48. UKGSN Podcast transcript

Mercy Morris (MM):

Welcome to the PlantNetwork Podcast. Today, I'm interviewing some of our partners from the UK Garden Sentinel Network. The UKGSN is a collaborative project using the people and plants represented by PlantNetwork and Botanic Gardens Conservation International to act as a system of early warning beacons for pests and diseases on trees. The identification, training and reporting infrastructure are provided by Observatree. If you'd like to find out more about this project, please have a look on either the PlantNetwork or BGCI websites.

David Slawson (DS):

that are already there, but also that cascade, the experts at Forest Research and elsewhere, to the volunteers and then to the public, I think that's a really worthy ambition of the UK Garden Sentinel Network. Pull that off, it will be a great benefit to everybody.

MM:

Joining us today are Peter Crow, Observatree Project Manager, Matt Parratt, Observatree Scientific Coordinator, and David Slawson, Honorary Visiting Researcher at Imperial College.

I shall start by asking Matt, Tell me about your day job?

Matt Parratt (MP):

So my job title, there's one for you Mercy, straight away, is the Scientific Coordinator for Observatree. I work for Forest Research. My role is to act as a bridge between our volunteer force and the scientific experts of Forest Research. So the entomologists. and the pathologists. Specifically, I plan and deliver all of the training for those volunteers, but also others out with the project as well. That can be a whole range of different media, face to face, quite a lot of the training, but we'll also do

webinars once a month or so, and there are printed resources as well, but the key really for us is our website.

It holds all of our information and a vast library of resources the volunteers can call on and any member of the public who's interested as well. Google Observatree, they'll find our website and all of those resources are there for them too.

MM:

How did you come to work in that role?

MP:

I've had quite a convoluted and broad career, so I started off as a crop analyst. I walked crops of wheat and barley in what was then MAFF, Ministry of Agriculture, Fisheries and Food. Then I started working for Forest Research, working on tree seeds and wound my way through a number of different roles working in ecology. And then latterly, when I moved to Scotland from the research station down south, I started working on some pests and diseases as well. So pine tree lappet moth and *Hylobius*. I started a big chunk of work on ash dieback, looking at getting the trials in to look for tolerant trees back in 2013, that went in the ground. I worked with Arboreta like Westonbirt and Bedgbury as well as Kilmun on the west coast of Scotland. But alongside all of that, I did some teaching for the Field Studies Council, Botanical Society of Britain and Ireland and the Wildlife Trust, teaching tree identification and general plant ID as well.

I was ready for something a bit different. So when this job was advertised back in 2022, I thought I'd have a go and I was lucky enough to get it. And it's great because it combines all of those different skills I've had in previous roles. into this one.

MM:

David, tell me about your, I would have to say, many roles, wouldn't I, and how you got there.

DS:

Okay, well I'm, I'm mostly retired, so that's my sort of main role, but I do keep active with nature, so I've got a few things; a visiting researcher with Imperial College London, where I used to work on the, the OPAL project; but mainly through a small consultancy, uh, kindly funded by DEFRA through Peter and Forest Research, to coordinate tree health system science in the UK. So I spend quite a bit of time on that and then quite a bit of volunteering. I'm a lead volunteer for Scotland and Northern Ireland for the Observatree project, which Matt has mentioned.

And then I do a few other things like look for dolphins occasionally in the Moray Firth, which is close to where I live. And until recently I was a trustee with the National Biodiversity Network.

MM:

How did you end up doing all of these different roles in retirement? What was the short version of your career?

DS:

Okay, well it was a bit interesting listening to Matt actually, because I too started with, with MAFF. I was an advisory plant pathologist with ADAS, looking at wheat, barley, diseases, potatoes, oilseed, rape you name it. But I probably ended up, probably as a result of *Phytophthora ramorum*.

So, there, I used to deal with horticultural crops and commercial crops. And then there was a disease that came into Britain on a horticultural crop and then spread into trees in parks and gardens. and trees into woodlands. So I took the commercial crops into trees, woodlands and nature.

It's very much that journey in that sort of direction and then ended up with working in citizen science because I was really keen that we got some of those messages across to the public so as they could adopt best behaviors, but also they could help the few officials that are looking for tree pests and diseases that surveillance.

So I've taken that, that journey really, which I'm sort of keeping going with. And actually it's mutually beneficial because it keeps my brain active. It keeps me in contact with lots of other people, you know, and then hopefully, you know, they benefit a little bit from the sort of knowledge and sort of connections that I've got. So hopefully it's a win win.

MM:

Now, Peter, tell me about your role and how you got there.

Peter Crow (PC):

I'm the Observatree project manager. I have been for the past eight years. Now, as project manager, the day to day part of the job is managing the project, as it says on the tin, it's bringing together the partnership.

There are a lot of partners within Observatree, both government and non governmental organisations. And it's that multi-partner aspect of the project, I think, that is one of the strengths. of a project and why it is so successful and works so well. As the project manager, I get to liaise with those different organisations and help to coordinate the project, help to move it forward and to oversee the day to day delivery of it and hopefully help to sort of build on the success in the future direction.

MM:

What was your career before you started your current role?

PC:

I've been at Forest Research for a number of years and I've worn several hats over that time. I've done work with remote sensing, environmental science, environmental aspects of forestry and forest practice, the historic environment and how the Forestry Commission and that part of the forest sector manage the environmental, the historic environment assets. So our coastal sites, for example, that they've got on their land, and the

implications and impacts of forest practice on the historic environment.

I spent a number of years researching that, combined with remote sensing LiDAR surveys. So I've worn a few different hats over that time frame an, been involved with several aspects of Forest Research.

MM:

What is it that keeps you fascinated by it?

PC:

As I said, I've been with the organisation for a number of years.

It's an area that I don't have a lot of previous experience in. So it's a new area for me to move into. I have found it very interesting to learn. all that is going on in the world of tree health, the different tree pests and pathogens that are either in the UK or heading our way. And I think in terms of what keeps me fascinated is the fact that it is an ever changing, evolving landscape.

There are more pests and diseases heading in our direction. Many that we know about, there are perhaps others that we are unsighted about. And it's that uncertainty of that early warning system, that detection, that I think is something that keeps me passionate about the subject.

MM:

David, why are you interested in tree health? Why have you been interested in it for some time? What do you think there is about it that distinguishes it from other areas for you?

DS:

I think Peter has said quite a bit really. I think we all actually love trees in Britain. I think it's sort of in our DNA and I think we all want to protect them and do our, do our bit really.

And so I see that as my sort of motivating force really. I've still got some knowledge that can be useful. I love being out and about looking at trees and woods. They always sort of surprise me. So, I think that's my motivation.

MM:

Matt, what about you?

MP:

So Peter mentioned that it's changing rapidly, growing, it's evolving, and yeah, that is interesting.

But it's, for me, it's not tree health per se that holds my interest. It's being able to communicate science and infuse and engage people across a really wide range of backgrounds about the natural world. And that's, that's what gives me the buzz.

MM:

The thing that links you all together is science communication about an area that you're passionate about. Would you say that that's true?

MP:

Definitely.

MM:

So, Peter, I'm going to ask you the horrible question. What is your favourite tree?

PC:

It's got to be the oak. I mean, it might sound like the tree that most people will say, why not? Because it's such a magnificent, majestic tree. built into so much of our heritage.

You know, I mentioned before the historic environment work that I've done and you know, throughout history, that the oak has been so much of that? Well, it's part of our culture, part of our heritage, so I think it's this kind of thing.

MM:

David, now that Peter has stolen the oak, presumably one of you may be panicking, I don't know.

DS:

Well, that is a tricky question, because obviously there's so many. But I think if I had to choose one, it would be the hawthorn. And I think it's a native tree. I think it's sort of embedded in our, in our sort of DNA, both biologically and culturally, as Peter has mentioned. But I think it almost mirrors Britain and its, and its people.

It's small, it's perfectly formed, it's culturally significant, it's incredibly useful, but it's also a bit prickly. I think it sort of sums us up. Its flowers are beautiful. the saying, ne'er cast a clout till May is out, which refers to the May blossom, not the month of May. So I think it ticks all those boxes really for me.

MM:

I have to say that that is my favourite tree as well. Matt, what is yours?

MP:

So I am going to go overseas and I'm also going to go for a conifer because that's my bag really. I will go for *Metasequoia glyptostroboides*. It's a relatively new tree, and I say that in terms of discovery. So it was discovered in 1941 in China, but we previously knew it only from the fossil records. So it's one of the fossil trees, if you like. It was introduced to the UK in 1948, I think, so none of them are older than 76 years. So any that you see are younger than that.

It's deciduous as a conifer, which I like. It's got soft feathery foliage that emerges an amazing acid green in the spring. It stays there all summer and then it turns a beautiful russet orangey red before it all falls off. And that really shocks some people who don't know it's deciduous. And they get quite panicky about it.

But that's one of its features. But it doesn't stop there because the bark of the tree is like liquid wax. It kind of flows down in these channels and runnels and buttresses. So you've got a tree that's stunning right through the year.

MM:

David, what changes have you seen in tree pests and pathogens since you started working?

DS:

I think there's probably been an acceleration of new pests and diseases coming into the country. I think that is a real effect. So that's probably driven by world trade and where we get our plants from, both in volume and diversity. Probably an element of climate change. Bugs that might have died in a traditional winter may be surviving.

More increased summer rainfall might be driving some of the pathogens. But also the one change is that some diseases can come in on one species and then move over to other species. I think that's something that has come in and is quite alarming.

MM:

Do you think they've changed since you started working Matt?

MP:

Everybody's already said that we've seen an increase, and if you look at the graph of discoveries. It just mirrors the hockey stick graph of climate change. It's gradually steepening up and that's probably the biggest thing. I mean, I missed Dutch elm disease just so I don't remember all these grand trees across the southern part of the UK, especially ash dieback.

I think it is almost our Dutch elm disease now and the impact of that is quite staggering.

MM:

Peter, do you think you have seen any dramatic changes in pests and pathogens since you started working?

PC:

I think, as David and Matt have said at the time I've been involved with the project, I think it's the number of different pests and pathogens arriving on our shores that I've noticed that, and obviously, again, the impact of a fashion like that.

You know, this is very obvious across the landscape, starting to see that now very widely.

MM:

Is there anything that's really shocked any of you? in the changes that you've seen?

DS:

I think it's the speed of the spread has sort of shocked me. chalara was first found on a nursery I think, in 2012; first found on a tree outside in 2013 and now if you look at the map, the 10k square map, across Great Britain.

It's almost, it's almost everywhere. So up here in the Highlands, I can go over to the West Coast, which is really, really remote. If I find an ash tree, it's infected. I think that sort of shocks me is the amount of spores that must be blown around in the wind and just depositing on a susceptible host species.

So it really brings home the lesson to me that prevention is better than cure because once something's got in, it's gone. It's very, very difficult to control it.

MM:

Matt, which pest or pathogen do you find most interesting? Which one do you get very excited to find, or are you excited because you haven't yet seen it?

MP:

This was another really difficult question. I had a good think about this. I'm going to pick oriental chestnut gall wasp. I think it's interesting for two reasons. One, it's the only gall that you find on sweet chestnut trees. So if you find a gall on a sweet chestnut, It's very likely that it's oriental chestnut gall wasp, but also only the females have ever been seen.

And that's like, Ooh, why, what's going on there? That's just quite, it's interesting from a biology perspective, I think. And the gall wasps themselves are really attractive. They're a lovely kind of rosy pink, background of green.

MM:

Peter, you were smiling there. Have you got something?

PC:

I think I'm a fan of the Elm zigzag sawfly.

It's what it says on the tin. Why small larvae should create this zigzag feeding pattern, you know, it's a mystery. It makes it such a distinctive pest to identify without doing the surveying work. It's a nice easy one for people to, to look for, to start to monitor tree health and to know how to, to report on these pests.

MM:

David?

DS:

Well, as an old plant pathologist, I'd have to come up with a disease against these two pests that have been suggested. So, so mine would probably be Phytophthoras. I think it's very amusing trying to hear people say the word and even funnier trying to see them spell it. I started my early career, as I mentioned, in ADAS. I spent a lot of time trying to control potato late blight, *Phytophthora infestans,* a huge historic disease with the Irish potato famine in 1845 and the next few years. But then *Phytophthora ramorum,* as I've mentioned. So this is another

Phytophthora species there. It's interesting that it's spread from ornamental plants onto trees, which I think is quite a threat.

But its biology is so interesting. It's even got a motile phase, little zoospores that actually swim. It actually behaves like an animal in some phases of its life. Absolutely fascinating species.

MM:

I have to say that I love a good scale insect, mainly because I love picking them off.

What would you feel is the most urgent issue facing trees in the UK at the moment? And I'm going to start with David.

DS:

I think money is tight for everybody. The number of experts in the country is limited. The number of committed members of the public in the country is limited. I think that that makes the most urgent issue collaboration, synergies, sharing people, you know, sharing volunteers, sharing data and sharing IT systems, really.

I think there's a huge challenge out there. Resources are tight. And I think we need to work more to collaborate across borders and whatever they might be to meet those challenges.

MM:

Peter?

PC:

I would certainly echo everything that David has just said and another part of that is then the knowledge exchange and educating people and raising that awareness so that we can get more and more people to help inform treating pests and pathogens and reporting them to the people that need to know, the relevant authority, so action can be taken to help try and reduce the impacts and stop them from getting in.

MM:

Matt, do you have anything to add?

MP:

Gonna step in a different direction again, because that's what I tend to do. No doubt in my mind, climate change. Because it's going to have two big effects, really. One, that it's going to change our weather patterns. It's going to change our rainfall distribution and timings.

It's going to mean increased extreme weather. All of those things can stress trees, and just like us, trees that are stressed are less able to fend off extreme weather. diseases and pests, so it's going to increase the likelihood they're going to succumb. Secondly, it'll also potentially open up a niche for pests and diseases that arrive in the UK to actually establish and spread the disease.

Whereas at the moment, perhaps, conditions aren't quite right for them. That's why I think it's the most important threat to our trees.

MM:

Do you think that networks like the UK Garden Sentinel Network, IPSN, and the US Sentinel Plant Network can make a difference?

MP:

Yeah, I think they do. I think they are.

MM:

Do you have an example of when this has happened, when they've made a difference?

MP:

Peter and David, I've got first bite at this, so I'm probably going to steal the big example.

And I've already mentioned Oriental chestnut gall wasp. That was, as far as we knew, its only location at that time, but we quickly rolled out training to the volunteers and sent them out looking, and very quickly, within a month, it was found by a volunteer in St. Albans.
Instantly, that changed our understanding of the distribution of the pest, and that's an ongoing process. We're getting records. every week of new locations. And that's what we're all about. It's building up this long term data set. Places like arboreta, Botanic Gardens and other plant collections.

That's got the potential to be even more powerful because you've got a wide range of plants in a relatively small area that are really well observed. That makes them really well placed to act as an early warning system.

MM:

Peter, do you have anything to add? You were nodding vociferously. As Matt confessed, he stole perhaps the obvious example, but we've already mentioned and others.

The Observatree network I'm going to draw upon because The volunteers within that network continue to add information on our understanding of distribution of a whole range of pest and pathogens. As they're spreading across the UK, we're starting to get to see how they're moving into different areas, how quickly, where they're going.

And we're getting those data from groups such as the Observatree volunteers. So all of that information coming in is really in our understanding of the distributions of where.

MM:

David, do you have anything to add? You have a very broad experience. Yeah, I've got a couple of things. I mean, going back a little bit, Asian longhorn beetle is a very good example.

So there was an outbreak in Kent which was found, but it was originally found by an informed member of the public who

actually reported, this looks rather unusual, came to the notice of the authorities and it was our only outbreak of Asian long horned beetle. But the other great thing about that story is that not only was it reported by a member of the public, it was reported earlier and allowed quite a bit of eradication action to be taken and the pest has now been eradicated from the UK.

And there aren't many examples where once something's got in, It's been eradicated successfully. And if I can pick up one thing that's a bit controversial, another great thing about the UK Garden Central Network is that we looked abroad for examples of best practice. And, you know, the USA had their sentinel PlantNetwork and we borrowed the best from them.

I would say we need to do more of that. So in Australia, for example, They're recording, whether it's a non native species, a species of biodiversity interest, or a species of biosecurity interest, is recorded by the public on iNaturalist. The iNaturalist system then links to the Atlas of Living Australia, which manages those data, and then which publishes maps of those data and atlases of those data that the policymakers, the public, or landowners can use to inform their decision making.

In Britain, we're sort of all over the place. The biodiversity community uses local biological recording offices. It uses iNaturalist. It uses iRecord. Invasive species are recorded on INS Mapper, iRecord or PlantAlert. And tree pests and diseases are recorded on TreeAlert if you're in Great Britain or on TreeCheck if you're in Northern Ireland, and then the data go in different directions. If it's the biodiversity data, it goes over to the NBN Trust and its atlases. If it's invasive species, it does end up sometimes on the NBN Atlas, but it ends up on government databases, and then the data for tree pests and diseases ends up in government databases, which usually nobody sees.

I think we should look over the horizon and follow some of the best practice out there in the world, like we've done with the garden sentinel network.

MM:

Peter, what do you find the most frustrating aspect of your role?

PC:

Just picking up on the last topic, I would say time. We are moving in the direction to try and pull some of these data sets together.

We are trying to join up and connect. But it takes time. We can't just suddenly wave a magic wand and have everybody collaborating, coordinating, everything joined up. There's some great work going on by lots of different groups, different organisations, different individual people. But it's going to take time to educate people, to train others, to pull all these datasets together and to have this joined up vision that David has got.

And we certainly share that vision, David, but it's going to just take that time to make it all happen. And that's the bit that I find frustrating.

MM:

Matt, what do you find frustrating?

MP:

I'd like to work with even more people. It's time and resources. I'd happily spend all of my time communicating these things with people, but we've got to focus on our volunteers and getting them really well trained to do the job we're asking them to do.

MM:

David, if you could learn a skill, what would it be?

DS:

I'm probably going to give a very quick hackneyed answer there and say, I can't read music or play a musical instrument, but I look on with envy at anybody who can like, play the piano or, uh, you know, play the guitar or something. So I think that would be a wonderful skill to have.

MM:

Matt, what skill would you like to have?

MP:

I'd like to learn to sleep for eight hours at night, but apart from that, I'd really love to learn to wing suit fly. That, that would be, just find the footage of people doing that absolutely mind blowing. And I love the idea of the flying down across a canopy of trees. Just be something else, I think, to do that under my own steam. And if it ends up in the tree, then it's all gone horribly wrong and I haven't learned the skill very well.

MM:

I don't know where you're going to go from there.

PC:

Well, I'm going to bring it back briefly to, to trees because I would actually, I would try and distill Matt's knowledge of conifer ID in common because I certainly bow to Matt's expertise on that area.

It's great to be able, to identify them the way he does. So that's one I would like to complete. [MP: Blushing here, Peter. But, outside of that, I think I would have to say languages. Foreign languages is not something that naturally comes, easily to me, but I wish it did. Again, it comes back to looking at the tree health, treating pests and pathogens, you know, it's a global issue as well.

And just being able to communicate more with partners, different organisations across the globe, you know, obviously we do, and a lot of that already goes on, but I think just being able to communicate more easily, more readily, I think is something I would value.

MM:

Which arboretum, forest, pinetum or garden is your favourite?

MP:

I doubt if anybody else will say mine. You see, I'm going to go to Kilmun, near Dunoon on the west coast of Scotland. It's really a jewel in the crown of Scottish trees and forestry, I think, because the trees aren't planted as individuals. They're planted in plots of 50 - 100 trees, so you get a real feel for what they're like as a forest rather than just as a specimen.

And nobody knows about it, and you don't even have to pay to go in. It's a fantastic place. If they're visiting Benmore, RBGE's garden, it's just around the corner from there, so you can do a nice little duo for a day trip there, maybe?

MM:

Right, who's next?

PC:

I'm going to go for a historic forest and again just revisiting what I was saying about the heritage work that I was doing earlier and, uh, my, you know, picking for the oak as a favourite tree.

I'm going for Savernake forest. Savernake Forest is an old historic parkland. It's got lots of ancient and veteran trees still across the forest, where it was formerly part of that design landscape. It's now managed as a more of a commercial forest, but a lot of these ancient trees, the veteran trees are still there dotted throughout.

It's got lots of archaeological sites as well. I've done a lot of survey work there, so I'm quite fond of Savernake forest. A lot of good memories there.

MM:

David, anything?

DS:

Well, this was a tricky question for me, because in my sort of plant health days, I've visited most of the beautiful historic gardens across the whole of the UK, and I just think there was,

you know, things like Trengwainton, Caerhays, Lost Gardens of Heligan, Llanhydroc, Knightshayes, Killerton, Leonardslee, Bodnant, Inverew, Brodick, Mount Stewart, you know, there are so many.

But if I had to pick a favourite one now, I think it would probably be the Royal Botanic Garden, Edinburgh. It's not too large. It's full of interest. All the plants are labelled, which is helps somebody like me. It's got a great restaurant. It's in my favourite city.

MM:

So which wild, if any of our country can be called wild, or globally, not limited to the UK, which wild area with trees is your favourite?

DS:

This is a bit of a confession, but I actually find many woods dark and foreboding, you don't get a view when you're in them. So, dense woods are not my favourite. But two woodland types I love are; Peter's mentioned oak, I think oak woodlands in places like the Weald of Kent are a real favourite, you know, where you get the beautiful bluebell displays under them in the spring.

And now I live in the Scottish Highlands. I think the Scots pine woods. are beautiful. It's a beautiful colour on the trees as they go sort of reddy orange higher up up the trunk I think is marvellous. The trees are majestic but they're not too densely packed so light comes through so you can get great views as well and there's a lovely sort of understory of plants under them.

Somewhere like Glen Affric or Glen Feshie would probably be my favourites up here.

MP:

I'm a big fan of the native Scottish pine woods but I'm gonna hop continents again. And probably the one place that's made the biggest impact on me, the Monkey Puzzle Forests in Chile. [MM: Oh, that's not fair.] Sorry, Mercy, but there is no other tree that looks quite so otherworldly and prehistoric. And when you

see them set against the landscape of the volcanoes, it's quite something.

MM:

I'm sorry, Peter. Really, I am sorry.

PC:

I'm not sure I can beat that, but I'm gonna attempt, as this is gonna be a controversial one, I'm gonna attempt to raise you, Matt, some, some tree ferns in New Zealand, possibly. I was down in South Island a few months ago and just wandering through some of the Forests there with the tree ferns above. of one's head, uh, and you know, a few of the kauri trees as well. It's, just a magnificent place. It's like Matt said on the wild theme because it's just so different to what we get here in the UK.

DS:

We used to get them in sometimes and take them to the lab. The number of different exotic species that we used to get on them.

MM:

Did either of you, did any of you manage to find any pests or diseases over the weekend?

MP:

I found some berberis rust. That's not one of our priority pests or diseases. So I had to walk on by pretty quickly.

DS:

We were out recently with the Woodland Trust volunteers in Scotland and found chalera and European ring spot associated virus.

PC:

I've certainly seen reports coming in from Observatree volunteers on oriental chestnut gall wasp, and they're now on zig zag sawfly. In fact, also the European mountain ash ring spot associated virus as well, and we've had cases coming in.

MP:

Several people have mentioned European mountain ash ring spot associated virus. So that's one of the three pests or diseases that we initially asked people to keep an eye out for. So we've got 24, what we call priority pests and diseases that we ask our volunteers to look for. But for the start of this project, we just said, look for three of them. And we tried to pick three that we thought people had a good chance of seeing. that were really easy to identify.

So Peter earlier mentioned the elm zigzag sawfly that does exactly what it says on the tin. It's incredible how it zigzags its way down between the veins of an elm leaf. So that's a really good one.

And then obviously there's the mountain ash ring spot associated virus that David's mentioned, and I'm just trying to remember the third. It was Dendroctonus, I think, was it not? Yeah, so dendroctonus is another one. So spruce is all over the UK, and we think dendroctonus probably is as well, but that produces these lovely symptoms of a resin tube that you can see on the trunks of the spruce tree.

So, have a look at the resources online, get to know those three, and then go out and see if you can find them. We've got a plug in about the Observatree website and its resources, I think, haven't we?

MM:

I think at least one. You can have another one.

MP:

Excellent. I can space them out. As far as I'm concerned, and I'm biased, obviously, the number one place to go and look for

current tree pest and disease information, and that includes their identification. And the hosts don't get up and run away, unless you're in a Tolkien novel. So you've got a good chance of identifying the host before it flies off, unlike some of the beacons, perhaps.

MM:

And you do have a host of the month, don't you?

MP:

So the whole concept of that is picking a host, For a time of year when pests and diseases are going to be most easily or most likely to be seen on that host, so it's really zeroing in on, okay, you know, it's July, we're going to say, go out and look for some pine trees, because you might be able to see some evidence of *Dothistroma* needle blight on those pine trees, for example.

So it's trying to really focus in on the easiest or the best chance of seeing that particular host. pest or disease at that time of year.

MM:

Are you more likely to find them in, the more monoculture type plantings or mixed plantings? Because I was just thinking we have spruce and some mixed plantings in the woodland around here. Are they just as likely to be in there, do you think?

MP:

Yes, absolutely. There's a garden near here called Dawyck, which is part of Edinburgh Botanics, and unfortunately their spruce, which is scattered in amongst their other tree collection there, is pretty much all suffering from *Dendroctonus*, so it pops up everywhere.

It's at Alice Holt, near Farnham, near the research station, so there's some spruce trees there, oriental spruce, that were planted around the outskirts of the old Arboretum, and they were the first ones to start getting it. So being sort of dotted out

alone doesn't mean you'll be immune to these things. The pests have got these amazingly evolved resources that mean they can zero in on their hosts and they will find them.