



Season 1 Episode 13—Ugly Tomatoes: Insects

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Announcer

Welcome to the *Southern Ground* podcast provided by Alabama Extension through Auburn University. Extension educators Shane Harris and Chip East discuss seasonal lawn and garden topics, address common questions, and provide the practical solutions you want to know. Let's dig in to our southern ground.

Shane Harris

Hello everyone, and welcome to *Southern Ground*. I'm Shane Harris with the Alabama Cooperative Extension System. And I'm joining with me is Dr. Chip East. Our fellow horticulturalist and partner in this *Southern Ground* podcast. Hello, guys.

Chip East

Good morning. I'm all excited today Shane because we got Dr. Paulo Cremonoz with us today to talk about, well, ugly tomatoes but insects on tomatoes. Paulo is an entomologist.

Shane Harris

We're continuing our conversation Paulo, about ugly tomatoes in the home garden, in the fields with the farmers. A lot of times you don't see the bugs immediately. Sometimes you do find the bugs on there. But as we talk about these ugly tomatoes and the disappointing results that a gardener may have. We want to talk about, a little bit about what the common insects pest are out there, but also what we can do to try to prevent these

problems, because unfortunately, tomatoes do have lots of issues, as we've discussed on this podcast. And today we want to get more in depth and talk about all the insect problems.

Paulo Cremonez

Good morning. Thank you very much for the invitation. I'm really excited to talk about tomatoes and the insects and mites that might affect it. And, yeah, it's a very interesting topic because, tomatoes are, kind of a central, crop on the vegetables. They can harbor any type of pests, that we find in over, 35 types of crops we grow here in Alabama for specialty crops we grow here in Alabama.

Chip East

Paulo is an entomologist. He works with vegetables and fruit. Paulo, is that the two crops mainly you work with is fruit and vegetable here at Auburn University? And whenever us Extension agents a lot of times have problems, something we don't know. Paulo's my first person to call when I have an insect issue. So, I really appreciate what you do for us so we can better help people out in Alabama, Paulo.

Paulo Cremonez

Yes, sir. Thank you. Yeah, I appreciate all the feedback. Is always good to collaborate with the regional agents.

Shane Harris

This list Chip that we've got here over the years from tomato workshops, working with our local specialists, we've identified about 30 different issues from abiotic to insect pest as well as plant disease and other problems. And so we want to go through, maybe a ten or so insects, not very specific on this or each one, but we've got a huge list here, Chip of all the common insects we can find in on the farm or in the home garden.

Chip East

I don't even know where to start with. If we'd start what you get early in the year or what we would want to do, I don't know, maybe the worst pest problems. If we want to start with that, where do we want to go?

Shane Harris

Well, let's talk about the type of insects out there. Maybe that'll help us because we have what we call sucking top insects, which would include the aphids, and the thrips, and the plant bugs, and the whiteflies, and even the spider mites. And then the most common what people see is the physical damage. That's the ones that has the chewing mouthparts of all the different caterpillars that we have out there that eat the leaves and, potentially even destroy some of the fruit. So, we can we can go that route, guys, if you like. You see the damage of the chewing mouthparts, but you don't necessarily see the damage of the sucking type mouthparts to maybe even up to harvest.

Chip East

Paulo, I grew some tomatoes this year, I grow them every year, we went and planted them for my aunt and uncle in their garden. And the next day we were. This was finished up late one evening planning. We were going

to put the little rings around them to help, be a barrier for the cutworm. And before that, one night was over, before we could do it, the next day we had cutworms Paulo and got on our peppers, but still they get tomatoes as well. And, so what are things we could do for cutworms? What is a cutworm? And what damage do they do?

Paulo Cremonez

So cutworms are mostly soil pest insects. And, there's a particular interesting, characteristic of cut worms is that they are active during the night time. So, it is important to protect the bases of the plants so that they don't, chew on them. So, you can use some strategies, like you can put some barriers around on the plant bases. So the caterpillars will not have access to it. And if you use a spray you can use neem oil or a Bt insecticide like Xentari or DiPel. But it is very important to use it after the sunset because that's when the caterpillars will be more active.

Shane Harris

And you'll see the damage after the next morning. So you're not going to see the caterpillar on the leaf or on the stem. You're going to see the damage. And that's where the pepper or the tomato or the other plants that they like to eat. It's just been cut down.

Chip East

One of my friends years ago, he, asked me about grafting tomatoes Paulo and did I know anything about grafting tomatoes. And I said yes sir and I grafted him a few tomatoes. He was interested in getting some grafted tomatoes, so I did that. He planted them in his garden, and he called me a few days later he says, something's killing your tomatoes. I said, what's what's killing the tomatoes? So go over there and look. And these were big, it's not just a little seedling. It was a bigger plant. The cutworm crawled up the stem and around and back down it, and that's the first time I ever saw that. It actually went up the stem. And believe it or not, why, I don't know. But it was just on those grafted tomatoes. He had other tomatoes out there and it would skip one that come up from a seed, but it would get that one that was grafted. Have no idea why.

Shane Harris

They can sense what's prized and what you want to keep. They always go after the good stuff. They never go after the ugly things.

Paulo Cremonez

That's right. Some varieties of tomato might be more susceptible to cutworms or, some specific pests as well, so that might have been the case. But this is a very interesting behavior. For sure.

Shane Harris

The caterpillars definitely get all the attention because you've got caterpillars eating the leaf and one of those is the hornworms. We see the tobacco and the tomato hornworm here in the Deep South and those caterpillars are extremely large. If left alone, they continue to grow, they get very big. They can be a little bit somewhat aggressive or try to intimidate if you try to pick them off, then you see the frass on the leaves and on the

ground. But most common is you just go out there and there's leaves missing where they have been eaten by these caterpillars.

Chip East

I would almost, I got a question for Paulo. Tell us the difference between a fruitworm and a armyworm.

Paulo Cremonez

So, the fruitworm is a *Helicoverpa zea*. That's the same species that on the corn, we call it corn earworm. That's basically the same insect. It just changes the name. So, that is one very important pest that will absolutely eat all the fruits that you have, the leaves. And it also causes a lot of frass. And it is very important to keep monitoring it even after, very close to, corn plantation, sweet corn or row crop corn, especially after harvest. Those moths will swarm up and try to find the nearest spot, and they will go to the tomatoes and absolutely destroy the fruits. They have some specific morphological characteristics, but the heavy feeding on the fruit is one of the first signs of tomato fruitworm presence.

Shane Harris

Is there a position on the fruit itself? On the tomato? Do they go on the top, the on the side and the bottom? Because I know from talking with specialists over the years, sometimes you can distinct what species of caterpillar it is based on their feeding damage.

Paulo Cremonez

Yeah. That's right. So the earworms, they basically, so the tomato fruitworms, they basically lay single eggs, like large eggs. And usually it's closer to the fruit and on the calyx of the fruit information. So when the caterpillar, implodes, it will be already on that fruiting part, which will have, necessary nutrition to grow up.

Chip East

And also the fruitworm goes inside the fruit to eat as well. And the armyworms can eat a lot of times on the outside of the fruit. They eat the leaves a lot of times, and on the outside of the fruit where the fruitworm goes inside the fruit.

Paulo Cremonez

That is correct. Yes, the armyworms are more leaf feeders. And they have a large diversity. There are different types of armyworms. Most of them are generalists. They would be on the tomatoes. It is important when we control them that we have a good spray coverage on the plants so we can reach out all the plant canopy and also the fruits information.

Shane Harris

Then the hornworms get all the attention, maybe because of their size, or maybe because they cause a lot more damage. Is there a big distinction between, the tobacco hornworm and the tomato hornworm here in Alabama?

Paulo Cremonez

Actually, I'm not entirely sure if there is more, presence of the tomato hornworm or the tobacco hornworm here. I'm. To be honest, I haven't seen much of the hornworms in the field so far. In my experience here in Auburn. I know that they are distinguishable between the morphological characteristics. Tobacco hornworms, they have seven stripes on the on the side. I might be wrong here. The, which, in the other one, the tomato fruitworm has eight or it might be vice versa.

Shane Harris

Everybody knows it because the horn on the end, the rear end of that caterpillar and they can get very large. I know probably up to about I've seen up to three inches. I've seen some up to 4 or 5 inches on other ornamentals. They're quite impressive. They can be a little intimidating, especially if you're trying to pick them off for control them. But they can definitely cause a lot of damage pretty quick overnight and a couple days.

Paulo Cremonez

Yes. So the thing about hornworms, they do have the characteristic horn on the end of their bodies, and they grow up massive. And, for any caterpillar species, their goal of life is just eat the way, their way through, growing to adulthood. So, to guarantee that they will be prolific moths. They need to eat as much as they can. So, the larger the caterpillar you have, the more food they will consume. And that's very bad for the tomato grower because they can be extremely voracious.

Chip East

Sometimes you're looking right at one Paulo as big and ugly as they are. I can't see them, but I see that damage. And I have to keep looking and looking and looking and you know, it's there and you'll finally get it. I've heard, or when I'm out there looking, I hear a clicking sound sometimes and I think, I know that hornworm is there. Is it chewing? Is it making the clicking sound?

Paulo Cremonez

That's right. Yeah. That's chewing. They make a large sound because they make a high sound, a loud sound because they eat a lot. They have their mandibles that will be chewing on the plants, that is absolutely right. It's a little bit complicated because they can grow large, but they are also very, extremely good at camouflaging into that, canopy. They have all those marks that make them more indistinguishable in the middle of all the foliage, which is very interesting. So, some visual cues, like a lot of frass that they produce can be an indication. They can also produce some types of smell depending on the infestation. You can smell it in the air because of all the frass.

Shane Harris

And let's define frass. Frass is the poop. That's the caterpillar droppings that we see on the leaves or on the ground. So, we'll make sure our listeners understand what that is. You're seeing the droppings of that feeding damage first.

Paulo Cremonez

That is correct. Yes.

Shane Harris

The other thing, Chip, is what's interesting is you'll find the damage. They've eaten the leaves and sometimes even the part of the stem all the way up, and they move to another portion of the plant and they really hide. You really have to look up and down or possibly another plant. Is it true that the moth typically only lays one egg per plant, because you typically only find one hornworm per tomato plant or sometimes only one, in a row of tomatoes?

Paulo Cremonez

Yes, that is correct. Yeah. Usually they try to guarantee that they will have sufficient food on that area. So they concentrate these efforts on laying just a few eggs on that.

Chip East

And I'll ask a lot of people ask me that question. So, if I pick it off, am I going to be stung by this horn that's on the end of the thing?

Paulo Cremonez

I don't think so. I don't think that's enough to sting you.

Chip East

Right? They are harmless, but it does look mean.

Shane Harris

They will strike. I've had a I've had a big one on a gardenia of all places, one time and that caterpillar was at least five inches long. It was fully mature. It raised back like a cobra and wanted to strike. And it did try to strike and bite at me. So, the behavior is very intimidating then to reach out there and pick it off and to get rid of it. So, you got to be careful and just understand that they're more menacing than they are harmful.

Chip East

Sometimes people ask about these white egg sacs on the caterpillar. What is that and what do we do about it?

Paulo Cremonez

Well, those egg sacs that you see on the hornworms or parasitoids, they are external parasitoids. So, it's not the usual parasitoids we found on the insects like aphids that grow, and you see the aphid mummies. That's a parasitic growing inside. Those small white egg sacs on top of the caterpillar are flies, that will lay their eggs on top. And then, the small larvae will hatch and start eating that caterpillar, from that part. Which, bottom line,

they are basically natural enemies. They're doing their biological role on controlling those hornworms. So, they are the good guys. So, if you see that, that's a good sign of biological activity in your tomatoes.

Chip East

And I've seen them with just a few, 2 or 3 egg sacs, and I've seen them with a lot more. So if you see that, we just leave that alone. It paralyzes the hornworm. So, it's not eating anymore. And if we were to kill it, we're killing our beneficial insects. So, we want to leave that one alone.

Paulo Cremonez

That's right. Yes, that's a good indication that the natural enemies are present and they're doing their role there. On keeping the tomatoes healthy. So, we might just be careful selecting a good insecticide for control.

Shane Harris

That was the question I was going to ask. So, if you find the caterpillars, we would recommend doing some hand removal, especially if you got 1 or 2. But if you want to do a prevention method, what are some of the latest insecticides that we put out there to prevent this problem as well as control caterpillars?

Paulo Cremonez

In the last season we have been growing some organic tomatoes here in Auburn University campus, and the recommendation was to rotate between, Bt insecticides and Spinosad. So, they kept this by using a rotation of DiPel and Entrust. They seem to be really, really good compared to the tomatoes that we had under no control at all. So, that's a good plan. It's still working really fine, against the caterpillars.

Shane Harris

And that's an organic control. So those are natural products that we can use to control.

Chip East

Those organic insecticides work good when the caterpillars are young, but what if you go out and you see some large caterpillars on your plant?

Paulo Cremonez

Yes, that's correct. It's, those organic insecticides, they act good as the as the larvae are from 1 to 3, larval stage. But you absolutely have to think about some selective insecticides you could use like growth regulators. And you can also include some other options like Carbaryl if you absolutely need to get to the point. The bottom line is always use in a rotation so we don't make the insect develop resistance to a certain insecticide class.

Chip East

Right. Don't use the same insecticide from the same chemical class repeatedly.

Paulo Cremonez

That's correct. Yes.

Shane Harris

As we talk about ugly tomatoes and the insect problems that result in ugly tomatoes near harvest, one of the biggest and most important issues that I have seen in my own personal home garden. As a county agent, I'm struggling to grow tomatoes. They're rotting at the very end toward harvest. Is very disappointed to put all this work and time and effort and see that the plants have these halo, defects and begin to rot on the vine. The last few years, the culprit has been identified as plant bugs or stink bugs. So, let's talk now about these sucking type insects Chip that cause this damage. But you don't see it toward harvest. And then unfortunately, we have an ugly tomato on the vine.

Chip East

Paulo, how early do these, leaf footed plant bugs, how early in that tomatoes cycle does it start feeding on the fruit?

Paulo Cremonez

So the plant bugs, they usually start feeding on the tomatoes when the fruit is already forming. So once the flowers are dropping and the fruit start developing, you might have a problem with the plant bugs. They would directly feed on the commercial, produce. So that's the problematic with them. And they have to feed by injecting saliva. So they pierce the fruit and they injects saliva that will dissolve the liquids and they will drink that liquid, that will be the nutrients they need. However, they left that toxic saliva on that area and when the fruit starts to grow, it will turn on that mushy part. It will turn on that ugly tomato we see at the end.

Shane Harris

Very disappointing, Chip. Very disappointing at the end that what have I done wrong? Why is this occurring? You don't always see the stippling or the damage, but as those tomatoes begin to ripen, you begin to see little halos and I call it dimples. Then tomato just begins to rot internally and externally.

Chip East

You grew that tomato so well Shane, that the insects came and had a party, and you provided the food.

Shane Harris

Is interested to hear that they do this early in the season versus later for the season. Because you think that damage was something that happened the last few days. But the tomato grew and developed with this damage internally the entire time. For several weeks.

Chip East

They come back and feed on it, correct? For weeks.

Paulo Cremonez

Yes, so it is usually we are battling other types of pests when the fruits are on formation, we have the flowering stages that usually is very attractive to thrips. Late on the season we have western flower thrips which is another complication. But over the year period we are controlling thrips so we might not have that many problems with plant bugs. But at the end when we think, okay, now I have a good fruit formation, now I'm going to be fine. Then they will find that window to attack and the tomatoes are maturing, so they will start feeding on it with more voraciously. And the interesting thing about some stinkbugs and leaf footed bugs is that they produce some aggregation pheromones. So once a few plant bugs found the tomato, find the tomatoes. They will release the pheromones and signaling to their peers that. Well, I found some cool food here. So, let's get around and share this banquet. That's the problem with them and that's why we have so much of this aggregation later.

Chip East

We do that Paulo and we find a good restaurant. We tell all our friends about it, and then will complain the lines too long. So if we'd keep that to ourself.

Shane Harris

I don't want these insects in my garden. What can I do as a gardener or a farmer to try to prevent this issue? Because I told Chip even off the air, I never see these plant bugs physically on the fruit. Even when I'm picking a green tomato to make fried green tomatoes, I never see them when I'm picking the ripe tomatoes, I just see the damage and the ugly tomatoes as the result.

Paulo Cremonez

Yes, it is very interesting, this behavior that they have on feeding and leaving and trying to find new plant sources for feeding. Usually when we want to prevent them, we have cultural practices that we can use. Obviously, keeping the area clean is very important, it's a rule of thumb for any type of pest, actually. So, that's very important. You might use some trap crops. I heard that sorghum is a very good source of trap crops for leaf footed bugs. So, if you have that on the side that will take your plant bugs away from the tomatoes. That can be a good, preventative management that you can do in your area. However, using trap crops can be a little bit complicated, because if you don't have a history of that same pest in that area, if you plant a trap crop, you're attracting, insects from outside to your area. So you always have to think, do I have this problem here? Is it recurring? So then you can use some, trap crops for that purpose.

Chip East

Stink bugs are real bad in orchards as well. And I always say we used to use some sunflowers and the sorghum between, well it's beside the tomato field, but it's between the tomatoes and the orchard or the tomatoes in the woods. But if you're in a big open area, maybe it's different and we have put them all around. But I have witnessed, the sorghum just being wrapped up Paulo with leaf footed plant bugs. And you have to hunt to find a leaf footed bug on the tomatoes that are just a few feet away. The trap crops really work. Now, they have to be planted before the tomatoes, and they take up, I'll say 10% of your garden. They take up space in the garden that you're not going to harvest. You're not going to eat anything off of that. But that really cuts down on the damage that we see and pesticide use.

Paulo Cremonez

That's right. Another interesting trap crop that you can use as a secondary cash crop or a consumption crop is okra. Stinkbugs and leaf footed bugs absolutely love okra. And they would prefer going to the okra instead of tomato any time. And you can even, grow. You can even.

Chip East

Harvest and.

Paulo Cremonez

Harvest some okra. Yeah. On the side. So that that would be a win-win situation.

Shane Harris

These sucking, piercing, sucking type insects. We want to try to prevent the problem, prevent the damage of creating these ugly tomatoes. So, there are some insecticides out there especially for these particular insects that would include whiteflies, that would include thrips as well as these plant bugs that we're talking about. So Chip, what are some latest recommendations that we would have for spraying the garden or the farm to prevent these problems?

Chip East

Well, it depends on what we're which one of those pests we're spraying for. We have a spray guide online that we can look up. I'm growing tomatoes and it will list pesticides that we can use for that particular crop. And it will also talk about, when you read the label of whatever product we're using, pre harvest interval is something we need to talk about before you start spraying anything. Read the pre harvest interval. The pre harvest interval is the time that we wait between application and harvest. It's not between application and eating. You may keep it in the fridge or the freezer for a while and then eat. No, it's between application and harvest. If we have to wait one day, then we wait a full 24 hours. And Paulo you tell us a few insecticides. If there's anything else you want to add, trap crops are good, but what else can we do?

Paulo Cremonez

Yes, so that's one interesting thing about piercing, sucking insects is that we have two main groups, the large ones and the small ones. And the small ones, they're usually, very problematic because they are vectors of diseases, which I'm pretty sure my colleague, Dr. Edward Sikora will talk about later. So, for the big pest, what we're talking about that usually makes the ugly tomatoes. But like plant bugs, pyrethrins or pyrethroids are usually, good recommendation. They are usually great on those large, sucking insects. However, it is the opposite when we're talking about the smaller ones. So when we're talking about whiteflies, thrips, or even spider mites, pyrethroids are definitely not a good strategy. They could flare up those populations. So taking in mind what is the problem that we have. Do we have aphids, white flies, thrips on that area that I should avoid using a pyrethroid. Or, if I have plant bugs on that part, especially at the end of the harvest, where whiteflies or thrips will not be a problem anymore, then you have that decision on using pyrethroids. Otherwise, you have to find another strategy. If you have problems with the micro pests.

Chip East

I would say step one is identifying the pest. And then I would recommend calling your local Extension office and telling them. When someone says, I've got stinkbugs on my tomatoes, I can help you. When you just say, I've got bugs in my garden, I need more information.

Paulo Cremonez

That is correct. Yes, that's the first step on any IPM. They don't usually realize they are already, conducting IPM on their area. So any decision making that takes into consideration that they're identifying the pest, their taking accountability of the natural enemies in the area, like you mentioned, the egg sacs on the hornworms. And then the use, cultural control strategies, crop traits, biological control, and use some, directed insecticide. That's IPM, that's the framework of IPM. So that's very important to identify the pest, know what's in the next step before decision making.

Chip East

Being out in that garden and scouting is, we need to see what's there. And then we can come up with a strategy to know what to do.

Shane Harris

I know what to do now, and I've got to go spray my garden. I've got to get work to do. So, as we end this podcast in wrap up guys, I've got some work to do to prevent these ugly tomatoes developing, this summer. Chip and Paulo, thank you again for being here on *Southern Ground* and part of this podcast. We've addressed the insect problems that are commonly in the vegetable garden, specifically on tomatoes. We hope you'll continue to tune in as we'll continue this discussion on trying to prevent ugly tomatoes in the garden and on the farm, so we'll hope you'll continue to listen. For more information on controlling insects or other things that in your home garden or on your farm, be sure to reach out to the Alabama Cooperative Extension System or any land-grant university in your state. But with us it is the www.aces.edu, Alabama Cooperative Extension System through

Auburn University and Alabama A&M. And you can go there to find more information or call your local County Extension office. Chip, Paula, thank you so much for being with us on this, another episode of *Southern Ground*.

Chip East

Dr. Cremonez, thank you so much for coming today and joining us.

Paulo Cremonez

Thank you, Chip and Shane, and I appreciate the opportunity to have talking about the ugly tomatoes.

Shane Harris

Thank you. And stay tuned as we'll continue another discussion on *Southern Ground*.

Announcer

Southern Ground has been a production of Alabama Extension at Auburn University.