (Clark, Prairie Home, and Windsor) and none had used any common inputs. Furthering the mystery was that high tunnels in the vicinity which had used common inputs (such as compost) had no problems. We ran



Home garden tomato about one week after mulching with contaminated old hay. Photo by Dean Volenberg

through all the possibilities of herbicide contamination, such as drift from roadside or pasture spraying (looking for afflicted broadleaf plants outside the high tunnel can help rule this out. Just to reiterate the various possible sources, here's a list.

- Spray drift as just discussed;
- Sprayer used on the crop had previously contained herbicide and wasn't cleaned well;
- From hay, manure or compost as discussed in this insert;
- From soil brought in where herbicides with long carryover had been applied;
- From pond water where herbicide runoff has occurred. Brushkiller has been a culprit for this.

All we could find in common was use of hay or straw as mulch.

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