Speaker 1:

Welcome to Urban Plant Health Network's Podcast series, The Good, The Bad and the Bug-ly.

Drew Radford:

We often hear of most wanted lists. Did you know, though, there's a most unwanted list as well? Well, sort of, it's actually a list of the top exotic pests, which pose a threat to Australian agricultural and horticultural industries. The number one exotic plant pest on that list is a bacteria called Xylella. It causes disease in a wide range of plants, including ones that we rely on for food and fibre production, such as grapes, olives, citrus, right through to berries and stone fruits.

Drew Radford:

To find out more, we are joined on this Urban Plant Health Network Podcast by Craig Elliott, Program Manager for the National Xylella Preparedness Program. Craig, thanks for your time.

Craig Elliott:

Thanks Drew. It's a real pleasure to be here.

Drew Radford:

Craig, Xylella tops the list of Australia's National Priority Plant Pests. I'm a little bit shocked by that, because I've done a bit of this stuff and I've never ever heard of it. What is Xylella?

Craig Elliott:

You're not alone there, Drew. Xylella is, as you said, it's regarded as a number one plant biosecurity threat in Australia. And *Xylella fastidiosa,* to give its full name, it's a plant bacteria that when it infects a host plant, forms a sticky biofilm or a gum inside the plant's xylem vessels. So, that gum, that biofilm essentially stops the plant drawing up nutrients and then it can cause the fruit to shrivel, can cause leaf to be desiccated, even die-back. And in a lot of cases for lot of the plants affected by it, it actually results in the plant death. It's symptoms, when you see it, look a lot like heat or water stress, but obviously a lot more serious and has a pretty substantial impact on our agricultural sectors.

Drew Radford:

Craig, so it's a bacteria, invisible to the eye?

Craig Elliott:

That's right. And that's one of the problems we have with it. So, we know now that it originated out of Central America, but it only really first came to notice in the late 1800s when some grapevines in California were withering. And no one was really sure what the cause was. And at that stage, it was often called Anaheim disease or California disease, after where it first been seen. And it wasn't until about the 1930s that it was identified as a bacteria. And the disease itself was then renamed as Pierce's disease after a fellow called Newton Pierce, who was the scientist who first described in the 1800s. And it was later on that as research went into the problem itself, was identified that, what the bacteria was like and how it actually behaved. And it was then named *Xylella fastidiosa*. If we sort of roll forward a few years from there, it was still just regard more as a problem for grapes in California, but then it entered South America and it affected the Brazilian citrus industry.

Craig Elliott:

And then the big turning point was in 2013 when it was detected in olives in Italy. Since then it certainly got a lot more attention and a lot more research into it. So we understand how it behaves and what its effects are. Today, we know that there's actually two species of Xylella. There's *Xylella fastidiosa*, the one we just mentioned before. And the second one called *Xylella taiwanensis*, which is only found in Taiwan, hence the name. And we believe it only affects apples and pears, but *Xylella fastidiosa* is the one that we're most concerned about. It's got four different subspecies and certainly over 80 genotypes. It's found throughout North and South America, now found through Mediterranean Europe, in Israel, Iran. And as we said earlier, it's regarded as a number one biosecurity threat to our horticulture and wine sectors. It can also affect our native species. So it's one of those ones, that the impacts just keep on happening. We know that some Australian native species are also susceptible to infection and hence it's reached that number one status.

Drew Radford:

Well, Craig, your list there seems quite long. Is there a number against there in terms of the number of plants that would be affected in Australia, if it got here?

Craig Elliott:

This is one of the challenges we often face with biosecurity in Australia that we see the impacts overseas, but until now the particular disease or insect arrives in Australia, we don't know the full extent of the impact. So we know from overseas surveillance and research that there's almost 600 different plant species at risk that can be host to Xylella and a lot of commercial crops in there. So everything from grapes and olives, through citrus, a lot of the berries, stone fruits, a lot of ornamental plants like oleander and lavender. And the Australian native species, we're still very uncertain about. From overseas where some Australian natives have been found to be infected. We know that some acacias and eucalypts are at risk, and even ones like callistemon.

Craig Elliott:

So what we're expecting that if Xylella does come into Australia, that we'll see the host range really explode in our native species. It's similar to what happened when we had myrtle rust detected a bit over a decade ago now, in Australia, where in the early days the host range was relatively small. And then as the rust sort of spread throughout the Eastern Australia, more and more host species were identified and that list unfortunately became extremely large. Our fear is that this will be the same experience with Xylella if it comes into Australia.

Drew Radford:

Well, Craig, yeah. If it comes into Australia and people like you are working very hard to try and raise awareness and make sure that it doesn't come in. But it's a bacteria, so what carries it around? Is it the wind or has it got a host species that carries it around?

Craig Elliott:

Yeah. What we've seen from overseas is it's usually introduced into a new region through infected plant material. So someone imports a plant from one country that has Xylella, it somehow bypasses a quarantine in that country and enters the country. So in Europe it's been linked to the movement of coffee plants, particularly from Central America and North America. And that's essentially what they believe saw the introduction of it into those areas. Once it's into a region it's vectored or it's moved, moved primarily through insects. And there's a number of different insects that we're concerned about here. Fortunately, the main ones overseas that are known to be transmitting it aren't found in Australia. So it's one of those cases, that one, we're on the lookout for the bacteria and trying to prevent it coming into Australia. But we're also watching for those insect vectors and trying to keep them out as well.

Drew Radford:

Craig, sounds like a bit of a horror show and I don't mean that lightly at all. In regards to, if it gets in, have we got anything that we can use to eradicate it?

Craig Elliott:

And you're right, it is a bit of a horror show. We've seen some examples of what happens in overseas countries when Xylella takes hold and the impact it has on horticulture and other plant species. And unfortunately there is no cure or treatment at the moment. So there's, again, been some really good research done overseas. In the US, there's now some tolerant grape varieties that are now available in the US that aren't as badly as affected. In Italy, there's some research that's found two particular olive cultivars, more tolerant to Xylella and so, they're still able to stay in production. But unfortunately, no real answer there yet.

Craig Elliott:

We are watching some research, particularly in Europe where they're using bacteriophages. So they're the good bacteria that attacks the bad bacteria like Xylella. So by using a bacteriophage, potentially you can inject it into a infected tree and it might be able to clean up the Xylella. But still very early days there in seeing how effective that will be and how well it can actually sustain a tree that's been infected. Like with a lot of biosecurity issues, prevention is the key. The longer we can keep it out of Australia, the better off we are.

Drew Radford:

Well, indeed prevention does sound like the key. So as part of that, what sort of projects and programs are currently preparing us for an incursion of Xylella or awareness to keep it away?

Craig Elliott:

At the national border, the Australian Government has systems in place and does surveillance on incoming plants, and that's obviously an important one, both for people passengers coming in, but also for any sort of plant imports that come in, that they're all being checked. In behind that obviously, we know that there's always a risk that something will be missed or someone will be able to smuggle something in and away we go. So we've been doing a lot of work over the last couple of years, working with the industry groups to prepare them. That ranges from working with growers and groups of growers to basically prepare their properties, so they have good biosecurity in place before they need it. So if something does go wrong, they've got an extra buffer that helps protect them.

Craig Elliott:

But we're also looking at the capability of the governments to respond to something like this. And with some projects that are looking at improving the diagnostics in behind it, so that if we do have a suspect detection that the test can be done very, very quickly and hopefully actually in the field. So there's no delay in getting a result back and that we can then identify what the problem is and get to it as quickly as possible.

Craig Elliott:

We're also looking at what our local insect vectors could be. We know overseas that, particularly in California, the glassy-winged sharpshooter is the major vector, in terms of moving the bacteria around. In other countries, particularly in Italy, it was an insect called the meadow spittlebug, which causes us some concern as it's also found in New Zealand. So we know those ones that we're on the lookout for, but we don't know if Xylella came into the country, whether some of our local insects might actually pick it up and then move it about as well. So we've got a research project going there, just looking at the potential for some of our native insects and some of our introduced insects, that are already here. What sort of role they might take in any sort of outbreak of Xylella in this country.

Craig Elliott:

There's a range of other projects going on. One that we are particularly excited about is looking at what's called hyperspectral image analysis. So it's using special cameras to identify any sort of responses by plants to infection. And it's been deployed overseas in Italy and Spain. And the beauty of it is, that it can actually detect up a Xylella detection before it's actually visible to the human eye. So by getting this sort of image analysis in place, we'll actually have an, again, early detection sort of system to help us out.

Craig Elliott:

So that's very early days here. And obviously the complexity of that is we know it works overseas. It's trying to work out whether it would work here in Australia, in Australian conditions.

Drew Radford:

Craig, some exciting developments there and fingers crossed their sped up as much as possible. Craig, what should gardeners do if they suspect a plant of theirs is showing signs of Xylella?

Craig Elliott:

And this is important. It's the same with any sort of biosecurity pest or disease. And we use that mantra of, "See. Secure. Report." So if you see anything unusual, whether it's an unusual insect or there's some unusual symptoms in your plant, report it to your local biosecurity agency. And there's a national hotline, 1800 084 881, which connects you to your local biosecurity officers. So, if you see something there it's, I think we always prefer people to be cautious and phone up, ask the question. They'll probably ask you a few more details and even if you're able to send in a photo or something like that of what you're seeing. So it's always, if you see an unusual insect, it's worth having a bit of a look and just confirming what it is. And if you've got some plants that have the leaves are showing a bit of die-back, or certainly around the margin of the leaf it's browning off, or it's got some sort of scorch on it, it's certainly worth just getting it checked to be safe rather than sorry.

Drew Radford:

Craig, you have a really big job helping keep Australia free of this, literally number one, pest. Craig Elliott, Program Manager for the National Xylella Preparedness Program. Thanks for joining us on the Urban Plant Health Network Podcast.

Craig Elliott:

Thanks Drew. Thanks for your help.

Speaker 1:

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All information is accurate at the time of release. This podcast was developed for the Urban Plant Health Network.