Steve Peios:

Hello, everybody. Welcome to Detect and Protect, the Australian biosecurity podcast. This podcast series is about sharing information on biosecurity and the difference that this makes to our everyday lives. My name is Steve Peios and I am your host today. The Khapra beetle, it is a pest known to hitchhike on shipping containers, importing items, that come into Australia and it is a massive biosecurity risk. That will be our topic today on the Detect and Protect podcast.

Steve Peios:

Now, the Khapra beetle, if established in Australia, this beetle can quickly spread and feed on stored grains, such as rice and other dry food products. This could have a massive impact on industries that provide goods such as grains, rice and nuts. They are one of the world's worst grain pests and this is why we have strong measures in place to manage the risk that this poses for Australia moving forward. Today, we'll be learning more about this pest, the risk that it poses and how it is being detected and especially by a member of the community here in Canberra, where this podcast is being recorded.

Steve Peios:

For today's episode, we are joined by Dr Gabrielle Vivian-Smith. She is Australia's Chief Plant Protection Officer. And it is my pleasure to welcome her to the podcast today. Thank you very much for joining us, Dr Vivian-Smith.

Gabrielle Vivian-Smith:

Thanks very much, Steve and it's a pleasure also to have the opportunity to talk to you about this pest today.

Steve Peios:

Great to have you with us again, Dr Vivian-Smith. For our listeners to the podcast and also those that subscribe and tune in to our webinar series, Dr Vivian Smith was on one of those recently and she will be a fantastic guest for me today. She's extremely knowledgeable and holds a very important position in our department. First of all, Gabrielle, could you please tell us a little bit about your role as Australia's Chief Plant Protection Officer and specifically the things that you do that are very important?

Gabrielle Vivian-Smith:

Sure. The Chief Plant Protection Officer role in a formal sense is the primary representative of an advisor to the Australian government on matters that relate to plant health. So, improving it, maintaining it, managing it and also working to support the systems underneath our plant, making sure that our plants remain healthy. In essence, I really work to protect Australia's plant-based industries, as well as the natural environment from harmful and exotic plant pests and diseases.

Steve Peios:

I feel like biosecurity has really expanded its focus now in the fact that it's a lot more prominent in everyday people's lives. And I think that can be credited to the work that you've done, which is really good.

Gabrielle Vivian-Smith:

Yeah. In Australia, we're really fortunate. We've got a very strong plant health system and it's highly effective in managing biosecurity risks. And it's really fundamental to ensuring that we've got productive landscapes and competitive plant industries as well as a sustainable environment. And I think Australia's positioned really well. We don't have a lot of pests and diseases that exist overseas and in many other countries. And it gives us a really good reputational advantage as a provider of reliable high quality food that meets the world's growing food demands.

Steve Peios:

I think that's very important as well, especially in this changing environment that we live in, Gabrielle, that we continue to keep that pest-free status and continue to be leaders in the agriculture and primary resources sector, because it's such a big thing these days, primary industries. And we're a leader of that. Let's talk about the Khapra beetle itself and why it is such a big risk for Australia moving forward.

Gabrielle Vivian-Smith:

The Khapra beetle is a tiny little beetle, but it's Australia's number two national priority plant pest. So it's number two on our hit list in terms of exotic pests and diseases, but for the grains industry, it's their number one priority plant pest for grains. And, in essence, it poses a really big risk for them. It's a really serious pest of stored grains and could cause major problems if it was to be found in a grain silo. And it also affects pretty much a whole range of different food products from rice to oil seeds, to dried food stuffs, such as dried fruit and nuts and herbs and spices. So it can affect quite a few different food stuffs, but it would really affect our grain and pulse industries because they're reliant on exports. And if Australia's status changed for Khapra beetle, currently, it's not present in Australia, but if it was to establish in Australia, we would lose a lot of export markets which are very lucrative and provide a massive income for the country and particularly our agricultural industries.

Steve Peios:

Now, without going too much into geopolitics, we're in a tricky time in the world at the moment, but there has been a lot of reporting that there is going to be, potentially, a bigger reliance on Australia when it comes to exports in this near future period. So I'm assuming it's fair to say, Gabrielle, that it's very important that now we continue to keep things like our grain silos pest free and ensure that we can continue to export because it's not purely just from the export market, but it's from doing the best that we can to supply the world as well.

Gabrielle Vivian-Smith:

Yeah. That's exactly right. Food security is really important from a global geopolitical stability perspective. And Australia's a major exporter of food. We produce way more food than we can eat. And trying to make sure that we can continue to produce food like wheat and other grain crops like chickpeas and pulses really effectively and really don't add to the cost and add to the need to use chemical treatments is really important.

Steve Peios:

No, that's great to hear, and I hope that continues and you continue doing that great job that you're doing. With regards to the Khapra beetle, Gabrielle, how can that arrive in Australia? Is it as basic as just through cargo, through airports, seaports and that type of thing, or if you could elaborate on that for us, that'd be very interesting to hear.

Gabrielle Vivian-Smith:

Sure. I'll tell you a little bit about the Khapra beetle because that explains how it can arrive as well and why it's a bit of a tricky one. As I've mentioned, it establishes itself in stored food products. And so it's really dependent on the movement of goods by humans. Human activities is really the main way it will spread to Australia. It can't really get here through natural pathways, like the wind or water. So it's really dependent on human activities. It's a tiny little beetle. It's only one to two millimetres long and generally the adults don't live for very long and they don't feed. But they produce a lot of eggs, tonnes of tiny little eggs and they turn into small larvae. And the larvae are tiny and they're quite cryptic, which means that they like to hide. They hide in little cracks in walls or in floors. They can hide under the floors of sea containers and they can even hide underneath paint, layers of paint.

Gabrielle Vivian-Smith:

And they're very clever from a biological perspective in that they can just hang around without very much food. They can actually live for 12 months about any food. And they can live for maybe up to 10 years by just kind of having a snack every now and then when food becomes available and then going back into a state of sort of dormancy, or what we call in the insect entomology world, a diapause. So they can just hang out there biding their time until food becomes available. And if they're hanging out in sea containers or in other areas where there's not a lot of food, they just keep there at that very low level, very low level of population, just a few of them. Sometimes might be a bit more of higher populations.

Gabrielle Vivian-Smith:

And then when the time and location and temperature are right and they've got food and they've got the right conditions, they'll just start to feed and their populations can be quite explosive. So they're really hard to detect and they can come into the country in those types of food stuffs. They might come in with travellers, with stuff in their bags. People who might bring their favourite herb and spice to Australia, not thinking that much of it, or people who are bringing rice in their personal goods when they're moving from one country to another. Or even in the case, we had a case number of years ago, where there was a wedding dress that came in personal goods to Australia and it had the rice from the wedding sprinkled through it, led to a detection of Khapra beetle. So they can come in in quite sneaky ways like that.

Steve Peios:

They are a pretty unbelievable pest, Gabrielle, when you think about that. I mean, you spoke then a moment ago about going 12 months without food. I mean, I wish I could go 12 hours without food sometimes, but I probably could learn a thing or two from the Khapra beetle. But is it fair to say as well, Gabrielle, I've heard stories as well that you talk about that diapause and that dormancy, but it can be years, can't it? It can be up upwards of three years, five years, they just sit dormant in these containers and then all of a sudden, bang. Okay. It's time to wake up now and as you mentioned with those eggs. So, it must be incredibly difficult when you think about that in terms of managing that, just noting that. You think about where a container's been in three weeks, let alone five years. It's pretty crazy.

Gabrielle Vivian-Smith:

That's right. It does make it difficult. Whilst we used to find them a lot in food stuffs, we're starting to see a different trend emerging. And that's where they've kind of started hanging out and building up in numbers in shipping containers that once upon a time might have contained food stuffs, so a commodity, some sort of grain commodity, or maybe peanuts or something like that. And they've just been able to hang out there even though then subsequent shipments might have been washing machines and refrigerators, and who knows what, until they get to the right spot. The scientists have done work, and they've found that just with a sort of an intermittent little bit of food, one sort of stage can last for up to 10 years. That's the extreme.

Steve Peios:

10 years now.

Gabrielle Vivian-Smith:

That's the extreme.

Steve Peios:

That's unbelievable.

Gabrielle Vivian-Smith:

Under scientific conditions, but, yeah, they are known to be able to last for quite a few years. So a shipping container that might have been contaminated three or four years ago can still pose a risk when it arrives on Australia's doorstep and where the Khapra is sort of lurking in a very cryptic, hidden away, fashion under the floorboards.

Steve Peios:

Absolutely. And I think that also puts paid to some of the important programs that we have, like sea container cleanliness programs and hygiene programs to ensure that the movement of cargo and bulk goods around the world can have these protections in place, because, as you said, it's so difficult when you have not only a dishwasher or something like that, a white good moving around the world. You have grain, you have pests, you have the remnants of that. And that story about the wedding dress is amazing. Like I know in certain cultures and traditions you'll throw, it could even just be a case of it's not from having a meal at a wedding, but could be when you throw things like rice in the air or whatever the case may be, it catches in a wedding dress and then you can inadvertently pick it up and next minute it arrives and we have a story here to talk about on the podcast. So incredible little beetle that it is.

Steve Peios:

Gabrielle, next question I have for you is, what the measures are that we have in place at the moment to keep it out, but also to manage its impact if it did happen to arrive and get itself set up here?

Gabrielle Vivian-Smith:

Right. We've got quite a few different measures. So we've got a very robust biosecurity system in the first place. So there's multiple kind of layers to our biosecurity system that help ensure that we're working offshore. So beyond our border, we are taking a really strong approach at the border to manage any risks, risk-based approach, biosecurity risk-based approach and then post-border as well. So we look at it in that way. So we've been really monitoring our detections of Khapra beetle over the last, well, really quite for quite some time. And that's an important part of our system because it tells us where we need to intervene on those biosecurity pathways and where the interventions, or measures as we often call them, need to be either ratcheted up a few notches or where we are doing a good job and we don't need to make any changes. And in some cases we might even relax them, although that's pretty unusual.

Gabrielle Vivian-Smith:

What we've been doing is we've been reviewing our measures that we've got in place to ensure that we're managing the risk and the risk profile is updated and then making changes where we need them. In response to these increased detections and interceptions at the border that we've had over the last 24 months, we've put in place a series of urgent measures and they began in September 2020. And they've been rolled out in a kind of, I guess, a series of phases over the last year and into the next year. And they include a range of different requirements. One of the requirements is mandatory offshore treatment of containers that have arrived from a country where we know Khapra beetle is present. They're considered to be fairly high risk. So they target these different risk profiles.

Steve Peios:

And that would be all part of an assessment process, I would assume.

Gabrielle Vivian-Smith:

Yeah. Very much.

Steve Peios:

It's kind of a process of doing that research and all the scientists you have and everybody knowing where the key areas are.

Gabrielle Vivian-Smith:

Exactly, Steve. So we have a bunch of scientists doing or scouring the literature and ensuring that we've got the best possible biological and other information. And then we also use data. We try and scour the world for information on Khapra beetle and where it's shown up. And then we use the data that we also gather ourselves from the detections at the border. So that particular measure, where we're really just treating offshore, we're managing that risk before it arrives in Australia, ensures that those containers are now free from Khapra beetle before they actually arrive here in the country which is great. Because the last thing we want is a Khapra beetle container to arrive in Australia with its Khapra beetle in it, or heaven forbid, get filled with a commodity that's a food stuff and just add to the global Khapra beetle problem by sending Khapra beetle plus their foods offshore to another country.

Gabrielle Vivian-Smith:

One of the other areas that we've been working on to collect data to really profile containers is looking at using science. So using EDNA, the genetic code of the Khapra beetle and using what we call EDNA, which is environmental DNA. So we use these vacuum cleaners to suck up the dust inside containers. And then we put that through gene testing, genetic sequencing, to determine whether there's any evidence of Khapra beetle being present in that dust.

Steve Peios:

That's incredible.

Gabrielle Vivian-Smith:

Yeah. It answers the question, has Khapra beetle been living in this container or not.

Steve Peios:

For the last 50 years.

Gabrielle Vivian-Smith:

And we've been finding out interesting things there. And the reason why we can do that is Khapra beetle, they have a lot of different life stages, but they're quite hairy little insects and they're always dropping hairs. The adults often drop their wings and they might drop a leg or two. And then, because they shed their skins when they move from one life stage to another, they leave their skins behind as well. So they're leaving a lot of DNA for us as a signature that they've been there having a little holiday in that container.

Steve Peios:

Of that being behind, that's right. And if there's one thing I could say here and I'd love for you to stress the point as well, but this sort of all feeds into the work, the science and I know the technology and innovation, that areas in our department are doing, for example, to try and pick up things to scan even containers when they arrive on the wharf. But you'd have to agree with me here, Gabrielle, that Australia's always been very front and foremost in looking as primary prevention versus secondary prevention. I mean, we had that concept with what happened with COVID-19 and we've seen that, whilst being very tough on a lot of people in the country, no doubt about that, it's sort of been marked as the gold standard for really trying to minimise death and serious illness on human health. But when it comes to this side of things too, primary prevention is our best way to do that, to mitigate that risk offshore. And I'm sure you agree with that and would love to stress that point.

Gabrielle Vivian-Smith:

Yeah. You're absolutely dead right there, Steve, particularly with Khapra beetle because it's a pretty tricky thing to get rid of once it establishes. The keystone, really, to our strategy with Khapra beetle is prevention. And hence we're throwing a lot of innovation, new technology, at improving our ability to prevent Khapra beetle from entering the country. So we're looking at traceability systems for sea containers. We're looking at how we might improve the treatment of sea containers so that they're more hygienic. We're using cameras and artificial intelligence technology that scans images and using other computer algorithms sort of self-learning to help improve our ability to detect Khapra beetle and to monitor sea containers and be able to identify those that present a higher risk to Australia for pests like Khapra beetle, but also other hitch hiker pests.

Steve Peios:

And I know in my time in the department, Gabrielle, I've seen lots of advances in that. I mean, when I started going back six to seven years ago, the importance of a lot of the programs we ran offshore were hugely important working with NPPO's and working with industry overseas to teach them how important that is for us. But seeing that technology develop has been something that I really enjoyed. And I guess, in a funny way, the pandemic led us to focusing a lot more on things like that in our own backyard here, how we can improve detection as opposed to getting out there and seeing what's overseas.

Steve Peios:

A quick one for you, Gabrielle, this is going down the path now of potential more difficulty, but have there been any detections of the Khapra beetle at Australian borders to this point?

Gabrielle Vivian-Smith:

Yes. Look, we have had detections. We've had a number of detections over the years. They were quite spread out and we would find, there was the wedding dress incident that I mentioned before, there's also been a detection in plastic beads that was a bit perplexing a few years ago and plastic containers a year or so before that. And then we find them from time to time in rice that's being imported and other personal goods, like I mentioned before, this herbs and spices. But some of the more interesting recent detections that we've had have been really helped by the general public. We had one very, I guess, concerning one in 2020 and that was in imported refrigerator packaging. And we also had another one, which was a separate incident that year, in packaging associated with imported highchairs.

Gabrielle Vivian-Smith:

And these detections were all, of course, successfully contained and treated and eradicated, but we're particularly thankful to the local public for their eagle eyes. The important detection in the refrigerator packaging was by a Canberra man who had just taken ownership of a new refrigerator. And his name was Brett Burdett. And he and his wife, Donna, noticed some live beetle larvae while they were unpacking the new refrigerator.

Steve Peios:

Awesome. Awesome.

Gabrielle Vivian-Smith:

And they noticed that beetles were in the packaging and had been shipped with the refrigerator and immediately thought this could be a biosecurity problem for Australia. They took photographs and they contacted us when they realised that they didn't know what these beetles were. And we went right out there and took care of the problem for them.

Steve Peios:

Not an everyday lady bug, is it, Gabrielle, that you see popping out of your items like that in your backyard? It's such an incredible story, this one of how that all began. And I mean, this goes back to what I said a moment ago about people having that awareness of biosecurity in the forefront of their minds now. They know that things like that are odd. They're unique in that circumstance and especially if you can't recognise it. I mean, I know I've seen a lot of great pictures of things like Khapra and things like BMSB, you can see when they infest and they go nuts. It's something that you really need to think about. So it's a great story for Brett. When that was dealt with and in your dealings with the circumstances, how surprised was he in that circumstance? Was it something that really took him aback when he found this sort of thing?

Gabrielle Vivian-Smith:

I didn't talk to him personally, but I think that he was surprised that this tiny little beetle, the size of a grain of rice or possibly smaller, could be something that was so important to Australia and so important to our agricultural industries. And, yeah, I think they were quite impressed that they'd managed to find this little beetle and the response that ensued after that in terms of biosecurity concern and ensuring that that pest didn't establish.

Steve Peios:

Absolutely. He deserves the key to the city, perhaps because he is probably saved the country a lot of money as we've talked about.

Gabrielle Vivian-Smith:

Absolutely.

Steve Peios:

And I know you've mentioned things like the figures that are involved in these type of incursions as well and they are mind boggling. You mentioned there a little bit about what happened when that incident was reported to the department and the response, but could you tell us a little bit more about the overall responses when these type of things happen and how we would look to manage things at the different stages? I know in this case it was found in someone's home, it was reported. We were able to get out there and begin, but I know that is part of the work that my section does in compliance. There's areas where we are involved in the daily meetings and briefings and ensuring that we spoke to as many members of the public that were affected by things like these consignments as well, because I know that there's been other ones where there's not that one. But if you could explain that to us, that'd be great.

Gabrielle Vivian-Smith:

Yeah. Sure. When these incidents kick off, we have a pretty good machine that kicks into gear. And in this case, there was quite a lot of tracking and tracing involved just to isolate and establish just how the Khapra beetle had arrived with the refrigerator and tracking the container that originally the refrigerator was packed in, tracking it back to the store and ensuring that any Khapra beetles that might have escaped in the store were dealt with. So there's quite a lot of tracking and tracing back through the supply chain to the point of entry and managing the risk there.

Gabrielle Vivian-Smith:

We're really fortunate in Australia in that we have also what's called the emergency plant pest response deed. And so that often kicks into gear and it's really good because the Commonwealth has a role. The states and territory agencies are often our response agencies for any post-border incidents. And so we work very closely with them. They ramp up their emergency response arrangements and get their biosecurity officers out there doing tracking and tracing, eradicating, working with the community.

Gabrielle Vivian-Smith:

But under the deed, we also have industry parties. So all the affected industry parties who are signatories to that deed, sit with us and work with us through the technical and scientific details and also are there for the decision making as well. Because we have had quite a few different plant incidents in the past, such as citrus canker eradications, it's quite a tested system. And it really helps formalise the different roles between the layers of government and also the industries who have a stake in the actual incident itself and ensures that we have good arrangements to respond and eradicate any pests. And also we have cost sharing arrangements that are in place. So everyone is able to contribute to the response as well.

Steve Peios:

How important is that collaboration, Gab, between not only the industries, the states and having that Commonwealth legislation behind it, that sort of underpins all of that thing? I mean, is there certain areas that you think need to be stronger than others, or is it just, I mean, because what I see is a hugely collegiate approach from everybody. I know when we had this circumstance take place, everybody was willing to get involved and looked and to be quite frank, the members of the public were fantastic. Most people were really looking to help. So how important is that collegiate approach to ensure that we can get on top of these things as soon as possible?

Gabrielle Vivian-Smith:

Yeah. Look, it's really critical. Our biosecurity system is, as I said, multi-layered and the community are a really big part of that as well. So we really try to make sure that all of our stakeholders are part of the system. And I think Australians, generally, have a strong awareness of biosecurity whenever they come back through their borders, they see it in action.

Steve Peios:

Hearing the message on the plane, Gab, when you're about to get home. It's something that's stuck with me my entire life. You always know that, "Right. I can't take this. I can't take that." I know that, as an Australian, it's very important.

Gabrielle Vivian-Smith:

Yeah. That's right. And I think in terms of the different layers of government and industry working together with the community, I think we know that we're going to have to do it again and again around the corner. So ensuring that we've all got really good relationships and we can work through some of the tougher things, tougher decisions together, and that we are all sharing our information as much as we can so that everyone's informed. They've got the same knowledge base to make the decisions. It requires a fairly high degree of trust and mutual respect, all those sorts of values, but it works really well. And I think we come out of it stronger and better and more ready to tackle the next one around the corner.

Steve Peios:

The next one that comes, that's right. You spoke before about the great work of Brett in Canberra and the efforts that he did. Can you explain to our listeners the best ways that communities can go about reporting potential biosecurity risks like Mr Burdett did in the case that they see or have a feeling that something's not right?

Gabrielle Vivian-Smith:

Yeah. Absolutely. So we really encourage the community out there to keep their eyes open and if they see an unusual insect or pest or a strange looking symptom on a plant, or just any kind of unusual looking organism, really, to take a look at it and report it. You can report. If you search for, Report a Pest, you can find our webpage on the Department of Agriculture, Water, and the Environment website. And there's an online form and you can report it through the online form. But if you want to just pick up the phone, there's a number of toll free hotline numbers as well on the website. There's one which relates to, if you find a bug or a pest in imported goods, containers, or parcels and that's See, Secure, Report.

Gabrielle Vivian-Smith:

There's also the exotic plant pest hotline as well, which is if you see unusual pests and diseases out there in your garden or on your farm and we really encourage people to report it. It's really useful information for us. Often it's a native species or it's nothing to be worried about, but in the case of Mr Burdett and his wife, Donna, it was something to worry about. And we're really thrilled and pleased that we've got members of the public out there really with their eyes on the ground and able to let us know when they see something unusual like that.

Steve Peios:

And willing to do it, right, Gab?

Gabrielle Vivian-Smith:

Oh, yeah. Absolutely.

Steve Peios:

I mean, that's an important thing too, that there's no hesitation to pick up the phone. And I think that's a great example there, if you have a circumstance where, okay, it's turned out to be something that we have here that is now native to the country or endemic or whatever the case may be. It's still better to get that answer and get somebody out to inspect it than say, "Okay. Well, I didn't do anything." Because then we can have a real problem, can't we? If things get away from us too quickly, we're in real trouble.

Gabrielle Vivian-Smith:

Yeah. It's absolutely the case, Steve, if we can prevent things from establishing, that's fantastic. If we can stop them at the border, that's even better. But if they have established or if they're setting up a new population and they're an invasive species or an exotic plant pest or disease, it's much, much more cost effective and much more feasible for us to get onto them really early, rather than wait until they've spread further. And then we've got to spend a huge amount more money, takes more time and there's more uncertainty as to whether we'll actually be successful in eradicating those pests or not. And sometimes the consequences to our primary production industries can be really great and also to our natural environment as well.

Steve Peios:

Yeah. That's very tough. And especially here in a country which prides itself on its big farming background and all the work that we do on the land. That's very important. You made a point a moment ago, again, then about those detections and things at the border, that primary prevention, just making a mention now about industry and importers and a lot of the people that have such a big role to play in goods that come in and out of the country, what can they do to help keep Khapra away?

Gabrielle Vivian-Smith:

So, some of the things that they can do are just to be aware of Khapra beetle, make sure that their staff who are working on their premises along that supply chain, so warehouses, importers premises, are aware of what bugs to look out for particularly Khapra beetle, the size of the Khapra beetle, it's tiny, and ensuring that also that sea containers that are arriving are clean and really just making sure that they're part of a supply chain where everyone's got their eyes out. They've all got a part to play with this. And we find that we are really grateful to those along the supply chain in the warehouses who pick up the phone when they see something unusual and give us a call so we can get out there early and take care of whatever pest or disease it is.

Gabrielle Vivian-Smith:

For those who are dealing with containers, I can't emphasise enough the importance of cleanliness in containers. A quick sweep out might seem good, but we really would like people to take a bit more care and get into those cracks and crevices, in the case of Khapra beetle. We recently created a short video on sea container cleanliness. We've got quite a lot of material on our website, so I'd encourage you all to visit the DAWE website, perhaps maybe search on Google, sea container cleanliness and give the video a watch.

Steve Peios:

Absolutely. And we'll look to get a lot of those links as well in these podcasts, as we've done with previous episodes. It provides lots of background for all of our listeners. Gabrielle, one last question for you today. This one's a little bit more broad for you, but I just wanted to ask what you see as the key priorities yourself personally. As I mentioned, you're in a very prominent role in the department. So when it comes to pests and plant health overall, what do you see is the most important things as we move into sort of 2025 and 2030 moving forward?

Gabrielle Vivian-Smith:

So one of the key areas is just really scanning the horizon, our sort of horizon and making sure that we're keeping track of what's going on out there in the real world, beyond our borders. And just making sure that we're looking at what threats, what pests and diseases, might be emerging overseas, in particular and preparing for those. We have had one recently the fall army worm, which arrived in Australia through natural pathways.

Steve Peios:

The army worm.

Gabrielle Vivian-Smith:

The old fall army worm, which is quite a nasty one really, but does sounds like a bit of fun. But, anyway, it's being prepared for the next pest, support and surveillance. So having industries that support surveillance programs to enable that early detection and effective response. I think that innovation is going to continue to remain really important in plant health. So continuing to be innovative, support scientific researchers, trying new things, testing new technology, to give us that technological advantage is also going to be quite important. And then I think we just need to continue to remember that pest prevention, being prepared, being able to respond to pests and diseases, is a really critical part of our toolkit in plant health.

Steve Peios:

Magnificent, Gabrielle. Thank you so much for all of that. The best part about that is you've really covered off a lot of the key messages and take homes from today. And that is that we need to keep eye open into the future, watch carefully what's happening around us every single day. And I think the work that you guys do in looking offshore and seeing emerging threats as they come through and being able to act on them are very, very important. It's also important for us to make sure that, as a community, we stick together, that we continue to look out for biosecurity risks. And if you're unsure, make that call. And at the same time, anybody who's working in the industries when it comes to importing-exporting and also the movement of cargo around the world, you made a lot of very important points there about sea container cleanliness. And I encourage everybody, please, to look at the DAWE website and see the ways that we can continue to keep things clean. And primary prevention, that is such a key component of it all.

Steve Peios:

So, Gabrielle, I'd like to say a very, very big thank you to you for joining me today. You're always a fantastic guest. And I look forward to seeing you in a podcast again soon, or another webinar or something where we can hear you speak very interestingly about all the wonderful things in your world as the Chief Plant Protection Officer. Thanks so much again, Gabrielle.

Gabrielle Vivian-Smith:

Great. Thanks. Thanks very much, Steve. It was a great opportunity.

Steve Peios:

Absolutely. Great podcast. Once again, thanks very much Gabrielle and a big thank you to all of our listeners for tuning into our podcast today. As we've talked about thoroughly through the podcast today, you can find out more information on Australian biosecurity on the department's website or by visiting biosecurity.gov.au. There's also some information there if you use the forward slash Khapra-urgent-actions. So that's awe.gov.au/Khapra-urgent-actions. And we will look to put all of those links in the episode description as well.

Steve Peios:

Make sure you subscribe to our biosecurity series to get updates on future topics and learn more about Australian biosecurity. We have another podcast that will be coming out once again in a few weeks time with some more interesting information. But for now, please enjoy this podcast over and over again. Gabrielle Vivian-Smith, the Chief Plant Protection Officer talking about our hairy little friend, the Khapra beetle. Thanks very much, everybody. I've been Steve Peios and we will see you once again on Detect and Protect, the Australian biosecurity podcast very soon.