

Horticulture pests and deficiencies seen later in the season...

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SPEAKERS

Christa Hartsook, Joe Hannan

- C** Christa Hartsook 00:15

Hello, and welcome to the small farms podcast, a prediction of the small farms program at Iowa State University Extension and Outreach. Our podcast covers the opportunities and challenges associated with rural life. In this episode I visit with Joe Hannan, commercial horticulture specialist for Iowa State University Extension outreach on current pests, disease and deficiencies surrounding horticulture crops around the state of Iowa. I'm Christa Hartsook, small farms program coordinator and we hope you enjoy the show. Joe, welcome. Thanks for being back.
- J** Joe Hannan 00:51

Yeah. Good morning. Christa. How are you today?
- C** Christa Hartsook 00:53

We are great here. It's a beautiful day in Iowa. So we're excited about that.
- J** Joe Hannan 00:59

Wonderful
- C** Christa Hartsook 01:00

Joe we've had a great growing season so far in Iowa. But I know now we're starting to see a few different pests in some of our horticulture crops. Let's just dive right in and tell me what you're seeing out there.

J Joe Hannan 01:12

Well, you and I have different definitions of great growing seasons apparently.

C Christa Hartsook 01:17

This is true, it's been a little bit of a challenge.

J Joe Hannan 01:19

It's been a little bit of a challenge. The last half of the season was cleaned up and done a little bit better. So but out in my travels last couple of weeks, I've been seeing some common issues in high tunnels tend to see some of the same problems year over year over year, so I thought we'd do a little podcast and talk about them a little bit. So a couple of issues I'm seeing right now are spider mites magnesium deficiency, I also tend to see potassium deficiency a fair bit this time of year and leaf mold.

C Christa Hartsook 01:48

Okay, so Joe, let's start with spider mites. If we are worried that we maybe have some problems with some spider mites on some of our plants, what do we look for?

J Joe Hannan 02:00

Well, we need to get out there and start scouting through the whole high tunnel and you'll you'll tend to see the spider mites in the high tunnel more so than outside. But you're looking for well they're very small. Typically we'll find the spider mites on the bottoms of the leaves. So they can vary in color from green to brown and yellow. The two spotted spider mite is their most common one that we see but not, you know, maybe a different one. Usually what I'll try to do is take some leaves and knock them onto a piece of paper and see if that'll knock them off onto the leaf or on you know onto the piece of paper. You can see them a little bit easier there. You know the color splotches on a white piece of paper. Now also, if you really poke around, you can find them on the bottom sides of leaves when you know they're just getting started. Once the populations really start to take off and bloom, you'll start to see webbing on the upper canopy of the leaves whether it's a tomato or pepper and then you'll see the actual spider mites running around on top of that webbing. Once you get to that point, you have a pretty significant infestation. That's really important though to make sure that you're scouting throughout the high tunnel. Spider mites can be very localized on one or to plants as they're getting started. And then they'll just kind of work and build out across the high tunnel as the numbers increase.

C Christa Hartsook 03:33

Okay, and Joe damage to just the plant or damage to the fruit. What are we talking about in terms of damage?

J Joe Hannan 03:40

Typically you're looking at damage to the leaves, you'll see what's called the bronzing starting around on the leaf margins of the leaf and then as it gets worse, you'll see it become more of a chlorosis and necrosis across. Eventually the entire leaf.

C Christa Hartsook 03:59

Okay. Joe, I'm assuming then we obviously need to treat if we're getting to that significant level of infestation.

J Joe Hannan 04:07

Yeah, if you're looking at if you have spider mites at low numbers, once you find them keep a really close eye on and if they're starting to get out of hand that you should be thinking about treating if you've gotten to the point where you're seeing webbing and stuff very easily. You definitely need to treat the Midwest vegetable production guide found on the extension store list a lot of different miticide products, things like acramite or Agri-Mek. Those are not restricted use products. Anybody can get those and use those and they're effective at controlling mites. Another example is mitate but it is a restricted use products so that does require a pesticide applicator license. And remember with any of those products if you have a localized infestation, you're only have you know 10 plants infested? You can just control or apply product to those 10 plants. You don't need to spray necessarily the whole high tunnel, try treating it localized first.

C Christa Hartsook 05:12

Okay, how about soaps and oils? Things maybe if we're trying a little bit less chemical heavy product.

J Joe Hannan 05:20

Yeah, so a lot of people in the high tunnels they want to use a softer type product. And the soaps and oils can be very effective on the soft bodied insects or insect type press like a spider mite. One of the things with the soaps and oils though is coverage is key you really have to do a good job of getting those products into the canopy and getting them onto the mite to actually kill them. A lot of times with those soaps oils too, you'll need to do a follow up application a week later. You'll kill a lot of them but you're gonna have to come back in and do likely going to have to come back in and do a little bit of follow up clean up. Sounds good. Joe, any other control measures for spider mite? Yeah, Christa. Agri-Mek and Acrimite and mitate, you know, we don't have a lot of great vendors close by in emergency situation if you need to buy something here and now to treat something if you don't have products on hand. So one product that people will commonly use in high tunnel, said malafion on it isn't listed in the Midwest veg

guide, but it is labeled for control on mites. Okay. It's fairly inexpensive, it's readily available. And most of the growers I talked to are seeing decent control using it. And primarily, the key is that it's readily available, you can get it just about anywhere

C Christa Hartsook 06:50

you bet. Always good sometimes to go with the readily available source.

J Joe Hannan 06:55

Sometimes you don't have a choice, right? You know, sometimes you can't wait three, four or five days or you can't spend three days finding the product and then several more days for it to come in, you need to get it you need to treat you need to keep moving on.

C Christa Hartsook 07:08

Joe, let's talk about some of the deficiencies you mentioned specifically magnesium and potassium. Let's start with magnesium. What are we looking for there to know if we have a deficiency in our plants.

J Joe Hannan 07:21

So magnesium is classified as chlorosis, which is a whole bunch of other other problems not just magnesium and potassium. But the chlorosis for magnesium will show up on the lower leaves of the plants, you'll see blotchiness that will not cross over the veins of the leaf. So you'll be able to distinguish the veins and leaf and then you'll see blotches that will go right up to the vein. Typically with a magnesium deficiency, you'll see it in the middle of the leaf working outwards towards the margin is a tip and the petiole. And as close as the magnesium deficiency gets worse, the symptoms will move up the plant closer, you know from the bottom of the canopy, it'll move further up the plant. And additionally, as it gets worse, those yellow blotches will start to turn purple and get a reddish purplish hue to a dark purple, and then eventually to a brown necrosis as it gets really bad.

C Christa Hartsook 08:32

Okay, Joe, I know it's a delicate balance with our soils, right? We're trying to balance you know, our calcium or magnesium or potassium? Do we need to be concerned immediately if we start seeing some of this yellowing appearing?

J Joe Hannan 08:47

So that's a good question. And it's it's always kind of a complicated answer, as you alluded to, it's, you're always trying to balance calcium, potassium and magnesium going into the plant because those three nutrients all go into the root zone via the same pathway, it's having the

right balance in the soil is really critical. Magnesium deficiency, I don't get too worked up over if it's just a little bit of chlorosis on the bottom couple of leaves. The reason being likely if we're having just a little bit of magnesium deficiency, that means we probably have plenty of calcium, we probably have plenty of potassium, which has been my experience in the in the high tunnels. And it's more important not to have a calcium deficiency where you're going to end up with blossom end rot or not to have a potassium deficiency, where you're going to end up with right core, you know hard internal core of the fruit or blotchy ripening in the fruit. So a little bit of magnesium deficiency I don't get too worked up over. Once you start seeing that magnesium deficiency moving up into the fruiting canopy, once you start to see those yellow blotches turning into purple blotches, then you need to be a little more pro active on on management.

C Christa Hartsook 10:01

Okay. And our management strategies, then Joe, what do we do?

J Joe Hannan 10:06

Well, too often they usually suggest growers take it from a to two point perspective. One, maybe back off your calcium and your potassium fertilization a little bit. So either reduce the amount that you're applying each time you're irrigating, if you're if you're applying your calcium potassium that way, or skip your next application of calcium and potassium, just skip an application. So if you're applying once a week or every other week, maybe back those applications out to every other or every third, third week. So that just basically reduces a little bit of what's in your soil. So the magnesium that's there can get to the plant. Okay. The other the other method, if it's a little bit worse, you can actually go in and spray a magnesium application onto the plants using Epsom salts, Epsom salts can be a magnesium fertilizer. So often I'll say, I typically when I get the call, at this point, I'm already starting to see some purpling and stuff up in the canopy. So my suggestion will often be at that point is, let's spray magnesium application. Let's back off our calcium potassium fertilizer, and then reassess in a week, 10 days and may be come back with a second magnesium application, which don't want to get into is having to spray magnesium application every week as well. Because at that point, you're just wasting fertilizer.

C Christa Hartsook 11:32

Sure, sure. It makes sense. Joe, let's talk a little bit then about potassium itself. If we're seeing a deficiency in there, what are we looking at? I'm assuming slightly different than that.

J Joe Hannan 11:42

Yeah, so potassium deficiency will be on the lower leaves again. However, this time you're looking at yellow chlorosis, or on the tips of the leaves on the margins of the leaves, working his way down from the tip down towards the base of the leaf and down towards the petiole and towards the interior of the leaf. As the chlorosis spreads or as a deficiency gets worse, there's

no inhibition of that chlorosis from leaf margins, this will go right through leaf. I'm sorry, it'll go right through leaf veins. So you'll have a solid yellowness rather than a blotchy or yellowness working from the tip down.

C Christa Hartsook 12:34

Okay. Okay. Can this one also show up in the fruit itself?

J Joe Hannan 12:39

Yep. So the potassium deficiency is a real concern for us, because you end up with a hard internal white coarse and non edible fruit, especially with something like tomato, you can also get to blotchy ripening, so you're not getting full red color on your tomato fruits. So don't don't confuse blotchy ripening, though, with too much heat in the high tunnel and failure for lycopene to form. So those can kind of look very, very similar to have to kind of take a look at the full picture. If you're when you're looking at it.

C Christa Hartsook 13:13

You bet, Joe management again, for this issue

J Joe Hannan 13:17

for potassium, often I say, applies potassium via the fertigation system, roughly looking at a couple pounds of potassium per acre weekly or running at about 100 parts per million potassium during your irrigation, I tend to be very conservative. So if the problem is really bad, or, or you're not seeing it getting fixed, and you're at those rates, you can always increase and move that pounds per acre up closer to five pounds per acre, or the concentration up towards 200-250. But again, I'm very conservative, I like to work my way up to those higher higher amounts as often as just a little bit extra is all you need.

C Christa Hartsook 14:02

Sure, sure.

J Joe Hannan 14:04

You could do it the a foliar application as well. But most people are set up with the drip irrigation system and their high tunnel. And it's just very easy to just put it down that way.

C Christa Hartsook 14:13

Absolutely makes sense. Joe, we talked about how the spider mites can be very individualized,

you know, to down to even just a few plants in a specific area. I'm assuming some of these deficiencies will be a little bit wider spectrum.

J Joe Hannan 14:28

Yeah, the potassium deficiency and the magnesium deficiency both should be fairly widespread across the high tunnel if you're having a problem, okay, you're only seeing one or two leaves on a couple plants here and there, but it's not bad enough to justify treatment.

C Christa Hartsook 14:44

Yep, makes sense. Just wanted to make sure we clarify that.

J Joe Hannan 14:47

You should see it pretty widespread.

C Christa Hartsook 14:49

Okay. Joe, let's talk a little bit about leaf mold itself. How does that appear different than a chlorosis?

J Joe Hannan 14:57

Okay, so leaf mold will be similar to the magnesium chlorosis. Starting from the interior of the leaf working its way out. It's blotchy, but it's not constricted to the veins within the leaf itself. So the leaf mold will start in the middle of the plant. But unlike magnesium, it will cross over the leaf veins. And then if you flip that leaf over and you look at the bottom of the leaf, underneath those blotchy yellow spots on the leaf, you'll see brown lesions. And it may be even more like a brown, hairy pubescent lesion. And that's a really good indicator that you have leaf mold, not magnesium deficiency, okay, magnesium deficiency is going to largely show on the top leaf mold, also the yellow chlorosis on top and the brown pubescence on the bottom.

C Christa Hartsook 15:54

Okay, and is that leaf mold found, you know, on those lower leaves, like we talked about with the deficiencies,

J Joe Hannan 16:02

typically you'll find leaf mold first showing up on the lower leaves, or on the leaves in between directly in between the rows, or any other place where you don't have very good airflow going through your high tunnel, if you're growing, you know, if you're in a really heavily populated,

very dense planting tomatoes or cucumbers or peppers leafmould actually could show up anywhere on the planet. But typically I look for the lower leaves and close to plants next to it.

C Christa Hartsook 16:38

Okay. So this is primarily, you know, a condensed planting Joe and not enough air moving through that tunnel situation.

J Joe Hannan 16:47

Yeah, and it's very common with high tones, and we jam as many plants as we can in there, we get a lot more vegetative growth inside the high tunnel than we do outside, which ultimately restricts how much airflow is going through the high tunnel. And with that air flow restriction, you end up with very high humidity, and you end up with leaf mold.

C Christa Hartsook 17:09

Sure. So I'm assuming we've got some strategies to kind of prevent?

J Joe Hannan 17:15

Well, my, my answer is just don't get it in the first place. Once you have it, you're kind of stuck with it. Yeah, the best, the best mode of action for leaf mold is just don't get it. And that means spacing out your plants, making sure you have enough space between your rows and our space down your rows. For air to move through that tunnel, making sure you're opening up that high tunnel as much as possible, get as much air going through there. If you know you have a history of leaf mold, you can try using resistant cultivars, they should, at the very least they should have less leaf mold than some of our non real non resistant cultivars. And then at the end of the season, clean and sanitize the high tunnel and all planting material out, power wash anything and everything to get it as clean as you can. So you don't have any spores overwintering.

C Christa Hartsook 18:11

Okay. Joe, you know, in that unfortunate incidents where we do have it, we're kind of stuck with it. We're battling out to end this growing season here. What can we do?

J Joe Hannan 18:23

Ah, your options really are pretty limited. Christa, we have some fungicide options for leaf mold that are listed in the Midwest vegetable production guide. I'm not going to bank on them working very well though, they are labeled for it, they might provide some control but whether they're going to be able to fully control it is kind of questionable, because you still have that ongoing problem. Further complicating any treatments that you would do, just taking a sprayer

in there and running just air or water through the canopy will actually spread the spores further so you can actually exacerbate the problem by trying to treat the problem. Sure. So you know if you can go in and do a little bit of pruning and get stuff out of there you know, depending on how much harvest season that you have have left otherwise you may just have to live with it and get as much yield as you can before the plants go downhill too far.

C Christa Hartsook 19:27
Makes sense.

J Joe Hannan 19:28
So I mean, you're the fruits is still going to be fine, which may end up with just a few fewer fruits or you may end up with some smaller fruits as as a problem persist and gets worse. Okay, that one down is really tough to to manage once you have it.

C Christa Hartsook 19:45
Good to know. Joe, we're winding down you know, we've got a couple months left at most in this growing season. Anything else we really need to be on the lookout for or kind of watching out for it.

J Joe Hannan 19:57
You know, those are the main problems that I've been seeing right Now okay, you know, stay on top of your irrigation right now I know we just got some rain here this morning and we have some rain coming up overnight. But keep in mind if those soils are really dry underneath the high tunnel, they're very dry next to the high tunnel, you're there, the soils are going to be pulling the water away from, away from your plants. So really keep an eye on that your plants are getting enough water use those tensiometers or irrometer or digital soil moisture meters to verify that you're getting enough water out there. Couple other issues I look for as keep an eye out for whiteflies I've been seeing a few of those. Again, something like a soap or oil will treat those pretty well. But just be out there scouting for them.

C Christa Hartsook 20:00
Okay.

J Joe Hannan 20:48
Let me see here. A few few calls few complaints about tomato hornworm but I think those have kind of come and gone at this point. The other major one that I've heard a little bit about is the tomato fruit worm. They have been causing people a little bit problems because it's kind of hard to identify where they are inside the high tunnel again, they can be pretty localized. So

that's one of those cases where if you have them if you can't find out where they are, where they are inside the tunnel and you might just be better off just spraying the whole tunnel and just taking care of the issue because they can very quickly destroy a lot product. Yeah, you know, they put a one or two bites out of out of a fruit and that's unmarketable.

C Christa Hartsook 21:33

Right, you're left with nothing.

J Joe Hannan 21:35

Yeah. And a BT Dipel type product is very effective on those.

C Christa Hartsook 21:40

Okay. Joe, thanks for being on today. We sure appreciate it.

J Joe Hannan 21:44

Yeah, always happy to come on Christa. Thanks for having me.

C Christa Hartsook 21:47

All right. Take care.